Determining Priorities of E-Government: A Model Building Approach

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ABSTRACT

e-Government refers to the use by government agencies of Information Technologies that have the ability to transform relations with citizens, businesses, and other arms of Government. These technologies can serve a variety of different ends: better delivery of government services to citizens, improved interactions with business and industry, citizen empowerment through access to information, or more efficient government management. The resulting benefits can be less corruption, increased transparency, greater convenience, revenue growth and/or cost reductions. Leaders from around the world are now committed to combining technology with new ways of conducting the business of government to provide more efficient, transparent and responsive delivery channels to citizens (Satyanarayana). At the same time, the statistics indicate that most eGovernment projects fail. They are either total failures in which the system is never implemented or is implemented and immediately abandoned; or they are partial failures, in which major goals for the system are not attained and / or there are significant undesirable outcomes. Only a minority eGovernment projects can be properly called successes (Heeks 2006). Estimates of the proportion falling in to failure categories range from 60% (Gartner 2002), through 60 – 80% (UNDESA 2003b) up to 85% (Symmonds, 2000). This paper is an attempt to conceptualise a model building approach, which will generate mathematically a Priority Index for a project, which can help overcome the important causes of failures and enhance the probability of success for the eGovernment projects.

Keywords: e-Government, Models of evolution, evaluation frameworks, prioritisation, priority index.

1. Need and Significance

The IT industry and especially the software and services industry are growing very rapidly in India and worldwide. The traditional drivers for this growth are the Banking, Finance, Securities and Insurance sectors, followed by manufacturing and retail sectors. However, recently e-Government is emerging as the leading driver of growth in this sector. e-Government sector has been witnessing above average growth in India for past consecutive three years (NASSCOM 2006). Indian Government Sector Surpasses China to Emerge as the Fastest Growing Public Sector IT Market in Asia**.** India's expenditure on IT in the Public Sector will be the fastest growing in Asia. India's expenditure on IT in the Public Sector is forecast to grow from US$1.4 billion in 2005 to US$2.9 billion in 2009 with a growth rate of 19.6%. This growth rate beats China, the second fastest growing country in Asia, which is expected to have a growth rate of 14.6% during the same period (Perrine, Sen, Silber 2006). India is playing catch up where the Public Sector is concerned,

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but it is making the key technology investments that are needed to help maintain the high rates of economic growth and to increase the speed and efficiency with which government services are delivered. The government understands that heavy investments in technology are needed to help India continue in its efforts to modernize the Public Sector and attract foreign investment. India is among the lowest ranking countries in Asia for per-capita spending on IT in the Public Sector, but based on the growth rates we are seeing, we feel that India is making the investments needed to increase the efficiency and capability of government services. As the Indian economy continues to post high growth rates, it will be crucial for the government to make sure that technology investments are being made to support this economic growth.

Under the National e-Governance Action Plan of Government of India, certain projects and components of the Government have been identified as Core Projects or Mission Mode Projects. Following table gives the list of these mission mode projects (NISG,).

Table 1: List of identified National Mission Mode Projects of Government of India.

S.No	Mission Mode Projects	Line Ministries/ Departments responsible
01	Income Tax	Ministry of Finance/Central Board of Direct Tax
02	Passport Visa & Immigration Project	Ministry of External Affairs/Ministry of Home Affairs
03	DCA21	Department of Company Affairs
04	Insurance	Deptt. Of Banking
05	National Citizen Database	Ministry of Home Affairs/Registrar General of India (RGI)
06	Central Excise	Department of Revenue/Central Board of Excise & Custom
07	Pensions	Deptt. Of Pensions & Pensioners welfare & Deptt. Of Expenditure
08	Banking	Deptt. of Banking
09	Land Records	Ministry of Rural Development
10	Road Transport	Ministry of Road Transport & Highway
11	Property Registration	Department of Land Resources
12	Agriculture	Department of Agriculture & Cooperation
13	Treasuries	Ministry of Finance
14	Municipalities	Ministry of Urban Development and Poverty Alleviation
15	Gram Panchayats	Ministry of Panchayati Raj
16	Commercial Taxes	Ministry of Finance
17	Police (UTs initially)	Ministry of Home affairs
18	Employment Exchange *	Ministry of Labour
19	EDI (E-Commerce)	Ministry of Commerce and Industry
20	E-Biz	Department of Industrial Policy & Promotion / Department of Information Technology
21	Common Service Centres	Department of Information Technology
22	India Portal	Department of Information Technology and Department of Administrative Reforms and Public Grievances
23	EG Gateway	Department of Information Technology
24	E-Courts*	Ministry of Justice/ Ministry of Home Affairs
25	E-Procurement*	Ministry of Commerce and Supply

