

A Proposed Model for E-government Maturity

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Abstract— Information technology affected on government and they are moving toward E-government. In many developed countries, E-government implementation is in final stages and many developing countries has just started e-government or stand on early stages. This paper will review e-government maturity models in order to compare and synthesize them. For this purpose, 9 e-government maturity models are investigated. So, the main e-government maturity stages are: online presence, interaction, transaction, transformation and digital democracy . After that, according to many references, the main technologies which are used in each stage are summarized.
(Abstract)

Keywords- *E-governmen, E-government technologies; ICT; Maturity model.*

I. INTRODUCTION

Developments in Information Technology (IT) are changing all aspects of society. One of the main aspects of a society is its public services and government. Governments are trying to change their service provision to be more focused on citizens and trade partners directly via the Internet[1].

There are a number of definitions for e-government in the literature. A popular definition which is David McClure's view [2] says: "Electronic government refers to government's use of technology, particularly web-based Internet applications to enhance the access to and delivery of government information and services to citizens, business partners, employees, other agencies and entities".

E-government is a way of making government smarter and smaller, improving delivery of services and giving citizens new tools to interact with government. Therefore citizens can expect better, cheaper, faster and more accessible services [3].

A number of e-government maturity models are reviewed in this paper. This research uses the qualitative meta-synthesis approach to develop an e-government maturity model which is based on existing models.

II. RESEARCH METHODOLOGY

Meta-Synthesis approach is used to produce interpretive translation, ground narratives or theories by integrating and comparing the funding or metaphors of different qualitative studies [4]. This method is used to integrate multiple studies in

order to produce comprehensive and interpretive finding by comparing, interpreting, translating and synthesizing different research frameworks. This method has been used in social sciences and medical area.

This research adopts Noblit and Hare[5] seven-step approach. These seven steps are: getting started, searching and selecting of relevant studies, reading the studies, determining how the studies are related, translating the studies into one another, synthesizing translations and expressing the synthesis. This research follow this approach.

III. PRODUTURE OF RESEARCH

As mentioned before, in this research, meta-synthesis approach is used that followed the seven-step Meta – ethnography of Nobilt and Hare.

- 1- Getting started: The aim of this research is study on e-government maturity stages.
- 2- Select relevant studies: the current literature related to e-government maturity models searched and 9 models were identified.
- 3- Reading the studies: 9 maturity models was reviewed and details of each stage was investigated.
- 4- Determining how the studies are related: In this steps , relationship between different studies are shown. Study of these models showed that developing trends of these models are similar, although they are based on various perspectives. For example, UN model focuses on a web-based public service. Deloitte and Accenture models are based on customer service perspective, Layne and lee's and Hiller and Blanger models are based on a general and integrated perspective.
- 5- Translating the studies into on another: In this step, this research compares different models and finds their corresponding relationships. The stages of models can be translated to each other. For example, the first stage of models, provide public information on line.
- 6- Synthesizing translations: this step, show relationship of different model with a diagram. The complexity, time-taken, and level of integration increase with each succeeding stage.
- 7- Presenting the finding: in this stage, result of research and finding organized into text and diagram.

IV. OVERVIEW OF E-GOVERNMENT MATURITY MODELS

A citizen-oriented strategy can not be achieved by only putting processes on the Internet and launching the websites, although this is the first and essential step. E-government is far more than just websites. E-government is about business transformation and may involve a government reform [6]. To achieve a fully functional e-government which can perform all the interactions and transactions online, the system should evolve gradually while all required facilities are being prepared. This results in a step-wise completion of the system. The stages of development start from publishing the information online to a website with full transactions between different departments of the government.

The stage-model outlines the available services and structural transformations of governments as they progress towards an electronically-enabled government. This progress may imply fundamental changes in the form of government. In this section, 9 e-government maturity models is described which some of them developed by individual researchers and other ones by institutions.

A. Delloite's six-stage model

Delloite group proposed a maturity model for e-government [Error! Bookmark not defined.] which contains 6-stage as follows:

- Information publishing: Each government department sets up its website to provide information about itself.
- "Official" two-way transaction: Users can transact information to individual departments with secure websites.
- Multipurpose portal: A portal allows customer to use a single point of entry to send and receive information.
- Portal personalization: Users can customize the portal with their desired features.
- Clustering of common services: Real transformation of government structure takes shape. All services will be clustered along common lines by government.
- Full interaction and enterprise transformation: The structure of government is changed and technology is integrated across the new structure.

B. UN five-stage model

United Nation (UN) defined [7] a maturity model for e-government with 5 steps as follow:

- Emerging: Basic and static information of government is presented through a few independent official sites.
- Enhanced: Information is updated regularly.
- Interactive: Some services are available. Users can download form, contact officials and make appointment .

- Transactional: Financial transactions are available online and users can pay for services.
- Seamless: All services and functions across administrative and departmental boundaries are integrated.

