

# Sustainable Maturity Model for e-Governance : An Indian Scenario

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## ABSTRACT

Last couple of years India has witnessed tremendous changes in the field of e-governance. The central government and all the states in India have been very active in introducing various e-governance initiatives to provide good services to the citizens. At present, the government of India has heterogeneous initiatives at every stage which are functioning in non-integrated manner. This has resulted into slow and uneven growth in e-governance projects. [Warale & Diwakar, 2016]. To achieve ultimate aim of e-governance, i.e. service Anytime and Anywhere in Integrated manner (AAI) it is necessary to assimilate these initiatives with standard maturity model. In this research paper, the researchers have presented an e-governance maturity model practically adaptable to Indian scenario [Warale & Diwakar, 2016].

## 1. Introduction

India is a country of villages. Indian government has a challenge to cater to varying needs of billions of citizen from various strata. A government with a population of 1.25 billion, 640 districts, 497 cities, 5767 sub districts & more than 6 lakh villages.

Government has its own challenges in fostering e-Governance in the country due to inadequacies in ICT infrastructure, illiteracy, electricity etc. Very often government departments simultaneously execute multiple projects, schemes at different locations and issues were reported in the integration of the information [STeP Training Programme on eGLC, DEIT-Gol, 2012].

Various studies have shown that e-Governance initiatives failed to progress in the way they were supposed to, did not succeed in achieving a desired maturity level. At this backdrop authors have conducted a rigorous study and suggested e-governance maturity model which is suitable to Indian scenario [Warale & Diwakar, 2016].

Next section explains the need and benefits of e-governance maturity model.

## 2. Need of e-governance maturity model

Challenges discussed in previous section have directly resulted in the following issues.

- Uneven growth and varying level of e-governance maturity in the country
- struggle for dependable apt infrastructure
- Non-integrated system
- Multiple initiatives that offer similar services at different rate,
- Nature of services -either online or offline,
- Use of heterogeneous software's
- Long gestation period to the system
- Issue of redundancy and confusion to citizens.

In order to overcome all these issues, there is a need to integrate all these disparate initiatives as primary objective is to develop an e-governance system that will provide all the services under one roof. Next section will discuss the literature survey related to e-governance maturity model.

## 3. Literature Survey

This section explains current status of e-governance, support infrastructure and referred maturity model used by government and also maturity models for building robust e-Governance systems are explained using various research papers.

### 3.1 Highlights of UN survey on e-government(2018) (world scenario):

Countries like Denmark, Australia, Republic of South Korea, UK, Sweden, Finland and Singapore have topped the e-government index with average of 0.9150, 0.9053, 0.9010, 0.8999, 0.8882, 0.8815 and 0.8812 respectively. [UN's e-Government Survey, 2018]

The snapshot of trends in development of e-government is given below:

- European countries lead e-government development globally
- Eight of the 11 new countries that joined the very-high performing group in 2018 are from Europe and 2 are from Asia.
- Uruguay is the only Latin American country with Very-High EGD I scores
- All 193 Member States of the United Nations had national portals and back-end systems to automate core administrative tasks, and 140 provide at least one transactional service online. Only 4 countries out of 54 in Africa score higher than the world average EGD I of 0.55
- there is a positive correlation between the country's income level and its e-government ranking

- As far as India is concerned its EDGI is 0.5669 whereas online service component index is 0.9514 [UN's e-Government Survey, 2018]

### 3.2 Current e-governance support infrastructure and maturity model in use (Indian Scenario):

- The National e-Governance Plan (renamed as e-kranti) has been formulated by the Department of Information Technology (DIT) and Department of Administrative Reforms & Public Grievances (DAR&PG).
- E-kranti has established institutional structure- SDC, CSCs, electronic gateways.
- In 2015, the central government has launched the Digital India initiative with the objectives of using cloud services and mobile applications for fostering good governance in the country.
- The new government plans for every citizen to have smart phones by 2019 and aims to deliver all government services through mobile phones. Government has allocated a budget of 1 lakh crores for this initiative.

As far as maturity model is concerned DEIT, Gol has not specifically proposed a maturity model, but have referred to various maturity model such as Gartner's e-Governance maturity model [2001], Layne and Lee [2001], Chandler and Emanuel [2002] in its training manual [STeP Training Programme on eGLC, DEIT-Gol, 2012] with different number of stages.

