A Characteristics Study of Existing Models for the Effective Development and Promotion of E-Governance

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Abstract: The research in e-governance shows, that a large number of models and frameworks have been proposed for the effective development and promotion of e-governance. In this research paper we will study all existing models and frameworks with their merits and demerits and we will also study about the problem that we face in these models.

Keywords: QoS, ICT, ISD, E-advocacy, E-governance

I.   Introduction

(a) WIMMER MODEL
Wimmer M.A., (2002) has proposed a Holistic Reference Framework for e-Government. A three-dimensional model with the following coordinate axes has been postulated:

1. Progress of a Public Service
2. Abstraction Layers
3. Different Views

The Holistic Reference Framework for e-Government, as postulated by Wimmer M.A., defines eight different views and each of them represents a specific frame to integrate the different stakeholders into the e-Government project. The framework serves good to observe all the different aspects of different stakeholder groups together with their specific needs as well as their specific know how. The x-axis (Progress of a Public Service) shows the progress of a public service from the status of information gathering via the contact, contract negotiations phase to the service delivery, payment and aftercare.

The y-axis depicts the abstraction layers. The abstraction layers lead from strategic framework level to level of information technology. It covers the complete general process of breaking down of a public service via few intermediate steps. The z-axis shows the different views. Eight different issues for e-Government are defined which are as follows:

- Cultural, societal and political view
- Legal view
- Process view
- Organizational view
- User view
- Knowledge view
- Security and privacy view
- Technical view

The detailed project goals are then assigned to its eight views in wimmer model. This is definitely possible only when at least one stakeholder is assigned to each view of the framework.   FinanzOnline which is an online e-tax application has been developed by the Austrian Federal Ministry of Finance in accordance with this Holistic Reference Framework. FinanzOnline has achieved tremendous acceptance by all its users.

(b) E-INCLUSION MODEL:
Wang H. and Wang J.F. [1,2] gave the E-Inclusion model as illustrated in figure 1. It involves E-governments, E-Businesses and E-commerce to realize the Global Village Governance over a Grid. They further opine that using the SOA would be as an economic dynamo to transform the various legacy business processes to the more matured and unbundled services. Also,

the SOA is being matured as a good strategy that represents all the functionalities by realizing and adopting the future as well as the new changing requirements in the form of added-value E-Services.
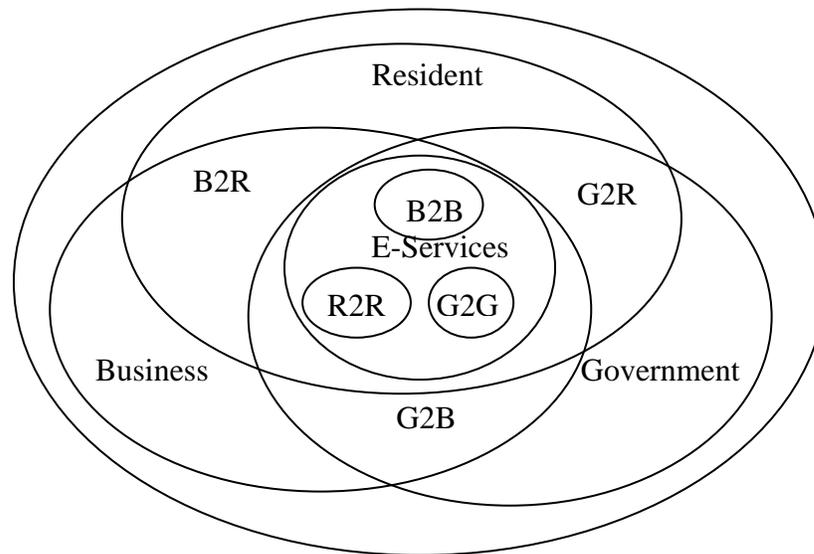
Figure 1 Venn diagram: The Next Generation Governance Frameworks

(c) MAIS FRAMEWORK:

Multi-channel adaptive information systems facilitate the creation of applications and the provision of e-services to users through several heterogeneous channels by monitoring the different features of the system resources and the different users. In the MAIS framework, the information to handle is organized at different levels:

1. Functional Level- It describes e-services and the available contents in terms of the properties and their temporal evolution. E-services have to be extended in order to allow multi-channel adaptive information systems to select and execute e-services in an adaptive way both with respect to the needs of the user and the network status. The monitoring system in MAIS takes into consideration the quality of service parameters related to:

- User satisfaction in terms of response time and results obtained.
- The e-service execution efficiency in terms of performance of the channel.

