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## LIST OF ACRONYMS AND ABBREVIATIONS

| | |
|---|---|
| BMI | Body Mass Index |
| CHD | Coronory Heart Disease |
| DOI | Digital Opportunity Index |
| EGDI | E-government Development Index |
| e-gov | e-governance |
| e-govt | e-government |
| ERI | E-readiness Index |
| G2C | Government to Citizen |
| G2G | Government to Government |
| G2B | Government to Business |
| HCI | Human Capacity Index |
| ICT | Information Communication Technology |
| ICT4D | Information and Communication Technology for Development |
| IS | Information Systems |
| M and E | monitoring and evaluation |
| NRI | **N**etwork e-Readiness Index |
| PLT | planned completion time |
| PM | project management |
| PMLC | project management life cycle |
| PIA | participatory impact assessment |
| TEF | Technology Enactment Framework |
| TII | Telecommunications Infrastructure Index |
| UN | United Nations |

| | |
|---|---|
| UNESCO | United Nations Educational, Scientific and Cultural Organization |
| UNISA | University of South Africa |
| | |
| WBS<br><br>WMI | Work Breakdown Structure<br><br>Web Measure Index |
| WHR | Waist-hip ratio |
| SEP | Socio-economic position |

## PUBLICATIONS

1. Hatsu, S., & Ngassam, E. K. (2017). An integrated framework for benchmarking e-government projects IST-Africa Week Conference (IST-Africa), 2017, 2017

2. Hatsu, S., & Ngassam, E. K. (2017). A framework for assessing the socio-economic impact of e-governance projects in developing countries, Technology and Society (ICTAS), Conference on, 2017

3. Hatsu, S., & Ngassam, E. K. (2016). A Framework for the Monitoring and Evaluation of e-Governance Projects in Developing Countries. In M. C. Paul Cunningham (Ed.), (pp. 1–7). IIMC International Information Management Corporation. Retrieved from www.ist-africa.org/Conference2016

4. Hatsu, S., & Ngassam, E. K. (2015). Article: An Exploration of Critical Success Factors for e-Governance Project Initiation: A Preliminary Framework**.** Paper presented at the 10$^{Th}$ IST-Africa conference in L Lilongwe, Malawi, May 2015

# CHAPTER 1: INTRODUCTION

## 1.1 Background

The advance of the Information Communication Technology (ICT) industry in this century has been beneficial to public administrations worldwide (Asgarkhani, 2005; Dawes, 2008; Organização das Nações Unidas, 2014). Although developing nations have been at the forefront in the evolution of appropriate ICT-solutions for their own public administration, there is increasing evidence that a number of north-south partnerships are being established for the development of Information Systems (IS) in the administration of governments (Richard Heeks, 2002). Evidence from the literature suggests that the use of ICT for efficient service delivery is often attributed to the private sector; however, recent evidence shows that electronic governance (e-governance/e-gov) has become a major research topic, especially when exploring its socio-economic effects (Asgarkhani, 2005; Backus, 2001; Wahid, 2012).

Many studies have revealed that a positive correlation exists between e-gov deployment and the socio-economic development of some nations to enhance the quality of service delivery to citizens. Asgarkhani (2005) argues that e-service, a component of e-governance, is capable of improving the following:

- internal governance efficiency;
- internal communications;
- access to information and services;
- enabling electronic democracy; and
- promoting interconnection and integration of electronic services.

E-governance has also proved to be effective for combating corruption and increasing transparency in governance. In addition, it empowers rural communities, helps reduce the cost of services, controls government expenditure, and also improves government revenue through taxation (Bhatnagar, 2003; Singh, Belwal and Naz, 2008).

According to Boateng (2013):

> To date, e-governance has been proven successful in developed countries but developing countries considerably lag behind developed countries due to a number of factors. Notable among these are lack of citizen awareness and participation and socio-cultural conditions among others.

It is, therefore, important to research possible approaches for implementing e-gov solutions that will guard against the above-mentioned challenges and thereby ensure that these solutions yield the desired results for the socio-economic well-being of developing countries. The purpose of this chapter, therefore, is to set the stage for the development of a framework for benchmarking e-gov projects in developing countries. The developed framework would help developing countries ensure that their e-gov projects adhere to best practice guidelines for consistent and maximum impact.

This chapter outline is as follows: section 1.2 gives the background and motivation underpinning the study; section 1.3 explores the problem statement for the study; Section 1.4 presents the research objectives for the study. In section 1.5, the research questions are treated; section 1.6 provides a discourse on the research methodology and design by exploring research design, theoretical foundation, case study, sample and sampling procedure, instrumentation/measures, data analysis, and the study area; while section 1.7 takes an in-depth look at the research contributions. In section 1.8, the scope and limitations of the study will be explored; with section 1.9 discussing ethical considerations undergirding the study. In section 1.10, an overview of all chapters is presented; and, finally, section 1.11 presents the conclusion to chapter 1.

## 1.2 Motivation

E-governance (e-gov) and e-government (e-govt) are two related terms with different meanings. They have been defined in many different ways by many researchers. Firstly, it has been argued that a proper understanding of e-governance requires an understanding of government and governance and collaborative engagement. As such, information systems designed to improve governance must take the concerns of all stakeholders into account, including service delivery to citizens, civil society, and development partners (Boateng, 2013; Education, 2016). E-governance, therefore, concerns the use of ICTs as an enabler to continuously transform the internal and external relationships of governments, private sector, and other governance stakeholders; and to build citizen-centric, cooperative and polycentric modern governance systems (Boateng, 2013).

E-Government (e-govt), on the other hand, refers to the use of specific ICT tools to improve access to government functions such as information or services. Furthermore, e-govt focuses on the empowerment of local and international economic potential as well as creating an environment where individuals and businesses in a country can thrive with government support and without government hindrance (Boateng, 2013).

E-governance is also defined by Sharma, Bao and Peng (2014, p. 82) as:

> The process of adopting electronic means in possible sectors and stages of government to ensure legitimate mass-access of administrative and service-oriented information with the potential to establish transparency and accountability of government activities and maximum service by redesigning and redistributing the administrative and operating system of government.

The term 'electronic' in the context of e-governance refers to all forms of ICTs such as information systems which government agencies deploy to enable effective service to the citizenry. This definition takes cognizance of the main aim of e-governance which is transparency and accountability in government that eventually culminates into socio-economic development. E-governance is categorised into three main domains: e-administration, e-services, and e-society depending on the nature of interaction that e-gov generates between the government and its citizenry (OECD, 2007; Boateng, 2013). These may be defined as follows:

- **E-administration** concentrates on improving the internal operations of the public sector's processes by reducing costs, improving performance, and creating strategic connections and empowerment within the bodies of government.

- The **e-services** component concentrates on improving the relationship between government and its citizens by increasing the volume and quality of information flow and service levels from the government to its citizens via a two-way interaction.
- The **e-society** domain extends the e-service domain by building more enduring partnerships amongst stakeholders of the public governance process for its socio-economic community (Jager, 2018).

E-governance in the context of this study, therefore, refers to the use of ICTs to govern. The use of ICTs helps to provide the essential services that citizens expect from government, such as:

- manage and provide social grants;
- issue of passports and VISAs;
- pay and manage utility bills such as water, electricity and gas; and
- certify birth and death registration.

However, many researchers have defined e-government differently. Although e-govt is directly linked to the role of government, it is important to note that the definitions have common concepts which centre on the use of technology and the provision of government services to citizens (Rabaiah and Vandijck, 2009). A government itself is defined as the body responsible for making and driving the public policy for an entire society. This body is, therefore, seen as the "the steering mechanism for a given society" (Waardenburg and Bovenkamp, 2012, p. 13). Its policies keep a particular society heading in the right direction (Proudhon and Robinson, 2004). Donald Norris (cited in Norris, 2010, p. 339) defines e-government as "the delivery by alternate, electronic means of governmental information and services 24/7/365". He argues that e-government is not the same as e-governance by explaining that e-government employs official governmental websites which connect to the outside world in terms of

- government to citizen (G2C)
- government to government (G2G)
- government to business (G2B)

E-government, therefore, is the outward face of information and communications technologies (ICTs) by the government to deliver information and services. Consequently, e-government is not to be confused with e-democracy or e-governance.

By contrast, e-governance is adopted by governments to carry out public sector reforms with identifiable strategies. The strategies span from the stage of '**ignoring**' the use of information and communication technologies (ICTs) to the stage of '**isolation**' (where ICTs are perceived by the major development agencies as a technology that external agencies such as vendors and donor agencies can drive and promote). This is followed by the stage of '**idolisation**' *(*where ICTs are placed at the centre stage in the development process). These governments then mature to a stage where ICTs are fully '**integrated**' in the programs for public sector reforms (OECD, 2008; Sharma, Bao and Peng, 2014).

However, despite this strategy by development partners to improve the public sector with e-governance systems in developing countries, there is, some scepticism on the effects it can have on the socio-political and economic aspirations of such countries. This scepticism can arise before and after the development of these solutions (Norris, 2010).

In this respect, the benefits of e-governance systems on the lives of citizens, businesses and government agencies have to be considered (Asgarkhani, 2005). However, to a large extent, the success or failure of e-governance projects within the public sector depends on the degree of acceptance accorded such systems by all stakeholders (Heeks, 2002a). Consequently, while researchers have looked at the challenge of acceptable of e-gov, only a few have attempted to develop a sustainable model that fits the political and socio-economic conditions of developing countries.

Countries such as Germany, Singapore, and Malaysia have successfully deployed a number of e-gov solutions in an attempt to continuously improve their economic fortunes. For example, in the UN rankings of 2014, the Republic of South Korea, Australia, and Singapore improved its performance (Organização das Nações Unidas, 2014). Previously, in the 2012 ranking, the UN graded the Republic of Korea, Netherlands, United Kingdom, Denmark, and United States among the top five countries in e-governance (Organização das Nações Unidas, 2014). It can be seen, therefore, that the Republic of Korea, which maintained its number one position in 2010, 2012, 2014 rankings, has achieved remarkable success in e-governance by the deployment of a number of e-gov solutions, namely; KISS-Korea Immigration Smart Service; Invite- Information Network Village; and, e-people (Petition) where citizens (and even foreigners) can file a petition with the Korean administrative agencies.

In spite of attempts to catch up by maximising efforts through policies and programmes, other developing countries are still lagging behind their developed counterparts in terms of the deployment of e-governance. The regional ranking of categories in the same UN report (Organização das Nações Unidas, 2014) obviously shows that the Republic of Korea has emerged as the leader in Asia; whereas the United States lead the Americas, while Australia leads the Oceania region. In Africa, Tunisia as at

2014 leads the rankings, displacing the 2012 leader, Mauritius. Despite the high performance by Korea and Singapore, the European block, led by France and the Netherlands, is still ahead globally, according to the 2014 regional performance index (OECD Government Studies, 2008; Organização das NaçõesUnidas, 2014).

Although a number of African countries have made significant efforts and improved their performance in the 2014 Report, the continent still lags behind other regions. This can be seen, for example, in the regional groupings where individual countries are grouped by the e-government development index (EGDI) as:

- very high EGDI (above 0.75)
- high EGDI (between .50 - 7.5)
- middle EGDI (between 0.25 - .50)
- low EGDI (less than 0.25).

It can be seen that only three African countries; Tunisia, Seychelles, and Mauritius made the mark to the very high group of EGDI (between 0.5 to 0.75) (Organização das Nações Unidas, 2014).

Many researchers have attributed various reasons to the perennial poor showing of developing countries. Firstly, they state that achievements in the sub-regions have been marginal and this could be attributed largely to lack of infrastructure and high illiteracy rates. The countries seen to be doing well within the sub-regions are those in southern Africa with a regional average of (0.3934) and Seychelles with an index of (0.5192). Nonetheless, the Seychelles, which is ranked as number one in the sub-region, is still far behind world leaders in spite of their impressive performance. Developing countries in other regions such as Pakistan, Saint Lucia, Marshall Islands, Haiti, Comoros, and Turkmenistan have also persistently lagged behind developed countries in their performance in e-governance in their regions (United Nations, 2012).

Consideration of the unique challenges that characterise developing countries must be taken into account when finding possible reasons for this disparity. These reasons, among others, are: the levels of infrastructure, literacy levels, political conditions, regulatory framework, financial conditions, and cultural and human resources conditions.

According to the UNESCO literacy report in 2013, sub-Saharan Africa and South and West Asia had the lowest youth and adult literacy rates. Adult literacy rates in Benin, Burkina Faso, Chad, Ethiopia, Guinea, Haiti, Liberia, Mali, Niger, Senegal and Sierra Leone fell below 50% compared to central Europe and Central Asia, Pacific and Latin America and the Caribbean which had rates above 90% (UNESCO-UIS, 2015). However, the high literacy rates combined with e-government solutions yielded successful results in the Republic of Korea. It appears, therefore, that the failure rate of e-governance projects in developing countries is due in part to the challenge of internet penetration. In spite of the fact that mobile penetration is rising rapidly in many countries, the cost of internet usage is still very high compared to that in developed countries like Singapore and the Republic of Korea (Lee, 2013).

### 1.3 Problem Statement

An e-governance project is like any other information system project in that it consists of many phases in its life cycle that include: strategy development; current state assessment; future definitions; implementation approach and sourcing; development and implementation of systems; and operation and system (Mendell, 2010).

Investigations have revealed that the failure rate of e-governance projects in developing countries is between 35% and 50% where 35% is classified as a total failure and 50% is considered partial failure (Heeks, 2004). The cause of failure of many e-governance projects in developing countries is attributed to a range of reasons. Alshehri in (Alshehri and Drew, 2010) identifies 11 different challenges that pre-dispose e-gov projects to failure; namely, weak IT Infrastructure; lack of knowledge about the e-government program; lack of security and privacy of information; lack of qualified personnel and training courses; culture differences; inadequate leaders and management support; lack of policy and regulation for re-usage; lack of partnership and collaboration; lack of strategic plans; resistance to change to e-systems; and insufficient financial resources.

The above challenges can broadly be classified into political, economic and operational challenges. These are further described below:

- **The political challenges** facing e-gov projects arise from the lack of commitment by politicians to political stability.

- **Economically,** it is noted that most e-gov projects in developing countries are donor-funded and as a result, the sustainability of the funding source puts the future of the projects in jeopardy (Bhatnagar, Rao, Singh, Vaidya and Mandal, 2007).

- In terms of **operational challenges,** e-governance projects also face competition from other government projects which are perceived as having a direct impact on the livelihood of the citizens. The ICT projects are generally difficult to monitor and evaluate and e-governance projects are no exception. According to Lea (2003), this is partly owing to the lack of clear objectives which stem from the fact that most stakeholders in such projects tend to, among others:
    - hold competing views;
    - lack clarity of project objectives;
    - have difficulty in defining success;
    - set off to be too ambitious;
    - use private-sector tools not applicable to an e-governance project.

In instances where the political challenges and funding are adequately covered, the projects still face a major challenge of failure. The design/reality-gap is another major hurdle which also poses a key challenge to the success of projects (Heeks, 2004). Many e-gov projects fail to adequately consider the real needs of the intended beneficiary and also the specific socio-economic conditions such as literacy rates and cultural values prevailing within the environment in which the projects are implemented.

Generally, most available frameworks tend to be more skewed towards developed countries than in developing countries. This is even in the case of those studies which claim to be highly representative, like that of Rabaiah and Vandijck (2009), who investigated the strategies of 21 countries drawn from all the continents to conceive a generic strategic framework for e-governance. Out of the 21 countries, the proportion of developing and developed countries used in generating the framework was at least 23% to 57% respectively. This, therefore, does not offer a single comprehensive e-governance framework for developing countries.

Obviously, the e-governance milieu of developing countries is very different from that of developed countries. For this reason, an e-gov framework that works well in a developed economy may not necessarily work the same way in a developing one. The reasons range from the differences in ICT infrastructure, culture, training capacity, literacy rates, internet and personal computer (PC) penetration, and socio-economic conditions, among others (Rabaiah and Vandijck, 2009). Thus, the development of a unique framework that is responsive to the socio-economic realities of each developing country needs to be considered. This research, therefore, seeks to propose a comprehensive framework that can serve as a blueprint for benchmarking e-gov projects in developing countries, not only for monitoring the project during its core life-cycle but also at its pre-initiation and post-deployment phases.

By studying the e-government strategic frameworks of 21 countries, Rabaiah and Vandijck (2009, p. 241) proposed what they called "a best practice framework that is generic enough to be adopted by any given strategy". The proposed framework was layered as follows: vision, objectives, principles, focus areas, building blocks, prioritised initiatives, and implementation plan. It is suggested that implementation of e-gov initiatives along the lines as suggested in the aforementioned framework is likely to be met with a lot of success, despite numerous differences across the different governments. These researchers also argue that this framework can be flexible, customised and extensive (Rabaiah and Vandijck, 2009). However, the proportion of developing countries represented in the development of this framework was not representative enough. This, therefore, requires surveys and applications to a broader number of developing countries not only for further improvements but also to make it more adaptable, taking into consideration their intrinsic specificities. Building blocks have to entail elements such as security framework, e-identification and reusability that respectively deals with the organization, infrastructure and guidelines, which form the three types of building blocks for e-gov.

## 1.4 Research Objectives

This study seeks to develop a framework for benchmarking e-governance projects, be developed and used as a tool for supporting socio-economic development in developing countries. An e-governance project in this context refers to a range of steps and processes taken to deliver e-governance capabilities for e-service delivery to intended beneficiaries. The focus of this research is therefore not only restricted to the e-governance projects lifecycle in general but also to their post-deployment phase. Consequently, the objectives of the research are:

- **Research Objective 1(RO1):** Investigate socio-economic indicators associated with e-governance in developing countries.
- **Research Objective 2 (RO2):** Investigate critical success factors in the lifecycle of e-governance projects.
- **Research Objective 3 (RO3):** Explore success criteria and assessment metrics of deployed e-governance solutions.
- **Research Objective 4 (RO4):** Develop a framework for benchmarking e-governance projects in developing countries.
- **Research Objective 5 (RO5):** Evaluate, improve and validate the developed framework through case studies and experts' contributions by the development of a prototype platform to translate and automate the improved e-gov framework for benchmarking e-gov projects.

## 1.5 Research Questions

The main question this study seeks to answer is:

> **How can a framework for benchmarking e-governance projects be developed and used as a tool for supporting socio-economic development in developing countries?**

In order to address the foregoing main research question, the following specific research questions will have to be answered:

- **Research Question 1 (RQ1):** What are the socio-economic indicators associated with e-governance projects in the context of developing countries? The research question explores the specific socio-economic indicators of developing countries that can be monitored and measured to ascertain the impact on growth which can be attributed to e-governance projects in the countries.
- **Research Question 2(RQ2):** What are the critical success factors of an e-governance project's lifecycle and how can we measure them? This question is aimed at identifying the critical success factors of e-governance crucial in the project lifecycle. This process will be achieved through the explorations and review of existing monitoring and evaluation theories of e-governance projects in the literature.

- **Research Question 3(RQ3):** What are the assessment metrics of a deployed e-governance solution and what are their measurement criteria? This question seeks to explore the post-deployment phase of e-governance projects. Impact assessment of deployed e-governance projects on the livelihood of beneficiaries and the various matrices for measuring the socio-economic impact of e-governance projects would be and methodologies for determining if the project object objectives have been attained.
- **Research Question 4 (RQ4):** What is the most appropriate framework for benchmarking e-governance projects in developing countries such that a project on which the framework is applied would lead to advancement in socio-economic development? In order to achieve this, this study will rely on the outputs of RQ 1-3. Critical success factors which will be established from research question1, the success criteria and the impact access matrices from RQ 2, and the socio-economic indicators which would be derived from the output of RQ 3 will form the input which will be used in the development and construction of the framework.
- **Research Question 5 (RQ5):** How can the proposed framework be validated, improved and evaluated for the purpose of socio-economic development in developing countries? To answer this question sufficiently, the research will employ a mixed approach. Expert opinions of e-governance project management experts, the staff of implementing agencies from government ministries and departments were sampled. Surveys of project managers of e-governance projects were carried out to further validate and fine-tune the framework

### 1.6 Research Methodology and Design

This section presents a discussion on the proposed research methodology to be adopted for this study, as well as its justification. It also provides a mapping of the research question, and the key themes to be explored with the respective proposed methodology (Table 1-1). Also presented are the theoretical foundations of the research paradigm and the justifications thereof.

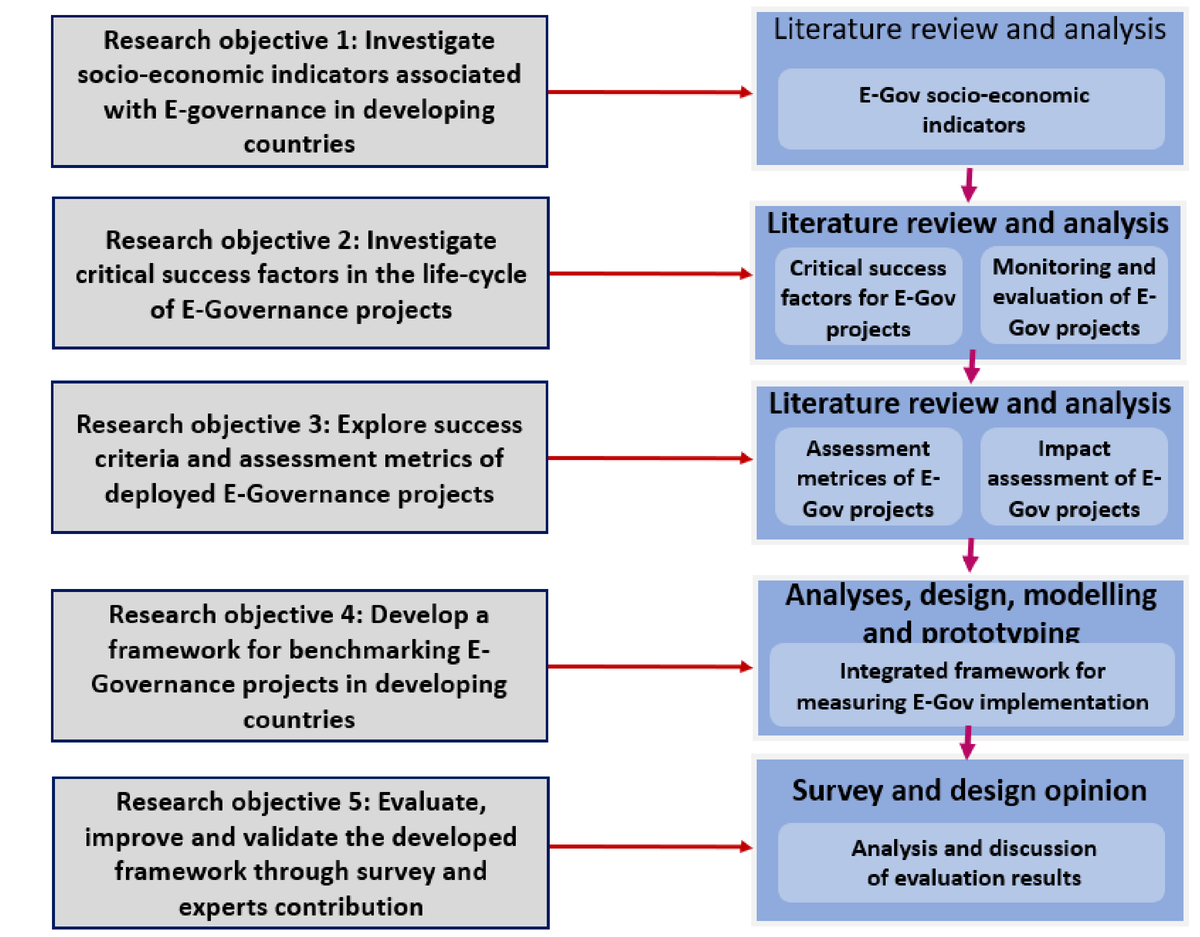
**Table 1-1:** Mapping of research questions, concepts and methodologies

| Research Questions | Concepts to be discussed | Research methodologies |
|---|---|---|
| RQ1. What are the socio-economic indicators associated with e-governance in the context of developing countries? | • Socio economic matrices<br>• Socio-economic matrices relevant to e-governance projects | • **Literature Review**<br>• **Analysis of the Socio-economic Indicators of Developing countries** |
| RQ2: What are the critical success factors of an e-governance project's lifecycle and how can they be measured? | • e-Governance project lifecycle<br>• Monitoring and Evaluation of e-governance projects<br>• Critical success factors of e-governance project | • **Literature Review**<br>• **Literature Review**<br>• **Analysis of the Critical Success Factors** |
| RQ3. What are the assessment metrics of a deployed e-governance solution and what are their measurement criteria? | • e-governance project evaluation<br>• impact assessment metrics | • **Literature Review**<br>• **Analysis of the impact assessment metrics of e-governance projects** |
| RQ4.How could a framework for benchmarking e-governance projects be developed based on critical success | • Framework construction and development | • **Analysis,**<br>• **Design** |

| | | |
|---|---|---|
| factors as well as socio-economic indicators in developing countries? | principles and approaches | • **Modelling**<br>• **Prototyping** |
| RQ5. How can the proposed framework be validated and evaluated for the purpose of socio-economic development in developing countries? | • Framework Evaluation criteria and techniques<br>• Framework Validation Criteria and techniques<br>• Statistical tools for evaluation and validation | • **Survey-based Case Study**<br>• **Experts' Evaluation** |

### 1.6.1 Research design

This section presents a structure of the design process based on the objectives and the methodology applied. The design entails the use of survey-based case studies and expert opinion. The details are summarised in Fig 1-1 below.