C. Layne and Lee four-stage model

Layne and Lee [8] proposed a four-stage model for e-government as follows:

- Cataloguing: Includes on-line presentation and ability of downloadable forms.
- Transaction: Putting live database links to on-line interfaces.
- Vertical integration: Online integration between different levels of government.
- Horizontal integration: On line integration between different levels and different functions of government.

D. Accenture five-stage model

Accenture in its report on 2003 [9] considered five stages for e-government development as follows:

- Online presence: Includes publishing government information online, making available a few services like downloading forms. This stage needs lowest amount of technical ability.
- Basic capability: Includes creating a central plan, developing a legislative framework, addressing the security and certification problem, broadening the online presence, and implementing some easy transaction capabilities. Customers can submit their personal information to individual agencies and digital signature is introduced. This stage needs higher level of technical abilities.
- Service availability: A basic portal website should be available. This is the gateway to the e-government system. Some efforts made to integrate services available through different agencies. Some cross – agencies or horizontal cooperation started, and citizen focus is presented.
- Mature delivery: Clear ownership, responsibility and authority, intra-agency relationships and collaboration across different levels of government should be implemented. Stronger services with the ability of adding more value are considered. The issue of customer service is emerging to the system.
- Service transformation: The main vision is to improve customer service by removing any problems the user are facing. The e-government can deliver all the services a government usually provides in online manner.

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- Presence: Information of agency such as mission, addresses, opening hours and some official documents of relevance to the public are available on site.
- Interaction: Some facility such as basic search capabilities, forms to download, link to relevant sites and e-mail address of officials are available.
- Transaction: Focus is to build self service application for public to access online. Typical services such as tax filling and payment, driver’s license renewal are available.
- Transformation: Delivery of government services is redefined by providing a single point of contact to customer.

F. World Bank’s three-stage model

The e-government maturity model was proposed by World Bank [10] with three stages as follow:

- Publish: Useful information to citizen which generate by government are published on web. This information starts with rules and regulation, documents and forms.
- Interact: Start with basic functions like e-mail contact information for government officials or feedback forms that allow users to submit comments on legislative or policy proposals.
- Transact: Users conduct transactions online. A transact website offers a direct link to government services, available at any time.

G. Asia pacific six -stage mode

Asia pacific region defines e-government maturity models according to its experience. Stages of this model are:

- Setting up an e-mail system and internal network: Systems in this stage focus on internal processes. This system typically supports basic administrative functions such as payroll and accounts. In this stage, most government organization use e-mail for internal messages.
- Enabling inter-organizational and public access to information: Business processes that are accomplished by moving paper can now be managed electronically. Governments are enabling inter-organizational and public access to information through the internet.
- Allowing 2-way communication: One or more telephone or fax numbers or email addresses are published on a website to encourage the public to send messages. Website allows visitors to select from categories such as government services, laws and regulations, links to other government departments, and an email section.
- Allowing exchange of value: ICT supports the development of more flexible, convenient ways for citizens to conduct business with the government. In addition, cyber shopping is in operation for the

E. Positioning Figures and Tables:

Gartner model [10] for e-government maturity is contained 4 stages as follows:

procurement of office supplies, cultural products, and recycled goods. There is also computerization of contract data underway, and the use of automation to

simplify procedures. Databases are being set up for the pre-qualification and cost accounting processes, and for storing information on supply firms.

TABLE I. E_ GOVERNMENT MATURITY STAGES IN DIFFERENT MODELS

Stage Model	Stage1	Stage2	Stage3	Stage4	Stage5	Stage6
Delloite	Information publishing	Official two-way transaction	Multipurpose portal	Portal personalization	Clustering of communications	Full integration& Enterprise transformation
UN	emerging	Enhanced	interactive	Transaction	seamless	
Layne & Lee	cataloguing	Transaction	Vertical integration	Horizontal integration		
Accenture	Online presence	Basic capability	Service availability	Mature delivery	Service transformation	
Gartner	Presence	Interaction	Transaction	Transformation		
World bank	Publish	Interact	Transact			
Asia pacific	Setting and e-mail system& inter network	Enabling inter-organizational & public access to information	Allowing 2-way communication	Allowing exchange of value	Digital democracy	Joined- up government
West	Billboard stage	The partial service delivery	The portal with fully executable & integrated service delivery	Interactive democracy with public outreach & accountability		
Hiller & Blanger	Information dissemination	Two-way communication	Service& financial transformation	Vertical & horizontal integration	Political participation	

- Digital democracy: Citizens will have the opportunity to benefit from ICT-enabled voting sites. There are at least two important sets of ICT applications that can support participatory and democratic processes in the region; applications that empower civil society organizations and those that allow citizens to vote.
- Jointed- up government: A web-portal or smart card integrates information and services from various government agencies to help citizens get seamless service without needing to know which government agencies are responsible. In this stage, there is both vertical and horizontal integration of service delivery.

advantage of the interactive and two-way-communications strengths of the Internet.