It can be seen that each of these projects is very large in terms of its scope and potential services and benefits. Added to this, each of these projects has to be implemented by more than one government entity such as central ministries, various state governments and their departments etc. The MMP for Municipalities alone will be implemented by over 6500 municipalities. Thus, in each project there will be thousands of decision makers, making decisions about scope, methodologies, and priorities of implementations. In the absence of either a large body of past case studies or a scientific method to assist

them, these decisions are currently taken in adhoc manner. It is seen that generally, the decision making process is guided/governed by following considerations:

i. Resistance to change, leading to computerisation rather than e-Government.
ii. Perceptions and personal preferences of the CEO. Thus in some places the scope is limited to very preliminary level such as dissemination of information, while in another place the CEO feels that nothing less than a fully portal based transactional implementation will be acceptable.
iii. Down the line, the organisational staff members influence and control the implementation process as per their individual needs or perceptions such as:
    a. Trying to pass the unwanted or most difficult tasks to computerisation
    b. Try to limit the scope for fear of loss of control, loss of esteem or even due to fear of monetary loss.

Secondly, e-Government is a holistic exercise requiring organisational transformation coupled with front end and back end computerisation. This means the whole activity should be planned well, costed properly, priorities must be set for most cost effective implementation, and in a manner that it starts service delivery to citizens in the shortest possible time frame. All this requires again a scientific approach. But the necessary framework or tool is not available to the decision makers today. The end results are:

a. Adhocism in implementations
b. Low levels of sustenance, after initial launch
c. Waste of resources, especially financial investments
d. Frequent changes of vision / direction, since transfers are an inevitable part of government administration.
e. Skewed levels of e-Government implementations leading to severe impact on citizen services.

The current IS literature suggests that human and organisational issues are now more important and will become even more critical to the successful development and implementation of IS than they were in the past (Al- Mushayt et al., 2001; Cabrera et al., 2001 and Doherty et al., 2003) A scientific Framework or a model based tool is a very vital need for the e-Government implementation today.
To summarise:

a. e-Government is the fastest growing sector for IT Industry today.
b. India is making huge investments in e-Government. In fact the growth rate of Indian investments in e-Government is the highest in Asia, surpassing even China.
c. The implementation of e-Government provides an extremely wide canvass in terms of functions, scope, citizen services and implementation architectures.
d. Implementation of e-Government involves thousands of projects being handled by thousands of decision makers.
e. These decision makers today, make their decisions and prioritisations, in adhoc manner, due to lack of any scientific framework or tools.
f. If such tool can be made available, it will lead to substantial cost savings as well as enhancing the returns on every Rupee spent on these projects.

The purpose of this proposed research is to build a framework, followed by a model to help organisations determine priorities of e-Government implementation. The first step in this activity would be identification of parameters which need to be considered for determining prioritisation of services for an e-Government project. Next, it will be necessary to determine their relative importance and assign weightages to these parameters. This would be followed by definition of a framework which will enable an implementer to determine priorities specific to his project, based on global and project environmental conditions. It will be necessary to try and build a mathematical model to calculate the Priority index of a service using the defined framework and then to verify output of the model using case studies and other relevant data.

2. Review of Related Research and Models.

The review of related literature predominantly reveals two trends. Various authors and organisations have tried to define a roadmap for evolving e-government implementations. Most of these studies end up defining a four stage roadmap. Some of them are described below. The other group of literature focuses on post facto evaluation or assessment of e-government projects. Some focus on ICT issues, others on project issues such as sustenance, usage, etc., still others on developmental issues. Some of these references are also described below.

2.1 Stage wise Roadmap for e-Government Projects.

The Table 2 presents some prominent stage wise evolution models for e-Government.