### 3.3 Literature related to e-governance maturity models

Maturity models designed so far by various authors present large similarities in terms of stages but differ from each other in terms of features included in those models. Few relevant contributions in this field of study are discussed below.

- E-portal's maturity model is a set of stages (from basic to high end) that determines the maturity of the government's e-portal [as cited in A.F. Allah et al, 2014]. Layne and Lee have developed a four stage maturity model of e-government. The model developed is based on observations on e-government initiatives in the US.

The four stages are catalogue, transaction, vertical integration and horizontal integration. Catalogue stage features the online presence of government and the facility to download government forms; at transaction stage, services and forms are available online.

At the third stage, i.e. vertical integration, local government systems are connected to national level system within the same government department followed by fourth stage, i.e. horizontal stage in which e-Governance systems are linked across different government departments [Layne and Lee, 2001]. In this model the authors did not mention the interaction stage like other models, instead they move directly to the transaction stage [Zahir Irani et al.,

2006]. However, presence of this stage is very important in the maturity model as it indicates the first point of online interaction between citizens and the government, which assists in finding out online behavior, preferences, and queries of citizens.

- Further, in 2001 the Gartner group developed a four stage maturity model of government defined with four stages viz. Web presence, interaction, transaction and transformation [Gartner group, 2000].

In the web presence stage, government hosts a project website and makes a list of services and forms available for citizens. In the next stage, i.e. interaction, citizens interact with website, view services and clarify their doubts. In transaction stage, citizens can apply for services online, ask queries.

This model does not have the integration stage, which is of utmost importance for any e-Governance initiative. However, in this model the author has incorporated the transformation stage, which indicates continuous evaluation.

- [Chandler and Emanuel, 2002] developed the four stage maturity model. This model has four stages i.e. information, interaction, transaction and integration. The Information stage features the availability of online information on government services and policies. Interaction stage features a basic level of interaction between government and citizens such as emails. In the third stage user can conduct online transactions whereas the fourth stage is features services delivery across various departments and agencies. This model seems an ideal model however, in this model the transformation stage is absent. After building an integrated system; it must help government permanently in overall planning of various activities at apex level.
- [Kim and Grant, 2010] developed five stage maturity model. The stages were web presence, interaction, transaction, integration and continuous improvement. Stages 1 to 4 were similar in functionality to Chandler and Emanuel's model of maturity. The only difference was the final stage, which features political activities with more focus on continuous improvement.
- Based on above mentioned studies on maturity model, [M. Naveed Baqir, Lakshmi Iyer, 2012] conducted a study on comparative analysis of e-Governance maturity over 10 years for selected countries in the world. According to the study, developed countries like those in the Americas and Europe are very advanced in ICT but use of the services by citizens is limited, whereas developing countries are huddling with basic infrastructure in spite of citizen's ability to use online services. Countries selected by the authors were US, Canada from North America, UK and Germany from Europe, India and Pakistan from Asia, Australia, and New

Zealand from Oceania , Kenya, and Nigeria from Africa, Argentina, and Brazil from South America.

of several researchers. The Framework consists of five stages (1) Emerging (EM) (2) Enhanced (EN) (3) Interactive (I) (4) Transactional (T) and (5) connected(C).

E-government maturity in these countries was evaluated by e-government framework designed after studying the work