I. Hiller and Blanger's five-stage model

Hiller and Blanger in 2001 defined a maturity model for e-government[12] with 5 stage as followed:

- Information dissemination/catalogue: Information and data is published on the web sites.
- Two-way communication: The government incorporates email systems as well as information and data-transfer technologies into web sites.
- Service and financial transaction: Public servants is replaced by based self services and the government allows online service and financial transactions. In this stage user can renew licenses, pay fines apply for financial aid and etc.
- Vertical and horizontal integration: Various government services is integrated vertically (intergovernmental integration) and horizontally (intra-governmental integration) by government.
- Political participation: Citizen can involve to political participation and some services such as online voting, online public forums and online opinion surveys are available. Pervious stages are related to web-based public services in the administrative arena, this stage show web-based political activities by citizen.

H. West's four-stage model

Darral West identified a maturity model for e-government [11] which content of 4 steps as follows:

- Billboard stage: Static mechanisms to display information. Reports and publications are posted on web and are accessible by visitor.
- The partial service-delivery stage: citizen can access, sort and search informational data bases. Government websites start to place some services online.
- The portal stage with fully executable and integrated service delivery: "One-stop" government portals with fully executable and integrated online services are available. The entire city, state or nation has one place where all agencies can be accessed and citizen able to find information and services.
- Interactive democracy with public outreach and accountability-enhancing features: Government websites move to a goal of system-wide political transformation. In addition to having integrated and fully executable online services, these kinds of government sites offer options for website personalization and push technology. These features help citizens customize information delivery and take

V. DISCUSSION

In previous Section, 9 e-government maturity models were discussed. Table 1 summarized these models .

By translating different stages to each other, table 2 is concluded. According to table 2 main stages in e-government maturity can be summarized as :

- 1- Online presence: In this step , government starts toward e-government and publish useful information online.
- 2- Interaction: Government go further and citizen can interactive with government by downloading forms, e-mailing to officials.
- 3- Transaction: In this step, typical services such as tax filling and payment, driver’s license renewal are available
- 4- Fully integrated and transformed e-government: In this stage, delivery of government services is redefined by providing a single point of contact to constituents.
- 5- Digital democracy: Some services such as online voting, online public forums and online opinion surveys are available.

TABLE II. CONTRIBUTIONS OF E GOVERNMENT MODELS TO IDENTIFY MAIN STAGES

Stage Model	Online presence	Interaction	Transaction	Vertical integration	Horizontal integration	Full integrated	Digital democracy
Delloite	√		√			√	
UN	√	√	√			√	
Layne & Lee	√		√	√	√	√	
Accenture	√	√	√			√	
Gartner	√	√	√			√	
World bank	√	√	√				
Asia pacific		√	√			√	√
West	√		√			√	√
Hiller & Blanger	√	√	√	√	√		√

VI. TECHNOLOGIES USED IN E GOVERNMENT

Several documents illustrate technologies that use in e-government stages. By using Gartner, Hiller and Blanger and New Zealand document , the main technologies which is used in each stage of e-Government is summarized in figure 1.

According to Figure 1, there are different technologies for each stage. In online presence stage, just basic web technologies is used. But in the final stages, complex technologies is used such as secure communication network, public key infrastructure.

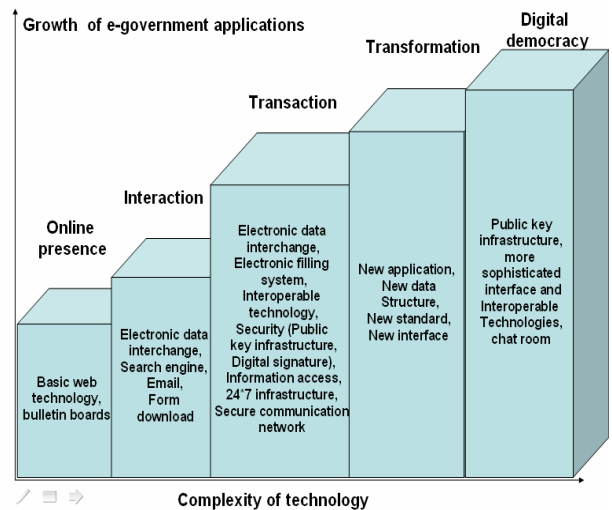


Figure 1. E-Government maturity model & useful technologies in each stages

VII. CONCLUSION

This paper proposed a e-government maturity model with 5 stages as online presence, interaction, transaction, transformation and digital democracy. Qualitative meta-synthesis approach is used to compare different e-government maturity models and synthesis them. The main technologies which is used for each stages are summarized by using meta-synthesis approach too.

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