CHAPTER I

Introduction

1.1 Background

e-Governance, especially in developing countries, is looked upon as a means to change the very concept of governance resulting in empowerment of the citizens and increased transparency in public dealings by the governments; increased efficiencies in delivery of public goods is an inherent underlying assumption.

However according to an oft quoted survey, done in 2003, on e-Government initiatives in developing/transitional countries only 15 percent of e government projects can be termed as successful with 35 percent as total failures and 55 percent as partial failures where the outcome is classified as follows:

- Total failure: the initiative was never implemented or was implemented but immediately abandoned.

- Partial failure: major goals for the initiative were not attained and/or there were significant undesirable outcomes.

- Success: most stakeholder groups attained their major goals and did not experience significant undesirable outcomes.
1.2 Issues

Figure 1.1 shows an analysis of major issues in e-Governance Applications towards success/failure with percentage of each parameters.

![Figure 1.1: Major issues in e-Governance Applications Success/Failure](image)

Issue of e-Governance is much more than a technological initiative but is made of a complex set of relationships between the stakeholder’s commitment, structured developmental processes and adequate infrastructural resources. There were a number of reasons for e-Governance projects not doing well or falling short of expectations. Many should be applicable across national boundaries and could serve as guiding points for the auditors. Some of the more important ones are shared below:

1.2.1 Lack of Business process modification, in many well meaning projects, and duplication of the manual processes in the IT environment was seen as major reasons for the end users/citizens not associating any value addition with the projects and looked upon e-Governance as an unwelcome addition to the hurdles to be crossed before getting ‘the work
done’. For example in departments which maintain land records especially in rural areas the details regarding land ownership, cropping patterns etc were computerized but no legal sanctity was given to the output generated by such systems in absence of a commensurate change in the statutes.

Similarly lack of horizontal integration also means that e-Governance projects would continue to deliver services in a fragmented and unsatisfactory fashion resulting in the end users having to approach a multitude of government agencies thus defeating the promise of ‘less government in your life’. Moreover an ambiguity about the very concept of e-Governance results in many government entities categorizing e-Government projects such as office automation and inventory management as e-Governance projects. Thus vast sums of money are spent on computerization activities without giving the e-Governance related benefits to the end users.

1.2.2 Vendor driven initiatives: Currently e-Governance is the buzzword in the corridors of power in governments and the international donor agencies. Vast sums of monies are being promised and given to implement such schemes.

- However a close scrutiny reveals, startlingly, that the preference for IT components such as the hardware and software such as operating systems and RDBMS change dramatically for similar projects within the same country in the same period of time. This is sometimes reflected in a kind of a secular trend resulting from an unstated agenda or a conscious shift. While there may be only limited objections to choosing one technology over the other but auditors need to monitor and examine the trends.
• It is also seen that often the Acquisition and implementation processes are not monitored in an effective fashion and deliverables are often less than the specifications. However due to a hurry to ‘get things going’ the projects may be operationalised even when they are not fully ready.

• Moreover it is not only in the Acquisition and Implementation but also in the Delivery and Support areas that excessive dependence on the developer(s)/vendors is seen resulting in large outgo on revenue expenditure while the untrained work force of the government entities sit idle.

• Additionally there is often poor control over outsourcing. The benchmarks for evaluating performance of the service provider are not set out in a transparent fashion and are often biased towards it. For example a penalty clause for deficient services and extended liability is often absent or extremely poorly drafted to be legally enforceable. This completes the chain which started from lack of transparency in selection of technology/vendor then goes through to less than adequate receipt of deliverables and continues to large payments for services which are not monitored for performance; the citizen or the governed being the only loser.

1.2.3 Individual led initiatives: In many projects at the system development stages, especially when the user requirements were being made, there was no effective communication between the users to share the domain knowledge with the system developer(s). This was particularly true of projects which were being implemented as a result of individual initiatives emanating from the top of the management hierarchy. In such cases the developers also felt answerable to none except the management at the very top. This soon caused even the enthusiasts at the operational
level to lose interest and the projects were implemented by ‘going though the motions’. This led to the development of systems which were inherently deficient and soon ran to the ground after the change of guard at the top management level. Even where the systems become operational and were hailed as success stories poor change management controls meant that over a period of time they completely stopped doing what they had set out to achieve.