Based on the observations made by the monitoring system possible variations in e-service such as new task sequences, new data exchanges and new agents follow. In particular, it is essential to define a model that is suitable to store the possible e-service variations.

2. Architectural Level- It describes the devices used to access the e-services. In order to implement the applications and then e-services, that are able to adapt their behavior to the specific characteristics of the interaction device, it is essential to define models. In these models the system resources (interaction devices, e-services, computation resources, and communication system components) are all modeled by the means of meta-objects. The meta-objects represent the relevant characteristics in terms of QoS.

To observe and to control system structure and behavior at the application level it is possible to provide e-services

This information must be made available to help facilitate observation and control of both system structure and behavior at the application level. This will enable e-services to adapt themselves to the different characteristics and different constraints of the technological platforms.

3. Context Level- It describes the requirements and profiles of users accessing the e-services. To facilitate adaptation and customization of e-service, user requirements and profiles provide information which is useful to characterize the context constraints.

The MAIS Reference Model (composed of the following sub-models) represents information involved at the different levels in multi-channel adaptive information systems:

Quality of service (QoS) aspects is taken into consideration in each considered model in order to evaluate the degree with which e-services meet the quality requirements of the user. QoS is a fundamental element on which the selection and negotiation of any e-service are based.

The two modeling perspectives related to the provisioning and the request of e-services and the MAIS reference model has been defined in UML to facilitate descriptions in terms that are either user independent or device independent or both -of the functional, architectural and contextual information that is required for multi-channel delivery and e-service customization.

(d) THE BROADCASTING MODEL:

The broadcasting model works for dissemination/ broadcasting of useful governance information through the use of ICT and convergent media to the citizens. In the broadcasting model the central concept which is used is that a more informed citizenry better judges the existing government mechanisms and develops an accurate opinion about the government. The benefit of the broadcasting model is that the citizens are more empowered to exercise their rights as they are well informed.

(e) THE CRITICAL FLOW MODEL:

In this model information of critical value is disseminated to a specific audience or into the wider public domain through the use of ICT as well as convergent media. The audience may include the media, opposition parties etc.

The Critical Flow model requires a thorough focus as well as a clear understanding of the "use value" of a particular information set, different and better ways to obtain the critical information, the manner in which information could be used strategically, and finally disseminating that information to the concerned users to whom the availability of such information must be made. In this model critical information hosted in a digital network is instantly made available to the concerned and authorized strategic user group no matter where they are located.

(f) COMPARATIVE ANALYSIS MODEL:

In this model cases of poor governance are matched against cases of good governance. The different aspects of poor governance and its impact on the citizens are analyzed. The model uses ICT to explore information which is available in the public or private domain and compares it with the known information sets. The outcome is the strategic leanings and the strategic arguments. The model continuously assimilates the Best Practices in the areas of e-governance. It then tries to use those best practices as benchmark to evaluate other possible governance practices. The results thus obtained are then used to advocate positive changes and also to make favorable the opinion of the public on these governance practices.
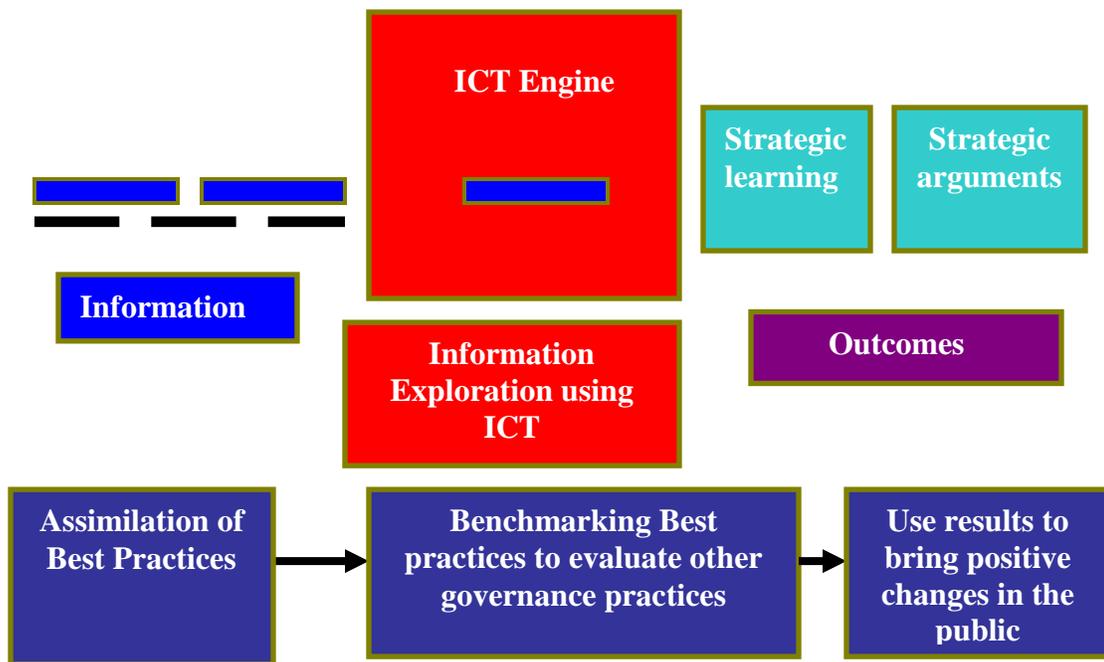
Figure 2 Comparative Analysis Model

(g) E-ADVOCACY / MOBILIZATION AND LOBBYING MODEL:

E-Advocacy / Mobilization and Lobbying Model is one of the most frequently used Digital Governance model. It has often helped the global civil society to make a great impact on global decision-making processes. The setting-up a planned and a directed flow of information, in order to, develop strong virtual allies to complement actions in the real world forms the basis of this model. The model accumulates diverse ideas, expertise and resources through a virtual network, and is thus able to, mobilize and leverage useful information, as well as, plenty human resources overcoming geographical, institutional and bureaucratic barriers and then use it for concerted action.

(h) INTERACTIV E-SERVICE MODEL:

Interactive-Service model is a consolidation of the electronic governance models presented earlier. The Interactive-Service model facilitates the direct participation of citizens in the governance processes. Fundamentally Interactive-Service model is used to involve every citizen in a digital network and enable an interactive flow of information between the citizens and the government.

In this model the various services offered by the Government become directly available to its citizens in an interactive manner. The huge ICT potential in transforming governance to digital governance has been fully leveraged in the Interactive-Service model.

The model provides an interactive Government to Consumer to Government (G2C2G) channel for different aspects of governance. Some examples include- election of government officials (e-ballots), opinion polls on various issues, the online solving of specific grievances of citizens, sharing of concerns and views as well as providing and sharing expertise knowledge etc.

(i) ISD MODEL

The model incorporates the organizational as well as the stakeholder (and especially the customer) interests.

1. Integrated

Integrated is simply defined as 'the connection of a number of government functions into a satisfactory and working whole'.

2. Service

Service component of ISD is defined as "a set of activities and exchanges that are able to meet the expressed need of persons or groups in other words customer".

3. Delivery

Delivery is defined as "the mechanism by which a particular service is provided to a specific customer in order to meet a specific user need". Four basic barriers to ISD were identified in Canada [3]. The barriers are as follows: political and legal, structural, operation/managerial and cultural.

IX (a) BARRIERS

1. Legal-Changing the legislation to support the development of ISD requires a strong political will which is almost always lacking.

2. Structural- For some services there is generally more than one delivery agency- federal, state and local government. Sometime a private sector (or charitable) organization [4] may be involved. It clearly indicates that there can be no simple and single directive to easily transform the service delivery in government.

3. Operational and managerial- Kernaghan[3] observes the following:

1. How should we describe the interfaces between one organization and another?

2. How is each of the players involved in the integrated service which is to be represented?

3. How will the players contribute their resources (time, money, and people)?

4. How to measure (the impact of a number of functions or the impact of their combination or both) what is being done?

4. Cultural- Kernaghan [3] points out two challenges which are as follows:

1. It is difficult for managers to share the objectives and the measurements in situations when they have only limited control or influence.