Figure 2: Four stages of evolution of e-government

Sr. No.	Authors	Particulars of the Model of evolution for e-Government
1	Gartner (Gartner 2000)	Phase 1: Information ----------→ Presence Phase 2: Interaction ----------→ Intake process Phase 3: Transaction ----------→ Complete transaction Phase 4: Transformation ----→ Integration and organisational 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; viz. democracy, government, business.
2	Cap Gemini Ernst & young. *Online Availability of Public Services: How is Europe Progressing* (Cap Gemini Ernst & young, 2006)	Stage 1: Online presence Stage 2: One way interaction (Downloadable forms) Stage 3: Two way Interaction Stage 4: Transactions (Full electronic case handling)
3	Karen Layne and Jungwoo Lee *Developing fully functional E-government: A four stage model* (Layne, Lee 2001)	Stage 1: Cataloguing, Stage 2; Transaction, Stage 3: Vertical integration Stage 4: Hhorizontal integration.
4	World Bank *The evolutionary stage of an e-Government implementation falls in to one of the four quadrants, where on X axis one maps service delivery capability and on Y axis is mapped the level of process integration.*	1. Moving Online 2. Channel integration 2. Process Integration 4. Service Integration
5	ABM Knowledgeware Ltd. India	Stage 1: e-Foundation Stage 2; e-Service Stage 3; e-Business Stage 4: e-Collaboration

All these classifications or prioritisations are really demarcation of inflection points in the life cycle of e-government projects. They also guide as to the step by step approach that may be adopted and paints the big picture of e-government projects. However, they do not provide a framework for service level prioritisations within each stage.

2.2 Evaluation Frameworks for e-Government Projects.

The Table 3 presents some prominent evaluation and assessment frameworks for e-Government.

Figure 3: Evaluation / Assessment frameworks for e-government

S.N.	Authors	Particulars of the Model of evolution for e-Government
1	Institute for Information Systems (IWi) at DFKI Dipl.-Kfm. Dominik Vanderhaeghen (Institute for Information Systems 2005)	Evaluating e-Government – A Process-oriented Approach IFIP Conference 2005, Poznan (Poland) Controlling Level – IKONet Founded in 1996 by the German KGST, a public consulting agency for municipal administrations Initiation of 127 "benchmarking circles" with participation of 651 municipal administrations IKO Net intends the set-up and implementation of „benchmarking circles" as well as the development and improvement of performance measurement systems At the moment, 56 performance measurement systems dealing with 35 fields of activities are available Provision of inter-municipal benchmarks at the IKON-Database
2	M. P. Gupta, Debashish Jana *Indian Institute of Technology, Department of Management Studies,Delhi, India* (Gupta, Jana, 2002)	Evaluation Criteria a. Hard measures 1) Cost benefit analysis, 2) Benchmarks in e-government b. Soft measures 1) Scoring method, 2) Stages of e-government, 3) Sociological angle c. Hierarchy of measures**:** 6 Levels
3	EAF 2.0 Centre for Electronic Governance, IIM Ahmedabad and National Institute for Smart Governance, Hyderabad. (Ramarao, Bhatnagar, Satyanarayana, Vekatarao, 2004)	Evaluation Criteria a. Success in Achieving Stated Purpose & Objectives b. Technology Platform Used for The Project c. Sustainability d. Cost Effectiveness in terms of 1) ROI 2) Cost per Transaction 3) Replicability
4	MIT 2.0 Ministry of Information Technology, Government of India.	Evaluation Criteria (For Matured Projects) a. Objectives b. Service Delivery c. Technology Platform Used for The Project d. Privacy e. Direct & Indirect Impact on Governance 1) Corruption 2) Accountability 3) Transparency 4) Participation f. Quality of Service 1) Decency 2) Fairness 3) Convenience 4) Availability 5) MTTR 6) Single Window
5	US Office of Management and Budgets (OMB) (US Office of Management and Budgets (OMB), 2006)	Evaluation Criteria a. Adoption / Participation 1) contribution of information 2) involvement in governance b. Usage 1) The level of use by the targeted end user, 2) Customer Satisfaction 3) End user satisfaction with the initiative's products and/or services
6	Waseda University of eGovernance, Japan (Waseda University of eGovernance, Japan, 2007)	Evaluation Criteria a. Network Preparedness 1) Internet users 2) Broadband users 3) Digital mobile users 4) PC users 5) Security system b. Required Interface-Functioning Applications

		1) Online applications 2) e-tender system 3) e-tax system 4) e-voting system 5) e-payment system c. Management Optimization 1) System optimization 2) Integrated network system d. Administrative and budgetary systems 1) Public management reform by ICT e. Homepage/Portal Situation 1) Updated Frequency 2) Public disclosure, 3) Link navigation system 4) Multi-language correspondence