1.2.4 Vested Interests: It was often seen that there was clearly stated commitment from the Political establishment but continuous resistance by a section of the executive and other stakeholders adversely affected by transparency brought in by e-Governance. e-Governance is a catchy slogan which translates into ‘power to the people’ and paints a picture where the omnipotent computer(s) would take over all those functions of the state which entail an ‘unnecessary’ interaction of the common man with a government official. This immediately attracts the fancy of the citizens who are also potential voters, and look forward to a corruption and discretion free system where each individual is treated according to transparent rules. This enthusiasm for IT enabled e-Governance allows the governments to announce and lunch mega e-Governance schemes which often translate into large scale expenditure on hardware and software. These are often associated with lack of transparency in acquisition and creation of technological and physical infrastructure, an irony since the projects themselves seek to increase transparency in the governance mechanisms. However there are also strong vested lobbies which feel threatened by this transparent governance and many a times they were seen to do anything to either discredit a new project or not allow it to take off at all. Though the bogey of unemployment resulting form computerization is long dead but the resistance continues as it has been
realized that automation of backend procedures would eventually result in e-Governance. During audit the government functionaries were often found painting a worse picture of the e-Governance projects than the actual situation. The expectation was that a very critical audit report would help in derailing the process of e-governance.

1.2.5 Confidentiality issues: A major concern is the lack of attention to issues relating to the Confidentiality of the data such as in tendering systems or regarding personal details of citizens etc. For example if an e tendering systems does not store the data regarding the bids before the opening date in unencrypted fashion, PKI is not mandatory for submission of bids, logical time locks to disable access to the bid details before the bid opening date are absent and there is inadequate provision of activity logs for system and data administrator activities then the system can be labeled as extremely risk prone to manipulation and does more harm to the cause of IT in improving governance. One may be surprised to find such cases where large contracts have been decided on the basis of such a system. Information Technology indeed cuts both ways! Similarly if personal details such as social security number or taxation details, in an e tax return filing system, are not kept in a secure environment it would ultimately undermine the confidence of the users in the use of such systems.

1.2.6 The digital divide: There is always the risk of the implementation of e-Governance projects being so prioritized as to benefit only a certain section(s) of the society. Additionally e-Governance delivery mechanism may not account for the existing digital divide. This would cause even the most well intentioned initiatives not achieving the objectives. Though innovative methods were seen, especially such as e-Governance kiosks manned by paid non government facilitators to help citizens, the fact
remains that without bridging the digital divide e-Governance projects may not gain critical mass to be effective. Successful e-Governance implementation is about four main components: End users need identification, Business Process Modification, Use of Information Technology and most importantly committed government intent. Deficiencies in any of these would result in e-Governance projects failing to achieve their objectives.

1.3 Challenges:

There are mainly three type challenges in every e-Governance project which can drag the project towards failure; they are at Bureaucratic, Developmental and Implementation layers. During implementation time the lack of infrastructure, maintenance of the infrastructure if they are available and lack of willingness to adopt the new technology creates the real problem. This is the most crucial challenges faced in all the e-Governance projects which became the only reason for the failure of many well designed, smartly coded and strongly tested e-Government projects. At the time of developing e-Governance projects, there are very few SDLC models available which hardly addresses those challenges faced by the government and Implementing agencies. This model specifically designed to meet the challenges of e-Governance projects along with their smart implementation.

Unlike any other Enterprise solution, the e-Governance projects meet certain specific challenges in the entire category like G2G (Government to Government), G2C (Government to Citizen), G2B (Government to Business) etc. These challenges can be categorized by three layers as follows:

- **Bureaucratic Layers**
- **Developmental Layer**
- **Implementation Layer**
1.3.1 Bureaucratic Layer:

Normally every kind of e-Governance project initiates from the Bureaucratic level. They are the real people who start the Herculean task to make the government smarter as well as they are the policy maker and responsible for arranging funds for the project. Normally e-Governance projects leads to failure by some of the below mentioned reasons at bureaucratic layer:

- Frantic effort to spend the fund at the end of the financial year without proper planning.
- Lack of technical knowledge and non-availability of expert panel at the Bureaucratic level.
- More focus on G2C services without having proper G2G services at the back end, which are the stepping stone of those G2C services.
- Loose monitoring, lack of support to the implementing agencies.
- Non awareness of the ground reality, lack of vision towards the infrastructure management on a long term basis.
- Lack of vision toward Legacy system, future extensibility, Interoperability to different government departments.