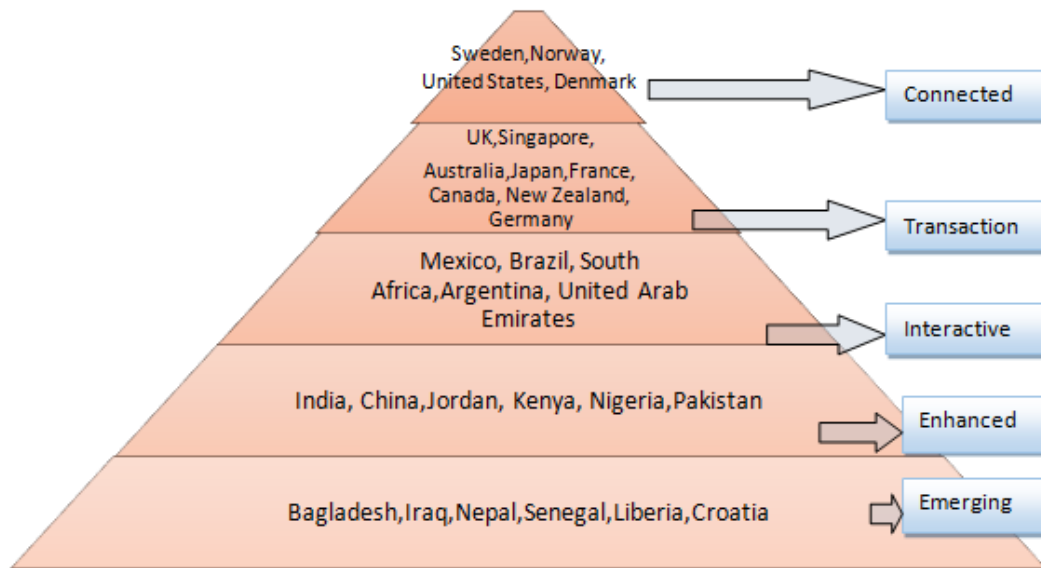


Diagram 1: Pyramid for e-Governance maturity

**4. E-Governance Maturity model proposed by Researchers**

This section describes e-governance maturity model proposed by the researchers. The researcher has evolved a maturity model based on the following key items:

- the founding ideas of various maturity models that are presented in the
- literature by e-governance researchers ,

- In depth study of the existing systems, their gaps, difficulties in integration due to the fact that some are online, some are not; limitation of the software etc., The practicality, applicability and easiness to use
- Adaptability to the Indian scenario.[Warale & Diwakar,2016]

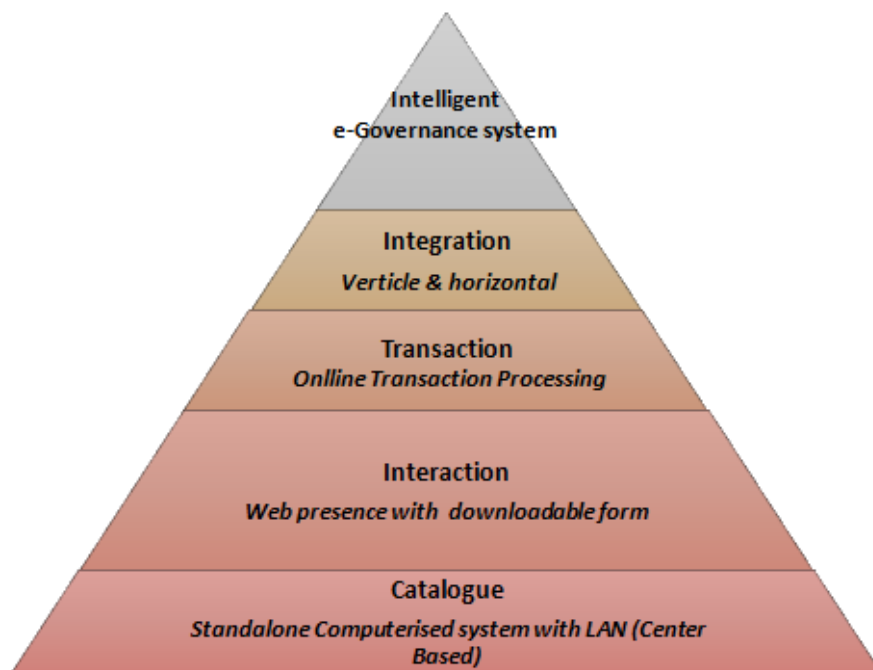


Diagram 2: e-Governance Maturity Model

The different maturity levels in the model are

- Catalogue,
- Interaction,
- Transaction,
- Integration and
- Intelligent e-governance system.

The model will clearly depict how an e-governance project should be implemented from its birth, i.e. introduction stage to maturity stage, bringing complete transformation where any e-government service can be made available to citizen at any time in most convenient manner i.e. through multiple service delivery channels. The unique feature of this model is that it is linked to the UID of citizen and digital locker. Stage wise functionality of the model is given below.

#### **Stage 1: Catalogue**

In the first stage, the government office (For e.g. SETU Suvidha Kendra) forms the computerized setup with LAN to offer basic services to citizens. This stage allows government employees to perform all transactions on the computer including, processing of the application form, delivery of services etc.