Based on the observation that there is a gap in the study of the impact of e-governance initiatives on lives of people in the developing countries, a framework to evaluate the impact of e-governance projects based on Sen's capabilities approach to human development should be developed. (Madon, 2006). A number of early evaluations of e-commerce and e-governance have concluded that these projects were only limited successes or outright failures. The shortcomings most frequently cited with missed deadlines, cost over-runs, unworkable technologies, and training inadequacies. (Riley, 2005). In response to such dilemmas regarding e-governance, several governments, consultants, public interest groups, and inter-governmental organizations researched such deficiencies and developed guidelines to alleviate them, both for more developed and less developed countries. The work of the Organization for Economic Cooperation and Development (OECD) and the Pacific Council on International Policy (PCIP) are exemplary in this respect. The OECD has provided the following guidelines (in the publication Citizens as Partners)

Table 4: OECD guidelines

The OECD's Ten Guiding Principles on E-Government
Commitment: proclaim feasible goals and provide financial support
Rights: assure access, privacy and confidentiality to all users
Clarity: adopt measurement standards for electronic service delivery
Time: provide long-term time frames - avoid artificial deadlines.
Objectivity: set criteria for network performance and user satisfaction
Resources: hire skilled personnel to design, implement, and operate facilities
Co-ordination: use common look & feel, and document content control
Accountability: be accountable for electronic service quality and quantity
Evaluation: conduct annual e-government audits and performance reviews
Active citizenship: encourage active use; incorporate suggested improvements

The OECD guidelines were crafted to apply to all projects with the mandate to implement e-government. However, the member countries in this organization can be considered more developed rather than less developed. The PCIP subsequently posed these following questions for e-governance planners (in their publication Roadmap for E-Government in the Developing World)

Table 5: PCIP's questionnaire for e-Governance project planners

The PCIP's Roadmap for E-government in the Developing World
(1) Why are we pursuing e-government?
(2) Do we have a clear vision and priorities for e-government?
(3) What kind of e-government are we ready for?
(4) Is there enough political will to lead the e-government effort?
(5) Are we selecting e-government projects in the best way?
(6) How should we plan and manage e-government projects?
(7) How will we overcome resistance from within the government?
(8) How will we measure and communicate progress? How will we know if we are failing?
(9) What should be the relationship with the private sector?
(10) How can e-government improve citizen participation in public affairs?

It can be seen that these measures stop at specifying broad guidelines and emphasising the need for post facto evaluations. All these frameworks and models provide basis for evaluation of an e-government project, after it is implemented. They do not provide guidance on prioritisation at the project initiation stage.

3. Research Concept - Priority quotient or Index.

3.1 Research Content and Approach

It is seen in the previous section, that generally any e-Government implementation can be categorised in to one of the four stages or quadrants. It is also seen that the implementer has the choice to decide the extent of implementation i.e. whether it should be limited to stage 1 or should it be comprehensive and aim for stage 4. This is one aspect of prioritisation. Secondly, regardless of the stage wise scope; within each choice, the implementers have to prioritise on sequence of IT enabling of various services and functions. The aim of this research is to evolve a scientific framework and subsequently a model for this purpose.

To determine the priority or sequence of implementation, it will be necessary to identify all important factors / parameters which have to be taken in to consideration. Then each of these parameters has to be assigned weightages, reflecting their degree of influence on the decision. Once these are achieved, the framework will be ready. The next step will be to build a model which will make use of this framework. The model will have to accept field level inputs specific to a project or organisation, for some of the parameters. These inputs, along with the weightages will have to be combined to arrive at the Priority quotient or Index. Broadly, the parameters can be classified in to 3 Main Groups, which can be further classified in to sub groups and then in to some pre-identified list of parameters. The current identified details are as follows:

a) Citizen Perspective Parameters

Currently four sub groups are envisaged under this group:

i. Priority of Service for the citizens
   a. Usage potential
   b. Proportionate impact on population
   c. Demographic distribution of potential users etc.
ii. Estimation / Actual data of usage volumes, frequencies etc.
   a. Empirical estimates
   b. Data from earlier implementations
iii. Current hindrances, problems and priority of their elimination for the citizens
   a. Procedural problems
   b. Lack of transparency
   c. Corruption
   d. Delays
   e. Subjectivity leading to arbitrary decisions and / or harassment
   f. Lack of expertise in the organisation leading to person dependent delivery. (Extremely narrow channel of service) etc.
iv. Stage wise preferences of citizens
   a. Sufficiency of a particular stage.
   b. Comfort level for a particular channel of service delivery
   c. Accessibility of a channel
   d. Affordability
   e. Security concerns
   f. Privacy concerns etc.