The above maintained challenges affect implementation level more than the developmental stage and may collapse the entire process of the project development. As this is the decision making layer so a dedicated team comprising of technical and domain experts must be formed from the beginning of the smart innovation.
1.3.2 Developmental Layer:

Government changes in its departmental policies on time to time basis, so if they occur during the development of certain software system, it may become the headache for the developer team. For example during the development of Holding tax monitoring system, if it has been finalized that to collect property tax instead of holding tax and calculation is quite different then it is a problem for the developer team to absorb this amount of change in their project. Maintaining a well balance between the legacy system and future extensibility of the project creates a problem for the software architect where as the technology used to find a middle way also becomes antiquated before the implementation of the project. For inter government operability it need to integrate applications of related departments, but those application may be developed by some other venders using some other platform so integrating with them creates the real problem as they may not be developed keeping in eye for the multi platform integration.

1.3.3 Implementation Layer:

Technology has never been a problem for implementation of e-Governance projects, given the country's pre-eminence in IT. However, the problem lies in understanding the intricacies of implementation of meaningful e-Governance projects. In our country, the government is probably one of the biggest employers, and the biggest sector, from the economic point of view. The main problem is managing process change and change management within the government. Processes are very much linked to government rules and regulations. These need to be simplified for the smooth implementation of G2C services. But the process reengineering is always very slow, with long gestation period. The first and the most important point is that the objectives, the milestones and the framework should be clearly articulated before we embark on any e-Governance project.
The evaluation of the project becomes very confusing due to the lack of measurable milestones, benchmarks or quantifying parameters. In this context, the emphasis should be on identifying quantifying parameters because, those things can't be measured can't be improved. Implementation is also affected due to lack of adequate funding towards awareness program, maintenance of infrastructure and lack of client coordination.

1.4 Motivation:
The Software Development Lifecycle (SDLC) was introduced in order to structure the software development process and ensure that it complies with the above definition. The SDLC identifies five phases in the software development process: Requirements Analysis, Design, Implementation, Integration and Testing (I&T), and Maintenance.

Hence, the software development process systematically begins with identifying and specifying user requirements and then proceeds to design, coding, testing and maintenance. These phases are found in the traditional approaches to software development such as the Waterfall model and the Spiral model. These structured approaches have helped reduce the chaotic state of software development by emphasizing

- Extensive planning to outline the process to be followed, identifying tasks to be completed during product development and determining product milestones
- Comprehensive documentation in the form of Software Requirements Specification (SRS), high- and low-level design documents, test plans, etc.
- Gathering and specifying user requirements upfront before proceeding to the design phase
• Anticipating future requirements and designing the architecture of the system to accommodate current and future requirements

• Process monitoring and control, risk management and software quality control and Assurance

However, in the last few years, many development teams have realized that these traditional approaches to software development are onerous and are not suitable for e-Governance applications. The traditional approaches were found to be inadequate and expensive for development efforts which deal with rapidly changing requirements. Conventional methods attempt to foresee future requirements and create the software system architecture upfront in order to accommodate current and future requirements.

However, when new requirements that were not previously identified surface, the current architecture may no longer be valid. The cost of modifying the architecture, and in turn the code, in order to accommodate requirements identified late during the development lifecycle is very high.

Creating comprehensive documentation is often a wasted activity in the face of changing requirements. Documents have to be maintained regularly to reflect changes made to requirements and design. Hence, in the face of rapidly changing requirements, maintaining comprehensive documentation is expensive. Also, the extensive planning and documentation efforts were found to be cumbersome for organizations and teams involved in developing e-Governance applications.

1.5 The Research Objectives:
This research topic attempts to make an original contribution to Information System theory as well as reveal opportunities for future research. The research primarily aims to assist system development teams in their negotiating abilities in systems development. It will be used to apply negotiation skills to the systems development
life cycle (SDLC) and ultimately produce benefits from these abilities, in terms of improved performance in system development.

A model will be presented in the research and aims to assist system development teams at each stage of the SDLC in developing e-Governance applications. It will be a model that will frequently be consulted, in order to facilitate negotiations within the SDLC team, and at what level to do so.

The objectives of this research work aims to:

- To find out the Challenges faced in e-Governance Applications
- Development of a new Model to address the challenges of e-Governance Applications.
- To examine what factors play a role in the acceptance of the proposed frameworks
- To assess whether the proposed module will improve systems delivery

1.6 Methodologies:

For this research, both Commercial Applications & e-Governance Applications were chosen for an in-depth case study. Both Applications have produced several high-quality software products and finally a SDLC Model has been developed which implements a hybrid methodology of defined and empirical approach to address the challenges of the e-Governance projects