**1. Figure 1-1 Research design of the study**

### 1.6.2 Theoretical foundation

Recently, design science research (DSR) has drawn more information systems (IS) research attention, since it is concerned with the production of information technology (IT) artefacts and their evaluation, which is at par in the level of importance with an investigation into IS impacts (Benbasat and Zmud, 1999; Hevner, Ram, March, and Park, 2004). Overall, design science research makes available models and guidelines to researchers that enable them to create, improve and evaluate IT artefacts (Hevner et al., 2004; Holmström, Ketokivi, and Hameri, 2009).

Design science research has been termed as the 'science of the artificial' as it deals with artefacts - things or processes which are not naturally occurring, but are either novel or innovated (Simon, 1996; Vaishnavi, Kuechler, and Petter, 2019). In that regard, Simon (1996) distinguishes the ‘science of the artificial’ from ‘natural science’. Design science research, among other things, is characterised by two important features – the creation of an artefact and multiple iterations. According to Holmström et al., (2009), design science research is discovery and problem-solving oriented. For this study, we seek to discover an integrated framework for benchmarking e-governance project in developing countries and solve the problem of e-governance project failures.

Design science research can manifest as both a method and a theory. As a method, it provides guidelines for conducting research in information systems. As a theory design science research complements positivism, interpretivism and critical perspectives (Vaishnavi, Kuechler and Petter, 2019). Weber (2010) in his paper titled, “Design Science Research: a paradigm or approach?” argues that “design science research is an important key factor for a new and innovative research paradigm (p. 1).” Gregg, Kulkarni, and Vinze (2001) advances the philosophical underpinnings of three research paradigms or perspectives as summarized in the table below.

**Table 1-2:** Comparison of Philosophical Assumptions with regards to Design Science Research

| Basic Belief | Research Perspective | | |
|---|---|---|---|
| | **Positivism** | **Interpretivism** | **Design Science Research** |
| Ontology | A single reality; knowable, probabilistic | Multiple realities, socially constructed | Multiple, contextually situated alternative world-states. Socio-technologically enabled |
| Epistemology | Objective; dispassionate. A detached observer of truth | Subjective, i.e. values and knowledge emerge from the researcher-participant interaction. | *Knowing through making*: objectively constrained construction within a context. Iterative circumscription reveals meaning. |

| | | | |
|---|---|---|---|
| Methodology | Observation; quantitative, statistical | Participation; qualitative. Hermeneutical, dialectical. | Developmental. Measure artifactual impacts on the composite system. |
| <u>Axiology</u> | Truth: universal and beautiful; prediction | Understanding: situated and description | Control; creation; progress (i.e. improvement); understanding |

Sources: (Gregg, Kulkarni and Vinze, 2001; Vaishnavi, Kuechler and Petter, 2019)

Based on findings from the literature, design science was found to be most appropriate as the theoretical foundation of this proposed research on the development of the e-governance implementation framework. The paradigm is the most suitable approach for creating, applying, and reflectively evaluating an artefact developed for evaluating features of information systems in e-government initiates.

Design science research involves the creation of an innovative, purposeful artefact for a specified problem domain through the guidelines as indicated in Table 1-2 below. The artefact of this research was the e-governance project implementation framework, which is intended to be applied in a real-life project to demonstrate its relevance to the problem. The design science process is not a once-off activity but rather iterative, using a **rigorous** process of theoretical analysis to develop the Scalability Assessment Framework, and an iterative process in the field to reflect on its **relevance** (Bækgaard, 2015; March and Storey, 2008).

**Table 1-3**: Applying the design science research in this research

| **Guidelines** | **How was it applied in this research** |
|---|---|
| Design as an artefact | The e-government project implementation framework developed represents the artefact, based on the current problems of high e-gov project failures in developing countries. The model is represented by the framework for benchmarking e-gov projects and tracking success through various phases of the project implementation. |
| Problem relevance | E-governance projects have proved to have a great socio-economic |

| | |
|---|---|
| | impact on the livelihood of communities, but often fail for lack of appropriate benchmarking tools for evaluating and assessing the viability of the projects through the entire project life cycle. Our proposed framework, when adopted, will ensure e-government projects failures are minimised. |
| Design evaluation | The survey-based case study strategy was used to explore the framework in that specific e-gov projects implemented by the Government of Ghana were used to test the framework. |
| Research contributions | ▪ This study will be of much significance to many stakeholders of development, including policymakers in national and international development agencies, academic and research institutions, and business agencies.<br>▪ The findings of the study, together with the suggested e-government implementation framework, will serve as a guide to all stakeholders in managing e-government projects countries through e-governance.<br>▪ Findings of the study would also contribute to the existing body of knowledge in the fields ICT4D, information systems, and development studies.<br>▪ This research to a great extent would improve upon the understanding of e-gov systems in developing countries. The study also prompts further investigations into these areas, hence serving as a catalyst for knowledge development.<br>▪ Finally, business-oriented organisations, such as consultant and private IT firms (Heeks, 2006), can also take advantage of the findings of the study, and its associated e-gov model (to be developed) for designing, delivering products and services capable of a smooth e-gov systems development. |

| | |
|---|---|
| | ▪ The practical contributions of the proposed integrated theoretical framework to stakeholders are manifold. First and foremost, the framework would provide stakeholders with a systematised model for benchmarking e-gov projects in developing countries. Secondly, the developed framework would serve as a diagnostic tool for pinpointing flaws and weakness within an e-gov project so that necessary corrective actions can be taken. Thirdly, the developed framework would make it easy to compare e-gov projects even those initiated in different environments because of the ability of the model's automation to provide a single benchmarking score for an e-gov project. Additionally, the developed model can be used to investigate why different e-gov projects may exhibit varying levels of success by comparing core indicators as opposed to contextual indicators. This is because core indicators may provide a common basis for comparison. Fourthly, the developed model would serve as a prescriptive tool to suggest the most important critical success factors needed to achieve breakthrough success in an e-gov project. Fifthly, the developed model would help to a large extent to replicate the level of success of a successful e-gov project by using the model to identify specific elements that significantly accounted for the exceptional performance of such an e-gov project and doing same in a similar project. |
| Research rigour | ▪ Theories on e-gov, monitoring and evaluation, impact assessment, socio-economic development, and technology diffusion. |
| Design as a research process | The design process is an iterative process. The research process is based on the model developed by Peffers, et al. (2007). The process has five aspects, namely; a) problem identification, b) definition objectives of a solution, c) design of the artefact, d) demonstration, |

| | |
|---|---|
| | e) evaluation, and f) communication. |
| Research communication | The output of the research was communicated through publications in journals and conference presentations. |

Sources: (Bækgaard, 2015; March and Storey, 2008)

### 1.6.3 Survey-based case study

Survey-based case study of real-life projects in Ghana was used to validate and evaluate the developed framework. With the aid of structured and unstructured interviews, expert evaluations were conducted by interviewing experts working on e-governance projects in Ghana and elsewhere. The experts interviewed were eight in total. The data from the interviews were content-analysed to generate appropriate themes for measuring the research questions.

### 1.6.4 Sample and sampling procedure

Based on categorisations of electronic governance activities provided in the literature (Backus, 2001; Jager and Reijswoud, 2018; Lee, 2013) and the kinds of services provided by such systems, government agencies have been identified to be main drivers of e-gov development. Although other stakeholders such as citizens, civil society, and development partners must be involved in any study in this field (Boateng, 2013; OECD, 2008). From this background, the population of this study includes all government agencies such as ministries, departments and agencies of the 24 ministries of the government of Ghana (UNDP, 2010), civil society organisations, international development agencies and the general Ghanaian society, making up a total population size of 1066

Selected staff/officers from Postal and Courier Services Regulatory Commission (PCSRC), Ghana Meteorological Agency (GMet), Ghana-India Kofi Annan Centre of Excellence in ICT (AITI-KACE), National Information Technology Agency (NITA), Data Protection Commission (DPC), National Communications Authority (NCA), Ghana Investment Fund for Electronic Communications (GIFEC) and Ghana Post Company Limited (GPCL) were sampled. The total selected staff/officers were eleven in all. Percentages and distinct sample sizes were not provided because of the sampling technique (purposive sampling) used and the nature of the research design employed (mixed methods).

The rationale for using purposive sampling is a result of the desire to gather reliable data for the study, and also because these institutions have developed a history with the Ghanaian electronic governance agenda (Danso, 2014). Purposive sampling is a sampling technique mostly used for qualitative studies, and respondents are specially selected because they are capable of offering appropriate data/information for understanding concepts and answering particular research questions (Tongco, 2009). Tongco (2009, p. 147) further justifies its blend with quantitative designs by stating that "a study may be started with a survey, and then purposive sampling was done based on the survey".

### 1.6.5 Data Collection and Instrumentation/Measures

Various instruments was used for data collection, analysis, and presentation of findings. Qualitative data was mostly gathered from expert evaluations conducted during the study. Online surveys were also conducted to elicit data from the selected case study organisations. The surveys used mostly close-ended questions but may also have sections for open-ended responses. Questionnaire for both surveys may employ some Likert-scale type questions.

The expert evaluation was employed as the dominant qualitative data collections instruments. As such, officers of the international development organisation ministries, departments and agencies and civil society organisations will be interviewed on various issues bordering on the research topic. Secondary data was sourced from various institutions that have conducted studies in related areas, such as the Ghana Statistical Service (GSS), the Ghana National Information Technology Agency (NITA), the United Nations Development Programme (UNDP) and other development and ICT related institutions.

### 1.6.6 Data Analysis

A study of this kind involves the use of both qualitative and quantitative data analysis mechanisms. The Statistical Package for the Social Sciences (SPSS), STATA 15 and Microsoft Office Excel 2016 were employed as software for quantitative data analysis. In addition, various tools for statistical analysis (descriptive and inferential) including frequency distributions, Pearson chi-square evaluations and the like were also employed. Thematic content analysis was employed for analysing qualitative data gathered from the expert evaluation. Finally, results will be presented in narrative form but interspersed with tables (both mono and crosstables) and figures.

### 1.6.7 Software Development Life Cycle Process

The software development life cycle (SDLC) process was followed to develop an automated prototype platform to translate the improved e-gov framework developed in this study for benchmarking e-gov projects, using a requirement analysis. The requirements can be grouped into two namely functional requirements and non-functional requirements. The functional requirements comprised administration, projects and benchmarking. The non-functional requirements covered deployment, user interface, documentation, maintainability, performance, scalability, security, reliability, usability and extensibility.

### 1.6.8 Study area

Ghana was purposefully chosen as the study area. This is because, the country is more abreast with e-gov projects country-wide and also, it has a number of governmental and non-governmental agencies involved in e-gov projects in the country. As such, there was a high probability for this researcher to have access to meaningful and reliable data in Ghana than elsewhere.

## 1.7 Research Contributions

Contributions of this study to the existing body of knowledge on e-gov are both practical and theoretical. The practical contributions of the proposed integrated theoretical framework are manifold. First and foremost, the framework provides a systematised model for benchmarking e-gov projects in developing countries. The developed model begins with a pre-initiation layer, followed by a monitoring and evaluation (M & E) layer and then an impact assessment layer. For example, the various phases of the project life cycle and associated critical success factors are within the M & E layer. Secondly, the developed framework can be used as a diagnostic tool for pinpointing flaws and weakness within an e-gov project so that necessary corrective actions can be taken. Thirdly, the developed framework makes it easy to compare e-gov projects even those initiated in different environments due to the capability of the model's automation (to be discussed in the next chapter) which provides a single benchmarking score for an e-gov project. Additionally, the developed model can be used to investigate why diverse e-gov projects may exhibit varying levels of success by comparing core indicators as opposed to contextual indicators. This is because core indicators may provide a common basis for comparison. Fourthly, the developed model can serve as a prescriptive tool to suggest the most important critical success factors needed to achieve breakthrough success in an e-gov project. Fifthly, the developed model can be used to a large extent to replicate the level of success of a successful e-gov project by using the model to identify specific elements that significantly accounted for the exceptional performance of such an e-gov project and doing same in a similar project.

By way of theoretical contribution, the present study reveals that previous e-gov frameworks do not even have a project discipline on which to rely to deliver e-gov systems effectively to stakeholders for further usage. Instead, it is implicitly assumed that the derived system is seamlessly delivered. Yet in developing countries, it is during the delivery of such systems where things fail miserably. Therefore, one of the key contributions of this research is to close that gap by introducing a rigorous project management principle at the start of the existing body of knowledge of e-gov.

Furthermore, the output of this research is the production of a list of socio-economic indicators that can show that an implemented e-governance project is yielding the expected returns. As such, since the purpose of an e-gov project is often that of improving the quality of life of the citizenry, the list of the socio-economic indicator are tightly coupled to our impact assessment model aimed at ascertaining that the desired impact on stakeholder has been achieved post-go-live.

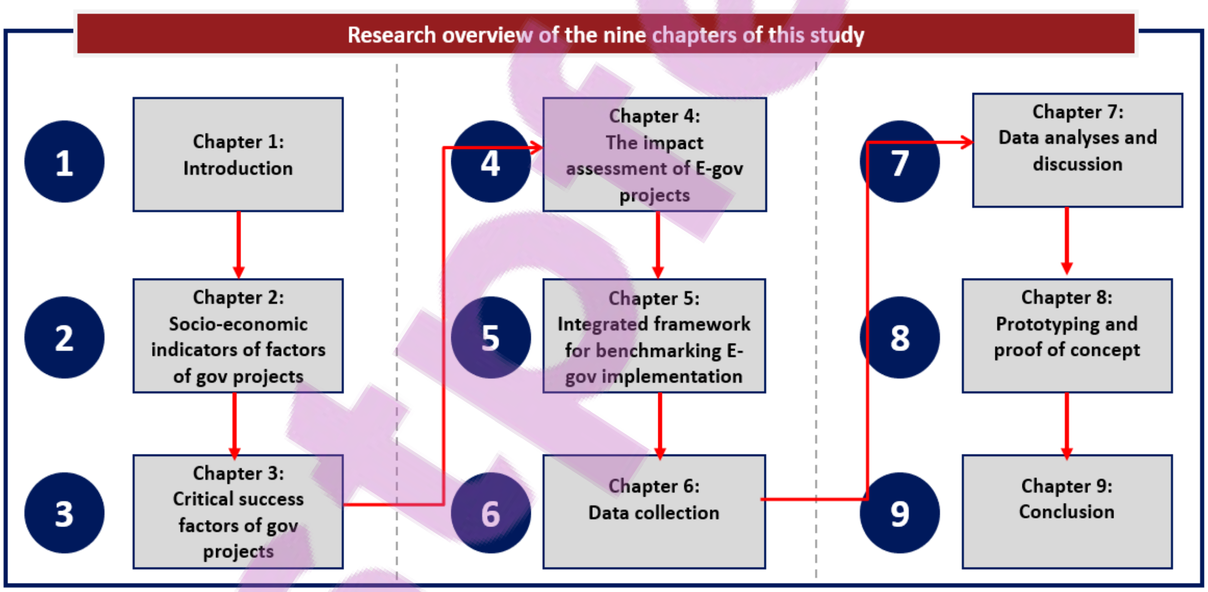
### 1.8 Scope and Limitations

This section delineates this study and identifies foreseen limitations and challenges which may influence the research. Specifically, this study concentrates on e-governance project initiatives in developing countries. An e-gov project is conceived in this study to denote the broad description of e-administration, e-services, and e-society (Backus, 2001; Jager and Reijswoud, 2018; Lee, 2013). The study, therefore, explored all possible aspects in e-government as regards critical success factors, success criteria and its socio-economic impact.

### 1.9 Ethical Considerations

Underlying this research are two core issues: the integrity of the researcher and the obligations to this study's participants. In light of the latter, permissions to conduct research were sought from the ministry with the oversight responsibility of all e-Gov and ICT projects across all other ministries and agencies in the public sector. Consent forms were submitted to individual respondents for their signatures to show their willingness to participate in this study. A copy of the approval letter and sample consent form is attached as Appendices A and B respectively. This study's participants were also informed that they had the right to pull out of the research at any point in time. Prior to the commitment of this process, an application for ethical clearance was submitted to the UNISA College of Science, Engineering and Technologies' (CSCET) Research and Ethics Committee and an approval certificate was given accordingly, (see attached Appendix D).

### 1.10 Chapters Overview




**2. Figure 1-2: Research overview of the nine chapters of this study**

This research document is presented in a total of nine chapters represented in Figure1-2 below.

- ***Chapter 1***, like the introduction, covers background information, comprising the research background, research problem, research purpose, objectives of the study, research questions, research significance, scope and limitation of the study, and the chapter synopsis/organisation of research.
- ***Chapter 2*** presents a discussion on an investigation and analysis of the critical success factors of e-governance projects, monitoring and evaluations of projects and relies mainly on existing literature.
- ***Chapter 3*** focuses on the impact assessment of e-governance projects. It also covers such areas as impact assessment theories and tools, assessment metrics of e-governance projects.
- ***Chapter 4*** details the socio-economic indicators of developing countries. These are used to identify the specific indicators of developing countries relevant to e-governance projects.
- ***Chapter 5*** presents the development of a proposed framework for benchmarking e-governance projects, taking into account findings from Chapters 2, 3, and 4 respectively.
- ***Chapter 6*** focuses on data collection necessary for conducting the survey targeting e-governance practitioners and international expert for the purpose of the evaluation and validation of the proposed framework.
- ***Chapter 7*** on Data Analysis and Discussions presents the results and output of the validation and evaluation of the proposed framework.
- ***Chapter 8*** deals with prototyping and generation of proof of concept for the proposed integrated framework.
- ***Chapter 9***, the last chapter, provides the conclusions and recommendations for future research.

### 1.11 Conclusion

The purpose of this chapter was to set the scene toward the development of a framework for benchmarking e-governance projects in developing countries. The developed framework is aimed at ensuring that e-governance projects in developing countries adhere to best practice and guidelines for consistent maximum impact. This chapter outlined the background and motivation underpinning the study; then it explored the problem statement for the study; and presented its research objectives and research questions. A brief discourse on the research methodology was provided whereby, the following items inherent to a research methodology were discussed: research design, the theoretical foundation, case study, sample and sampling procedure, instrumentation/measures, data analysis, and the study area. This was followed by in-depth coverage of the research contributions; the scope and limitations of the study; and finally, the chapters overview of the research was presented. The next chapter explores the socio-economic indicators of e-governance projects.

**Table 1-4** Definition of Key Terms

| **Key Terms** | **Definitions** |
|---|---|
| e-governance | The process of adopting electronic means in possible sectors and stages of government to ensure legitimate mass-access of administrative and service-oriented information with the potential to establish transparency and accountability of government activities and maximum service by redesigning and redistributing the administrative and operating system of government. |
| Developing country | A developing country is a low or middle-income generating country whose industrial base remains underdeveloped, and possess a low human development index in relation to other countries. |
| Framework | The bare-bone structure underpinning a concept, system or an approach; in our case e-gov. |
| Project | It is an undertaking that has a beginning and an end. |
| Socio-economic Indicator | The term is used to describe how societies progress, stagnate or regress because of their local or regional economy, or the global economy. |
| Critical success factors | These are limiting factors that ultimately determine the success of a project. |
| Prototyping | In our context, it is the process of transforming an e-governance framework into a preliminary solution, which will form the basis for further development of the said solution and other derivative. |
| Proof of concept | This is evidence, typically derived from an experiment or pilot project, which demonstrates that a design concept, business proposal, etc., is feasible. proposal, etc., is feasible. |

# CHAPTER 2: SOCIO-ECONOMIC INDICATORS OF AN E-GOVERNANCE PROJECT

## 2.1 Introduction

In the era of big data, timely and accurate data such as socio-economic indicators are an important prerequisite for the execution of policies that encourage social and economic advancement. As a result, governments and private firms advance considerable resources in the development of socio-economic indicators which usually emanate from costly surveys and economic reports (Mao, Shuai, Ahn and Bollen, 2015). The purpose of this chapter to explore the literature can be achieved by answering the first research question of the thesis:

> **What are the socio-economic indicators associated with e-governance projects in the context of developing countries?**

The exploration of this research question can be monitored and measured to ascertain the impact on growth which can be attributed to e-governance projects in the developing countries.

In this chapter, we identify and range of socio-economic indicators that can be depended upon to show that an implemented e-governance project is yielding the expected returns. Socio-economic indicators of which appropriate metrics are associated help determine whether stakeholders are satisfied with an implemented e-gov project and if they are reaping the benefits. This aspect of the research would contribute to the developed framework at the post-deployment phase in the sense that these indicators would be used to perform a post-assessment of any given project. It is a critical component of the construct compiled in the monitoring and evaluation at the post-deployment phase for impact assessment.

This chapter is structured as follows: section 2.2 discusses socio-economic indicators with particular emphasis on the definition, history and development of socio-economic indicators, and characteristics thereof; section 2.3 deals with the socio-economic indicators of ICT for development (ICT4D). Also discussed in this section are ICT4D indicators of e-governance projects in both developed and developing countries. The outcome is a table of ICT4D socio-economic indicators and how they are measured; section 2.4 concludes the chapter.

## 2.2 Socio-economic Indicators

### 2.2.1 Definition

Diaz-Chavez (2014, p. 18) defines a socio-economic indicator as a concept “relating to or concerned with the interaction of social and economic factors in order to better understand how the combination of both influences something”. Gurewitz, (2009, p. 11) has explained that the term is used “to describe how societies progress, stagnate, or regress because of their local or regional economy, or the global economy”. Furthermore, Webler, Tuler and Krueger (2001, p. 435) have stated that the term deals with “the use of economics in the study of society”.

According to Spar and Dail (2002), the term ‘socio-economic’ describes the relationship of economics to social values. This description is similar to Rydin, Holman and Wolff (2003) who stated that ‘socio-economic describes the reciprocal relationship between economic science and social philosophy, ethics and human dignity.

Lastly, from the point of view of Ramos and Jones (2005), the term socio-economic focuses on the social impact of some sort of economic change. They also indicated that some prime examples of economic change include market manipulation, a closing factory, new natural gas regulation, the signing of international trade treaties, among others. According to Jackson, Lee and Sommers (2004), these social effects can range from local effects on a small town or community to changes in an entire economy.

On the other hand, the concept of **indicators** has attracted enormous research with different meanings being ascribed to it. The term ‘indicator’ was initially defined briefly and simply by O’Sullivan and Sheffrin (2005, p. 101) as “something that shows what a situation is like”. From Frank, Bernanke and Squalli's (2012) point of view, the term indicator has financial or economic trends.”

Looking at more comprehensive definitions, the Department for International Development (DFID) defines an indicator as a qualitative or quantitative variable (factor) that offers a simple reliable means to measure an achievement, to mirror the changes linked to an intervention, or to aid examine the performance of a development actor (Parsons, Gokey and Thornton, 2013). The United Nations (UN) Entity for Gender and Equity and the Empowerment of Women also defines it as specific, noticeable and quantifiable features that can be used to demonstrate changes or improvements that a programme is making towards a specified outcome (UN Women, 2013). It is also defined in the Faculty of Washington Education as, “a measure that is used to demonstrate a change in a situation or the progress in, or results of, an activity, project, or programme” (Faculty of Washington, 2016, p. 1). Similarly, Hales (2010) defines it within the context of monitoring and evaluation (M & E) as a quantitative metric that proffers specific information to directly measure achievement, monitor performance, and determine accountability. The last definition of the term indicator that will be examined is the one given by Sabatella and Franquesa (2012, p. 1) as “data or combination of data collected and processed for a clearly defined analytical or policy purpose”.