b) Organisation Perspective Parameters

Currently four sub groups are envisaged under this group:

i. Transformation required for service delivery. (Here the weightages as well as field responses will vary from stage one to stage four).
   a. Definition of citizen charter
   b. BPR limited to within a single Dept.
   c. BPR across multiple Depts.
   d. BPR to be supported by legal changes etc.

ii. Organisational Efficiency related
   a. Service related workloads
   b. Quantum of complaints received
   c. Service related revenues earned
   d. Probable loss of revenue
   e. Potential for revenue growth
   f. Volume of usage etc.

c) Stage wise Costing Parameters

Currently two sub groups are envisaged under this group:

i. Current IT readiness status
   a. Infrastructure
   b. Skill sets
   c. Back end Systems in place
   d. e-Government systems in place
   e. Resilience of the Organisation & its back end and front end legacy systems, etc

ii. Anticipated scalability for each stage

3.2 Proposed Research Action Plan.

This research will focus on evolving a methodology for arriving at the Project or Service priority Index, (PPI or SPI) in a scientific manner. The currently envisaged steps or methodology will be as follows;

- Identify the list of Parameters.
- Identify their relative importance.
- Assign appropriate weightages.
- Segregate parameters in to global i.e. not affected by project environment of a specific e-government project, and those where project environment will have a bearing on them.
- Assign some standard values for project environment weightages, which can be manipulated by the users to reflect their project environment.
- Try and build a model which will calculate:
  - PI_I = Priority index based on global or independent set of parameters.
  - PI_E = Priority index based on parameters affected by project environment
  - C_1, C_2, C_3, C_4, = stage wise costs

- Try and build a formula for calculating
  - Priority Index = $f(PI_I , PI_E, C_1, C_2, C_3, C_4)$

- Verify the results and conclude on the hypothesis.

The Table 6 elaborates on the concept of stage wise costs.

Table 6: Upper and Lower bounds for weightages for stage wise costs

Stage. No.	When IT Readiness of an organisation is Zero. i.e. Starting from Scratch	Organisation specific Values
1	C1 = 1.0 (Assumed Value)	0<=X1<= 1.0
2	C2 >= 1.0*	X1 <=X2$ X2 can be greater than C2
3	C3 >= C2*	X2<=X3$ X3 can be greater than C3
4	C4 >= C3*	X3 <=X4$ X4 can be greater than C4

* = Assumption 1: Value will be relative to stage 1, and determined on the basis of industry inputs and assumed implementation of end-to-end integrated application software package.

$ = Assumption 2: Some of the parameters affecting the values of X1 to X4 will be:

- H/W variances
- Level of difficulty in discarding legacy
- Costs incurred on legacy
- Efficiency of legacy
- Integration requirements with legacy
- Integration capability of legacy
- Specific security concerns and requirements

The proposed research will fall in to Exploratory / Descriptive type of research. Various methods will have to be employed for data gathering such as Surveys, Field Study, Review of literature, Case studies, Analysis of public databases etc.

Case–study analysis is a well known approach for exploratory study (Eisenhardt, 1989 and Lam, 2005). The use of a single case study to identify factors that affect e-government prioritization is considered to be too limited an approach to be appropriate for this study. Multiple case studies will be more able to generate a diverse set of factors affecting e- government prioritisation than the use of a single case study (Lam**,** 2005). In addition, semi-structured interviews will be employed as a primary data technique for this study. The research will focus on methods to seek those who have significant experience of working on e-government projects or have good knowledge about this topic. The second source will be independent experts who work in the academic field or in the private sector. (AL-Shehry, Rogerson, Fairweather, Prior 2006). The typology of the proposed model will be real and heuristic. Attempt will be made to make it Extensor at a later stage.

4. Concluding Remarks

eGovernment is one of the fastest growing segments of activity for IT industry. Huge investments are being made and are planned for in the near future. India is racing ahead with ambitious plans and investments, on a scale even bigger than that of China. Substantial research has been happening in understanding the various stages of evolution of e-governance. Similarly many researchers and organisations have evolved frameworks of evaluating or assessing the success or failure of an e-government project... But there is a need to provide a framework or tool to e-Government implementers, which can help them in prioritizing projects or services in a manner which will maximize impact hence ROI, along with the highest probability of success. This research aims at determining whether it is possible to build a model to determine priority of projects or services of e-government implementation in any type of Government organisation /

department, based on a universal set of parameters and based on a set of organisation specific parameters reflecting its current status. Once such a model is established, it may be possible to further extend this model to determine priorities of services of e-government implementation across different Government organisations / departments, for implementation of one stop Government initiatives.

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