2. It is difficult for managers to see outside the boundaries of their specific area.

IX (b) ENABLERS

1. Political Intent- A clear political intent facilitates governments to learn more about the underlying citizens' requirements and the challenges that need to be met.

2. Financial incentives- Both the government revenues and the demands for services are increasing day by day.

3. Citizens' use of technology- The impact of citizens' use of technology is that government in almost all countries are focusing on e-government and using several e-government models as ways to meet the burgeoning customer demands for efficient government services.
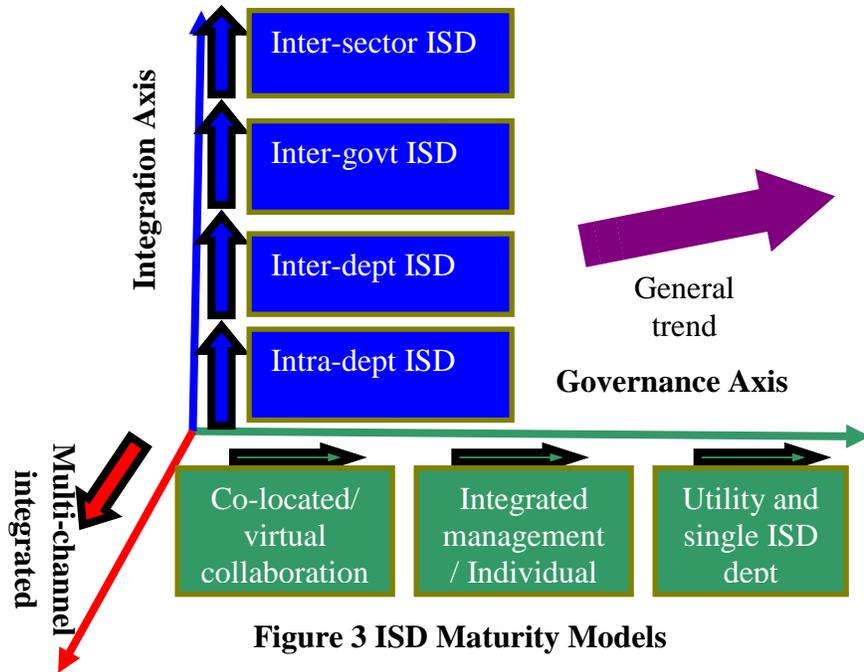
Figure 3 ISD Maturity Models

II. COMPONENT PROCESS MODEL OF E-GOVERNANCE:

If frameworks for the E-Governance services are available, then it would be a good idea to develop reusable software components from the existing frameworks. Since frameworks are always designed after making a proper domain analysis, it would thus, be very easy to sort out common services illustrated from these frameworks and make software components for those services. Components developed from existing frameworks will simplify the task of developing component for E-governance based solutions.

COMPONENT DEVELOPMENT FOR COMPONENT BASED E-GOVERNANCE SYSTEMS

In the majority of the E-governance services provided by the states, the basic functionality is the same, but some business rules may be different for the different states.

Software components should be developed in such a manner that they can be used in all states E-Governance solutions. One possibility is to add all the possible business rules (of different state governments) within the component's internal logic. But in practical terms this would be inefficient as the size of the component would become extremely large.

The other possibility is to use lightweight components that express the internal logic of a particular E-governance service in a base class. A common generator function will be then used that will generate the component according to the variations or modifications required by the specific state's E-governance application. Stated in other terms, the idea is to develop a component in semi-code form (the component will have attributes and functionalities, some of them possibly in abstract form, common to all the applications) and store it in a repository for further customization according to the need.

A component may have different variations in functionality for the different states' applications. In another part of the repository, all the possible variations in functionality (for different state governments) of a component will be stored. The basic idea is that:

1. An E-Governance service component should be designed with attributes and functionalities that will always be essential in any deployment.

2. It should have scope for the addition of, or modification in, other functionalities as per the requirements of the specific application for the different state governments.