When talking about indicators, what comes to mind are development indicators. However, a thorough review of the plethora of research studies has shown that the term does not relate only to development, although development is a multifaceted concept. From a scholarly perspectives it pertains to indicators such as social, health, educational, agriculture, economic, industrial, among other sectors (Faculty of Washington, 2016; Grant, 2014; Hales, 2010; Horsch, 1997; Milenkovic, Vukmirovic, Bulajic and Radojicic, 2014; Parsons, Gokey and Thornton, 2013; UN Women, 2013). Thus, there are indicators for health, food and agriculture, ICT, education, manufacturing, economics, social, and more. According to Parsons et al. (2013), these categories of indicators fall under five groups, namely: activities, outputs, outcomes, and impacts in any well-designed e-government project. However, amongst all these indicators, according to Galobardes et al. (2006), there is no single best indicator for the aims of all studies and no general applicability at all time points in every setting.

It is clear from the various definitions that indicators are being characterised by the numerous variables of their features. The UN Women (2013) concluded that by its very definition, the underlying concept indicators should be a focused, clear and unambiguous (specific) description of exactly what they are intended to measure. Parsons et al. (2013) also asserted that the design of indicators should be based on widely agreed-upon standards that are exact to each of the ‘levels’ of measurement. Other researchers further explain that indicators measure distinct but mostly interrelated aspects of socio-economic stratification, which could be more or less important to different outcomes and at distinct stages in the life course (Galobardes et al., 2006). They (Galobardes et al., 2006) recommended that indicators should ideally be selected by consideration of certain proposed mechanisms and specific research questions linked to the outcome. The reason being that, in some cases, "using different indicators may result in gradients of varying slopes" (Galobardes et al., 2006, p. 7).

Fundamentally, the important goal of an indicator is that it provides circumstantial evidence that something is true or exists (Hales, 2010) and it is, therefore, observable evidence of a certain prevailing condition or certain results have, or have not been achieved (Brizius and Campbell, cited in Horsch, 1997). More simply, it shows the presence of a state of a condition or situation (Hales, 2010). Clayton (2015) has further explained that, over the years, indicators have been used by different individuals and organisations to organise, monitor and assess information in different contexts. Similarly, Mankiw (2011) has added that an indicator is used to evaluate the sustainability performance of diverse activities by the implementation of set standards.

In a broader perspective and not denouncing other scholars' views, Parsons, Gorkey and Thornton (2013) articulated that indicators are used to monitor activities, describe project outputs, trace outcomes, and evaluate whether they are meeting their intended targets. Thus, indicators redress various facets of programming (Parsons et al., 2013). In addition, indicators also help decision-makers to evaluate progress geared towards the attainment of intended output, goals, outcomes, and objectives; they are therefore an integral aspect of a"result-based accountability system" (Horsch, 1997, p. 8). It can be concluded, therefore, from the aforementioned definitions, that indicators result from collected and processed data to measure current conditions and/or forecast future trends. As such, they show what a situation is like.

Combining the two (narrow and broad) definitions of socio-economic and indicator, a hasty definition for the term 'socio-economic indicator' can be given as "statistics that are used to measure the social impacts of economic change" Grant (2014, p.182). This defines it as a kind of indicator used to measure the economic and social development of a particular population. After careful scrutiny of several definitions from several papers, Land and Ferriss (2006, p. 518) brought out a generic definition of socio-economic indicators as, "statistics which measure social and economic conditions and changes therein over time for various segments of a population". By social indicators, Land and Ferriss (2006) mean external (physical and social) and internal (perceptional and subjective) contexts of human existence for a given society.

However, the term socio-economic indicator(s) has no single or generally accepted definition, since as Land (1975) claimed, in so far as it is conceived of as a generalization of standardised social and economic indicators, and in so far as such indicators are mere indices of social and economic functions, its definitions or characterization is apt. In the context of the present study, therefore, socio-economic indicators are defined as a range of well-defined, quantifiable and qualifiable metrics that are used to gauge the current wealth and health of a nation.

### 2.2.2 History and development of socio-economic indicators

Galobardes et al. (2006) trace the roots of socio-economic indicators to the works of two social theorists: Max Weber and Karl Marx. This is mainly due to their concept of 'social class' whereby an individual is categorised by the relation to the means of production: factories, land, labour and resources. Per contra, a review of the plethora of literature on socio-economic indicators shows that the chronological root of the concept can be traced to the notion of social change, which was a cardinal preoccupation of these two grand social theorists in the nineteenth and early twentieth centuries. Undoubtedly, most of the socio-economic definitions centre on the social impacts of economic change. Yet, according to Land (1975), during that period little emphasis seems to have been given to its measurement because social change data were rare.

The notion of social and economic indicators appears to have originated in 1962 in a project executed by the American Academy of Arts and Sciences for the National Aeronautics and Space Administration (Land and Ferriss, 2006). This project according to Land (1975) was purposely to investigate the economic, social, and technological consequences of the space programme. The outcome of this project showed that the socio-economic consequences of the space programme were essential and often unexpected. Consequently, this motivated some of the participants to turn their attention to the more general issue of monitoring the changing socio-economic conditions (indicators) of society.

In 1969, the USA Department of Health, Education and Welfare published a document titled '*Toward a social report'* which fostered both public and professional interest in social and economic indicators

(Land, 1975). The department explored numerous sets of indicators (measures) that helped monitor changing social conditions across many areas including health; the physical environment; social mobility; public order and safety; income and poverty; participation and alienation; and learning, science and art.

The department upholds that the availability and utilisation of this set of indicators are necessary prerequisites for reporting a detailed image of social life (Land and Ferris, 2006).

Subsequent years have witnessed changes in the interest and focus on deriving better measurable indicators for monitoring conditions of social change. Otis Dudley Duncan (1969, p. 1, cited in Land, 1975), argued that this period was a transition from initial incubation to an intermediate stage of testing alternative indicators, until 1973, when a major work on social indicators by Daniel Tunstall (an official in the Office of Statistical Policy of the Office of Management and Budget of the Executive Office of the US President) was done. This led to the publication of a statistical book called *Social Indicators 1973* to designate social conditions and trends in the US within eight key areas of social life, namely: health; education; public safety; employment; housing; income; population; leisure and recreation (Land, 1975).

In confirmation of this, the United Nations-Department of International Economic and Social Affairs Statistical Office (UN-DIESO) (1989) reported that the preliminary guidelines on socio-economic indicators were received by the UN Statistical Commission in 1976 and it was in that time that the socio-economic indicator guidelines became general for public use.

A comparative assessment of the various definitions and historical facts presented above about socio-economic indicators provide evidence that the term seems to be applied in a manner inconsistent with its origin or used in a way that did not emphasise its origin but rather what it was intended to be used for.

### 2.2.3 Characteristics of socio-economic indicators

A study by Galobardes et al. (2006) presented a comprehensive list of socio-economic indicators used in health research to determine a person's socioeconomic status. They identified numerous socio-economic indicators and what they intended to measure, namely: income; education; housing tenure/housing conditions and household amenities; occupation-based facts.

In a similar vein, the National Sample Survey Organisation ─ Ministry of Statistics and Programme Implementation ─ Government of India (NSSO-MSPI-GoI) reported that certain socio-economic indicators were needed to attain national health goals through identification of the linkage that existed between socio-economic indicators and achievement of health goals, namely: education; poverty; gender amenities; employment; housing (Bhawan and Marg, 2017).

These indicators, as reported by the NSSO-MSPI-GoI, provided a strong background to comprehend the health scenario in a developing country (Bhawan and Marg, 2017).

Previously, Sabatella and Franquesa (2004), had developed socio-economic fisheries indicators for the evaluation of the state and the development of ecological sustainability of fisheries systems and managing the common fisheries policy for the United Nations globally (UN) worldwide. They identified several variables under a single economic indicator (see Table 2-1), which was an elaboration of the Food and Agriculture Organisation's (FAO) 1999 indicators for sustainable development of marine capture fisheries.

**Table 2-1:** UN Economic indicators for evaluating sustainable fisheries systems worldwide

| Indicator Dimension | Criteria | Example of Indicator | Structure |
|---|---|---|---|
| Economic | Harvest | - Landing<br>- By-catch | - by species; age groups<br>- by area<br>- by fishery sub-sector |
| | Harvest capacity | - GT (decked vessels)<br>- number. of boats (undocked vessel)<br>- total effort (mainly at | - by fleet type<br>- by fishery segment<br>- age composition of vessels<br>- fishing morality/species |

| | | | |
|---|---|---|---|
| | | the fishery level) | |
| | Harvest value (in constant prices) | - total deflated value (landed price) | - by species groups<br>- by sub-sector and fishery |
| | Taxes and subsidies | - Tax rebates<br>- Grants | - by sub-sector<br>- by fleets/fishery |
| | Contribution to GDP | - Fisheries GDP/National GDP | - by species groups |
| | Exports value (compared with the total value of exports) | - Export/Harvest value | - by species groups<br>- by fishery segment |
| | Investment (in fishing fleets and processing facilities) | - Market or replacement value<br>- Depreciation<br>- Fleet age composition | - by fleet type<br>- by fishery |
| | Income | - Minimum daily wage | |
| | Net revenues | - (Profit + rent)<br>- Net return/investment<br>- Value of entitlements | - by sub-sector<br>- by fishery |
| Social | Employment | - Total employment<br>- Full-time equivalent (FTE) Jobs | - Sub-sector<br>- Fleet/fishery |
| | Demography | - Gender ratio | - |
| | Education | - Literacy rate | - No. of literates/Population |
| | Fishing traditions/culture | - Norms<br>- Value system<br>- Belief system | - |
| | Indebtedness | - Debt ratio | - Debt/Income |

(Source: Food and Agriculture Organisation, 1999; Sabatella and Franquesa, 2004)

In 1999, according to the UN's Food and Agriculture Organization (1999), the social indicators for sustainable development of marine capture fisheries were: employment/participation; demography; literacy/education/protein/consumption; income; fishing traditions/culture; indebtedness; gender distribution in decision-making.

It was explained that the selection criteria for the above indicators were based on the scale of fisheries and dimensions (ecological, social and economic) of the fishery systems. However, there were a large number of other potential indicators that could also be applied. Sabatella and Franquesa (2004) concurred that these other indicators could be applied to fisheries at all different levels, ranging from individual fisheries to those at the global level. This implies some socio-economic indicators are interrelated and can have general applicability. Sabatella and Franquesa (2004) further explained that economic indicators should complement the social indicators in the assessment of resources.

Drawing on empirical studies, a study of working-class people was conducted by Kjollesdal, et al. (2010) to explore the relative importance of indicators of socioeconomic position (SEP) in explaining the differences in body mass index (BMI) and waist-hip ratio (WHR), and the mediating effect of work control and lifestyle factors. For this study, occupation, education and income were all used as the indicators of socioeconomic position. Furthermore, the lifestyle factors in question were smoking, dietary patterns and physical activity.

The study was designed as a cross-sectional study and consisted of a sample of 9 235 working-class adults in Oslo, Norway. The results of the study indicated that BMI and WHR were inversely associated with education and occupation, whereas there were no significant associations with income or the work control (Kjollesdal et al., 2010). Furthermore, through factor analysis, four dietary patterns that emerged were referred to as ‘traditional’, ‘Modern’, ’sweet’, and ’Western’. With that said, the study revealed that the modern and sweet dietary patterns and physical activity level were inversely associated, whereas the Western dietary pattern was positively associated with both BMI and WHR **(**Kjollesdal et al., 2010**)**. Nevertheless, these lifestyle factors were not fully able to explain the socio-economic differences in BMI or WHR. This is consistent with Gurewitz's (2009) assertion that indicators are useful for describing or helping to describe a given situation, but not for explaining it. The last finding was that the socio-economic factors explained more about the variation in WHR among men (21%) than among women (7%) (Kjollesdal et al., 2010).

A similar study conducted by Salomen et al. (2009) was inspired by their observation that obesity is modified by a number of factors which include socio-economic factors. With this in mind, their study was aimed at examining the importance of socio-economic factors on the development of obesity from a life course perspective. Body mass index (BMI) was used as a proxy to represent obesity. According to the findings of this study, people with lower education levels and in lower social classes showed a tendency for higher BMIs in both men and women (and thus being more obese) (Salomen et al., 2009). Regarding children under the age of 13, childhood social class was inversely associated with BMI in men, while lower household income was associated with higher BMI in women. In fact, the males that belonged to the lowest childhood social class were shown to have a higher risk of being obese than those of the highest childhood social class. Furthermore, household income was shown to be the strongest predictor of obesity among women. Finally, it was shown that “overweight” and “obesity” are inversely related to “socioeconomic status” (Salomen et al., 2009, p. 94).

Maki and Martikainen (2009) studied the effects and interrelationship of three socio-economic indicators (education, income and occupation-based social class) on non-alcohol and alcohol-associated suicide mortality among women in Finland. Data used for this study came from census records and the death register. According to the findings of the study:

- low social class was an important determinant of suicide risk;
- education had a strong effect on alcohol-associated suicide;
- the effects of social class were partly mediated by income; and
- social class explained income differences to a certain extent.

The last study, looked at in this section, is one conducted by Tenconi, Devoti and Comelli (2000) and the Rifle Research Group**.** The purpose of their study was to examine the relationship between socio-economic indicators and short-term all-cause mortality and coronary heart disease (CHD) mortality among Italians. The socio-economic indicators used in this study consisted of occupation level, education level and residence. The study utilised a sample of 12 361 Italian males between 40 and 69 years of age and used Cox Proportional Hazards models to compute the cause and CHD mortality risk ratios (RR) for the different educational and occupational levels and residences.

According to the findings of the study, no relationship was found between all-cause mortality and the respondents’ education levels; neither was there a relationship found between CHD mortality and the respondents’ education levels (Tenconi, Devoti and Comelli, 2000). However, the respondents’ occupational levels were shown to be significantly related to all-cause mortality (Tenconi, Devoti and Comelli, 2000).

Although the preceding studies showed different uses of socio-economic indicators in diverse context, in mainstream literature, the way in which these indicators should be used and what exact role that they should perform is constantly being debated among numerous governments, agencies and organiSations. Bowen and Riley (2003, p. 307), for instance, were of the opinion that a good economic indicator must minimise the measurable numbers normally required for the specific presentation of a situation and simplify the process of communication to stakeholders, managers, and communities. They further stated that being able to attain a reliable economic indicator is neither an easy nor immediate task due to the fact that access to the necessary data for constructing these indicators was very difficult.

From the above review, it means that selection of a category of socio-economic indicators is based on some criteria. As identified by Sabatella and Franquesa (2004), data cost and availability were the key issues in their adoption of the choice of indicators.

### 2.3 Socio-economic Indicators of ICT for Development (ICT4D)

The ICT for Development (ICT4D) refers to “the use of information and communication technologies (ICTs) in the fields of socio-economic development, international development and human rights” (Van Dijk and Hacker, 2003, p. 320). The development of ICT4D indicators stems from various engagements at the 2003 World Summit on Information Society by participating experts from both developing and developed countries. A survey conducted by the UN helped gather data targeting a range of aspects in the economic environment but more importantly the people, public and private sectors (Van Dijk and Hacker, 2003).

Feng (2012) stated that in terms of infrastructure and access, ICT4D indicators provide the public with statistics regarding:

- If and how individuals, businesses and households have access to mobile phones and landlines.
- The degree of mobile phone penetration and use.
- The number of computers available.

- The availability and use of broadband and the like.

Moreover, some other helpful indicators could cover whether:

- the introduction of ICTs has led to the community acquiring new skills;
- there was any type of capacity development (i.e. technical knowledge, improved negotiation skills, automation of manual tasks;
- the introduction of ICTs has contributed to enhanced social inclusion and interactions;
- the timely access of information has led to better decision making, (the introduction of ICT has led to increased and improved local content creation, and thus, the termination of information gatekeepers).

Tas (2011) argued that some obvious indicators of ICT for development pertain to how and if ICTs have:

- created new opportunities for employment and in what market (i.e. informal labour market, off-farm market, on-farm, market);
- resulted in the creation of a vibrant rural environment which has assisted in restraining the migration from rural to urban areas;
- contributed to an increase in income and gross domestic product (GDP), and led to increased expenditures in ICT at the household level**.**

At the policy level, Russell et al. (2003) argued that some ICT indicators could relate to development if:

- the ICTs are part of sectoral national policies;
- the countries in question have national technology policies;
- they advocate for universal access (and in what form) for the countries that have these policies;
- are the national policies conducive for creating the right environment for public-private-people partnership;
- the national policies encourage the public and private sectors to invest in ICTs;
- the national policies foster competition and transparency; and

- the ICT policies are gender and youth sensitive.

Significantly, they made the assertion that ICT could reduce corruption when used in e-governance projects (Russell et al., 2003).

**Table 2-2:** Socioeconomic Indicators for ICT4D

| Indicator Dimension | Criteria | Example of Indicator | Structure |
|---|---|---|---|
| Socio-Economic | Mobile Phones Access | Mobile phone penetration | |
| | Access to computers | Number of computers per 1000 individuals | |
| | Broadband | Speed of broadband | measured in Mbps |
| | | Usage of broadband | Number of broadband user pers 1 000 individuals |
| | Acquisition of new skills | | |
| | Capacity Development | Improved technical knowledge | |
| | | Improved negotiation skills | |
| | | Automation of manual tasks | |
| | Social inclusion and interaction | Number of persons with active social media accounts per 1000 people | Bridging of the digital divide between rural and urban communities |
| | Timely access to Information | Better decision making | |
| | | Better policies | Quantity and quality of well-thought-out policies that improve the socio-economic wellbeing of people |
| | | Improved standard of living | Improved minimum daily wage |
| | ICT Introduction | Improved local content creation | |
| | | Termination of information gatekeepers | |

### 2.3.1 Developed countries

This sub-section looks at socio-economic indicators for e-gov projects in developed countries. E-governance initiatives are used to support government fundamental reform programmes and to aid core socio-economic and development goals to enable the creation of concrete public value. International benchmarks have been used to measure the progress of e-gov at various levels of government. Some of these benchmarks include socio-economic indicators (Rozanski, 2002).

In terms of e-government, however, researchers have been making use of many indicators and sub-indicators to initiate and evaluate e-govt projects in the developed world. These include the E-Readiness Index (ERI), E-Government Development Readiness Index, and Network E-Readiness Index (NRI). Other complementary sub-indices are the Web Measure Index (WMI), Telecommunications Infrastructure Index (TII), Digital Opportunity Index (DOI), Internet Bandwidth, and the Human Capacity Index (HCI) (Rahman, 2010; Tarvid, 2008; United Nations, 2010). These are described in further detail below:

- **E-Readiness Index (ERI).** The ERI is used to measure the degree to which a country or nation or an economy is ready to obtain benefits arising from ICTs (see Table 2.3 below), implying a nation's preparedness towards participation in e-government activities (Dada, 2006).

  The ERI is expressed in terms of indices. Countries (nations or economies) are rated in areas such as the percentage of GDP they spend on IT infrastructure and the number of telephone lines per 100 people; and the results are used to make comparisons between countries (Dada, 2006).

  Peter (2005) (cited in Zaied, Khairalla and Al-Rashed, 2007) also presented rephrased sub-indicators of the e-readiness model that comprises:

  - **Physical infrastructure** – the telecommunications infrastructure: including teledensity (usually the number of telephones per 100 people), Internet access, bandwidth, pricing, and reliability.

- **ICT use** - levels of use throughout society including homes, businesses, schools, and government.
- **Human capacity** – literacy, ICT skill levels, and vocational training.
- **Policy environment** – the legal and regulatory environment affecting the ICT sector and ICT use: including telecommunications policy, trade policy, e-commerce taxation, universal service provisions, consumer protection, and privacy.
- **ICT economy** – (the size of the ICT sector).

With respect to the advantages of the e-readiness index, Picci (2006) has stated that:

- There is ease in using this index as the indicators are easily quantifiable and summarise a broad set of characteristics of a country (nation or economy);
- This index can provide benchmarks for comparisons and gauging progress;
- It is useful for judging the impact of ICTs on a country (economy); and
- It can measure levels of IT infrastructure, education and supportive government policies.

Concerning the limitations of the e-readiness index, Lanvin and Quang (2004) argued that:

- there are a variety of measures for the e-readiness index and no standardisation of measures;
- an e-readiness index assumes a one-size-fits-all set of requirements and it is burdened with uncertainties and ambiguities in both theory and practice, and
- the index only measures certain factors that lend themselves to such measurement.

Another socio-economic indicator of import to e-governance in developed countries is the e-Government Development index. Maugis et al.. (2005, p. 314) define EGDI as the "ability to pursue value creation opportunities facilitated by the use of the Internet." The EGDI is a complex measure of both the ability and readiness of countries (nations or economies) to use e-government or ICT-led development (see Table 2-3 below) (Maugis et al., 2005; United Nations, 2010; UN Public Administration Programme, 2016). This indicative measure, according to the UNPAP, focuses on the most important dimensions of e-government models, policies and initiatives, namely:

- Telecommunications Index (connectivity);
- Human Capacity (Capital) Index; and

- Online Service Index.

The Telecommunications Index (connectivity), is a composite of five indices, including the number of individual computers per 100 heads; internet users per 100 heads, telephone lines per 100 heads; mobile cellular subscription per 100 heads, and fixed broadband subscribers per 100 heads. Whereas, the Human Capacity (Capital) Index is a composition of two sub-indicators (adult literacy rate and school gross enrollment ratio). The Online Service Index tests the minimal level of website content accessibility, the scope and quality of national online services in accordance with the World Wide Web Consortium guidelines (United Nations, 2010; UN Public Administration Programme, 2016).

Furthermore, the efforts of a government are ranked, and the size, ICT penetration, infrastructure availability, and the level of education and skill development of countries (nations or economies) are also considered (Rahman, 2010). Owing to the inherent multiplicity of EGDI, Maugis et al. (2005, p. 1112) concluded that, "EGDI means different things to different people, in different contexts, and for different purposes, EGDI means different things to different people, in different contexts, and for different purposes". Table 2-3 reveals the UN e-Government Development Index (EGDI) for the Top 10 developed countries.

**Table 2-3:** UN EGDI of Top 10 developed countries

| **Country** | **EGDI** |
|---|---|
| United Kingdom | 0.9193 |
| Australia | 0.9143 |
| Republic of Korea | 0.8915 |
| Singapore | 0.8828 |
| Finland | 0.8817 |
| Sweden | 0.8704 |
| Netherlands | 0.8659 |
| New Zealand | 0.8653 |
| Denmark | 0.8510 |
| France | 0.8456 |

(Source: UN Public Administration Programme (UNPAP) 2016)

Tarvid (2008, p. 314) described the Digital Opportunity Index as a composite index used to measure the possibility of the citizens of a particular country to benefit from access to information that is "universal", "ubiquitous", "equitable", and "affordable". This index is therefore based on 11 ICT indicators that are grouped into the following clusters: infrastructure, opportunity, and utilisation (Tarvid, 2008).

Furthermore, the WMI covers the willingness and capacity of governments to use e-governance as a means to inform. The TII explores the volume and number of internet users, the online population, mobile phone users and televisions for every 100 people, and the provision for government services and products online; and the HCI gathers information on education and technology users. As a matter of fact, these three sub-indices reflect the relevance of e-governance to the socio-economic life of a developed country.

The developed countries have made and relied on many socio-economic indicators associated with e-government projects. , For instance, in the Arabic world, a study by Zaied, Khairalla and Al-Rashed (2007) about assessment of e-readiness model and people's perception about ICT in public organisations in the state of Kuwait demonstrated that three variables, namely: human skills, infrastructure and connectivity were used to apply e-services in public organisations.

According to the Economist Intelligence Unit (2010), a recently added e-governance socio-economic indicator available and accessible on a single individual (per-head) basis of the developed countries is the IB. This indicator emerged as a result of the recent explosion of internet traffic on the world's network. The Economist Intelligence Unit (2010) reported that the major driver of this indicator is the increasing hype of file-sharing (especially videos) and Web 2.0 sites (e.g. Facebook, Myspace, etc.). With this indicator, most of the Asia Pacific region suffered falls in their overall connectivity score (Economist Intelligence Unit, 2010) but above all, it also developed Internet capacity that attracts more users.

A study conducted by Dias and Costa (2013) has presented an empirical study of local e-government in Portugal and investigated the socio-economic indicators which were the most significant in explaining its e-government development projects. The study, guided by four hypotheses, two which were:

- **(H1) There is a set of socioeconomic variables associated with local e-government development considered as a whole; and**
- **(H2) There are different sets of socio-economic variables associated with different dimensions of local e-government development.**

A list of the socio-economic indicators that were used in the study can be seen in Table 2.3 above. Afterwards, it was analysed according to the three dimensions: government information, service delivery and participation.

