Comparative Review of e-service Maturity Models: 6I Model

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Abstract
This paper examines what are known as the 'maturity models' or the 'stage-ladder models' which all share stages of growth or maturity with one common point; the implication of the evolution of e-services in series of stages moving upward to embody the notion of a continual process improvement. However, this paper suggests a new model called the six dimension model (6I) that provides a framework for a detailed description of what each stage involves in terms of e-service characterization. It attempts to provide a common/standard characterization of the features of each stage and thereby enhances previous models.

Keywords: maturity model, stage-ladder model, 6I model, e-service, e-government initiative.

1. Introduction

The concept e-government as a tool for developing the administration in the public sector and thus the implementation and provision of e-services, is becoming widespread, and therefore, many researchers, practitioners and academics have tackled the topic of the e-government from different angles. One of the most frequent topics in the literature is what is called the "maturity models" or the "stage-ladders models". These models help us to have control over the various processes that are used to improve and maintain the service delivery. They also enable us to select the plans and processes that would improve e-government quality even though it might take years to achieve. However, the fact that a maturity model is an enumeration of attributes for a sequence of maturity levels would highlight some key facts regarding e-government [1]. Different models have emerged to describe the "evolutionary" stages of which government go through to make it to the ultimate goal where seamless e-services are presented in one-stop-shop.

The well-known maturity models which are considered to be used for benchmarking whether they are those suggested and developed by researchers (e.g. Layne and Lee, Moon), global companies (e.g. Gartner Group, Deloitte and Touche), or international institution (e.g. the UN, the World bank) they all present stages of growth with one common point i.e. the implication of "maturity" that is with the evolution of e-services in the series of stages embodying the notion of continual process improvement. However; these maturity models have their own shortcomings in terms of ignoring some dimensions such as the "political dimension" or the "e-participation". This is clear in Gartner's four stage model, Layne and Lee's four stage model, and the UN five-stage model. Moreover some models have left out "the process of re-engineering the governmental back office" this is clearly shown in the UN's five stage model, Deloitte's six stage model. In addition some maturity models were not concise enough "Hiller and Be’langer, Deloitte and Touche" [2].

Beside all the previously mentioned pitfalls, one can notice an important short coming in all the proposed models; that is the lack of enough description of what is goes into each stage, what does each stage mean? what is the process or how is the e-service characterized? Based on that, we have proposed a 6I model to evaluate the e-services in the government. Each dimension will give clear description and characterization of the e-service. But first we present a discussion of the reviewed literature involving most of the well-known stage models followed by a tabular benchmarking of each of the reviewed models. The table demonstrates that the proposed 6I model not only incorporates e-service features of all
the other models but provides a standardized characterization of each of them.

2. Review of Maturity-Models.

For the purposes of analysis we have classified the ten models reviewed in terms of three categories dependent on their origin or provenance; they are global private companies (GPC), international public institutions (IPI) and research organizations.

2.1 Global Companies.

2.1.1 Gartner’s four-stage model [3]. Gartner is an international consultancy firm which has proposed a four-stage model; it has the following phases

a. *Web presence* –this is the same as *Catalogue* of Layne and Lee.

b. *Interaction*–simple processes can be done online via the available web sites by the customers as *email or do self-service*.

c. *Transaction*– this is a complex process in which whole process is transacted online, but due to security and privacy, this could involve technological organizational structural and legal changes.

d. *Transformation*–personalized, integrated and seamless services are what this stage is after.

2.1.2 Deloitte’s six-stage model [4]. In this model citizens are seen as the main focus of e-government which should facilitate their life and enhance their relationship with government: it involves a six-stage model as follows:

a. *Information publishing / dissemination*– this is the very early stage in which information is displayed and an access to it is provided to the different users.

b. “*Official” two-way transaction*–interaction between governments and users through ICT is provided.

c. *Multi-purpose portals*–various services are presented via a single portal which joins different departments.

d. *Portal personalization*–this is an advanced stage in which customers personalize portals depending on their needs and expectations.

e. *Clustering of common services*– the intermediates is reduced to gain seamless yet integrated services.

f. *Full integration and enterprise transaction*–this is the ultimate goal of the e-government in which what ever kind of service is presented in a personalized way to each user according to his/her aspirations and needs.

2.1.3 Accenture five-stage model [5]. In 2003 Accenture presented a five-stage model for the development of e-government which includes:

a. *Online presence*– it is again the display of information but here with the addition of providing simple services like *downloading forms*.

b. *Basic capability*– a more sophisticated level can be noticed here as a strategic plane is put forward. Customers can now do some secured transactions including issues as digital signature and personal information.

c. *Service availability*– customer centric approach begins to take place in this stage more clearly with the presentation of a central website and the integration of various services from different agencies.

d. *Mature delivery*– the crucial issues of *ownership, authority, intra-agency relationships* and a kind of partnership between different governmental levels must be carried on.

e. *Service transformation*– the ultimate objective of any e-government in which all services are presented online in an efficient, easy way.