An exploratory research process using observations, surveys, documentation, and interviews was conducted for both Commercial Applications & e-Governance Applications.
1.7 Research Approach followed:
The approach for the development of a most suitable and dedicated SDLC Model for the e-Governance Software is of six steps:

a. **Study of existing SDLC Model (Both definitive & Empirical Model):**
   Existing SDLC Models are of two types, one is definitive like Waterfall Model, Prototype Model, Spiral Model etc and other empirical like Extreme Programming, Crystal Clear, SCRUM Model etc. An in depth study should be done on each categories of model in the perspective of e-Governance & list out the shortcomings.

b. **List out the parameters of a virtual SDLC Model, ideal for e-Governance Software Development :** A virtual SDLC Model should be conceptualized which may be the most suitable for the development of the e-Governance and then list out those parameters which make that an ideal model.

c. **Identify the nearest suitable Model of virtual ideal SDLC from the pool of existing :** From the pool of existing Definitive & Empirical SDLC Models, the Model which is nearest suitable to the virtual ideal SDLC Model conceptualized in previous step (step: b) need to be identified.

d. **Challenges issues in the nearest suitable Model:** As the nearest suitable Model may also have certain challenges which prevent it to meet all the parameters of the Virtual Ideal SDLC Model. Listing out all those challenging issue will provide a goal to achieve.

e. **Address the issues by adding new features & removing problematic ones :** By appropriately adding and removing as well as modifying the features of the nearest suitable Model (Step: c), try to achieve the goals by mitigating the challenging issues listed out in Step: d.
f. **Compare with the parameters of Ideal Model in an Iterative manner until the Ideal one is achieved:** Compare the parameters of the customized model with the Virtual Ideal SDLC Model and follow the step e in an iterative manner until all the parameter touches certain standard conceptualized in Step d.

### 1.8 Problem Statement

Every e-Governance Projects have certain challenges and unsolved issues, which are hardly addressed by any traditional or modern SDLC models. The challenging issues lies in Government Process Re-engineering (GPR), Change Management, Adoption Time, non consumption and G2G Integration.

The main objective for our research is to develop a dedicated SDLC Model for e-Governance Projects. As mentioned, clear specification of activities in the existing SDLC Models is missing and there is a lack of a set of techniques that practitioners can choose from. There is no structure to the development of e-Governance Projects. Hence, there is a need to develop a structured approach that clearly outlines the activities for development of the e-Governance Projects and suggests techniques or practices that can be used. Such an approach guides practitioners adopting development of e-Governance Projects. To achieve clear specification of activities in developing the e-Governance Projects, it must be structured. However, it is imperative that the impact on existing SDLC Models, the new approach should be soft structured in that it structures the development of e-Governance Projects process without compromising existing SDLC Models.

E-Governance Project development and roll out must follow certain policy framework so that all the peculiar issues can be rooted out from the path of success. All we need to follow up is a dedicated policy framework, guidelines or process...
flow which can lead us to a productive e-Governance Project rescuing the investment from being sinking and can overcome all the challenges which may lead to failure of the project.

1.9 Thesis Organization

The research paper is a descriptive study formatted in five chapters.

1.9.1 Chapter One: Background to Research

This chapter has introduced the motive for the research and given an overview of the research problem. The research objectives have been identified.

1.9.2 Chapter Two: Review of Literature

This chapter review the literature related to the evolvement of software development methods in respect of e-Governance applications.

1.9.3 Chapter Three: Research Methodology

This chapter describes the research methods and online tools and resources employed during the completion of the thesis.

1.9.4 Chapter Four: Data Analysis And Research Results

This chapter presented the results of the research and provided an analysis of the strengths and weaknesses of lightweight methodologies.
1.9.5 Chapter Five: Discussion And Management Guidelines

This chapter provided a summary of lightweight SDLCs and gave recommendations for their appropriate use.

1.9.6 Chapter Six: Our e-Governance SDLC Model

This chapter suggests a new SDLC model for the adoption and utilization in the development of e-Governance projects. A Case study has also been done in this chapter.

1.9.7 Chapter Seven: Summary and Future Research Directions

This is the concluding chapter in which the research will be evaluated against the research objectives and the associated propositions and research problems relating to these objectives. Further, recommendations for system development teams and areas for future research will be discussed.

1.10 CONCLUSION

This chapter explained the motivation that drove the research. It explained the significance of the research, provided a background of the study, and explained the aims and objectives of the research. Further, it outlined the structure of the report as well as the implications, limitations and prospective research opportunities that may emanate from the study. The ensuing chapter provides a discussion on the varying system development practices available, the roles involved in the SDLC, as well as the social aspects pertaining to the different roles and their responsibilities.