Regarding the findings of the study, four socio-economic indicators were identified to have a definite impact on e-government development policies and initiatives in Portugal. Specifically, the size of municipalities (measured in terms of the resident population and available resources) had a positive impact on local e-government development projects. The 'taxes' variable was used to measure the size of municipalities, while the participation in e-government development also had a positive impact. Furthermore, the school dropout rate had a negative impact. This indicated that municipalities with poor social development present lower e-government development. The study also revealed that different socio-economic indicators are associated with different dimensions of e-government development. Table 2-4 presents the socio-economic indicators used by Dias and Costa (2013) in a study in Portugal.

**Table 2-4:** Socio-economic indicators used by Dias and Costa (2013) in a study in Portugal

| Indicator | Mode of measurement |
|---|---|
| Irsub | The ratio of IRS forms submitted online |
| Digital | Digital cities and regions program |
| Illiteracy | Illiteracy rate |
| Ngrade | Percentage of population with 9th grade or less |
| Highte | Percentage of population with a higher education degree |

| | |
|---|---|
| Dropout | School dropout rate (% of students leaving school before the 9th grade) |
| Ageing | The average age of residents |
| Ppower | Purchasing power per capita (normalised to the national average purchasing power) |
| Purbpop | Percentage of population resident in cities |
| Abstaining | Abstention rate in the municipal election |
| Phone | Telephone lines per 100 inhabitants |
| Popden | Population density |
| Aging | Ageing rate (relation between the inhabitants aged 65 years or more and those aged 14 or less) |
| Pop | Resident population |
| Taxes | Direct taxes (total for all direct taxes, VAT excluded) |
| Cartax | Municipal tax on the vehicle |
| Reven | Total revenues of the municipality |

(Source: Dias and Costa, 2013).

Furthermore, Henning (2013) developed a theoretical framework on the determinants for the adoption of interoperability standards by organisations in Government Information Networks in the Netherlands, between January and September 2011. His findings indicated the determinants (in ascending order as follows).

- Firstly, IOP Governance (defined as those determinants that pertain to the manner by which strategic management (decision-making, coordination and oversight) on the IOP architecture in a GIN is governed by means of the use of institutions, structures of authority and collaboration (Provan and Kenis, 2008). Its sub-constructs are specified as Decision-Making Centralisation, Enforcement, and Guidance.
- Secondly, Network Characteristics (its subconstructs are specified as network complexity, trust, mimetic dynamics, domain structure, interaction and information infrastructure).
- Thirdly, Results (the consequences resulting from the adoption of IOP standards. Its sub-constructs are specified as internal-operations results, external-relations results, return-on-investment results, and network-level results).
- Fourth, Network-External Environment;

- Fifth, Organisation-Specific Determinants;
- Sixth, Adoption Efforts: and
- Seventh, Interoperability Standards Characteristics (this construct covers those determinants pertaining to the general characteristics of the IOP standards (Zhu, Kraemer, Gurbaxani and Xu, 2006).

This shows that perhaps every country has its own socio-economic indicators upon which e-government initiatives are taken because there is no generalised socio-economic indicator for every country. Hence to clarify any doubts and set a standard of no dispute, the UN deduced a global ICT and socio-economic indicators for parameters, which is the **E-Government Assessment Model.** Table 2-5 below shows Socio-economic indicators of e-governance projects in developed countries.

**Table 2-5:** Socio-economic indicators of e-governance projects in developed countries

| **Indicator** | **Criteria** | **Example of Indicator** | **Structure** |
|---|---|---|---|
| **Dimension** | | | |
| E-Readiness Index | Physical infrastructure | Teledensity | |
| | | Internet Access | |
| | | Bandwidth | |
| | | Pricing | |
| | | Reliability | |
| | ICT Use | Screen time/ Time spent<br>Ease of navigation | levels of use throughout society |
| | Human Capacity | Literacy rate | Education |
| | | ICT skill level | Practical training in ICT usage |
| | | Vocational Training | Practical training in ICT usage |
| | Policy Environment | - Policy Compliance rate<br>- Policy Adoption rate | telecommunication policy; trade policy; e-commerce taxation; consumer protection; privacy |
| | ICT Economy | Size of the ICT sector | Contribution to GDP |
| E-Government Development | Connectivity | Individual computers per 100 heads | ICT penetration |

| | | | |
|---|---|---|---|
| Index | | Internet users per 100 heads | Internet penetration |
| | | Telephone lines per 100 heads | ICT penetration |
| | | Mobile cellular subscription per 100 heads | ICT penetration |
| | | Fixed broadband subscribers per 100 heads | ICT penetration |
| | Human Capacity | Adult literacy rate | Education |
| | | School gross enrollment ratio | Education |
| | Online Service | Web content accessibility | Content development |
| Digital Opportunity Index | Access to Information | Volume and number of Internet users | Internet penetration |
| | | mobile phone users and televisions for every 100 people | ICT penetration |
| | | provision for government services and products online | e-services |

*Source; Author's construct*

### 2.3.2 Developing countries

This subsection looks at socio-economic indicators for e-gov projects in developing countries. The developing world is lagging behind the developed world in the ICT marathon. According to the UN Public Administration Programme, (UNPAP, 2016), despite a drastic rise in the number of countries using e-services in the governance system, Africa specifically is still lagging behind. Most of the developing countries deduce their e-governance socio-economic indicators from that of the developed countries. This not surprising considering the cradle of the world of ICT, and that there is a huge generational gap existing between the developed and the developing countries. Undoubtedly, a census on "first generation" e-readiness evaluation shows that most of the less-developed countries have had no assessment at all (Bridges.org, 2002, cited in Maugis et al., 2005, p. 318). In supporting this, Dada (2006) attributed the lack of IT infrastructure and apparent skill set among the population of the developing countries to most of these countries' e-gov indicators. Nevertheless, several case studies have demonstrated most of the developing countries rely on the UN and developed countries' e-governance socio-economic indicators to provide public e-services that enhance and attain their Sustainable Development Goal 9 (UNPAP, 2016). These indicators include Digital opportunity index (DOI), network e-readiness index (NRI), e-participation, and e-government assessment model. Though there are other rankings, these set of rankings were deemed the most applicable as regards the context of our study, which is e-governance in developing countries. Of all the other rankings, it was our considered opinion that the Network Readiness Index, e-Gov readiness and digital opportunity index were found to be the indices that spoke much more directly to the readiness of governments of developing countries as regards development of e-governance, as well as their level of e-gov preparedness.

In a study by Minges (2005), evaluation of the e-readiness indices in Latin American and Caribbean countries, the purpose was to provide information for the governments of these nations to inform their competitiveness and policy agendas. In doing so, Minges (2005) provided the digital opportunity indexes for a group of Latin American countries (see Table 2-6). Table 2-6 presents the DOI for Latin American countries.

**Table 2-6:** DOI for Latin American Countries

| Country | Rank | Opportunity | Infrastructure | Utilisation | DOI |
|---|---|---|---|---|---|
| Chile | 25 | 0.79 | 0.26 | 0.24 | 0.43 |
| Argentina | 26 | 0.85 | 0.23 | 0.11 | 0.40 |
| Mexico | 27 | 0.78 | 0.20 | 0.09 | 0.36 |
| Venezuela | 34 | 0.62 | 0.15 | 0.14 | 0.30 |
| Colombia | 36 | 0.54 | 0.28 | 0.05 | 0.29 |
| Brazil | 38 | 0.49 | 0.21 | 0.13 | 0.28 |
| Peru | 37 | 0.69 | 0.07 | 0.10 | 0.28 |

(Source: Minges, 2005)

Generally, despite the existence of many socio-economic indicators for e-governance projects, the literature demonstrates that e-government readiness is one of the top priorities for countries in the world, especially developing countries (Al-Aghbari, Ibrahim and Saeed 2014; United Nations, 2010; Zaied, Khairalla and Al-Rashed, 2007; UNPAP, 2016). However, a special case is that of Yemen.

In 2012, Yemen decided that it wanted to improve its e-government for the years 2014 to 2015, although many challenges were preventing it from achieving this goal. In light of this, a study was conducted by Al-Aghbari et al.. (2014) which surveyed the e-government readiness ranking for Yemen from 2003 to 2012 using the e-readiness index, online services index, and telecommunications infrastructure index.

The EGDI remains a universal assessment model for e-governance projects and ranking of countries on performance level in e-services (see Table 2-7 below). According to Tas (2011), the e-governance efforts in any country involves a large number of resources and since the economic and social conditions of developing countries do not allow them to take undue risks with new projects, it is imperative that the policymakers and planners in these countries have a fair idea about their 'preparedness' or e-readiness before they allocate funds or begin the development and implementation. Thus, he recommended the use of the e-readiness index.

**Table 2-7:** E-government readiness index

| Rank | EGDI | Country | Rank | EGDI | Country |
|---|---|---|---|---|---|
| 1 | 0.9283 | Korea | 67 | 0.5731 | Trinidad and Tobago |
| 2 | 0.9125 | Netherlands | 73 | 0.5561 | Dominica |
| 3 | 0.896 | United Kingdom | 75 | 0.5479 | Grenada |
| 4 | 0.8889 | Denmark | 81 | 0.5272 | Saint Kitts and Nevis |
| 5 | 0.8687 | United States | 85 | 0.5177 | Saint Vincent and Grenadines |
| 6 | 0.8635 | France | 89 | 0.513 | Dominican Republic |
| 7 | 0.8599 | Sweden | 90 | 0.5122 | Saint Lucia |
| 8 | 0.8593 | Norway | 108 | 0.4552 | Jamaica |
| 9 | 0.8505 | Finland | 109 | 0.4549 | Guyana |
| 10 | 0.8474 | Singapore | 110 | 0.4488 | Cuba |
| 44 | 0.6566 | Barbados | 116 | 0.4344 | Suriname |
| 49 | 0.6345 | Antigua and Barbuda | 123 | 0.3923 | Belize |
| 65 | 0.5793 | Bahamas | 187 | 0.1512 | Haiti |

Source: (UNDESA, 2010; Rahman, 2010).

Tarvid (2008) stated that an ‘e-ready’ country has extensive usage of:

- computers in schools, businesses, government, and homes;
- affordable reliable access in a competitive market;
- free trade;
- a skilled workforce and training in schools;
- a culture of creativity;
- government-business partnerships;
- transparency and stability in government and an evenly enforced legal system;
- secure networks and personal privacy; and
- regulations allowing digital signatures and encryption.

Rahman (2010) added that e-readiness should also measure five key areas:

- connectivity (infrastructure, access and pricing);
- e-leadership (government policies and regulations);
- information security (intellectual property, privacy, electronic signatures);
- human capital (ICT education, available skilled workforce); and
- e-business climate (competition, political and financial stability, foreign investment, financial infrastructure).

This was in contrast to five different areas given by Alaaraj and Ibrahim (2014) namely:

- **Network Access.** What are the availability, cost and quality of ICT networks, services and equipment?
- **Networked Learning.** Does the educational system integrate ICTs into its processes to improve learning? Are there technical training programs in the community that can train and prepare an ICT workforce?

- **Networked Society.** To what extent are individuals using information and communication technologies at work and in their personal lives? Are there significant opportunities available for those with ICT skills?
- **Networked Economy.** How are businesses and governments using information and communication technologies to interact with the public and with each other?
- **Network Policy.** To what extent does the policy environment promote or hinder the growth of ICT adoption and use?

With contrasting indicators identified by Rahman (2010) and Alaaraj and Ibrahim (2014), all countries, be it developed, underdeveloped or developing, use the UN universal e-government index to support sustainable e-government development projects. This includes (a) Telecommunication Index, (b) Online Service Index and Human Capacity Index.

Emphasising these non-universal sub-indicators, Zaied, Khairalla and Al-Rashed (2007) concluded that no assessment model embodies all sectors and provide the entire set of required indicators. Simply because many prevailing e-readiness assessment models differ pertaining to results, objectives, and methodologies (Zaied Khairalla and Al-Rashed 2007). In the same vein, Dada (2006) confirmed that the e-readiness model varies in methodologies and definitions; thus, it is a product of several different methodologies hence, it does not centre on consistent indices.

Finally, countries are rated in these five categories on a scale of one to three and extensive analyses and recommendations are given. Maugis et al. (2005) were of the firm assertion that the e-readiness is a "one-size-fits" set of requirements, irrespective of the features of investment context, individual countries, or demands for a specified application.

Another universal e-governance socio-economic indicator is the NRI (Network e-Readiness Index). This index measures the tendency of countries (nations or economies) to make good use of the opportunities that are offered to them by information and communication technologies (Tarvid, 2008). According to Alaaraj and Ibrahim (2014, p.5), "this is the most authoritative and comprehensive assessment of how ICT impacts the competitiveness and well-being of nations." It has four components; namely:

- the readiness of the key stakeholders of a country (i.e. persons, businesses and governments) to use information and communication technology (ICT);
- the environment that a country or community offers for information and communication technology (ICT);
- the usage of information and communication technology (ICT) among the aforementioned stakeholders; and
- the impact of ICT on the competitiveness and well-being of countries (Tarvid, 2008).

The final NRI score is computed as an average of the four sub-indexes (Tarvid, 2008). The NRI is used by both the developed and developing countries to implement e-government projects (Alaaraj and Ibrahim, 2014; Tarvid, 2008). Table 2-8 shows the network readiness index of countries for the year 2016. Singapore and Finland topped the Table with a value of 6.0.

**Table 2-8:** The Network Readiness Index 2016

| **Rank** | **Country/Economy** | **Value** | **2015 rank (out of 143)** | **Rank** | **Country/Economy** | **Value** | **2015 rank (out of 143)** |
|---|---|---|---|---|---|---|---|
| 1 | Singapore | 6.0 | 1 | 71 | Moldova | 4.0 | 68 |
| 2 | Finland | 6.0 | 2 | 72 | Brazil | 4.0 | 84 |
| 3 | Sweden | 5.8 | 3 | 73 | Indonesia | 4.0 | 79 |
| 4 | Norway | 5.8 | 5 | 74 | Seychelles | 4.0 | 74 |
| 5 | United States | 5.8 | 7 | 75 | Serbia | 4.0 | 77 |
| 6 | Netherlands | 5.8 | 4 | 76 | Mexico | 4.0 | 69 |
| 7 | Switzerland | 5.8 | 6 | 77 | Philippines | 4.0 | 76 |
| 8 | United Kingdom | 5.7 | 8 | 78 | Morocco | 3.9 | 78 |
| 9 | Luxembourg | 5.7 | 9 | 79 | Vietnam | 3.9 | 85 |
| 10 | Japan | 5.6 | 10 | 80 | Rwanda | 3.9 | 83 |
| 11 | Denmark | 5.6 | 15 | 81 | Tunisia | 3.9 | 81 |
| 12 | Hong Kong SAR | 5.6 | 14 | 82 | Ecuador | 3.9 | n/a |
| 13 | Korea Rep. | 5.6 | 12 | 83 | Jamaica | 3.9 | 82 |
| 14 | Canada | 5.6 | 11 | 84 | Albania | 3.9 | 92 |
| 15 | Germany | 5.6 | 13 | 85 | Cape Verde | 3.8 | 87 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 16 | Iceland | 5.5 | 19 | 86 | Kenya | 3.8 | 86 |
| 17 | New Zealand | 5.5 | 17 | 87 | Bhutan | 3.8 | 88 |
| 18 | Australia | 5.5 | 16 | 88 | Lebanon | 3.8 | 99 |
| 19 | Chinese Taipei | 5.5 | 18 | 89 | Argentina | 3.8 | 91 |
| 20 | Austria | 5.4 | 20 | 90 | Peru | 3.8 | 90 |

(Source: World Economic Forum, 2014; 2016)

The revised literature on the subject matter demonstrates that there are no ad-hoc or set specific socio-economic indicators for e-governance projects. However, with the exception of the UN e-governance indicators, which is the most relied upon in the world, the numerous others that exist are interrelated and intertwined. Also, it is demonstrated that most developing countries rely on socio-economic indicators that have already been established and used in advanced countries. Table 2-9 presents a table of socio-economic indicators of e-gov projects.

**Table 2-9:** Table of socio-economic indicators of e-gov projects

| SOCIO-ECONOMIC INDICATORS | MEASUREMENT METHOD | DESCRIPTION | SOURCE |
|---|---|---|---|
| **DEVELOPED COUNTRIES' E-GOVERNANCE SOCIO-ECONOMIC INDICATORS** | | | |
| IOP Governance | Qualitative | Those determinants that pertain to the manner by which strategic management (decision-making, coordination and oversight) on the IOP architecture in a GIN is governed by means of the use of institutions, structures of authority and collaboration (cf. Provan and Kenis, 2008). | Henning (2016) |
| Network Characteristics | Qualitative | Its subconstructs are specified as Network Complexity, Trust, Mimetic Dynamics, Domain Structure, Interaction and Information Infrastructure | Henning (2016) |
| Network-External Environment | Qualitative | | Henning (2016) |
| Organisation-Specific Determinants | Quantitative and Qualitative | | Henning (2016) |
| Adoption Efforts | Qualitative and quantitative | | Henning (2016) |
| Interoperability Standards Characteristics | Qualitative | This construct covers those determinants pertaining to the general characteristics of the IOP standards | cf. Zhu *et al.*. (2006) |
| Results | Qualitative and Quantitative | The consequences resulting from the adoption of IOP standards. Its sub-constructs are specified as Internal-Operations Results, External-Relations Results, Return- | cf. Zhu *et al.*. (2006) |

| | | | | |
|---|---|---|---|---|
| | | | on-Investment Results, and Network-Level Results | |
| Municipality Size | | Quantitative | | Dias and Costa (2016) |
| Taxes | | Quantitative | | Dias and Costa (2016) |
| Participation in e-Government development | | Qualitative | | Dias and Costa (2016) |
| Internet Bandwidth | | Quantitative | | Economist Intelligence Unit (2010) |
| Human Capacity Index | | Quantitative | | Rahman (2010), Tarvid (2008), and United Nations (2010) |
| Telecommunications Infrastructure Index | | Quantitative | | Rahman (2010), Tarvid (2008), and United Nations (2010) |
| Web Measure Index | | Quantitative | | Rahman (2010), Tarvid (2008), and United Nations (2010) |
| E-Readiness Index | | Quantitative | A gauge to measure the readiness of a country to participate in electronic activities, example e-government and e-commerce. | Dada (2006), Rahman (2010), Tarvid (2008), and United Nations (2010) |
| ***Sub indicators*** | Physical infrastructure | Qualitative and Quantitative | the telecommunications infrastructure: including teledensity (usually the number of telephones per 100 people), Internet access, bandwidth, pricing, and reliability | Peter (2005) (as cited in Zaied et al.., 2007) |

| | | | | |
|---|---|---|---|---|
| | ICT use | Quantitative and Qualitative | levels of use throughout society including homes, businesses, schools, and government | Peter (2005) (as cited in Zaied et al.., 2007) |
| | Human capacity | Qualitative | literacy, ICT skill levels, and vocational training | Peter (2005) (as cited in Zaied et al.., 2007) |
| | Policy environment | Qualitative | the legal and regulatory environment affecting the ICT sector and ICT use: including telecommunications policy, trade policy, e-commerce taxation, universal service provisions, consumer protection, and privacy | Peter (2005) (as cited in Zaied et al.., 2007) |
| | ICT economy | Quantitative | the size of the ICT sector | Peter (2005) (as cited in Zaied et al.., 2007) |
| E-Government Development (Readiness) Index (EGDI) | | Quantitative | Concerns a country's capacity and the willingness to adopt ICT for e-government development | United Nations (2010) |
| ***Sub indicators*** | Telecommunications index | Quantitative | which includes the number of (a) individual computers per 100 head; (b) internet users per 100 head, (c) telephone lines per 100 head, (d) mobile cellular subscription per 100 head, and (e) fixed broadband subscribers per 100 head. | United Nations (2010) and UN PAP (2016) |
| | Human capacity (Capital) Index | Quantitative | A composition of two sub-indicators (adult literacy rate and school gross enrollment ratio) | |
| | Online Service Index | Quantitative | The test of a minimal level of Web content accessibility, the scope and quality of national online services in accordance with the World Wide Web Consortium guidelines | |

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|---|---|---|---|
| | | | |
| **DEVELOPING COUNTRIES' E-GOVERNANCE SOCIO-ECONOMIC INDICATORS** | | | |
| Telecommunications Infrastructure index | Quantitative | A composite weighted average index of six (6) major indices directly based on basic infrastructural indicators that define the capacity of a nation or country's ICT infrastructure. These indices are: PCs/100 persons; Internet user/100 person; Telephone Lines/100 person; Mobile phones/100 persons; and TVs/100 persons | Al-Aghbari *et al.*. (2014), the United Nations (2010) |
| Online services index | Quantitative | | Al-Aghbari *et al.*. (2014) |
| e-readiness index | Quantitative | | Al-Aghbari *et al.*. (2014) |
| | | | |
| | | | |
| **UNIVERSAL E-GOVERNANCE SOCIO-ECONOMIC INDICATORS** | | | |
| Networked E-Readiness Index | Quantitative | The most authoritative and extensive indicator for assessment of how ICT impacts the competitiveness and well-being of nations and the tendency to the nations to make effective use of the opportunities offered by the ICT. | Alaaraj and Ibrahim (2014), Tarvid (2008). |
| E-readiness Assessment Model | Qualitative | A universal socioeconomic model for adoption of e-Services in governance | Rahman (2010), Ibrahim (2014) |
| **Sub-** *Connectivity* | Qualitative and Quantitative | infrastructure, access and pricing | Rahman (2010) |

| | | | | |
|---|---|---|---|---|
| **Indicators** | *e-leadership* | Qualitative | government policies and regulations | Rahman (2010) |
| | *information security* | Qualitative | intellectual property, privacy, electronic signatures | Rahman (2010) |
| | *human capital* | Qualitative and Quantitative | ICT education, available skilled workforce | Rahman (2010) |
| | *e-business climate* | Qualitative | competition, political and financial stability, foreign investment, financial infrastructure | Rahman (2010) |
| | *Network Access* | Qualitative and Quantitative | What are the availability, cost and quality of ICT networks, services and equipment? | Ibrahim (2014) |
| | *Networked Learning* | Qualitative | Does the educational system integrate ICTs into its processes to improve learning? Are there technical training programs in the community that can train and prepare an ICT workforce? | Ibrahim (2014) |
| | *Networked Society* | Qualitative | To what extent are individuals using information and communication technologies at work and in their personal lives? Are there significant opportunities available for those with ICT skills? | Ibrahim (2014) |
| | *Network Policy* | Qualitative | To what extent does the policy environment promote or hinder the growth of ICT adoption and use? | Ibrahim (2014) |
| | *Networked Economy* | Qualitative | How are businesses and governments using information and communication technologies to interact with the public and with each other? | Ibrahim (2014) |

### 2.4 Conclusion

This chapter explored the literature on socio-economic indicators with a view of identifying them for e-gov projects. E-governance refers to “the public sector’s use of information and communication technology (ICT) with the aim of improving information and service delivery, encouraging citizen participation in the decision-making process and making the government more accountable, transparent and effective” (Lee and Chircu, 2005, p.12). Socio-economic indicators, on the other hand, are the indicators used to measure social and economic development within a specific population.

Some common socio-economic indicators for measuring the impact of e-government projects include the e-readiness index, the e-government readiness index, the networked e-readiness index, the web measure index, the e-government assessment model, including telecommunications infrastructure index, online and the human capacity index. Nevertheless, regarding studies that examine the socio-economic indicators associated with e-government projects, the one study that could be found shows that the most relevant socio-economic indicators were: the size of municipalities, the participation in e-government development, and the school dropout rate. From this insufficient information, no direct relationship could be made between socio-economic indicators and e-governance. The next chapter deals with the critical success factors of e-governance projects.

# CHAPTER 3: CRITICAL SUCCESS FACTORS OF E-GOVERNANCE PROJECTS

## 3.1 Introduction

According to Heeks (2008, p. 26), “Economic, social, and political life in the 21st century will be increasingly digital, and those without ICTs will be increasingly excluded”. Information and Communication Technology (ICT) has been blazing trails from health, education, banking and finance, and agriculture to governance and has left behind noticeable ‘footprints’ with the advent of the Digital or Information Age – an era where ICT use can mean the difference between poverty and wealth, bad governance and good governance for a people. Developed countries like the United States, Japan and Singapore have successfully transformed their governance process through e-governance. However, the same cannot be said for developing countries probably because they lack a working framework for monitoring and evaluating e-governance projects in their governments.