2.1.4 A comparison of the Global Companies’ models. These three models which are presented by three leading private companies share certain stages and differ in others. The initial stage of having static or dynamic presence on line is shared by all the three, they also share the interaction and transaction stages. However, the one stop shop is presented in Deloitte’s (2001) and Accenture’s (2003) models but it is not found in Gartner’s (2000). Furthermore, issues of security and personalization are addressed as separate stages in Deloitte and Accenture but are embedded within the third stage i.e. (Transaction) in Gartner’s. Concepts of seamless and integrated e-services are combined as the fourth and the last stage in Gartner’s and Accenture’s, but it is presented as two separate stages of developing in Deloitte’s.

2.2 International Institutions.
2.2.1 UN’s five-stage model. According to the United Nations and American Society for Public Administration [6], the ultimate goal of the e-government is to offer efficient web-based public services. So the key word for this model is the web presence through the different stages. Following is a closer look at each stage:

a. Emerging presence - one or a few web sites presents basic information.

b. Enhanced presence - much more specific, and up to date information is provided.

c. Interactive presence - the interaction is getting more complicated as the government plays the role of the intermediate as a portal between customers and services providers.

d. Transactional presence - a single government web site will enable users to complete transactions of life cycle documents in a secured way.

e. Seamless or fully integrated presence - a one-stop portal is what this stage must offer to let users have access to all the various services in a fast and comfortable way.

2.2.2 World Bank’s three-stage model. Centre for Democracy and Technology [7] presented this model which consists of three stages as follows:

a. Publish - information that is helpful to citizens is displayed on the web.

b. Interact - basic connection through the e-mail between different government organizations can be applied at this stage as well as receiving feedback from users.

c. Transact - a presence of a transact website that will allow customers to conduct any desired service at any time.

2.2.3 Asia Pacific six-stage model. Taking into consideration, their own experience; the Asia Pacific countries presented this model which consists of six stages as follows [8]:

a. Setting up an email system and internal network - the focus of this stage is on internal processes between the different government agencies through a proper medium which is mainly the e-mail.

b. Enabling inter-organizational and public access to information - a step forward where many manual processes will be done online.

c. Allowing 2 way communications - a more active web sites rather than passive ones. Those web sites will enable customers to interact with the government through the published email addresses, telephones or fax numbers. They will also choose from categories as laws and regulations, government services.

d. Allowing exchange of value - different procedures will be put online to achieve a more easy, comfortable and flexible conduction of business with the government.

e. Digital democracy - this stage will enable citizens to have their share in any political process, for example, voting.

f. Jointed - up government - the full integration of services and information which different government agencies are providing to reach the stage of seamless service. In other words there is both vertical and horizontal integration of service delivery.

2.2.4 A comparison of the international institutions’ models. These three international institutions share the initial stage as a basic static web presence. However, while this stage is aimed to public in both the UN and the World Bank, it is only meant as an internal network between the different governmental organizations in the Asia Pacific model. The second stage is characterized by dynamic presence of the information on the web for both the UN and the Asia Pacific models, while it refers to interaction stage in the World Bank model which also takes the transaction stage as its final one. The third stage (interactive) is the same for the UN and the Asia Pacific models. But they differ in the last two stages which are transaction then seamless and integrated services for the UN, while the Asia Pacific takes seamless services as the fourth stage in its model and adds the e-democracy stage which is not found in the others.

2.3 Researchers.

2.3.1 Layne and Lee’s four-stage model. From a different angle where the focus shifted to technical, organizational, and managerial feasibility; a four-stage model was suggested by Layne and Lee [9] as follows:
a. **Catalogue**- simple pieces of information (*basic and static*) will be displayed through web sites. So it is simply like a catalogue where information is shown without any interference of the customers.

b. **Transaction**- here the customers are a little bit involved, they can conduct some online processes.

c. **Vertical integration**- the focus of this stage is to connect systems of the local governments and those of the main government so as to provide the customers with seamless services.

d. **Horizontal integration**- this final stage tends to collapse the barriers between the structured functions within the government.

### 2.3.2 Moon’s five-stage model

Adopting different models, Moon [10] introduced his maturity model which has five stages as follows:

a. **Simple information dissemination (one way communication)**- this stage is the same as catalogue stage of Layne and Lee’s model (2001).

b. **Two way communication (request and response)**- interaction begins at this stage between governments and customers.

c. **Service and financial transactions**- this stage resembles what is known as G2C and G2B, which means that both customers and business can do online services.

d. **Vertical and horizontal integration**- again this stage is adopted from Layne and Lee’s model where different systems are brought together within the same agency or department (vertical) and from different departments (horizontal).

e. **Political participation**- this phase encourages the spread of e-democracy through online voting, for example.

### 2.3.3 West’s four-stage model

Suggested by Darral West [11], this model consists of four stages as follows:

a. **Billboard stage**- the stage is the same as each early stage in the different models, as there is a display of information and an access by users to this basic information.

b. **The partial service-delivery stage**- some online services are being initiated, so citizens can now start to conduct some online processes like finding informational data bases.

c. **The portal stage with fully executable and integrated service delivery**- at this stage all the services will be found and accessed through one place which is known as “one-stop”. This will provide customers with a more convenient way of interaction.

d. **Interactive democracy**- this would be the final stage of any mature model when the websites move towards “political transformation”. Moreover, there would be choices of “personalization” the website and making use of great potentials that the internet offers.