#### **Stage 2: Interaction**

- As the name indicates, this stage will facilitate interaction between government, citizen and business. This stage acts as the first point of online interaction between citizens and government. This is achieved by the launch of e-Governance project website.
- Users will be provided with various utilities such as, facility to download application form, use help, search facility, view presentations and videos and browse MCQs etc.
- At this stage, a kiosk based tracking mechanism may also be introduced.
- A feedback from covering various aspects could be designed for citizens. This will help study citizens' expectations from the government.

#### **Stage 3: Transaction**

- This stage plays a very important role in the maturity model. It will change the way citizens interact with the government. Users may track the progress of their application online.

- This stage is characterized by the introduction of an online method.
- At this stage the user can apply online for services, upload the documents, make a payment and also deliver services online. Users will also be able to track the progress of their application online.

#### **Stage 4: Integration**

This stage features the vertical and horizontal integration of systems. When a system at different levels, such as sub district-district-state is integrated together, it is called vertical integration, whereas, integrating systems at geographically different locations such as district1-district2 etc. is called horizontal integration.

- The nature of integration can be intra (within the similar department) or inter (within different department) integration.
- At this stage, services of several government departments like revenue, land records, transportation, municipal corporation services etc. could be offered through a common gateway i.e. state portal.
- Through the state portal, services can be offered in an integrated manner by using various system integrators such as National service delivery gateway (NSDG), Mobile service delivery gateway (MSDG) and state service delivery gateway (SSDG) and payment gateways.
- Additionally, for seamless integration and connectivity to capacity building, initiatives like GI Cloud, NOFN, CSC, SDC, SSDG, SWAN, e-district, which are cloud based and network based services could be established.

Changes made by citizens in the UID data, will also simultaneously be reflected uniformly across e-governance system, resulting in data consistency. Now a day, the AADHAR number has become a key source of information for banks (for depositing subsidy, schools for getting a scholarship, government to implement "Pradhan Mantri Yojana" etc.)

The next diagram 3 show repositories created at the end of stage four which is obtained from stage one onwards. These repositories along with other individual repositories such as state level repository, department's repository etc. will serve as input to the next stage