In the previous chapter (Chapter 2) of this study, the socio-economic indicators of e-governance in both developed and developing countries were explored. The chapter covered and discussed the following: socio-economic indicators, ICT for development (ICT4D) indicators, socio-economic indicators of e-governance projects in both developed and developing countries, and finally a tabulation of generated matrices. This chapter, however, presents a discussion of critical success factors (CSFs) of an e-governance project’s lifecycle and how these factors are measured. This present chapter is important because it is widely held that failure rates in ICT4D initiatives, including e-gov projects, are significantly higher than success rates (Dodson, Sterling and Bennett, 2013; Stanforth, 2010). The findings from a Heek study indicate between 60 to 80 % of e-gov projects fail in some way resulting in "a massive wastage of financial, human and political resources, and an inability to deliver the potential benefits of e-government to its beneficiaries" (Heeks, 2011, p. 101).

The purpose of this chapter is to examine the critical success factors of e-governance. To realise this purpose, two research questions, RQ2 and RQ3 are tackled. The research questions are: *What are the critical success factors of an e-governance project’s lifecycle and how can we measure them?* (RQ2) and *What are the assessment metrics of a deployed e-governance* *solution and what are their measurement criteria?* (RQ3). It must be noted in the tackling of these research questions within this chapter, the emphasis was significantly placed on the pre-initiation and core part of the project life cycle.

The value of this chapter in the whole thesis lies in the production and delivery of a comprehensive list of CSFs metrics that can be used for M&E throughout an e-gov project lifecycle after identification of success factors that are critical to e-gov projects in developing countries for enhanced monitoring and evaluation success. The foregoing is important in the light of Heeks' (2008) observation that a lack of monitoring and evaluation of e-gov projects coupled with the notion that e-gov projects that worked in developed countries will naturally work in developing countries has been found to be one of the key causes of failure of e-gov projects (Heeks, 2008). The fact of the matter is that M & E is vital since any successful project largely depends on mechanisms put in place to ensure that all activities during its entire lifecycle are performed at optimum levels with efficiency and effectiveness. Monitoring and evaluation with application to e-gov projects set the stage for all these, allowing for the appropriate adjustment to be done. The objective of this chapter, therefore, is to explore success criteria and assessment metrics for ensuring the successful execution and implementation of an e-gov project.

To address the research objective for this chapter, the research questions were subjected to a rigorous literature review and analysis. The output from this review and analysis was structured in this chapter as follows: section 3.2 discusses the e-gov project life cycle, with subsections as the traditional lifecycle and the proposed e-gov project life cycle. This is then followed by section 3.3, with a discussion on the monitoring and evaluation process coupled with the extraction of CSFs. Section 3.4 provides a proposal of the framework for monitoring and evaluation of e-gov projects. Section 3.5 discusses monitoring and evaluation of e-gov projects. Section 3.6 discusses the logic model as M & E. Section 3.7 provides a discussion of some challenges of M & E in ICT projects. Section 3.8 discusses the benefits of the proposed frameworks, while section 3.9 explored the critical success factors of e-gov projects; and finally, section 3.10 gives a summary and conclusion of the chapter.

## 3.2 The E-governance Project Life Cycle

In project management, the project life cycle has been defined as the stages found in all projects. These ar definition, planning, execution, and delivery (Larson and Gray, 2011). The project life cycle is one of the ways of depicting the peculiar nature of project work. The project life cycle embraces the fact that projects have a limited lifespan and display “predictable changes in the level of effort and focus over the life of the project” as illustrated in Figure 3-1 (Larson and Gray 2011, p. 7).

As a model, the project life cycle serves three main purposes:

- It allows all project team members to know and understand the processes that would be followed throughout the project's life cycle.
- It leads to the documentation of lessons learnt in best practice so that continual improvements can be made on processes embedded in each phase, which can then later be applied to similar projects.
- Additionally, the project life cycle provides the milestones based on which effective monitoring and evaluation can be done since it has been found that project managers use the project life cycle as the blueprint to guide their work (Larson and Gray, 2011).

### 3.2.1 Traditional Project Life Cycle Model

According to Larson and Gray (2011), a standard project will consist of the following four traditional stages (Figure 3.1):

- **Definition stage.** In this stage, specifications of the project are defined; project objectives are agreed-upon; teams are formed, and major responsibilities are assigned.
- **Planning stage.** The level of effort increases and plans are developed to determine what the project will entail, when and how it will be scheduled, whom it will benefit, what quality level should be maintained, and what the budget will be.
- **Executing stage.** This is where a large portion of the project work takes place ─ both physical and mental. The physical product is produced (a bridge, a report, a software

program, an e-gov project). Time, cost, and specification measures are used for control in answer to the following investigations:

- Is the project on schedule, on budget, and meeting specifications?
- What are the forecasts for each of these measures?
- What revisions/changes are necessary?

- **Closing stage.** Closing includes three activities: delivering the project product to the customer or target beneficiary; redeploying project resources, and post-project review. Delivery of the project might include customer training and transferring documents. Redeployment usually involves releasing project equipment/materials to other projects and finding new assignments for team members. Post-project reviews include not only assessing performance but also capturing lessons learned.

Although there are a number of different project life cycle models, the majority of them are exclusive to a particular industry or type of project. It is, therefore, highly possible that the varying project life cycle models may be modifications of the above basic generic model (standard traditional project life cycle), with the stages contracted or expanded. For instance, a new software project may entail five stages: definition, design, code, integration/test, and maintenance. This could be an apparent elaboration of the standard traditional **start-plan-execute-closeout** phases (Archibald, Filippo and Filippo, 1999). Another example is seen in Munns and Bjeirmi (1996) who proposed a six-stage model of the life of a project, where the standard four-phase project life cycle is expanded into six phases. These latter phases being as follows:

1. **Conception phase**: the idea for which the project was birthed within the client organization and its feasibility determined.
2. **Planning phase**: the method to achieve the original idea is planned and designed.
3. **Production**: the plans are converted into physical reality.
4. **Handover**: the finished project is handed over to the client for use.

5. **Utilisation**: the client makes use of the finished project.

6. **Closedown**: the project is dismantled and disposed of at the end of its useful life."

All projects consist of a number of different phases that constitute the life cycle (or lifespan) of each project (Archibald, Filippo and Filippo, 1999). Previously, in the field of project management, and for that matter e-gov projects, it was not unusual "to see each phase of a project being planned, scheduled, and managed as a separate project, from start to finish of each phase" (Archibald, Filippo and Filippo, 1999, p. 3). Consequently, every new phase of the project was handled by a **new** project manager. The result was that unresolved issues and/or conflicts in a preceding phase were carried forward into the next phase, which made them the problems of the new project manager assigned to that next phase. Hence, the new project manager spends time and resources to resolve these issues before actually starting the next phase, thereby throwing the whole project out of gear. The result is the loss of time originally scheduled for the next phase. This time could have been taken to convert an opportunity into an asset (Westney, 2001).

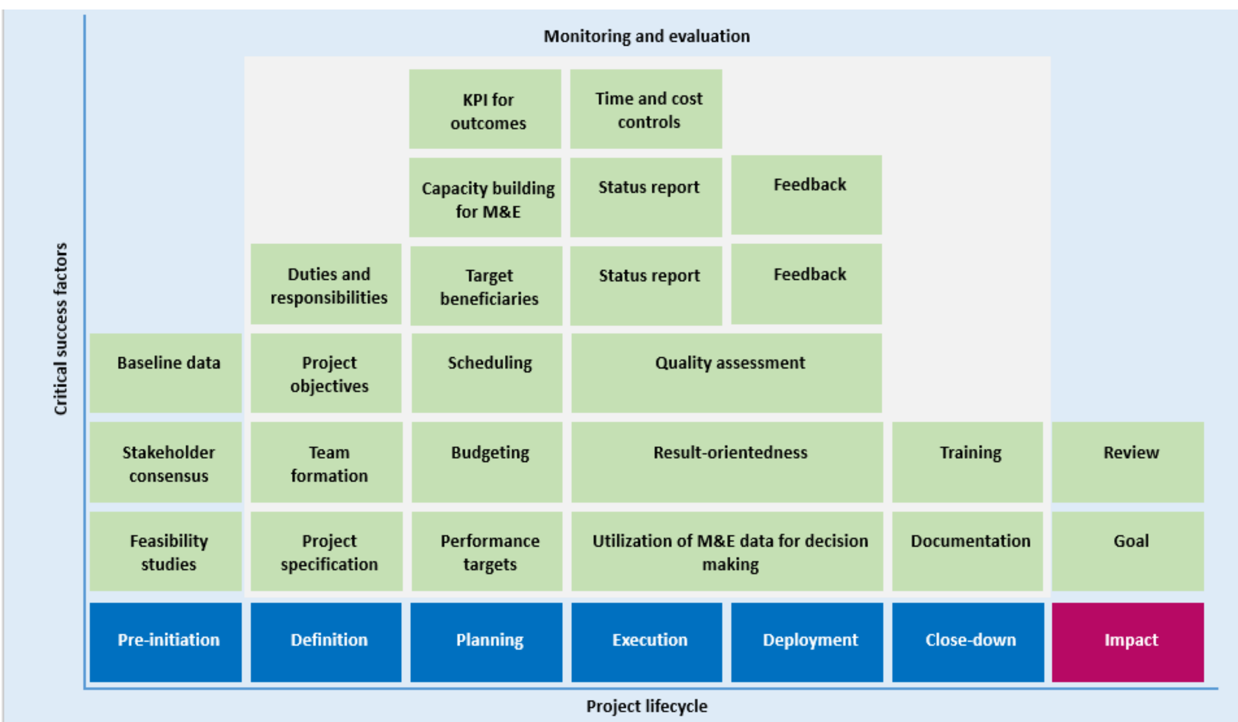
According to Archibald, Filippo and Filippo (1999), the simplicity of the traditional start-plan-execute-close phases is of little practical value in actually planning, authorising, scheduling, and controlling any complex project. This is perhaps because of the many variables – controllable and uncontrollable – that come into play, not to mention the relational and task complexities associated with such projects such as e-gov initiatives.

Although several practitioners and authorities limit the scope of 'project management' (PM) to the traditional start-plan-execute-closedown (?) phases, projects begin their existence **before** the traditional start-up phase (Archibald, Filippo and Filippo, 1999) which can be referred to as the **pre-initiation phase**. Moreover, the products, results of or deliverables from these projects continue to exist and must be evaluated after the projects are closed down (Archibald, Filippo and Filippo, 1999) and so this phase can also be termed as the **post-deployment phase**. There is also the added advantage of some level of overlap between the standard project close-down phase and the initiation of the product usage and thus its product life cycle (Archibald, Filippo and Filippo, 1999). Hence, in the face of these two realities, a model for the e-gov project life cycle is proposed which consists of five phases, coupled with two additional elements that are new to standard project management.

### 3.2.2 A proposed e-gov project life cycle

Our proposed e-gov project lifecycle consists of ■ pre-initiation phase ■ definition; ■ planning; execution ■ deployment phase and, ■ close-down phase.

Figure 3-1 below shows a suggested e-gov project lifecycle for the study premised on the fact that the project needs to achieve the desired socio-economic benefits for its stakeholders. The pre-initiation phase is added to the suggested e-gov project life cycle because of the need to incorporate feasibility studies to avoid embarking on an irrelevant project; this is very important in e-gov projects because of past experience.




**3. Figure 3-1: Suggested e-governance project lifecycle**

The foregoing suggests therefore that, the two elements new to the standard PM are monitoring and evaluation, and impact assessment. The monitoring and evaluation elements span across the whole project lifecycle ─ from definition to close-down phases. The constituents of the proposed e-gov project life cycle are discussed as follows starting with pre-initiation and ending with monitoring and evaluation:

- **Pre-initiation phase**

This phase is prior to the definition phase in the proposed e-gov project life cycle during which the necessary information and "embryonic knowledge and understanding" of the potential project is collected, compiled, buffered, and analyzed sufficiently to enable a well-informed decision to proceed with initiation of the standard project starting phase (Archibald, Filippo and Filippo, 1999, p. 10).

The pre-initiation phase of the e-gov project life cycle can be seen as the project incubation or feasibility phase, where the viability of the e-gov project in question is assessed. This phase involves:

- the determination of what the project will create (deliverables) and the change to be effected;
- an evaluation of what business benefits will be produced for the organisation sponsoring the e-gov project (Archibald, Filippo and Filippo, 1999); and
- verification of whether the project is aligned with the strategic plans and objectives of the sponsoring organisation.

Here, the theory of change that would underlie the e-gov program is defined and clarified. Assumptions undergirding the approach that would be used to achieve the expected outcomes are mapped out in a causal chain and communicated to all stakeholders.

At this phase, national governments first communicate their intent and vision in a vision statement. This phase is perhaps the most crucial as all other ensuing phases will rely hugely on its clarity and practicality (Lea, 2003). As such, this phase eventually leads to the transformation of government services (Service Transformation) to citizens and other stakeholders in the governance process. In fact, service transformation is the ultimate goal of the E-gov Project Life Cycle. It is during this phase that the resources for subsequent phases would be defined as well as the delineations set for the e-gov systems.

Adequacy of information coupled with the establishment of the feasibility of the e-gov project at the pre-initiation phase authorises the entry of the project into the next phase – the implementation phase.

- **Definition phase**

  Although this is the phase where the nitty-gritty of the project is worked out, there is however certain aspects of the pre-initiation phase that flow into this phase as the pre-initiation phase informs the definition phase.

  The definition phase involves the following steps:

  - project scope definition;
  - establishment of programme priorities;
  - creation of the Work Breakdown Structure (WBS);
  - Integrating the WBS with the project; and
  - coding the WBS for the Information System Responsibility matrices (Larson and Gray, 2011).

  The studies using a sample size of 1 500 project managers in both United States and Canada do indicate that poor project definition, especially in terms of scope, often accounts for about 50% of the planning problems (Gobeli and Larson, 1990). The document prepared on scope enables all stakeholders to keep their eyes on the project purpose throughout the entire project lifecycle. It is also in this phase that stakeholders are divided into teams and assigned their various responsibilities (work packages). Project objectives are clearly communicated so that all can buy into it.

- **Planning phase**

  This is the phase where the project charter is put together and risks associated with project assessed and the needed measures put in place to take care of them. Here, the original project idea is broken down into work packages, tasks and activities so that they can be appropriately scheduled and costs allocated to them. The workflow is then designed and resources (time or cost) assigned to them. Using project networks, work packages are converted into networks allowing for the unveiling of dependencies, sequencing and timing of activities, as well as the identification of the critical path underlying the project. Identification of the critical path ensures that adequate attention is given to activities or tasks along that path so that any unnecessary delays are forestalled.

- **Execution phase**

  This phase has two objectives; reliable day-to-day operations and, the progressive integration of systems to achieve service transformation (Lea, 2003). Consistency in the execution of these operations is at the heart of service transformation. This is where actual work takes place and all the plans on paper are put into operation.

- **Deployment phase**

  During this phase, applications are rolled out for the provision of services specified in the vision statement at the pre-initiation phase. At this phase, ranging from the simple to the enormously complex, more than a few applications can be simultaneously developed (Lea, 2003). It is important also that these services are deployed at the right time for maximum user take-up. Here again, issues of technology, user-friendliness, scalability, availability, ownership and pricing of services prevail (Lea, 2003).

- **Close-Down Phase**

  Ultimately, all projects come to an end. This phase marks the completion of the project. Resources assigned to the project are released for other projects. Lessons learned are documented. Documents pertaining to the project are then transferred. In fact, there are three core deliverables associated with the close-down (Larson and Gray, 2011). These are:

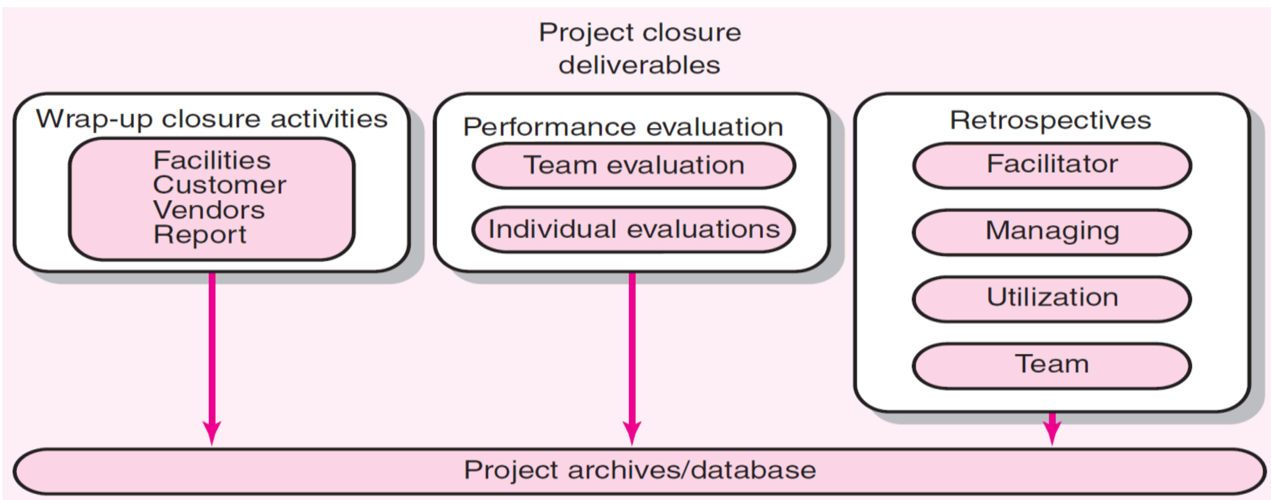
  - Wrap-up closure activities – ensuring the project meets the owner's approval and acceptance, closing accounts, bill payments;

  - Performance evaluation – individual and team evaluations provide important insights for the future;

- Retrospectives - thinking through the project during its lifecycle to deduce lessons learned.

- **Impact Assessment**

Impact assessment comes into force after the e-gov initiative has been deployed for the use of the citizenry and during the close-down phase of the project. There have been instances where an e-gov solution has been deployed with much fanfare but in the end, it failed to achieve the desired outcomes. This phase in the project life cycle assesses the level of impact the project has brought in the situation that necessitated the project in the first place, as well as the rate of diffusion of the e-gov initiative amongst the citizenry. Figure 3-2 portrays project closure and review deliverables.




**4. Figure 3-2: Project closure and review deliverables (Source: Larson and Gray, 2011)**

- **Monitoring and Evaluation**

This element extends from the execution phase to close-down: each phase and the agreed-upon outcomes duly subjected to monitoring and evaluation. However, the monitoring sub-phase pertains to service optimisation (Lea, 2003). The quality level of outcomes is evaluated to ensure they conform to standards. The various factors that influence the different phases of the e-gov project life cycle may determine, in the short or long term, the success or failure of the project.

### 3.3 The Monitoring and Evaluation Process

Generally, researchers do not seem to agree on the number of steps required to build an effective M & E system (Catherman, 2013). Kusek and Rist's (2004) handbook *Ten steps to a results-based monitoring and evaluation system* describes a stepwise approach that has been used in several developing countries for the design and building of M & E systems. For the purpose of this study, these steps shall be adopted as guidelines for the M & E of e-gov projects because of their applicability. An attempt shall be made also to identify critical success factors from each step. These steps are:

- Step 1: Conducting a Readiness Assessment
- Step 2: Agreeing on Outcomes to Monitor and Evaluate
- Step 3: Developing Key Indicators to Monitor Outcomes
- Step 4: Gathering Baseline Data on Indicators.
- Step 5: Planning for Improvements—Setting Realistic Targets
- Step 6: Monitoring for Results
- Step 7: Evaluative Information to Support Decision-making
- Step 8: Analysing and Reporting Findings
- Step 9: Using the Findings
- Step 10: Sustaining the M & E System within the Organization

In this section, the research draws heavily upon the guidelines of Kusek and Rist (2004) in *Ten Steps to a Results-based Monitoring and Evaluation system.*

- **Step 1: Conducting a readiness assessment**

  The readiness assessment refers to the degree of preparedness of government in relation to requirements for instituting M & E system. Readiness assessment, if properly done, provides a firm grounding for the whole M & E since the other steps depend on it. According to Kusek and Rist (2004, pp. 41-42)), the Readiness Assessment is composed of three main parts which may also be regarded as critical success factors:

  - **Incentives and demands for designing and building the M & E system**. It is important to ascertain what incentives there are, be it political, institutional, socio-economic or even personal, before initiating the M & E system. Kusek and Rist (2004) identified five important questions relating to this critical success factor:

- "What is driving the need for building an M & E system—legislative or legal requirements, citizen demand, donor requirements, or political or public sector reform?
- Who are the champions for building and using an M & E system—government, parliament, civil society, donors, others?
- What is motivating those who champion building an M & E system—a political reform agenda, pressures from donors, a personal political agenda, or political directive?
- Who will benefit from the system—politicians, administrators, civil society, donors, citizens?
- Who will not benefit from building an M & E system—politicians, administrators, civil society, donors, citizens? Are there counter-reformers inside or outside the political system?"

- **Roles and responsibilities and existing structures for assessing performance.** From this component of readiness assessment, the critical success factor for M & E that can be extracted is the specification of the roles and responsibilities of actors, with regard to the project. When the roles and responsibilities of all stakeholders are known and stated, it makes M & E easier since performance lapses, in terms of efficiency and effectiveness of activities in the project charter, can be tracked to the assignee (the actor in charge).

- **Capacity building requirement for M & E**. Another component of the readiness assessment is capacity building for M & E. Do the actors have what it takes (be it technically, managerially or fiscally) to monitor and evaluate the e-gov project? Some five areas have been identified in which it is vital that stakeholders build some capacity for effective M & E: ■ programme and programme management, ■ data analysis, project and program goal establishment, ■ budget management, and ■ performance auditing (Kusek and Rist 2004). In sum, capacity building is the CSF that can be extracted from this component.

In a nutshell, the identifiable CSFs from Step 1 (the Readiness Assessment) are the presence of incentives and demand for M & E, specification of roles and responsibilities of stakeholders and capacity building for M & E.

- **Step 2: Agreeing on outcomes to monitor and evaluate**

  Outcome refers to the condition or state we desire to see after the introduction of intervention into a situation. For example, in the context of e-gov, a key outcome desired will be transparency and accountability by the government. However, in setting these outcomes for M & E, it is vital that they are done in conjunction with all stakeholders - internal and external. This would help trigger a sense of ownership of the M & E system in stakeholders, thereby leading to its sustainability. The process of setting and agreeing upon outcomes involves:

    - identifying specific stakeholder representatives;
    - identifying major concerns of stakeholder groups;
    - translating problems into statements of possible outcome improvements, and
    - disaggregating (outcomes) to capture key desired outcomes (Kusek and Rist, 2004).

  Agreeing on outcomes means agreeing on priority areas because these areas have to be important enough most actors concerned, if not all, to warrant being included as an outcome to be monitored and evaluated. Thus, CSF extracted from this step will be a stakeholder consensus on outcomes to monitor and evaluate. Without that, M & E will suffer serious setbacks.

- **Step 3: Selecting key indicators to monitor outcomes**

"Indicators are the quantitative or qualitative variables that provide a simple and reliable means to measure achievement, to reflect the changes connected to an intervention, or to help assess the performance of ... the project … against the stated outcome" (Kusek and Rist, 2004 p.65). Since monitoring and evaluation occurs virtually throughout the project lifecycle, it is therefore imperative that indicators for outcomes be developed for all the levels of the M & E system. Key performance indicators are important because they enable us to see how project success will look when they attain the standard quality, as well as letting us know whether the project and everything pertaining to it is moving toward the expressed desired outcomes. In the context of the tax profiling example, an indicator could be increased in the proportion of businesses paying taxes on a regular basis. According to the "CREAM" acronym developed by Schiavo-Campo (1999), performance indicators must fulfil a set of five criteria otherwise they will be essentially flawed and less useful even if a single one of these criteria are not met. In essence, key performance indicators must be:

- **C**lear: Precise and unambiguous
- **R**elevant: Appropriate to the subject at hand
- **E**conomic: Available at a reasonable cost
- **A**dequate: Provide a sufficient basis to assess the performance
- **M**onitorable: Amenable to independent validation

In light of the foregoing, the CSF for M & E extracted from this step will be the selection of the most appropriate key performance indicators to monitor outcomes.

- **Step 4: Gathering baseline data on indicators**

A performance baseline is an either qualitative or quantitative information that makes available data at the start of, or just before the start of the monitoring period (Kusek and Rist, 2004). The baseline of data measures the current state of affairs so that it can be used as a basis for comparison with future changes elicited by the intervention, as evidenced by changes in the key indicators. By this, the baseline helps actors learn about current project performance levels. Again, using the online tax profiling as an example, the baseline data that will be collected will be the proportion of businesses in the Greater Accra that pay taxes on a regular basis prior to deployment of the solution. The CSF that will be extracted from this step is the availability of baseline data as it also allows for the evaluation of quality before and after project deployment.

