BUSINESS INTELLIGENCE AND E-GOVERNANCE

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Abstract

As a majority of the population lives in rural areas and are illiterates how to bring them into the new system will be a big challenge to the government. Further, still there are some villages which are not accessible and do not have electricity. To train the entire population on how to use, how to communicate with the officials in case of any issue, one has to have a detailed working strategy for its better utilization. In the e-governance environment, the cost of providing infrastructure would be a big challenge. The costs of new technologies get distributed and in comparison to the value generated, it is worthwhile to invest in such infrastructure only when all the three participants effectively put it into use.

Keywords: *Business Intelligent system, E-governance, Data Warehouse, OLAP*

Introduction

The advent of Information and Communication Technology (ICT) in the recent years has presented an opportunity for the IT managers and the senior officials in the government to change the way organizations leverage and value their information assets. With the ability to easy access of information mission delivery, resource management and data dissemination can be raised to levels which were previously not at all possible. In contrasts to the private industrial and business/government organizations are measured not by profits and losses, but by their ability to deliver upon their mission. Regardless of this mission, the ability to understand the citizen and the ability to use the resources are the key factors in matching services to citizen needs.

At times, government departments might have come across shortages or resources in one department and excess of resources in the other. This could be due to non-availability of proper data and facilities to disseminate information. Even if government departments are computerized and networked more for the purpose of Internet usage and mail transfer, the information available in one department, which possess the data could not be utilized in other department. This is because the information is stored in different formats, in different platforms and in heterogeneous different data base systems.

By deploying the latest ICT the government departments can not only maximize access to information, but also can bid farewell to the massive paper trail often associated with various government agencies. Rather than providing non-detailed information to uninterested constituents, the departments can now direct the right information to the right people at the right time. Further, the enterprise-wide information can be an asset to the government as well as to the entire population. This will help the departments in detailed micro level analysis and decision-making.

E-Governance System

E-governance is to governance processes in which Information and Communications Technology (ICT) play an active and significant role.

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E-governance is the application of information & communication technologies to transform the efficiency, effectiveness, transparency and accountability of informational & transactional exchanges with in government, between governments, agencies of National, State, Municipal & Local levels, citizen & businesses, and to empower citizens through access & use of information.

E-Governance solutions are oriented towards helping government organizations transform into enterprise infrastructure-based end-to-end digital governments that:
- Build services around citizen's choice
- Make government more accessible
- Facilitate social inclusion
- Provide information responsibly
- Use government resources effectively
- Reduce government spending
- Deliver online services
- Involve citizens in the governing process

Governments are increasingly looking to cut down on operating costs and improve delivery of services to citizens and employees. The focus is slowly shifting towards giving self-service process improvements through online web based applications. The three main target groups that can be distinguished in e-governance concepts are government, citizens and businesses/interest groups. The external strategic objectives focus on citizens and businesses and interest groups, the internal objectives focus on government itself.

The major components involved in E-governance are:
1. Government to Government (G2G);
2. Government to Citizens (G2C);
3. Government to Business (G2B);
4. Citizen to Government (C2G).

Government to Government (G2G) - All the G2G interactions and dealings are required for planning, decision support and implementation of its action plans. The goal of the Government-to-Government (G2G) system is to forge new partnerships among various levels of government. These partnerships facilitate collaboration between levels of government, and empower state and local governments to deliver citizen services more effectively. The time gap can be greatly reduced once the E-governance system is in place.

It requires a single interface to government offices and staff, to effectively carry out functions like human resource management and financial resource planning in an integrated environment. Further, all government agencies to be linked through a modern computerized network that allows secure communications and interaction. Existing government systems are either replaced or integrated into the new technology, depending on the functionality and adaptability of legacy systems.

Government to Citizen (G2C) - is basically serving the customers on the Web. The customers need not to visit, each time, the government departments with Xerox copies of documents. The documents submitted at any of the facility center is made available across the departments so that carrying of volumes of documents and feeding them into computers is totally eliminated or minimized to a maximum extent. Each citizen will have a unique identification number and all the facilities and services rendered to a particular citizen can be tracked easily. Once implemented, this will drastically reduce the workload of the government departments. For example, as the government units are functioning in silos, it requires issuing various certificates to the general public for availing some facilities. Instead if common general-purpose citizen identification is given to each citizen, there won't be any further need for issuing the same set of certificates again and again. The concerned departments can verify the details from the central database.