Due to the constant changes in technology and business rules, the majority of the legacy E-governance systems generally require extensive patches and modifications. In the majority of cases, the original developers are not available and the development methods used in legacy E-governance systems may also become outdated. It will become too difficult to maintain such outdated systems. In spite of this, it is not possible to ignore the importance of legacy E-governance systems.
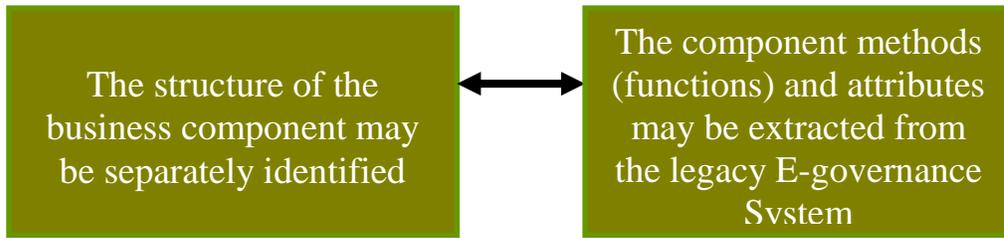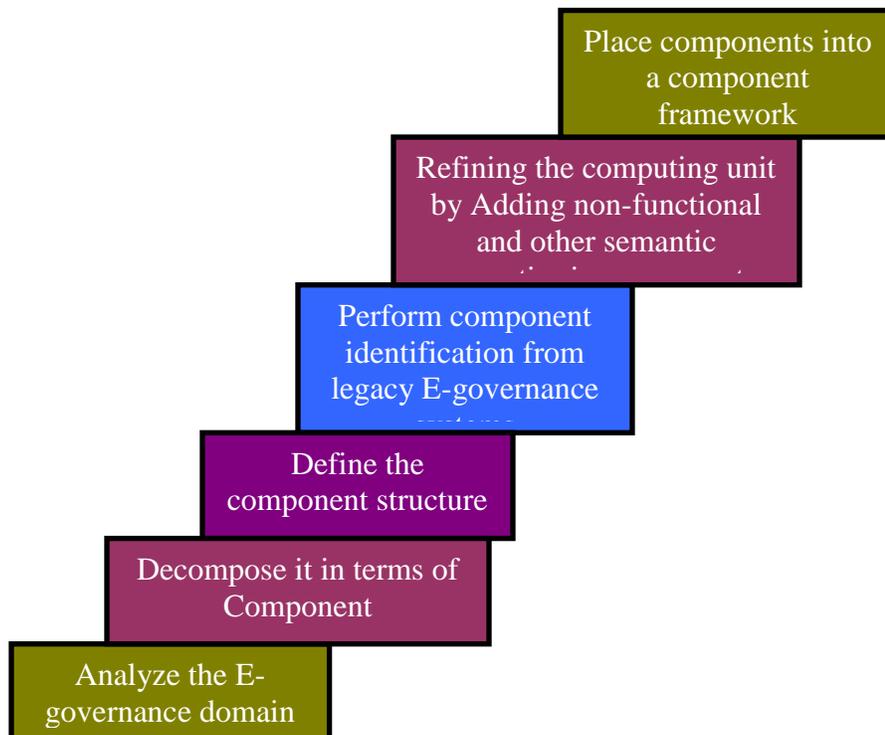
Figure 4. Component Development in E-governance: The Two-Way

Legacy E-Governance application systems, particularly some of their functions, are too valuable to be discarded and also too expensive to reproduce. Software Reverse Engineering, attempts to understand the existing software by reverse engineering and redesigning and scaling it up into new software as per the newer demands.

The following are the activities necessary according to this process model[5].

1. Analyze the E-governance domain.
2. Decompose it in terms of component.
3. Define the component structure-A component should be specified such that it covers all the necessary information in order to assist a developer in integrating proper components into their systems. The interface as well as semantic specification parts can be designed at an earlier stage and the implementation part of the component can be brought from the legacy systems.
4. Perform component identification from legacy E-governance systems-The component identification exercise firstly requires the software developer to gain an understanding of the legacy E-Governance system.
5. Refining the computing unit-The component unit can be refined by adding the non-functional and other semantic properties in components. The next step after refining the computing unit is to place them into a component framework.

Figure 5. Component Development Process Model

Component based E-governance systems are going to be easily modifiable. The reason is that it is possible to change components with the newer versions. Such systems are also going to be easily maintainable as a component can even be added, deleted and replaced in a system at run time. Component based E-governance systems would be more modular, so it is quite easy to test the software.