- **Step Five: Planning for improvements – selecting results targets**

  Under this step, results-based targets are set. These are objectives that specify the number, timing and location of what is to be achieved (Guijit and Woodhill, 2004). Mathematically speaking, Target = baseline indicator level + the Desired level of improvement (Kusek and Rist 2004). Put another way, target represents the desired reflection of the improvement in the baseline indicator level. According to the United Nations Development Programme (2013), the target is what the situation is expected to be at the end of a program or activity. In the context of the tax profiling example, the target could be in the next two years, an increase in the proportion of Greater Accra businesses that regularly pay taxes by 20% against the baseline. The CSF deduced from this M & E step will be the crafting of suitable performance targets.

- **Step 6: Monitoring for results**

  There are two types of monitoring: (a) Activity-based monitoring and (b) Results-based monitoring (Kusek and Rist 2004). The first involves the tracking of scheduled activities to ascertain whether they have been carried out within the stipulated time, whereas the second one has more to do with ensuring that predetermined outcomes are being or have been realized. And so in a sense, activity-based monitoring focuses more on the tracking of execution of identified activities than results as, most often than not, these activities are not aligned to outcomes. However, Kusek and Rist (2004) contend that it is better to monitor for results than just to monitor for scheduled activities. In view of this, the CSF deducible from this step is an orientation to results.

- **Step 7: Evaluative information to support decision-making**

Evaluation leads to the production of data on the level of project quality and this information can then be used to support decision making. Failure to do so could amount to a waste of evaluation efforts and the benefits associated with evaluation. In addition to accessing the level of quality, the evaluation also has a number of uses which are:

- helping rethink the causes of a problem;
- identifying evolving problems, and
- building consensus on the causes of a problem and how to respond.

For evaluation to fully serve its purpose, it has been proposed that quality evaluation should be free of bias, useful (i.e. data collected should be relevant), technically adequate, involve stakeholders, involve information sharing, and give value for money (Kusek and Rist, 2004). The CSF identifiable from this step, therefore, is the utilisation of M & E data for decision-making. This would even serve as a source of encouragement to actors especially those who collect the data as they would be motivated by the fact that their data collection efforts were not in vain (Hatry, 1999).

- **Step 8: Reporting findings**

  Reporting is often ignored in the M & E process (Worthen, Sanders and Fitz-Patrick, 1997), thus leading to a loss of institutional memory. The rationale behind this step is to demonstrate accountability, convince, educate, document, gain support and promote understanding amongst stakeholders. Documentation of evaluation findings is the CSF that can be extracted from this step. This CSF plays a role in sustaining M & E systems. Documented data may later serve as a resource from which lessons can be drawn to improve the deployed project or be used to inform subsequent projects.

- **Step 9: Using findings**

  The CSF deducible from this step is one and the same with that extracted from Step 7. The fact that the utilization of findings is alluded to twice in this M & E process makes it very important.

- **Step 10: Sustaining the M & E System within the organisation.**

  The sustainability of M & E systems depends on its use. After all, one will only sustain a system that one actually uses. To ensure sustainability six critical pillars have been proposed (Kusek and Rist, 2004) which work together to ensure a sustained M & E system as follows:
  - demand

- clear roles and responsibilities
- trustworthy and credible information
- accountability
- capacity
- incentives

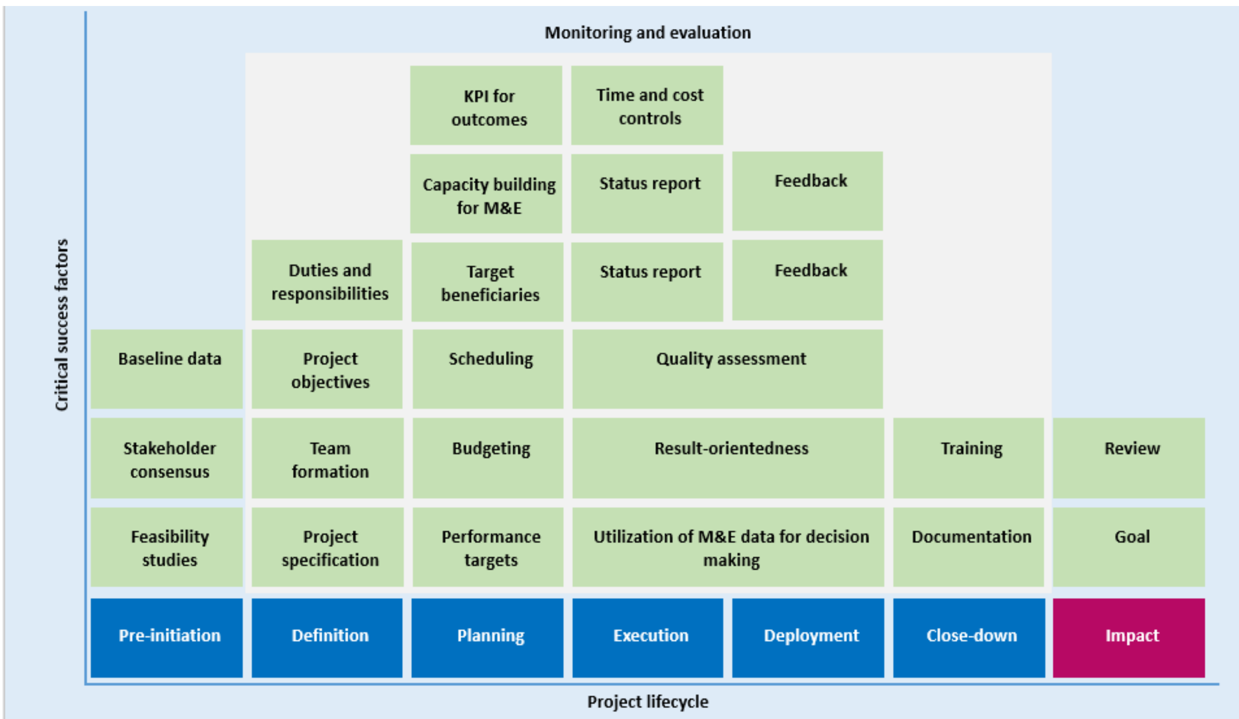
**3.4 Monitoring and Evaluation Frameworks**

Implementation of e-gov related activities is one thing and carrying out these activities in conformity to stated objectives and benefits is another. It is therefore essential that national governments set up systems in the form of Monitoring and Evaluation (M & E) frameworks that will "monitor and track the achievement of stated objectives and benefits throughout the life cycle of the project" (Government of India, 2012, p. 180). A life cycle approach to e-governance is considered most convenient as citizens would be able to have access to public services which would be required right from birth to death (Government of India, 2012).

Evaluating e-gov has become a vital ingredient in initiating and rolling out e-gov initiatives (Lenk and Traunmüller, 2002). Evaluation is critical to:

- uncover the current state of e-gov development;
- determine the degree to which aims couched within different strategies and action plans have been met;
- tease out strengths and weaknesses;
- mould new guidelines;
- Search for instances of best practice; and lastly
- contrast various e-gov organisations at the national and international levels (Kunstelj and Vintar, 2004).

Moreover, in its eEurope 2005 programme, the Commission of the European Communities (2005) unequivocally emphasised the importance of monitoring and benchmarking in the crafting of new guidelines and policy. Nonetheless, numerous reportage and research findings indicate that existing methodologies to monitoring, evaluating and benchmarking e-gov projects are unfavourable to comprehensive e-gov assessment and thus requires further enhancement to provide policymakers with a workable framework for evaluating their decisions. Hence, further research is required in the field (Kunstelj and Vintar, 2004). In view of this, CSFs from the monitoring and evaluation process as well as the project lifecycle have been combined to produce the framework below in Figure 3-3 below:

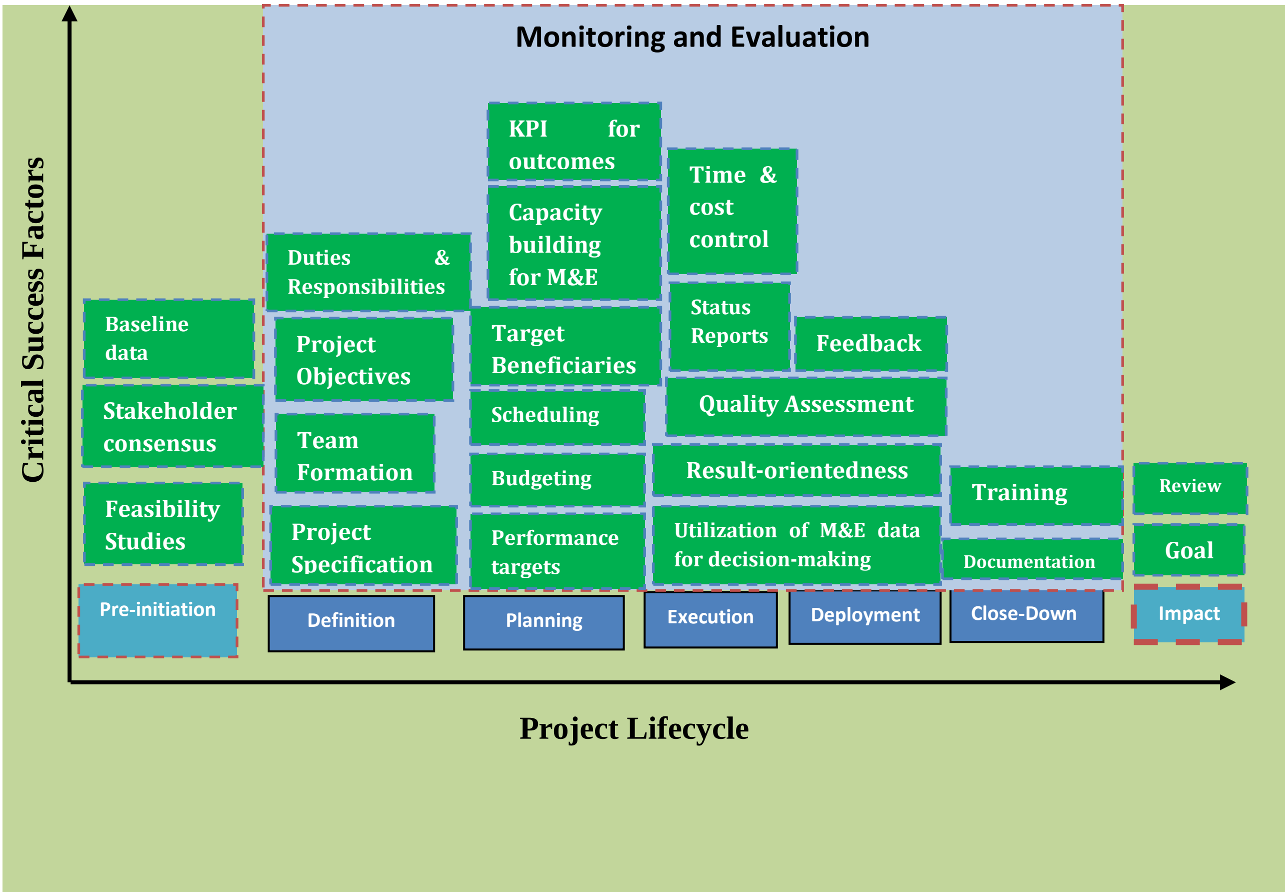



**5. Figure 3-3: Framework for M & E of e-gov Projects, showing Critical Success Factors and Project Lifecycle**

Figure 3-3 above shows the proposed framework for M & E of e-gov projects. The figure further illustrates how the project lifecycle aligns with CSFs specific to each phase of the project lifecycle. For example, the CSFs required for the success of an e-gov project in the definition phase of the project life cycle per the framework will be:

- determination of project objectives;
- formation of teams;
- allocation of duties and responsibilities; and
- and project specification.

This suggests that attention to these CSFs will greatly increase the probability of project success at the definition phase of the e-gov project lifecycle.




**6. Figure 3-4: Framework for M & E of e-gov projects, showing monitoring and evaluation**

The above diagram as shown in Figure 3-4 depicts a slight modification of the proposed framework for M & E of e-gov projects. It was conceived by combined identified CSF of M & E and matric thereof (Figure 3-4) with the suggested e-gov project life cycle (shown in Figure 3-2). In the framework, although M & E mostly covers the core sections of the project life cycle (PLC) (from definition to close-down), the fact that our proposed PLC was augmented with two additional critical phases, namely; pre-initiation and impact enables this researcher to produce a framework that is optimal enough to ensure that if carefully adhered to, e-gov project not only will succeed from a technical perspective but would also yield the desired outcome. It must further be noted that the relevance of M & E during the core phase will rely on CSF whilst for post-deployment it will rely on socio-economic indicators already discussed in Chapter 2 for demonstrating the impact of the project on its stakeholders.

### 3.5 Monitoring and Evaluation of E-Gov Projects

Implementation of e-gov related activities is one thing, and carrying out these activities in conformity to stated objectives and benefits is another. It is, therefore, essential that national governments set up systems in the form of Monitoring and Evaluation (M & E) frameworks that will “monitor and track the achievement of stated objectives and benefits throughout the life cycle of the project” (Government of India, 2012, p. 180). A life cycle approach to e-governance is considered most convenient as citizens would be able to have access to public services which would be required from birth to death (Government of India, 2012).

Evaluating e-gov has become a vital ingredient in initiating and rolling out e-gov initiatives (Lenk and Traunmuller, 2002). Evaluation is critical to uncovering the current state of e-gov development, determining the degree to which aims couched within different strategies and action plans have been met, teasing out strengths and weaknesses, moulding new guidelines, searching for instances of best practice and lastly contrasting various e-gov organisations at the national and international levels (Kunstelj and Vintar, 2004). Moreover, in its eEurope (2005) programme, the European Commission unequivocally emphasised the importance of monitoring and benchmarking the crafting of new guidelines and policy. Existing methodologies to monitoring, evaluating and benchmarking e-gov projects are unfavourable to comprehensive e-gov assessment and thus requires further enhancement to provide policymakers with a workable framework for evaluating their decisions. Hence further research is required in the field (Kunstelj and Vintar, 2004). In view of this, CSFs from the monitoring and evaluation process as well as the project lifecycle have been combined to produce the framework below:

### 3.6 Logic Model as the M & E Framework

One model that has the capability to serve as a framework for monitoring and evaluation is the Logic Model. After Cooksy, Gill and Kelly (2001) compared the Logic Model to other approaches like path diagrams, program templates, concept maps and textual description, they arrived at the conclusion that the Logic Model is the most comprehensive and easy to use, a view to which Savaya and Waysman (2008) agree.

A key characteristic of the Logic Model is its responsiveness to changes in the environment and target beneficiaries with respect to the deployed e-gov project (Savaya and Waysman, 2008); hence its lack of rigidity and apparent flexibility. Along these lines, Savaya and Waysman (2008) warned that rigidly sticking to a model as originally conceived at a time when external circumstances have changed is risky. Indeed, there would be times when models may require some amount of rethinking. As such, the E-gov Logic Model successfully applied for one developing country may have to be adapted for another developing country to reflect local cultural and socio-demographic characteristics.

The Logic Model is inalienably linked with the program theory in that it is a tool whose purpose is to describe and articulate the theory of change (Savaya and Waysman, 2008) undergirding an e-gov project. The basic Logic Model includes the following components (Savaya and Waysman, 2008):

- **Inputs**: the human, financial, organizational, and community resources that need to be invested in the e-gov program so that it will be able to perform its planned activities.
- **Activities**: what the e-gov program does with the inputs; the processes, events, and actions that are an intentional part of the program implementation.
- **Outputs**: the direct products of e-gov program activities, usually measured in terms of the volume of work accomplished and the number of people reached (number of citizens utilizing the e-gov initiative).
- **Outcomes**: the benefits or changes in the program's target population; for example, changes in knowledge, perceptions, attitudes, and behaviour.

The basic generic logic model is as follows:
**Situation:** target population and needs → inputs → Activities →Outputs →Immediate outcomes → intermediate outcomes → long-term outcomes.

Despite the fact that the Logic Model is an extensive and pricy endeavour and that discussions regarding a Logic Model may reveal conflict or power struggles within the organisation that were dormant while things were left imprecise, there are nonetheless several benefits associated with the Logic Model Cycle, some of which are (Savaya and Waysman, 2008) to:

- “assess the feasibility of a program idea;
- assess the readiness of a program for evaluation;
- facilitate communication, cooperation, and shared understanding among stakeholders;
- promote greater clarity in role division among staff;
- specify the resources needed to run the program;
- present the program to external agencies for different purposes, such as fundraising;
- aid in making decisions about adaptations and modifications of a program to fit with the needs and characteristics of different implementation sites;
- help select the aspects of program performance to be monitored, when developing a performance measurement system, so as to ensure that the aspects most important for accountability and for organizational learning are selected (rather than those that are easiest to measure);
- generate knowledge about successful programs;
- elicit feedback from stakeholders and experts, regarding different issues, such as relevance, innovation, and generalizability to other settings; and
- teach and disseminate the program”.

Another framework for monitoring and evaluation of e-gov projects is set out as follows (Goyal, 2011): Stakeholder Consultation and Baseline Study; Monitoring (for Project Milestones, Physical Progress, Financial Progress); Conformance Assessment; Impact Assessment.

These steps are described in more detail as follows:

- **Stakeholder consultation and baseline study**

  This first stage in the framework as proposed by Goyal (2011). Studies in impact assessment have shown that e-gov projects which lacked the involvement of the citizenry from the start only recorded a marginal improvement in overall citizen satisfaction, thus the need to stipulate stakeholder consultation. Most often than not, the expectations of the citizens are not known from the start of the project. This tends to prevent such expectations from being factored into the project at the onset. The result is a yawning gap betweenthe planned output and the expectation of stakeholders. To forestall such a situation from continuing, Goyal (2011) suggested that stakeholder consultation and capturing of baseline data should be carried out concurrently to ensure that citizens' expectations are no longer captured through secondary sources. This would also enhance the objectivity of impact assessments.

- **Monitoring of the progress**

  Time is a key success dimension for projects (Shenhar, 2001) and so delays tend to be costly economically. It is more so in e-gov projects where the risk of technology obsolescence is very high, especially in this era of rapid technological changes and breakthroughs. It is, therefore, necessary to review and monitor the progress of projects periodically. This is done at three levels (Goyal 2011):

  - Progress made in achieving the project milestones;
  - Progress made in achieving the physical targets; and
  - Progress made in achieving financial targets.

- **Conformance assessment**

  A cardinal reason for the failure of projects is the gap between end product and requirement (i.e. between what was intended to be achieved and what is finally achieved).

This means that as a project progresses through the different phases and is tackled by multiple agencies a loss in terms of the user requirements occurs. The greater the loss, the bigger will be the gap between the intended design and reality. Projects with longer gestation periods have a higher risk of loss/change of user requirements. To avert delayed detection of such loss at a stage where it has huge implications on cost and time and to ward off failures, it is necessary to institutionalise a mechanism that minimises the loss in translation of user requirements at critical stages. This is what is referred to as a conformance assessment.

- **Impact assessment**

  Generally, very limited reliable data is available on the impact of E-Gov projects on citizens (Goyal, 2011). Impact assessment is done to ■ ensure that funds/efforts deployed towards E-Gov projects provide corresponding value to citizens; ■ create benchmarks for service delivery for future projects to achieve and exceed**;** as well as to ■ make informed course-corrections for projects under implementation.

### **3.**7 **Challenges of M & E in ICT Projects**

Projects naturally are unique and so it is not uncommon to find each project posing peculiar challenges for monitoring and evaluation efforts and ICT projects are, therefore, no exception. The most basic thing with regard to M & E is the issue of goal setting because they determine what is to be monitored or evaluated; hence, monitoring and evaluation indices, some of which cost, time and quality.

There are a number of challenges that confront M & E in ICT projects, some of which are:

- A lack of well-developed monitoring and evaluation indices. Without a well-formed and robust M & E index, it would be difficult to detect whether an ICT project is performing above or below expectations as there would be nothing to benchmark it against.

- Limited resources and capacities for monitoring and evaluation (Andersson, Jensen, Naitore and  Christoplos, 2014). Countries are daily saddled with the problem of how best to allocate resources to cover the myriad of problems that a country faces. Political expediency allows very little or no resources to be assigned towards monitoring and evaluation of even government-backed ICT projects. Additionally, it is widely accepted that the increasing number of M & E specialists have need of more technically-orientated M & E training than that provided by one or two workshops (Lahey, 2010).

- Poor M & E reporting structures as well as multiple and uncoordinated M & E systems occurring within the same institution (Andersson et al., 2014). It is one thing carrying out M & E, and another is being able to get the M & E data to the decision-makers for informed decision making. A poor reporting structure creates a disconnect between M & E data producers and decision-makers, thus diminishing the motivation of the producers as they begin to view their efforts as a waste of time.

- Another challenge has to do with the M & E data – its timeliness, analysis, dissemination and utilisation. Most often than not, data collected is seldom analysed and disseminated. This is especially true for probably most developing countries.

- Lack of institutionalisation of M & E (Lahey, 2010) is another issue. When M & E has not been made an integral part of an organisation, stakeholders may not be obliged to carry out M & E, but only when it may be convenient for them, especially if doing so will pose a threat to their personal interests.

- Lack of follow-up is another challenge faced by M & E in ICT projects (Loquai and Bay, 2007). There are times when projects are not followed up, to ascertain whether the desired changes have been affected, after making requisite adjustments on the basis of the M & E data earlier collected. This situation affects the fine-tuning of the M & E methodology employed.

- Lack of a uniform M & E methodology. This situation is probably due to the fact that M & E is still a developing field. As a result of the different methodologies used in M & E, it leads to the generation of different data/information and consequently varying conclusions of the same project.

- Lack of collaboration with beneficiaries in designing M & E tools. The involvement of stakeholders in the M & E process will make them keener to give feedback on whether the project has made any difference or not in their socio-economic life, and they may even be predisposed to give some good suggestions as to how to improve the ICT project.

### 3.8 The Benefit of the Proposed Frameworks

More importantly, the augmented lifecycle for e-gov projects ensures that the project gets initiated on a sound footing and makes the intended impact, respectively because of the incorporation of pre-initiation and impact phases; thus, reducing chances of project failure. In essence, with the proposed framework, the e-gov project gets monitored along the entire project lifecycle and not only at the core part of the PLC. Another key benefit of this framework is that it will equip project managers with the knowledge of the particular CSFs needed to achieve project success at each particular phase of the e-gov project lifecycle. This will also help to concentrate efforts of project team members at each phase of the project lifecycle on what is really important for each project phase, thus preventing wastage of valuable resources and time, which tend to be so scarce in developing countries.

### 3.9 Critical Success Factors (CFS) of E-gov Projects

Most often than not, control is an aspect of project management that is often not given due attention (Larson and Gray, 2011). Perhaps, this is because of the resistance that project team members tend to have against control processes. This is by no means the only challenge confronting the execution of control processes. Some additional challenges are unavailability of data for reviewing metrics, inaccuracy of data (probably because it was not tested for validity), and the absence of a timeline for refining and reporting metrics. Without control, in the form of monitoring and evaluation, the project is likely to veer off course and suffer budget overruns. But to achieve this, there is the need to predefine the indicators and metrics that would be utilised to track project progress.

According to the Business Analysis Body of Knowledge (BABOK®), “the purpose of metrics and key performance indicators are to *measure* the performance of solutions, solution components, and other matters of interest to stakeholders” (Wagner 2011, p.4). By implication, therefore, CSF metrics for M & E measure quantitatively or qualitatively to ascertain that a project is successful at each phase throughout the lifecycle and they also provide a means to detect early warning signs.

Critical success factors (CSFs) can be defined as “the limited number of areas in which satisfactory results” will ensure successful monitoring and evaluation (Napitupulu, 2014, p. 469). This implies that if CSFs for M & E is not in place, virtually every monitoring and evaluation effort exerted will be unsuccessful. CSFs thus are ingredients of which occurrence or lack of it may determine whether an initiative, be it M & E or otherwise, will succeed or not (Gichoya, 2005).

A clear definition of what constitutes monitoring and evaluation indices is a key CSF for M & E. When what is to be monitored or evaluated is agreed amongst stakeholders, there is less dissension and thus a higher probability of success for M & E. Introduction of M & E in all the phases of the project life cycle is important. This helps to inculcate, to some extent, an M & E culture in stakeholders of e-gov projects. Stakeholders should be involved in the design of monitoring and evaluation from the start to the end since it makes them feel a part of the M & E process and therefore willing to contribute to its success, having understood its importance and their own particular role in it (Unwin and Day, 2007). Additionally, this will allow continual learning throughout the entire project life cycle.