Citizen to Government (C2G) is the online relationship between the citizen and all of the various government departments one would like to interact to so that the citizen gets some services without actually physically visiting the various government offices. The role of C2G is to introduce the citizen to websites that one will find the most useful, in daily life and times of need. This is an application to make public-to-government transactions more efficient, effective and productive, while enhancing the quality of services, by facilitating public transactions with government using various electronic channels. The association between citizens and the government as a grievance redresser in an online environment can easily be leveraged to provide many more services to citizens from different providers.

Government to Business (G2B) and Business to Government (B2G) - In order to implement the government's various plans and projects it needs the business communities' services. Services like e-procurement, e-payment, and project monitoring and implementation forms part of this model. E-Procurement is an application to transform the existing manual system of government procurement into an efficient electronic based one.
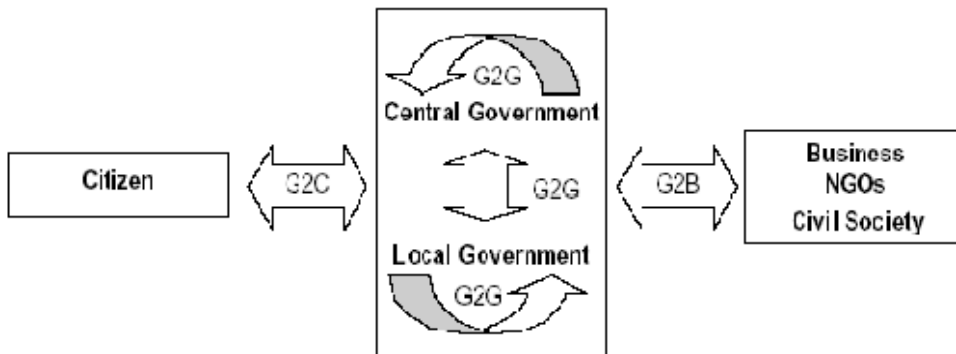

Figure 1 **Interactions between main groups in the e-governance**

Gartner, an international e-business research consultancy firm, has formulated a four-phase E-governance model. This e-governance model can serve as a reference for governments to position where a project fits in the overall evolution of an e-governance strategy. In most cases, governments start with the delivery of online information, but soon public demand and internal efficiency ask for more complex services. Of course this change will take effect gradually, some services will be online earlier than other services. In some cases the public demand is the driving force, in other cases cost saving aspects for the government are leading. According to Gartner, e-governance will mature according to the four-phase e-governance maturity model.

E-Governance Maturity Model (Gartner)

Early 90's	Information	→ Presence
Mid 90's	Interaction	→ Intake process
Present	Transaction	→ Complete transaction
Future	Transformation	→ Integration and organizational changes

In each of the four phases, the delivery of online services and use of ICTs in government operations serve one or more of the aspects of e-governance: democracy, government, business.
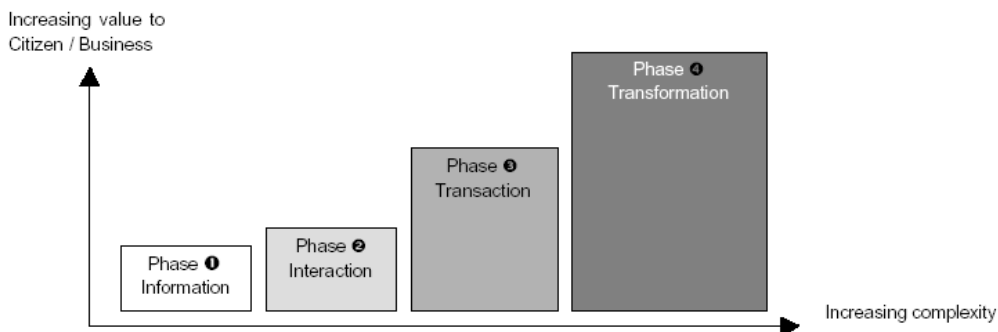
Figure 2 - E-Governance Maturity Model
(Source: Gartner, 2000: 11)

The model does not mean that all institutions have to go through all phases and all at the same time.