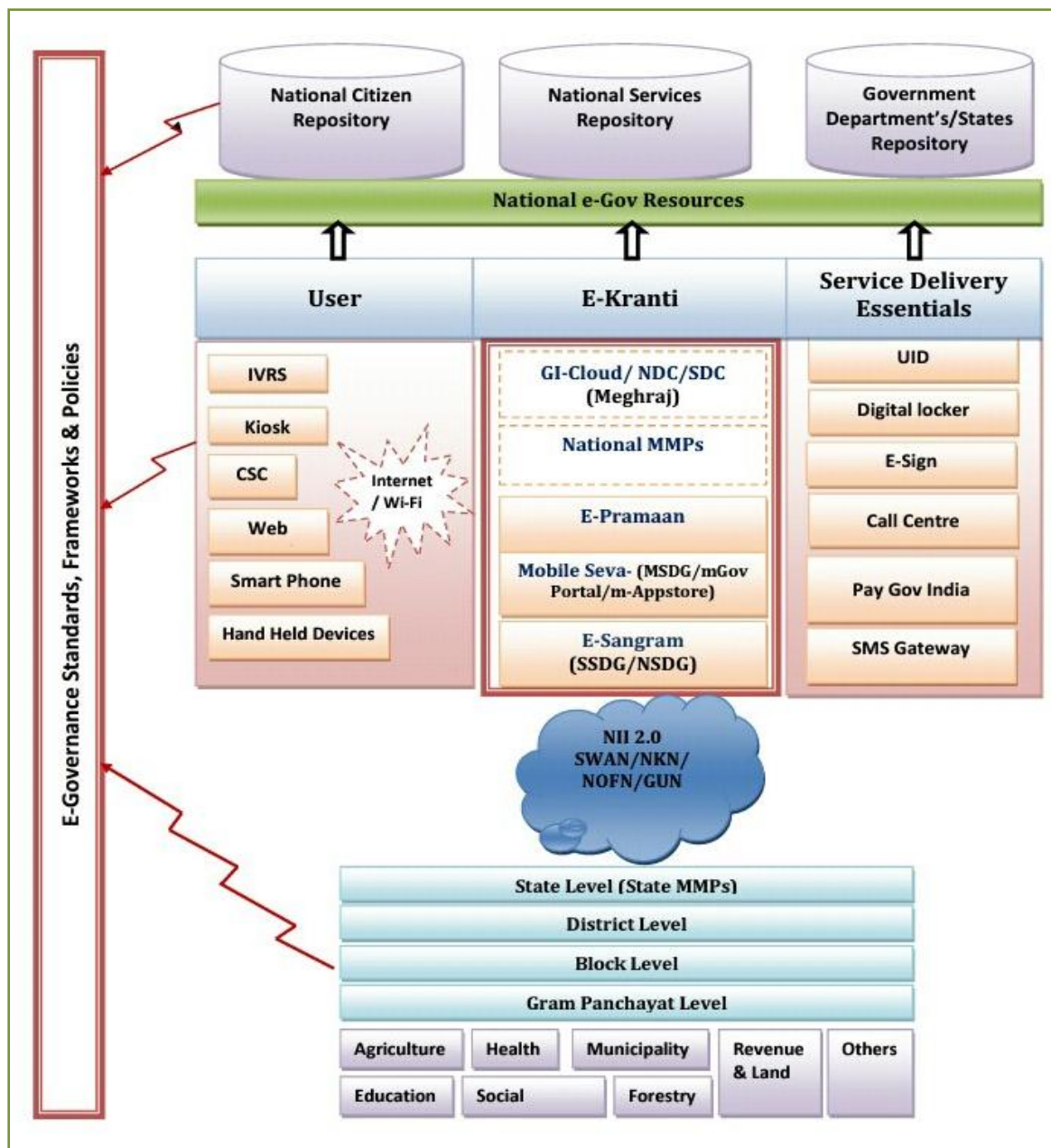


Diagram 3: Integrated view of SDC, SSDG, user perspective and service delivery perspective.

**Stage 5: Intelligent e-Governance System**

This stage is the final stage of the model and represents the smart use of the e-governance system at the national level.

- Introduction of “**Intelligent e-Gov System**” is the unique contribution made by the researcher to the body of knowledge.
- The maturity models proposed in theory so far has been limited to only the discussion of the *integration stage* and *transformation stage* meant for integrating services. This fifth stage will help in finding
  - ✓ which service is becoming obsolete,
  - ✓ which is in more demand,
  - ✓ what changes in the current procedures will help in saving time,
  - ✓ any changes in existing plans how they impact the services,
  - ✓ what are future demands from the existing patterns ,

- ✓ GIS based decision support system to assist in offering service,
- ✓ predicting future demand based on the history,
- ✓ predicting the change in percentage of citizens changing from one bracket to another in the future due to retirement or
- ✓ Students graduating to work force etc. need for creating more jobs etc. can be accomplished.
- ✓ There is a high possibility of deriving more frequently, census data (nearly accurate/estimate) using various government department data repositories and service repository than the physical collection done once in ten years.
- ✓ This in turn will help in formulating development plans for the citizens that will be more accurate. Prediction, forecasting models also will help the government in planning and introducing various

development initiatives such as which sector needs more allocation of funds and so on.

The next section shows three level functional architecture for Intelligent e-Governance system.