Capacity building of team members involved in M & E is another critical success factor for e-gov projects. Monitoring and Evaluation are technical in nature and so appropriate training is crucial; as without M & E training, there is likely to be a competency gap as far as the project is concerned, leading to failure of the e-gov project.

All M & E instruments should be pilot tested. This is to ensure the validity and reliability of the instrument and also to make sure that the instrument will actually collect the data that is being sought (Unwin and Day, 2007). Wrong data means wrong evaluation and therefore an erroneous decision.

Feedback and Flexibility is another CSF. Doubtless, deviations will occur in the project because not all variables will be under the control of the project manager. These deviations to the set plan may arise as a result of local culture; hence, there is the need to seek feedback and be flexible enough to make the appropriate adjustments to the M & E process adopted.

Monitoring of indicators can be done over time and space to track any changes in them (i.e. indicators or metrics) The indicators should, however, be logically valid, measurable, precise and reliable (Sethi, 2012).

Monitoring of a program as per this study's definition is to make sure that the program adheres to its intended plan. As such, since a program is grouped into projects, and projects consist of work packages, and work packages consist of tasks while tasks consist of sub-tasks, the role of the monitoring expert will be to ensure that the programme does not deviate from the predefined plan. The planned activities within the program would, therefore, be the aggregation of planned activities within each project. Dependency between projects is not uncommon and should be taken into consideration. It is therefore important that dependencies amongst tasks/work packages/projects be appropriately managed. For instance, a task may take longer because another task depending on it has not been delivered on time due to some factors such as unreliable time estimates, minor redesign, scope creep, and unavailable resources (Larson and Gray, 2011). This holds true for a project as well; it may be impacted by another project's task/work package because they are waiting for that deliverable before getting on with their part of the work.

The role of the monitoring expert would thus be that of ensuring that program's outputs/deliverables are produced in accordance with the sequence predetermined by the plan as well as according to the time planned into the project for each deliverable. Work packages produce intended deliverables and those deliverables are produced by executing one or more tasks and by doing a range of activities. The project plan also contains milestones. A milestone is a point in a project where the team under the leadership of the project manager agree that a decision could be made with regard to the progress of the project or a point where all that was promised in terms of deliverable could be accounted for.

Furthermore, the role of the project manager is to make sure that those milestones are reached. Qualitatively, the attainment of a milestone can be ascertained using a ‘Yes’ or ‘No’ answer. But to give a yes/no answer, the expert would need to do a number of things since, for each milestone, there is a range of expected deliverables. Those deliverables which are project artefacts arise from the successful execution of tasks/sub-tasks that produce the output(s). For a task to produce an output, it must be executed for a certain period. Executed within, below (i.e. shorter duration) or beyond (i.e. longer duration) the expected period, the task will still produce an output. Hence, the collection of all the outputs will make up the deliverable, and the aggregation of deliverables will help ascertain whether a milestone has been reached or not. The role of the M & E expert will be to track those outputs emanating from the executed tasks and the time at which it was delivered and also whether it took more or less time to produce the expected output. If it took more time, it may likely impact on the total duration of the project; however, this might not always be the case as some tasks can be executed faster, which tend to make up for those that took more time.

In terms of the ecosystem, interest should be taken in the level of interaction between the stakeholders and the intervention. Information flow is crucial to successful projects. When team members do not know what others are doing it can create problems, especially when the success of their respective assigned task is strongly dependent on those allocated to team members. It is, therefore, important to track the interactions between stakeholders by studying how information flows or diffuses amongst them. Information flow between stakeholders and the intervention can serve as another M & E indicator. Effective interaction between actors and the intervention should also engender understanding. And in this vein, another indicator that can be looked at is the level of understanding of project vision by stakeholders.

Monitoring of a project entails strict adherence to project plan; costs and time are used as controls to keep the project on track so that it does not deviate from the predetermined plan. Each outcome is allocated a cost and a timeline. If time and cost are therefore important to keeping the project on track, it stands to reason that they can be used as an indicator in assessing the state of affairs of the project. This then implies that if a deliverable has been marked for completion, by say, six days, and this said work package gets completed within that stipulated time or less and at designated cost, it will give a strong indication to the M & E expert that the project is on course. Cost and time would, therefore, constitute another CSF metric for M & E. Additionally, in terms of evaluation, a project should be of the required standard in terms of quality for it to be acceptable by the owner and usable by target beneficiaries. Thus, quality would also serve as another important M & E indicator.

However, the three commonly accepted core indicators or dimensions on which metrics can be developed to track project progress are cost/budget, time/schedule and quality/scope. Table 3-1 depicts proposed CSF metrics for M & E as they relate to deliverables, work packages and milestones with particular reference to monitoring and evaluation phases. These metrics are applicable to each phase of the project life cycle, even as iterations of M & E are conducted continuously at each phase of the project lifecycle as and when needed.

**Table 3-1:** CSF Metrics for successful M & E of e-gov projects

| Phase | Cost Metrics | Measurement Method | Description |
|---|---|---|---|
| | The estimated cost to complete remaining work (ETC) | Quantitative | Amount of money expected to be spent to complete unfinished work. |
| | Estimated Completion Cost (ECC) | Quantitative | Amount of money expected to be spent to complete deliverable, work package or reaching a milestone. |

| | | | |
|---|---|---|---|
| **Monitoring Phase** | Actual Completion Cost (ACC) | Quantitative | The actual amount of money spent on completing deliverable, work package or reaching a milestone. |
| | Estimated Cost at Completion (EAC) | Quantitative | Forecasted cost of the project as the project progresses |
| | Actual Cost (AC) | Quantitative | The actual cost of the work completed. |
| | Earned Value (EV) | Quantitative | Budgeted cost of the work performed (BCWP). |
| | Cost Variance (CV) | Quantitative | Refers to the difference between the earned value and the actual costs for the work completed to date (i.e. CV = EV – AC). |
| | Cost Variance at Completion (VAC) | Quantitative | VAC indicates expected actual over- or underrun cost at completion. |
| | Cost Performance Index (CPI) | Quantitative | Ratio of earned value (EV) to actual cost (AC) (i.e. EV/AC).<br><br>When CPI >1, it means work is ahead of schedule and/or under budget; whereas when CPI < 1, work is behind schedule and/or over budget. |

| | | | |
|---|---|---|---|
| | To Complete Cost Performance Indicator (TCPI) | Quantitative | Measures the rate of efficiency at which assigned resources on the project should be deployed for the remainder of the project (i.e. TCPI = (Total budget –EV) / (Total budget – AC) |
| | **Time/Schedule Metrics** | | **Description** |
| **Monitoring Phase Cont'd** | Estimated Completion Time (ECT) | Quantitative | Forecasted time for completion of work. |
| | Planned Completion Time (PCT) | Quantitative | Budgeted time allocated for completion of work. |
| | Actual Completion Time (ACT) | Quantitative | The actual time is taken for completion of work. |
| | Schedule Performance Index (SPI) | Quantitative | A ratio of the work performed to the work scheduled, in terms of cost (i.e. SPI = BCWP/ BCWS). |

| | | | |
|---|---|---|---|
| | | | When SPI >1, it means work is ahead of schedule and/or under budget; whereas when SPI < 1, work is behind schedule and/or over budget. |
| **Evaluation Phase** | **Quality Metrics** | | **Description** |
| | Defect tracking (DT) | Quantitative | A number of defects per thousand lines of code. |
| | Defect density (DD) | Quantitative | The ratio of the total number of defects opened to measure of size (i.e. DD = total # of defects found /measure of size) |
| | Defect resolution rate (DRR) | Quantitative | The ratio of a total number of defects resolved to total effort spent (i.e. DRR = Total # of defects resolved / total effort spent). |
| | Defect Age (DA) | Quantitative | Refers to the duration between the discovery of the defect and its fixing. |
| | Problems per user month (PUM) | Quantitative | PUM = [Total problems that customers reported (true defects and non-defect-oriented problems) for a time |

| | | | |
|---|---|---|---|
| | | | period] / [Total number of license-months of the software during the period] |
| | Defect Removal Effectiveness (DRE) | Quantitative | DRE = (Defects removed during a development phase / Defects latent in the product) x 100 %; *where defects latent in the product = Defects removed during the evaluation phase + defects found later*. |
| | Total Defect Containment Effectiveness (TDCE) | Quantitative | TDCE = (Number of pre-release defects) / (Number of pre-release defects + Number of post-release defects) |
| | Failure Rates (FR) | Quantitative | FR = Number of failures/ Execution Time. |

Source: (Malone, 1986; Kratzert, 2002; Larson and Gray, 2011)

### 3.10 Conclusion

The purpose of this chapter was to examine the critical success factors of e-governance. To realise this purpose, two research questions, RQ2 and RQ3 were tackled. The purpose of this chapter was achieved by proposing a new e-gov project life cycle, a generic framework for M & E of e-gov projects and identifying a range of CSF metrics that ought to be relied upon and consistently tracked in various stages of an e-gov project in order to ensure positive/successful outcome. The newly proposed e-gov project life cycle included two elements – monitoring and evaluation, and impact assessment – which are new to the standard project management. In conclusion, with the proposed new project lifecycle, M & E will not be performed only at the core part of the PLC but in all phases, which certainly minimise e-gov project failure. If e-gov projects in developing countries are going to enjoy enhanced success rates, it is a necessity to make monitoring and evaluation an integral part of the project and impact assessment a component part of the project lifecycle. After all, the reason e-gov projects are initiated is to effect socio-economic development. However, not discussed in this chapter are metrics can be used to ensure that post-deployment of the e-gov project, the intended impact on thecitizenry can be tracked and measured consistently for further improvements to be made as and when required. This aspect of the research is dedicated to the next chapter on impact assessment. The next chapter looks at the impact assessment of e-governance projects.

## CHAPTER 4: THE IMPACT ASSESSMENT OF E-GOVERNANCE PROJECTS

### 4.1 Introduction

The previous chapter looked at the critical success factors of e-governance projects in developing countries and how they are critical for monitoring and evaluation. Furthermore, in Chapter three a framework for monitoring and evaluation of E-gov projects was proposed with critical success factors were identified for each stage of the proposed M and E framework. The new project life cycle advanced in that chapter will also help ensure M & E will not be performed only at the core part of the project life cycle but in all phases. The present chapter continues from where Chapter 3 left off by doing an in-depth treatment of monitoring and evaluation of e-governance projects with special emphasis being placed on the proposed new additions of post-deployment and impact assessment to the traditional project life cycle.

The rationale behind this chapter lies in the fact that in an EU report of more than 100 e-Gov projects, it was revealed that impact assessment of deployed e-Gov projects, in terms of tangible and quantifiable economic benefits, was found to be still insignificant (Steenson, 2000). This situation seemed to be in line with findings from other studies (Benjamin, 2001; Heeks, 2002; Kanungo, 2003). These findings remain inconclusive by virtue of the fact that outcomes of public sector based ICT4D initiatives (e.g. e-Gov) have “not been fully established” (Bhatnagar, Tominaga, Madon, and Bhatia, 2007, p. 6). Furthermore, although numerous studies on e-governance have been conducted, there still appears to be no systematic framework for assessing the impact of e-governance projects (Bhatnagar, Tominaga, *et al.*, 2007), possibly due to the presence of a wide array of impact assessments (Rattle, 2009). This chapter thus seeks to address the seeming lack of a systematic framework for assessing impact of e-governance projects. The value of this chapter therefore lies in the delivery of a proposed framework for socio-economic impact assessment of e-Gov projects.

The main aim of Chapter four therefore is to explore impact assessment of e-Gov projects thereby addressing objective three which involves exploring success criteria and assessment metrics of deployed e-governance solutions. The research questions under investigation are thus: *What are the critical success factors of an e-governance project’s lifecycle and how can we* *measure them?*(RQ2) and *What are the assessment metrics of a deployed e-governance solution and what are their measurement criteria?* (RQ3). It must be noted in the tackling of these research questions within this chapter, emphasis was significantly placed on the post deployment phase of the proposed e-governance project life cycle. This is to ascertain whether the deployed e-Gov project had had any positive impact on the socio-economic condition of stakeholders such as individual citizens and client businesses.

To tackle the research questions outlined for this chapter, rigorous literature review and analysis was conducted. The remaining portion of this chapter is divided into three sections. Section 4.2 provides an overview into the concept of impact assessment. Section 4.3 discusses impact assessment methodologies whilst section 4.4 under this chapter covers impact assessment of e-Gov projects. A proposal of a framework for socio-economic impact assessment of e-Gov projects is addressed in Section 4.5 with Section 4.6 concluding the chapter.

## 4.2 Impact Assessment: An Overview

The impact assessment of e-gov projects is a challenging task for many developing countries and even some developed ones; reasons for which would be discussed in subsequent sections of this chpater. Impact assessment can be defined as "the systematic analysis of the lasting or significant changes - positive or negative, intended or not – in people's lives brought about by a given action or series of actions" (Roche, 1999, p. 21). Projects can have unintended consequences and this may be positive or negative; impact assessment helps bring this to the fore. With regards to e-Gov impact assessment, the level of analysis may require en entire dedicated projet or programme in order to ensure positive outcome and improve on shortcomings that may arise post-project go-live.

Impact assessment has two key functions – to 'prove' and to 'improve' (Table 4-1). The 'prove' function of impact assessment involves a test of the significant changes brought about by an intervention (e.g. e-Gov initiative) for reasons of accountability; whereas the 'improve' function entails improving a practice for the purpose of drawing lessons (Herbert and Shepherd, 2002). The accountability role of impact assessment has to do with relaying information to stakeholders that may be either upward or downward. For example, upward accountability involves government being accountable to donor agencies and development partners with regard to a funded project; but, in downward accountability the project's beneficiaries are the focus. Nonetheless, upward accountability is far more favoured than downward accountability in many developing countries (Bird, 2002).

Under impact assessment for lesson learning, sponsors and managers of a project are ready to accept mistakes with regards to the project. For this type of impact assessment to work out, there has to be a lot of transparency and trustworthiness (Montgomery, 1995). This is because there is the possibility of key decision makers involved in a project having their revealed failures and shortcomings being used against them (Bird, 2002).

**Table 4-1:** Goals of Impact Assessment

| Dimensions | Proving Impact | Improving Practice |
|---|---|---|
| **Primary Goal** | Measuring as accurately as possible the impacts of the interventions | Understanding the processes of the intervention and their impacts so as to improve those processes |
| **Main Audiences** | Academics, Policy makers, Evaluation Departments, Programme Managers, Implementing agents | Programme Managers/ Implementing Agents, Donor field staff, Civil Society Organization, Target beneficiaries. |
| **Associated Approaches/Factors** | Objectivity, Theory, External, Top down, Generalization, Academic research, Long timescales, Degree of confidence | Subjectivity, Practice, Internal, Bottom up, Contextualization, Market Research, Short timescales, Level of plausibility |

*Source: After Herbert and Shepherd 2002, adapted from Hulme, 1997.*

Table 4-1 shows a comparison of the goals of impact assessment. These impact assessment goals are: proving impact and improving practice and were compared across three dimensions: primary goal, main audiences and associated approaches/factors. When the goal of IA is to prove impact, the primary goal will be to measure as accurately as possible the impacts of the e-Gov interventions; however, when the primary goal of IA is to improve practice, understanding the processes of the intervention and their impacts so as to improve those processes are most crucial. Academics, Policy makers, Evaluation Departments, Programme Managers, implementing agents are the key stakeholders most interested in proving the impact of interventions such as e-Gov initiatives. However, when it comes to improving processes, the most interested key stakeholders are Programme Managers/ Implementing Agents, Donor field staff, Civil Society Organization, Target beneficiaries. The foregoing means that implementing agents/programme managers are interested in both proving impact and improving practice. Table 4-1 further compares the associated approaches used to achieve each primary goal. For the IA goal of proving impact, the associated approaches are objective, external in nature and requires academic research; but for the IA goal of improving practice, the approaches used are the opposite of that used for the IA goal of proving impact as seen in Table 4-1 above.

**4.3 Impact Assessment Methodologies**

In simple terms in the context of this study, impact assessment methodologies are approaches used for determining socio-economic impacts instigated by interventions such as e-Gov. Impact assessment (IA) has over the years gone through some changes spurred on by shifting development paradigms – evolving from modernism to social development and empowerment (Bird, 2002). Impact assessment has become a blend of quantitative and qualitative methodologies, having been influenced by trends in environmental impact assessment, social cost benefit analysis, social auditing and participative methods. This may have consequently resulted in a wide range of impact assessment approaches; thus, triggering a certain level of confusion perhaps because of a lack of clear-cut differences between approaches (Mendell, 2010). Impact assessment may draw upon either quantitative or qualitative data or both; thus, influencing the type of impact assessment methodology employed. Table 4-2 further below provides more details on this.

Broadly speaking, there are three groupings of impact assessment studies/methodology according to Bhatnagar, Tominaga, et al.., 2007, and these groupings depend on the focal point(s) forming the basis of the exercise. These groups are: Supply-side oriented impact assessment; Anecdotal-oriented impact assessment; Citizens and government agencies-focused impact assessment (Bhatnagar, Tominaga, *et al.*., 2007).

The supply-side oriented impact assessment methodology focuses on macro-level appraisals of e-governance activity such as web presence, network coverage, institutional and regulatory support and human capital provision (Bhatnagar, Tominaga, *et al.*., 2007). This type of methodology basically measures impact in terms of physical access to ICT. However, the shortfall with this type of methodology is that it fails to take into consideration concerns such as affordability, appropriateness, ICT capacity and training, and regulatory and macroeconomic environment.

Under the anecdotal-oriented approach, impact assessment is essentially based on anecdotes – 'success' stories and narrations. These anecdotes may be subjective, circumstantial, over-hyped and or even unreliable, coupled with the fact that often times impact assessment studies based on anecdotes are fragmentary and haphazard in nature (Bhatnagar et al.., 2007). The foregoing situation makes identification of clear-cut patterns that could have provided valuable insights on how to effectively create actual success stories problematic.

Citizens and government agencies-focused impact assessment methodology as the name implies has as its focus citizens and government agencies. Under this approach, impact assessment is carried out in relation to how the deployed e-Gov project affects key stakeholders such as citizens, business entities and government agencies. The common flaw with studies using this approach, however, is that findings made tend not to be appropriately situated within the larger national, regional or worldwide trends; such as shifts in the approach to policy undergirding development and governance (Madon and Kiran, 2002; Heeks, 2004; Grant, 2005) or if you will the prevailing development paradigm. This situation thus makes impact of e-Gov projects appear to be out of sync with prevailing development and governance policy.

Building on the work of Hulme (1997) and Montgomery (1995), Herbert and Shepherd (2002) argue that there are six (6) commonly accepted impact assessment methods namely, Sample Surveys; Rapid Appraisal; Participant Observation; Case Studies; Participatory Learning and Action and; Specialized Methods (Table 4-2). Bird (2002) observes that the methodology or combination of methodologies used is/are a function of the type of information required for impact assessment, which in turns relies on the underlying aims of the impact assessment exercise and who the end users of the generated information are. Table 4-2 below depicts different impact assessment methods and their core characteristics.

**Table 4-2:** Common Impact Assessment (IA) Methods

| IA Method | Key Features |
|---|---|
| **Sample Surveys** | Collect quantitative data through questionnaires. Usually a random sample and a matched control group are used to measure pre-determined indicators before and after the intervention. |
| **Rapid Appraisal** | A range of tools and techniques developed originally as rapid rural appraisal (RRA). Involves the use of focus groups, semi-structured interviews with key informants, case studies, participant observation and secondary sources. |
| **Participant Observation** | Extended residence in a programme/project community by field researchers using qualitative techniques and mini-scale sample survey. |
| **Case Studies** | Detailed studies of a specific unit (e.g. an e-Gov target group, an e-Gov project, organisation) involving open-ended questioning and the preparation of 'histories'. |
| **Participatory Learning and Action** | The preparation by beneficiaries of a programme of timelines, impact flow charts, village and resource maps, well-being and wealth ranking, seasonal diagrams, problem ranking and institutional assessments through group processes assisted by a |

| | |
|---|---|
| | facilitator. |
| **Specialized methods** | E.g. Photographic records and video |

Source: Herbert and Shepherd (2002), adapted from Hulme (1997) and Montgomery et al. (1995).

Each of the above impact assessment methods has its own pros and cons, advantages and disadvantages, weaknesses and strengths. In view of this, they are often combined to yield an optimal impact assessment method which has combined strengths greater than a singular IA method and combined weaknesses much lessened than it would have been if a singular IA method was employed. Table 4.3 below provides a comparative analysis of the above impact assessment methods. Table 4.4 shows the conditions that should be in place for the use of a key impact assessment method to be considered appropriate.

**Table 4-3:** Strengths and Weaknesses of Key Impact Assessment Methods

| **Method Criteria** | **Surveys** | **Rapid Appraisal** | **Participant Observation** | **Case Studies** | **Participatory Learning and Action** |
|---|---|---|---|---|---|
| **Coverage (scale of applicability)** | High | Medium | Low | Low | Medium |
| **Representativeness** | High | Medium | Low | Low | Medium |
| **Ease of data standardization, aggregation and synthesis** | High | Medium | Medium to Low | Low | Medium to Low |
| **Ability to isolate and measure non-intervention causes** | High | Low | Low | Low | Low |

| | | | | | |
|---|---|---|---|---|---|
| **of change** | | | | | |
| **Ability to cope with the problem of attribution** | High | Medium | Medium | Medium | Medium |
| **Ability to capture qualitative information about e-Gov project** | Low | High | High | High | High |
| **Ability to capture causal processes** | Low | High | High | Medium | High |
| **Ability to capture diversity of perceptions** | Low | High | High | Medium | High |
| **Ability to elicit views of target beneficiaries about e-Gov** | Low | Medium | High | High - if targeted | Medium |
| **Ability to capture unexpected negative impacts on target beneficiaries** | Low | High | Very high | High | High |
| **Ability to identify and articulate felt needs** | Low | High | High | Medium to Low | High |
| **Degree of participation of** | Low | High | Medium | Medium | Very High |

| | | | | | |
|---|---|---|---|---|---|
| **target beneficiary encouraged by the method** | | | | | |
| **Potential to contribute to building capacity of stakeholders with respect to deployed e-Gov** | Low | High | Low | Medium to Low | Very High |
| **Probability of enhancing downwards accountability to target beneficiaries (citizens and businesses)** | Low | High | Medium | Medium | High |
| **Ability to capture the multidimensionality of e-Gov initiatives** | Low | Medium | High | Medium | Very High |
| **Ability to capture impact of e-Gov projects at different levels e.g. individual, household, community, business, and government agencies.** | Low | Medium | High | Low | High |

| | | | | | |
|---|---|---|---|---|---|
| **Human resource requirements** | Specialist supervision, large numbers of less qualified field workers | High skilled practitioners who are able to analyse and write up results | Mid-skilled practitioners. Long time commitment. Need good supervision | Mid-skilled practitioners. Need good supervision | High skilled practitioners |
| **Cost range** | Very high to medium | High to medium | Medium to Low | Medium to Low | High to Medium |
| **Timescale** | Very high to medium | Medium to Low | High | High to Medium | Medium to Low |

**Source**: Herbert and Shepherd (2002), adapted from Hulme (1997) and Montgomery et al.. (1995).

**Table 4-4:** When are Key Impact Assessment Methods Appropriate?

| **Sample surveys are appropriate when:** | **Rapid Appraisal and/or PLA are appropriate when:** | **Participant Observation and /or Case Studies are appropriate when:** |
|---|---|---|
| The intervention affects large numbers. Accurate estimates of impact are required | The intervention is promoting participatory principles in (re)-planning, implementation, monitoring and evaluation | An understanding of motivations and perceptions is a priority |
| Statistical comparisons must be made between groups over time and/or between locations | An understanding of motivations and perceptions is a priority | Other methods are unlikely to capture the views of women, minorities and other disadvantaged groups. |
| Delivery/implementation mechanisms are operating well, thereby justifying investment in the assessment of impacts | One of the purposes of the study is to assess whether or not felt needs are being addressed by the intervention | One of the purposes of the study is to assess whether or not felt needs are being addressed by the intervention |
| The target population is heterogeneous and it is difficult to isolate the factors unrelated to the intervention | The impact of community-based organisations or other institution building activities are of importance | The impact of community-based organisations or other institution building activities are of importance |
| | There is a need to understand the quality of the data collected through surveys | There is a need to understand the quality of the data collected through surveys or rapid appraisals (e.g causal processes of poverty) |

| | | |
|---|---|---|
| | There is a need for contextual studies before designing more complex monitoring or impact assessment exercises (e.g. Case studies or surveys) | There is a need for contextual studies before designing more complex monitoring or impact assessment exercises (e.g. before carrying out rapid appraisals or before designing a survey) |
| | | |
| **Sample surveys are usually <u>not</u> appropriate when:** | **Rapid Appraisal and/or PLA are <u>not</u> usually appropriate when:** | **Participant Observation and/or Case Studies are usually <u>not</u> appropriate when:** |
| An intervention affects a small number of people | Interventions are relatively un-complex, in which bounded locations are not units of analyses (e.g. health centres serving a wide catchment area) | The intervention is small and 'uncomplicated' providing a specific service or limited intervention which is unlikely to affect community dynamics beyond a few specific effects (e.g. diseases specific health facilities or campaigns) |
| Policymakers are mainly concerned about the outcomes of the intervention e.g. how many people use the health clinic? | Indicators of impact are uncontroversial and negative impacts are unlikely | Bounded locations are not units of analysis |

| | | |
|---|---|---|
| Implementation is recent and untested and it is likely that the way in which the intervention is implemented will have little impact in the present time | Standardized and statistically representative generalizations for large and diverse populations are regarded as the sole priority. | Indicators of impact are clear and easily measurable or assessable (by survey or rapid appraisals) |
| The purpose of the assessment is to study complex activities or processes (e.g. the development and operation of community-based organisations in poor communities) | Participation of beneficiaries is not a priority | Indicators of impact are uncontroversial and negative impacts are unlikely |
| The purpose of the assessment is to document easily observable changes in the physical environment or other tangibles | | Information is needed quickly, and standardized, statistical representative generalizations are regarded as the sole priority |
| The purpose of the assessment is to understand whether or not the intervention is meeting the felt needs of the beneficiaries | | |

Source: Herbert and Shepherd (2002)

End users play a vital role in how impact assessment is structured and implemented (Bird, 2002). For example, the essential design of impact assessment for illiterate village folks will most likely differ from that for literates dwelling in urban areas, contingent on the type of intervention at play. End user participation or stakeholder involvement has become much evident in the design of impact assessment frameworks these days. A case in point is a study conducted by (Bhatnagar and Singh (2004) which measured impact in terms of the total value delivered by an e-Gov project to its diverse stakeholders – client (i.e. citizenry), agency, society and government as a whole; hence, making the stakeholders a focal point for impact assessment. This makes sense considering the fact that any deployed project aims to cause significant changes, be it socio-economic or otherwise, in the lives of a particular group of people aka 'target beneficiaries'. It therefore follows that the best group of people who can perhaps unequivocally and objectively help determine, via provision of data, whether a project was a success is the target beneficiaries. There is therefore the need to involve them in the project from Day 1. This is a major recommendation by many authors in the socio-economic development space. Consequently, any e-Gov impact assessment framework worth its salt must of necessity incorporate end users or stakeholders; in fact, stakeholder participation has been noted as one of the critical success factors of e-Gov project initiation (Hatsu and Ngassam, 2015). The ideology is if stakeholder participation is needed to initiate a project, it therefore stands to reason that stakeholder involvement is equally important for assessment of impact.