In the *first phase* e-governance means being present on the web, providing the external public (G2C and G2B) with relevant information.

In the *second phase* the interaction between government and the public (G2C and G2B) is stimulated with various applications. People can ask questions via e-mail use search engines for information and are able to download all sorts of forms and documents. These functionalities save time.

With *phase three* the complexity of the technology is increasing, but customer (G2C and G2B) value will also be higher. Complete transactions can be done without going to an office.

The *fourth phase* is the transformation phase in which all information systems are integrated and the public can get G2C and G2B services at one (virtual) counter. One single point of contact for all services is the ultimate goal.

	External: G2C	**External: G2B**	**Internal: G2G**
Phase Information	Local / Departmental / National information (mission statements and organizational structure Addresses, opening hours. employees, telephone numbers Laws, rules and regulations Petitions Government glossary	Business information Addresses, opening hours, employees, telephone numbers Laws; rules and regulations	Knowledge base (static intranet) Knowledge management (LAN)
Phase Interaction	Downloading forms on websites Submitting forms Online help with filling in forms (permits, birth / death certificates) Intake processes for permits etc. E-mail Newsletters Discussion groups (e-democracy) Polls and questionnaires Personalised web pages	Downloading forms on websites Submitting forms Online help with filling in forms (permits) Intake processes for permits etc. E-mail Notification	E-mail Interactive knowledge databases Complaint handling tools

	Notification		
Phase Transaction	License applications / renewals Renewing car tags vehicle registration Personal accounts (mytax, myfines, mylicenses etc.) Payment of (property) taxes Payment of tickets and fines Paying utility bills Registering and voting online	License applications and renewals via website Payment of taxes Procurement	Inter-governmental transactions
Phase Transformation	Personalized website with integrated personal account for all services	Knowledge base (static intranet) Knowledge management (LAN)	Database integration

Table 1 - Overview e-governance solutions

Business Intelligence Technology

Information is one of the valuable assets to any Government. When used properly, it can help planners and decision makers in making informed decisions leading to positive impact on targeted group of citizens. However, to use information to its fullest potential, the planners and decision makers need instant access to relevant data in a properly summarized form.

In spite of taking lots of initiative for computerization, the government decision makers are currently having difficulty in obtaining meaningful information in a timely manner because they have to request and depend on IT staff for making special reports which often takes long time to generate. An information warehouse can deliver strategic intelligence to the decision makers and provide an insight into the overall situation. This greatly facilitates decision makers in taking micro level decisions in a timely manner without the need to depend on their IT staff. By organizing data into a meaningful data warehouse, the decision makers can be empowered with a flexible tool that enables them to make informed policy decisions for citizen facilitation and accessing their impact over the intended section of the population.

The need to improve the decision making capabilities using the ever increasing computing power, availability of RDBM Systems across heterogeneous platforms led to the use of more and more information in the decision makes process. Though the information base in each of the sector has grown into hundreds of thousands of GBs/MBs, the peculiarity of database structure does not allow one to perform a detailed analysis on the data from the way one wants to do. Further, even if one does the analysis on large volume of data one should know the complete designing of the data model and the contents of it. It is practically not possible for any one to know the complete data modelling and the contents and ad hoc query analysis is simply not possible. This implies that only an expert in data modelling can do any sort of desired analysis. This clearly shows the limitations in the conventional systems. As the top-level officials/decision makers want to do detailed analysis before taking a decision the departments are now looking for a framework by which one can accomplish multiple goals.

Three types of spontaneous questions that arise while dealing with the data include:

- **Those that produce a number:** *How many families are benefiting?*
- **Those that fit into a report:** *What are the industries broken out by the proposed districts realignment?*

▪ **Those that require analysis**: *How many additional acres of land will get benefit with the new irrigation scheme? Will it make any difference in the life style of the farmers? Is there any chance of stopping the migration of farmers?*

How and from where one can find answer for the above queries. It is here that the Business Intelligence –a new database technology in IT helps in analyzing and selecting the right answer.