### 2.3.4 Siau and Long Synthesize e-Government stage Model

Siau and Long [2] have synthesized a new maturity model from different models using the meta-synthesize approach which is relatively new in the field of information technology. By combining several maturity models and joining the similarities; a four stage model has been created presenting the following stages:

a. **Interaction**- this step provides customers with their first connection with the government websites through simple technical steps such as: e-mail system, basic search engines and downloading official forms.

b. **Transaction**- complete official procedures can be conducted via the web. All the customers will be able to conduct from A to Z transaction, like license application, tax filling, personal information updates.

c. **Transformation**- this stage presents a crucial step in achieving the goals of the e-government projects as it seeks the change of the operations in which the government presents the services rather than changing just the services. This phase includes both “vertical and horizontal” integration to offer seamless and integrated services. To reach this stage governments should start a total change of the old-fashion existing processes which will lead to a more effective and free-intermediates performance.

d. **E-democracy**- this stage is the ultimate one, when a government provides its citizens with the chance to have their say in the political issues by voting or participating in surveys; then the concept “transparency” at all levels could be easily reached. On the other hand this would change the way in which the people look at or deal with the government.
2.3.5 A comparison of the researchers’ models.
These researchers presented their models in four or five stages. All of them share the first stage which is the web-presence which ranges from static to dynamic. While Layne and Lee (2001) have both the interaction and transaction as one stage; Moon (2005) presents them as separate stages. On the other hand, West (2004) refers to this stage as simply interaction while Siau and Long (2005) refer to it as transaction. All the models, except for Layne and Lee who refer only to seamless, have the seamless and integrated services as their third stage. The final stage also has a distinctive difference between Layne and Lee and the other three models (Moon, West, and Siau and Long), since Layne and Lee refer to the services integration as the final stage while the others develop a more complicated stage to include the e-political or e-democratic stage.

4. A comparison Review of all the models.
The comparison of all the models that were presented reveals the similar stages they have and it also highlights some differences between them. The first three stages (online presence, interaction, transaction) are found in all the models with the exception of the Asia Pacific model which does not have the online presence and also the deletion of the interaction stage in West and Layne and Lees. Further more all of them refer to integration stage except the World Bank. However, only four models refer to the political participation, those models are Moon, West, Asia Pacific and Siau and Long.

5. The 6I model to evaluate the e-services in the government.
Each stage model is unique in its evaluation of the e-services within the e-government initiatives. The use of the meta-synthesized approach, which is mainly comparative allow us to gain an understanding of each model and establish its relationship to the other models. This helps in producing a new framework called the 6I model that reveals the characteristics of each stage.
1. **Inform**: This dimension indicates that there is a content that tells or informs the user with some pieces of information, about the department, which is usually formal, limited and static, like the hours of operation, address, some regulations and the organization's function. Later on the information will be dynamic instead of static, specialized and regularly updated, that is the content will be changed every now and then to present new information that is totally dedicated to the organization's activities, and what e-services it presents, this refreshment in terms of updating the information makes the site more vivid and that will encourage the user to visit the website once again.
2. **Interact**: Here there is simple group ware or ICT features functionalities which allow two way transaction or communication between the government and the users in which the interaction flows. That could be within two levels, either full interaction in which there is a request on the user's side and a response from the e-service provider via email or half interaction when there is an inquiry or a request from the user without a response from the governmental. Also this dimension points out to the possibility of downloading information or forms as well as having linkage to other relevant sites.
3. **Intercommunicate**: A full or complete transaction online is carried out, which means you can conduct a whole process of procedures from A to Z online. This may range from filling the form electronically to updating birth and death records to paying taxes and fees, to submitting bids for procurement contracts to getting certificate.
4. **Individualize**: This dimension was overlooked in most the stage-models, although it is of great importance. With individualization the user will be allowed to be identified to the department they are dealing with or allows the user to manage the e-service by activating the PIN or changing an account details and/or the e-services can be personalized to meet the users' needs in a certain context.
5. **Integrate**: This refers to the combination of different services from separate departments; this may range from clustering of common services to become one unified service to a seamless service "the one stop shop". This will need aligned systems and some level of intra-departmental collaboration.
6. **Involve**: This is the ultimate dimension where citizens are given the opportunity to participate in the design and transformation of services via survey, interviews, e-voting, opinion poll and focus groups. An implication of the promotion of e-participation from a political point of view if found within this dimension as the transform will include the governmental practices along with the services.
Figure "1" presents the 6I model in a pyramid shape where the characteristics of the e-services have been briefly outlined.

5. Conclusion.

The evaluation of the e-services according to the stage models does not give enough description of the characteristics of the e-services in each stage. The new 6I model that it used to evaluate the e-services in the government gives a more comprehensive idea of what the e-service looks like according to each dimension. In this new model the e-services could be characterized from the primary inform dimension to the ultimate involve dimension or in any one of the dimensions in between.

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Table 1: A comparison of 6I & other stage models
6. References