To understand the ecology of E- Governance it would be necessary to identify the components and to elaborate upon how these components interact with each other in order to deliver the output in to society.

III. A CONCEPTUAL FRAMEWORK OF OPERATIONAL E- GOVERNANCE:

The framework is based on three basic premises. These are:
1. The present bureaucratic structure has lacked to leverage the potential of e-Governance, because of the certain risks and challenges still unsolved.
2. E-Governance can transform present conventional system of bureaucracy into Neo-Bureaucratic system with the help of its interventional strategies. These strategies require a careful analysis of interplay of its various components before planning and designing the strategies.
3. The significance of e-Governance lies in creating a global society, with the capacity to absorb divergent value patterns having thrust on humane element.

(a) COMPONENTS OF E-GOVERNANCE
The following components can be identified:
• Technological Component with Electronic dimension.
• Social Component with Egalitarian dimension.
• Cultural Component with Ethical dimension.
• Political Component with Enactment dimension.
• Psychological Component with Extensional dimension.
• Service Component with Empowerment dimension

1. Technological Component
This relates to educate people who are in the bureaucratic structure or outside its periphery regarding use of electronic means to develop better connectivity with and within the system. It requires the use of computers in the following:
 (a) In developing the data-base.
 (b) In networking to facilitate the communication.
 (c) In creating e-knowledge workers to increase their potentiality.

2. Social Component
The fundamental duty of any government is to develop a society that abides the principles of equality and justice. For a society that has no distinction between haves and haves-not, it is essential that everyone is aware of their rights & duties on the one hand, and know about the governmental policies made for them on related issues.

3. Cultural Component
Reorienting some of the value patterns conducive for e- governance to cannot be denied. The requirement to build an ethical framework is emphasized.

4. Political Component
The political system is the essential aspect and cornerstone of governance. The political component rationalizes various operative frameworks by enacting laws. In this model it refers to the importance of "e" of enactment of laws to stop any society from disintegration.

5. Psychological Component
The development of right type of attitudes in the people is prerequisite for achieving success in any task and more so when the task is of governance.
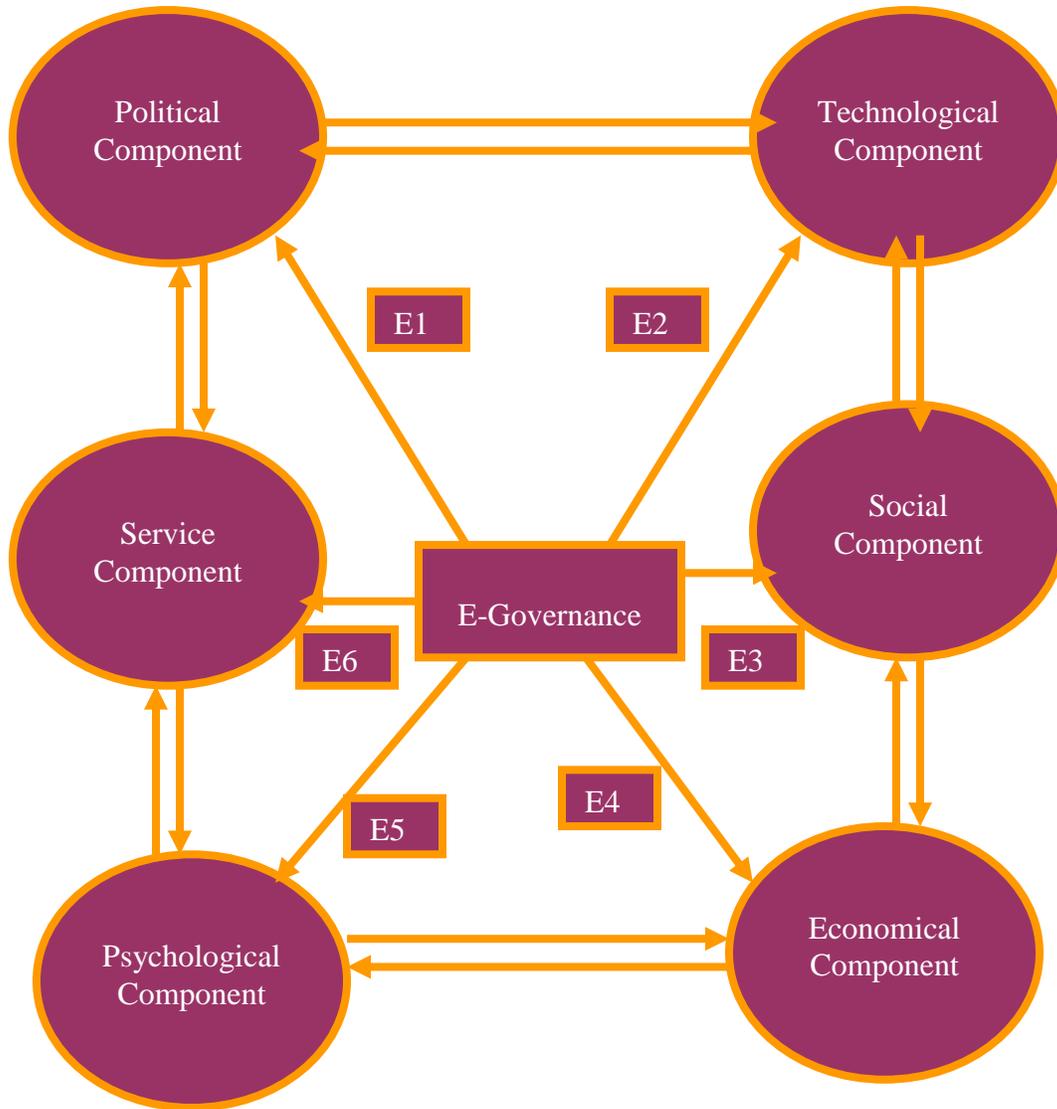
Figure 6. Conceptual Framework of Operational E- Governance
Original Source: United Nations New York, 2004