Relationship between e-governance and business intelligence

Business Intelligence is a broad category of applications and technologies for gathering, storing, analyzing and providing access to data to help the decision makers in making decisions. Typically, BI applications include decision support systems, query and reporting, On Line Analytical Process (OLAP), statistical analysis, forecasting and data mining (a technology to extract unknown and hidden patterns and knowledge from within the data). Business Intelligence therefore is well suited for e-governance applications in the G2G and G2C environment. For effective implementation of a BI solution, the de facto condition is a solid and reliable data warehouse.

Data warehouse is a subject-oriented, integrated, time-variant, non-volatile collection of data, cutting across the enterprise. Until there is a repository of accurate data across the enterprise value chain, application of BI tools to analyze and aid in strategic business decisions is impossible. Currently, data integrity, found wanting in most enterprises is the most difficult and resource consuming stage of BI development and deployment.

Benefits of BI for better E-governance is:

1. Do not have to deal with heterogeneous and silo's systems
2. Dependence on IT staff minimized
3.   Can obtain easily decipherable and comprehensive information without the need to use sophisticated tools.
4. Can perform extensive analysis of stored data to provide answers to exhaustive queries. This helps them to formulate more effective strategies and policies for citizen facilitation

Going by the E-governance definition, Business Intelligence technologies, which help policy makers draw key conclusions from data, become a critical component of any e-Governance initiative, as is shown in the figure below.

Figure 3 - BI and E-governance System
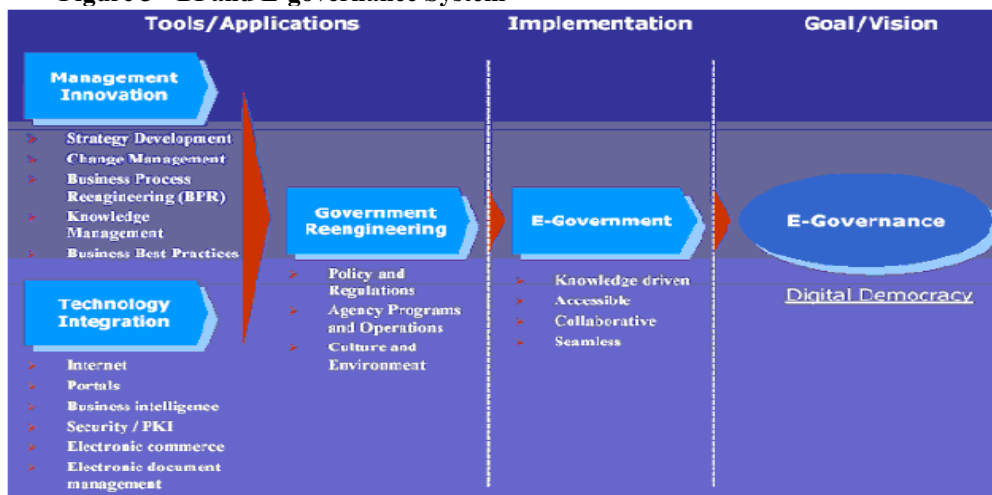
The benefit of the BI system can summarize in this way. From a layman's angle the BI technologies are more towards G2G than other forms. All the government plans and decisions can be arrived with the help of detailed multi-dimensional analyses of all the relevant data. In fact it helps the citizens more than the government. The citizens can have a compact and compiled profile of each individual from the government and everything the citizen can have it as a web based report and the same can be used wherever the citizen feels.

Conclusions

A framework for BI in E-governance is presented here. A large number of e-governance applications are already in operation in most of the state centers. The necessary BI infrastructure has been created at the head quarter and sufficient number of officials was trained on BI. This is the right time for introducing BI in the e-governance and to further strengthen the e-governance system. In order to incorporate the BI system and implement this, initially one or two sectors may be identified and the BI system built over it as a proof of concept. Once the desired results are achieved the same can be replicated in other sectors of the government. Once the complete system is in place at the national level for use a knowledge bank can be created for the entire E-governance environment.

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