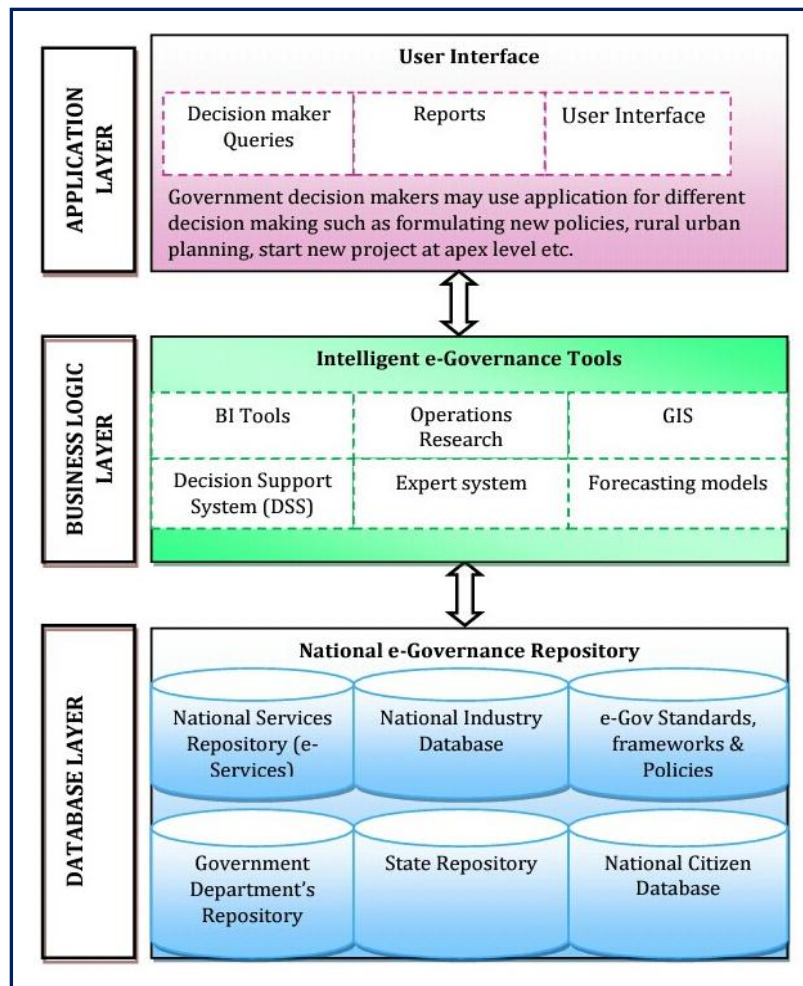


Diagram 4: Three level functional architecture for Intelligent e-Governance System

Diagram 4 given above represents a three level functional architecture for Intelligent e-Governance System. The architecture consists of three layers viz., data layer, business logic layer and application layer.

**Layer- (I) – Data Layer:**

First layer of the system is a data layer, which consists of the e-Governance database. This layer acts as a basic building block for the Intelligent e-Governance system. This layer is a repository of various databases of national importance, such as, the Government Department's database, State Department's database, e-Governance Standards and Policies, National Services Repository, National Industry Database and Integrated services delivery Database.

**Layer- (II) – Business Logic Layer:**

The Second layer is the business logic layer that consists of Intelligent E-Governance Tools. This stage is a collection of analytical and statistical tools, models as well as special purpose software which is used to perform advanced analysis on data. The objective of this stage is to employ different tools in order to reveal patterns of data and pinpoint critical areas in e-governance. The different tools and techniques adopted are, business intelligence tools (Data mining and Data warehousing

and OLAP), Decision Support System (DSS), Geographic Information System (GIS) and most importantly forecasting models.

**Level-III –Application Layer:**

The last and final stage of the architecture is the Decision making layer. The objective of this stage is the ultimate accomplishment of better e-governance practices in the country.

This stage is highlighted with the opening of new canvas for government planning. Few examples (benefits) are discussed below [Warale, Diwakar, 2016]

- Intelligent e-Governance system will help identify the number of people in India that are retiring this year and identify employment opportunities that are generated.
- Preparation of the development plan for rural and urban areas.
- It may also help in sector wise planning. For e.g. manufacturing sector (SEZ planning), environmental planning, education sector planning.
- Government can identify sick sectors, which need cushioning and an influx of more funds.

- The new projects/initiatives of national importance at the central as well as state level can be identified.
- New rules/policies/schemes/standards could be formulated for meeting the varying needs of the citizens.
- Rough estimate of census data can be derived.

It will ultimately help in making projections on various fronts such as agriculture growth, income growth of citizens, technology growth, population growth, future and extent of the use of mobile governance, migration, fertility, mortality etc.

## 5. Conclusion

After studying maturity level of the existing e-Governance projects it has been observed that state wide maturity level of

e-Governance varies. It is critical to bring them all e-governance projects together to offer an integrated service, as desired by the state as well as central governments. With this as the main intention, a five stage maturity model is proposed and the expected features at each stage along with and benefits that can be derived by developing an e-governance system using this as a reference model are presented. Further the unique contribution by the researcher is the introduction of the top most stage for providing 'Intelligent e-Governance'. The proposed model will help the government to achieve its aim of not only offering all services in an integrated manner under a single umbrella but also assist in making decisions, planning and implementing various new schemes to accelerate overall growth of the nation, a very important outcome of e-governance.

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