E1-enactment, E2-electronic know how, E3-egalitarian, E5-economization
E5-extension, E6-empowerment.

6. Service Component:
The service component of this model emphasizes "e" of empowerment of people in any system by constant focus on delivering high quality services to government by responding to public demand in a very fast and transparent manner.

7. Interaction between various components
The various components identified in this model are not only interdependent but they are also interrelated with each other. The interactive relationship amongst the various components exist in such a way that the output of one component becomes input of the other component
These interrelationships between the various components reciprocate e- Governance, in a way that the resultant impact is the transformation of any society into one that has right knowledge and right morality.

IV.   GARTNER GROUP'S MODEL:

Many approaches have been established [6, 7] towards the founding an e-government stages model. Although these models differ in the numbers and names of stages but most of them have similar characteristics for each stage. One of the most used is the Gartner Group's model. It has classified e-government services offered online into four evolutionary phases which are as follows:

1. Publishing (web presence) - Publishing is the earliest stage. In this stage static information about the agency mission, services, phone numbers and agency address are provided [8] for further communication.
2. Interacting- Interacting goes one step further by enhancing the government website's features with search capabilities.
3. Transacting- Transacting represents a full-featured online service which allows users to easily conduct and complete entire tasks online.
4. Transforming- Transforming is considered to be the long-term goal of almost all e-government services. In this stage all the information systems are integrated and most services can be obtained at one virtual centre.

V.   FIVE DIFFERENT MODELS OF E-GOVERNMENT:

Braim [9] stated that the development of e-government relies on four cornerstones: customer centricity, knowledge focus, private sector involvement, and government alignment. Each of these cornerstones should be considered when deciding what type of e-government model has to be put in place. Braim has presented five different models of e-government:
• Automator – It provides on-line access and service delivery for all basic government services.
• Integrator – It develops leading edge internal operations that provide the best go-to market strategy.
• Independent Innovator – It provides leading edge service as well as delivery methods to address the customer needs.
• Market Driven – It provides the customers with the ability to conduct basic services through integrated delivery channels across all public sector departments.
• Collaborator – It delivers decisions and services when, where, and how customers want.

VI.   CONCLUSION

The research in e-governance shows, that a large number of models and frameworks have been proposed for the effective development and promotion of e-governance. Although these models differ in the numbers and names of stages but most of them have similar characteristics for each stage. One of the most used is the Gartner Group's model. It has classified e-government services offered online into four evolutionary phases- Publishing (web presence), Interacting, Transacting and Transforming.

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