In the light of the above, Catley, Burns, Abebe, and Suji (2007) have proposed a Participatory Impact Assessment (PIA)approach, which can also double as a framework (to be discussed in much detail in subsequent sections). This approach perhaps draws upon the Rapid Appraisal IA method shown in Table 4-2. The PIA however is stakeholder centred; in a sense a philosophy – a way of approaching impact assessment especially in developing countries because of local culture differences.

The functioning of the PIA depends on participation of target beneficiaries in the impact assessment process, combining participatory tools and statistical approaches in a flexible way, thereby ensuring that impact assessment adapts to changing local conditions (Catley et al.., 2007).This is important because developing economies are characterized by differing local cultures and these local cultures greatly influence how the introduction of new technology initiative will be accepted (Hatsu and Ngassam, 2015). In view of this, it is imperative that every decision taken and plan made with regard to the e-Gov project initiative factor in intended beneficiaries. As such any form of disregard for intended users would be met with resistance.

Most often than not, there is a failure on the part of project managers and government to collect pre-intervention baselines, possibly because impact assessment tends to be handled as an afterthought and not built into the project life cycle from start to finish. Refusal to acknowledge the importance of stakeholders to the whole impact assessment process may be another contributory factor to this situation. Catley (1999, p. 9) observes that ‘local people are capable of identifying and measuring their own indicators of change’.

In summary, each key impact assessment methodology has its own strengths and weaknesses; impact assessment methodologies are not all appropriate for all situations/conditions. End users or stakeholders play a cardinal role in how impact assessment is structured and implemented.

### 4.4 Impact Assessment of e-Gov projects

Impact assessment of e-Gov faces a number of challenges because of certain flaws intrinsic to conventional impact assessment approaches (challenges to be treated in more detail in the next section). Some of these challenges include assessing process as against actual impact, placing more weight on external as against community centred indicators of impact. There is also the matter of weak or absence of baselines. In response to these challenges, Catley and colleagues advanced a participatory impact assessment approach. The approach contained eight stages: defining the questions to be answered; defining the geographical and time limits of the project; identifying and prioritizing locally-defined impact indicators; deciding which key impact assessment methods to use, and testing them; deciding which sampling methods and sampling size to use; assessment of project attribution; triangulation; obtaining feedback and verifying the results with the community.

Stage 1 – **Defining the questions to be answered**: This is the most difficult stage of the PIA. It is the stage that sets the tone for exactly what the impact assessment aims to achieve. This stage can either make or unmake the whole impact assessment exercise. This is because it is this stage that factor in the various interests of the different stakeholders of a project or intervention, in terms of impact.

Stage 2 - **Define the geographical and time limits of the project**. By 'geographical' we are referring to a specific grouping of people dwelling in a specific location and have presumably been exposed to a particular intervention within a specified time frame.

Stage 3 – **Identify and prioritize locally-defined impact indicators.** Certainly, what different groupings of people consider important in terms of impact will differ and so it is important to ensure that these areas be inclusive in the list of areas the intervention seeks to trigger significant changes; otherwise the project would not be appreciated and if the project is not appreciated it is likely to fail because of lack of support by the locales. But then, the interests of project funders (e.g. multilateral organizations), in terms of the impact they desire to see, must also be satisfied; hence, the need for an impact assessment framework that factor in all the varied impact-related interests of the various stakeholders.

Stage 4 – **Decide which methods to use, and test them.** The appropriate method should be chosen that would effectively capture the desired data on impact. The nature of intervention deployed plays a big role in determining the choice of impact assessment method. For example, an intervention that affects a large number of people require sample surveys as an impact assessment method since it is *more* appropriate, whereas rapid appraisal, case studies or participant observation may be more suited for interventions affecting a small number of people (Table 4.4).

Stage 5 **- Deciding which sampling method and sample size to use.** The sampling methods that can be used may range from random sampling, purposive sampling to convenience sampling. Random sampling is the most rigorous, making possible the generalization of findings made from the sample by virtue of representativeness. Purposive sampling does not allow for generalization; it depends on the opinions of individuals selected as representatives of target group (Catley et al.., 2007). Convenience sampling is the least rigorous type of sampling.

Stage 6 **– Assessment of project attribution.** Project attribution has to do with ascertaining whether observable changes elicited are actually due to project factors. This is important because of the confounding influence of non-project factors. It is important to know what quantum of the changes occurring in the project site can be attributed to project factors. In fact, there are key ways of approaching the study of project attribution assessment (Catley *et al..*, 2007). These are: Assessment of the comparative importance of project and non-project factors within a given project area; Making comparisons between project and non-project populations within a specified project area.

The first approach focuses on the factors be it project-related or otherwise that may have caused changes in the identified impact indicators as well as their comparative importance. Should the non-project factors appear comparatively more important than the project factors, it becomes most difficult to attribute change to project intervention. The second approach is classical in nature as it makes use of counterfactuals in the form of control populations and groups. Under this approach, the population receiving the intervention is compared to the control group – that is the population not receiving the intervention. Catley et al.. (2007) propose that the use of controls in participatory impact assessment may be applicable in the following types of impact assessment studies: "a comparison of areas where the project intervention took place against an area where there was no intervention; a comparison of project and non-project participants within the same community; a comparison of different interventions in the same area (p. 49).

Despite the usefulness of controls in assessing project attribution issues, its use nonetheless raises certain ethical concerns, particularly when it comes to administering humanitarian interventions. These challenges shall be dealt with in a little bit more detail in subsequent sections.
Stage 7 – **Triangulate**. Triangulation entails the use of other sources of information to validate results obtained from participatory exercises. Secondary data sources are cardinal to triangulation, most of which originate from the project's own monitoring and evaluation process as well as from other external sources. Direct observation may also be used to triangulate.

Stage 8 – **Feedback and verify the results with the community**. This stage involves dissemination of project findings to target community for verification of results and for their suggestions as to how best to better improve project the next time it is deployed in another target area.

In 2008, the Department of Information Technology of the Government of India carried out a study to assess the impact of three e-Gov projects namely, Income tax portal, MCA21 e-Governance Project and Online Passport Service. Impact assessment framework for the study was structured along four key dimensions of impact: Cost of availing service; Overall assessment; Quality of Service; Quality of governance, further illustrated in Table 4.5 below. Aside MCA21, the Income tax portal and online passport service can be considered self-explanatory. The MCA21 is an e-Gov initiative that gives business and professional entities in the corporate space direct online access to services (e.g. registration and incorporation of new companies) provided by the Ministry of Company Affairs, India. These indicators as set out below will further be explored along with other impact indicators in literature in the last section of this technical report for possible adoption into the proposed impact assessment framework.

**Table 4-5:** Framework for assessing impact of e-Gov projects

| **Dimension of Impact** | **Indicators** |
|---|---|
| Cost of availing service | Number of trips made for the service |

| | |
|---|---|
| (Measured directly) | Average travel cost of making each trip |
| | Average waiting time in each trip |
| | Estimate of wage loss due to time spent in availing the service |
| | Total time elapsed in availing service Amount |
| | Amount paid as bribe to functionaries |
| | Amount paid to agents to facilitate service preference |
| Overall Assessment | Preference for manual versus computerized system |
| | Composite Score measured on 5-point scale factoring in the key attributes of delivery system seen to be important by users |
| Quality of Service | Interaction with staff, complaint handling, privacy, accuracy measured on 5-point scale |
| Quality of Governance | Transparency, participation, accountability, corruption measured on a 5-point scale |

Source: (Department of Information Technology - India, 2008)

It was observed that MCA21 registered the greatest positive impact on users with regards to key dimensions covered (Department of Information Technology - India, 2008). However, the online passport service registered practically no impact. With regards to the income tax portal, corporate users were found to have significantly benefited from the e-Gov initiative as their total waiting time was cut from 10 to 6 days whilst also reporting considerable improvement in quality of service and quality of governance; but this was not the case for individual tax payers (Department of Information Technology - India, 2008). One would have thought that individual users of the service should have significantly benefited from the service also. This therefore implies that the income tax portal though a great e-Gov initiative from the point of view of corporate users, serves very little or no purpose as far as the individual filers are concerned since the initiative did not significantly impact them. Well, this is not too surprising considering the fact that the impact assessment conducted may not have been really participatory in nature. The study observed that the differences in the extent to which the three projects produced impact were due to the varying "extent of computerization and reengineering done in each of the projects" (Department of Information Technology - India, 2008, p. 23). It is likely that prior to computerization and reengineering stakeholder participation may not have been involved, resulting in some users benefiting more than others, amounting to a violation of the key mantra of e-governance which is 'citizens first' (Kumar *et al.*., 2008).

**4.5 A Proposed framework for Socio-economic Impact Assessment of e-Gov projects.**

Countries are investing considerable amounts of money into e-Gov projects these days, all in a bid to bring governance to the doorstep of the ordinary citizen as well as also remain relevant in this technological age. However, most often than, baseline studies fail to be conducted for such projects and so it becomes difficult later on to objectively ascertain whether the deployed e-Gov initiative significantly improved the socio-economic conditions of target beneficiaries or not (Rao *et al.*., 2004). This lack of an assessment framework tends to result in subjective assessment and value judgment subject to the discretion of a small number of individuals and authorized bodies. Rao et al.., (2004) argue that this situation does not make a strong case for continual injection of funds by donor partners – be it private or multilaterals – into the e-Gov sector as the whole impact assessment framework may be lacking in rationality and objectivity.

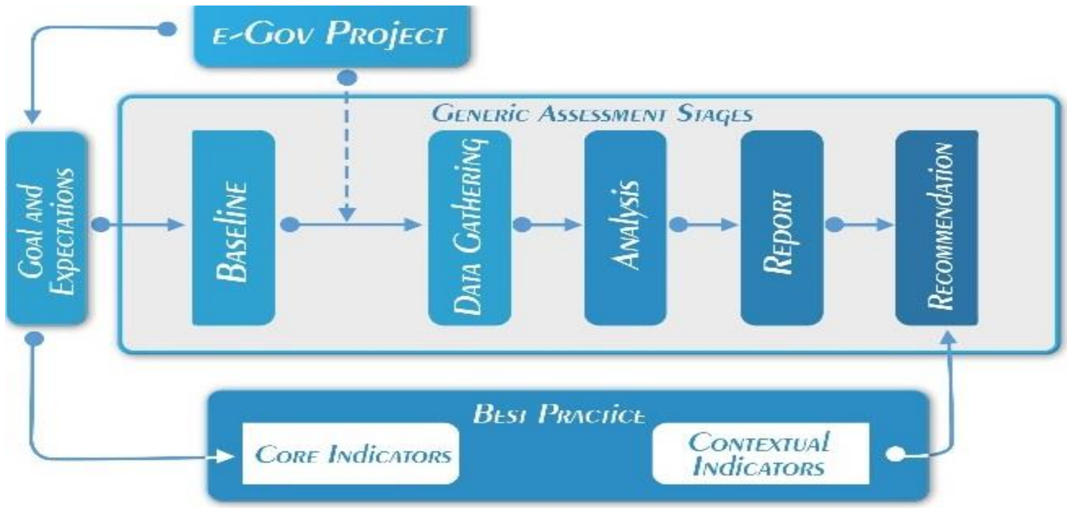
Without doubt, one benefit of an e-Gov impact assessment framework is that it allows stakeholders to realize in an objective way the full effect an e-Gov initiative brings to bear upon the socio-economic condition of target beneficiaries as well as see how a successful e-Gov project look like; thus donor partners and all interested partners become cognizant of which e-Gov initiative to scale up or replicate and which to modify 're-engineer' or drop. As a result, available funds are directed into projects showing the greatest impacts per a rational, widely-accepted impact assessment framework.

E-Governance projects differ greatly in terms of their functionality, magnitude and scope (Rao *et al.*., 2004). This seems to imply that no single e-Gov impact assessment framework may be applicable to all possible e-Gov projects by virtue of the different categories of e-Gov projects which may range from Government to Citizen in Urban Environment (G2C-U), Government to

Citizen in Rural Environment (G2C-R), Government to Business (G2B) and Government to Government (G2G) (Rao *et al.*., 2004). Notwithstanding, Bhatnagar et al.., (2007) are of the view that it is possible to develop an impact assessment framework that may be "applicable for different ICT projects" (p. 11), provided diverse stakeholders are taken into account when developing the framework. A case in point was when impact assessment framework for e-Gov was applied on e-Gov initiatives of varying types i.e. Government to Consumer (G2C), Government to Business (G2B), Government to Government (G2G) (Bhatnagar, Rao, *et al.*., 2007).

Again, Rao et al.. (2004) hold that a comprehensive and a good quality e-governance project should of necessity be: service-oriented; technologically conformed to universally accepted architectures and standards; sustainable; cost-effective; Replicable. It follows then that an effective e-gov impact assessment framework should capture to some extent some of the foregoing dimensions/variables. Some of the attributes of these dimensions can serve as building blocks for an e-Gov impact assessment framework. Service delivery speed, user perception of e-service quality, user ease of accessibility, simplicity of user actions needed for obtaining the service, decline in frequency of visits to high level government offices are examples of some attributes underlying the aforementioned dimensions that may be considered in the design of an e-Gov impact assessment framework.

A framework for the socio-economic impact assessment of e-Gov projects is proposed below in Figure 4-1.




**7. Figure 4-1: A framework for the socio-economic Impact Assessment of e-Gov project**

The framework is made up of eight components: Goals and Expectations; Baseline; Data gathering; Analysis; Report; Recommendation; Core indicators; and Contextual indicators. The *Goals and Expectations* component of the proposed framework seeks to capture the expected change the project owners hope to engineer by the deployment of the e-Gov initiative. The *Baseline* component represents the state of affairs of the socio-economic condition of target beneficiaries prior to deployment of the e-Gov project, which then forms the basis for comparison to ascertain the impact of the e-Gov project. In *Data Gathering*, who, how, what and when data is collected is determined. Under the *Analysis* component, collected data is subjected to both robust and objective analysis using the baseline as a frame of reference. Findings made during the *Analysis* stage is collated, summarized and presented in the form of tables or charts. At the *Recommendation* phase, the necessary suggestions are put forward to help improve upon project outcomes in the future or for similar projects. Contextual indicators differ from core indicators in that contextual indicators are designed to be very specific to the unique setting the e-Gov project finds itself. On the contrary, core indicators may cut across different settings for different projects. Examples of core indicators are cost, project and quality.

To use the above framework as seen in Figure 4-1 to evaluate socio-economic impact of e-Gov projects; the goals and expectations for the e-Gov projects are set from which are derived from the core and contextual indicators; the state of socio-economic condition of target beneficiaries are determined to serve as baseline; after deployment of the e-Gov initiative, data is gathered and analyzed; findings are then reported for the necessary recommendations to be made using both core and contextual indicators as benchmarks.

## 4.6 Conclusion

This chapter examined the impact assessment of e-Gov projects. In this chapter also, the success criteria and assessment metrics of deployed e-governance solutions were also explored. A brief overview of impact assessment revealed that impact assessment was a challenging task for many developing and even developed nations. Literature review and rigorous analysis showed that e-Gov impact assessment has two levels of analyses – project or programme.

Impact assessment (IA) has over the years gone through some changes spurred on by shifting development paradigms – evolving from modernism to social development and empowerment. Impact assessment has become a blend of quantitative and qualitative methodologies. A critical analysis of the different impact assessment methodologies showed that there was no such thing as a one-size-fits-all impact assessment methodology.

It is therefore not far-fetch to deduce that impact assessment faces a number of challenges. Some of these challenges include assessing the process as against actual impact, placing more weight on external as against community centred indicators of impact. There is also the matter of weak or absence of baselines. Participatory impact assessment approach was then advanced as a possible remedy to those shortcomings. The approach contained eight stages: Defining the questions to be answered; Defining the geographical and time limits of the project; Identifying and prioritizing locally-defined impact indicators; Deciding which key impact assessment methods to use, and testing them; Deciding which sampling methods and sampling size to use;

Assessment of project attribution; Triangulation; Obtaining feedback and verifying the results with the community.

Most often than, baseline studies fail to be conducted for such projects and so it becomes difficult later on to objectively ascertain whether the deployed e-Gov initiative significantly improved the socio-economic conditions of target beneficiaries or not. This lack of an assessment framework tends to result in subjective assessment and value judgment subject to the discretion of a small number of individuals and authorized bodies. This situation does not make a strong case for continual injection of funds by donor partners – be it private or multilateral – into the e-Gov sector as the whole impact assessment framework may be lacking in rationality and objectivity. A framework for socio-economic impact assessment was then put together to address the aforementioned situation. The framework is made up of eight components: Goals and Expectations; Baseline; Data gathering; Analysis; Report; Recommendation; Core indicators; and Contextual indicators. The next chapter, Chapter 5, covers our proposed framework for benchmarking e-gov projects.

# CHAPTER 5: A PROPOSED FRAMEWORK FOR BENCHMARKING e-GOVERNANCE PROJECTS

## 5.1 Introduction

The previous chapter examined the impact assessment of e-Gov projects. In that chapter, a framework for the socio-economic impact assessment of e-Gov projects was proposed. The framework was made up of eight components Goals and Expectations; Baseline; Data gathering, Analysis, Report, Recommendation, Core indicators, and Contextual indicators. The present chapter proposes a conceptual framework for benchmarking e-governance projects in developing countries. The essence of this chapter is to lay out a framework; which is a kind of blueprint that enables e-Gov projects to be effectively translated into tangible socio-economic development outcomes.

The main aim of this chapter, therefore, is to develop an integrated theoretical framework for benchmarking e-governance solutions in developing countries that particularly factors in the various phases of the entire e-Gov project life cycle, thus addressing objective four of this research. The objective is achieved by answering the following research question: *How can a comprehensive theoretical framework be developed to benchmark e-governance projects?*

The research question pertaining to this chapter is answered by conducting a rigorous literature review and analysis on e-Gov and on e-Gov related projects. As such, reasons for the success (and therefore failure) of e-Gov projects are critically reviewed. Findings from the literature search are then relied upon to cluster a range of factors, which are critical to benchmarking e-Gov projects. This leads to the development of core components to be used within the framework. Iteration of combined findings from previously published papers on e-Gov centric project lifecycle, M & E framework with associated critical success factors (CSFs) for managing e-Gov projects, and impact assessment framework to assess their post-deployment stage are considered in order to produce the integrated solution. The design science approach is also employed during the development of the framework. The proposed model went through a number of iterations to yield the final result output reported in this chapter.

The remaining portion of this chapter is divided into four sections. Section 5.2 provides an overview of the classes of e-Gov benchmarking frameworks. Section 5.3 centres on e-readiness and strategy-based e-Gov framework whilst section 5.4 under this chapter look at maturity or stage-based e-Gov framework. Meanwhile, section 5.5 introduces project life cycle and implementation based integrated framework for benchmarking e-Gov; section 5.6 details some of the various ways the proposed framework can be applied. Finally, section 5.7 presents a summary and conclusion.

### 5.2 Overview of e-Gov Frameworks

Though still in its developing stages, e-governance is the future of governance in many countries worldwide. A digital revolution is ongoing all over the world; although slowly but surely in the governance space. National governments are being swept along in its wake to the extent that governments are becoming e-governments (Jayashree and Marthandan, 2010). As e-governance continues to make inroads in developing countries spurred on by the digital revolution, the transformation of human societies into e-societies is becoming inevitable.

In fact, the term "e-Gov" has become one of the most commonly used terms when dealing with issues of modernization of public administration (Lenk, 2002). In the near future, it would not be surprising to find many governments worldwide especially developing ones fully embracing e-governance; but until then, there is a need to benchmark e-governance in these developing countries so as to smoothen implementation efforts and drastically mitigate failure rates.

To benchmark something is to appraise it against a set of universally accepted standards. In an attempt to benchmark e-governance, a number of frameworks have been developed. Heeks (2002) developed the ITPOSMO factor framework to help explain why e-gov initiatives either fail or succeed on the basis of seven dimensions as enshrined in the said model. These seven dimensions are information, technology, processes, objectives and values, staffing and skills, management systems and structure, and other resources (e.g. time, money etc). He argues that these dimensions have to be in place in an e-governance project if the occurrence of design-reality gaps is to be prevented. However, this framework, though useful in a number of ways, appears to ignore the role of policy and governance in e-gov implementation success. Fountain's (2001) Technology Enactment Framework (TEF) suggests a theory of dynamic process rather than a predictive outcome. The framework is dynamic because of the interplay between the ICT elements and the actors and their behaviours. The bedrock of this framework is the differentiation it places between ICT elements (‘objective IT’) and the actors’ perception and use of these elements (‘enacted technology’). Enacted technology has four specific elements or contexts, namely; perception, design, implementation and use. Of these four, the context of use has the greatest impact on technology enactment. Complexities linked with the implementation of technology in public sector organisations such as e-governance is explainable by a TEF (Fountain, 2001). The framework views technology as a carrier of policy aims; thus, e-governance as an IT-enabled initiative can be seen as the embodiment of e-governance policy aims awaiting enactment to produce an outcome.

E-governance projects involve different components which tend to be interrelated such that ignoring one component can lead to the failure of the other; hence the need for integration. For example, there can be no evaluation of an e-gov project without a monitoring mechanism being first in place since the data that is collected during the monitoring phase is what would be used for the evaluation.

Considering the high failure rates of information system(IS) projects in developing countries (Heeks, 2002), there is the need for a comprehensive framework – which encapsulates a system of concepts and objectives – that continuously lead to the generation of universally accepted standards that are consistent in nature. These standards can then be used as the basis for benchmarking e-gov projects.

As e-Gov is constantly evolving (Rabaiah and Vandijck, 2009) any framework that would propose to benchmark e-Gov must of necessity be flexible, customizable, and extensible. It must not be ‘cast in stone’; but rather should be one that is responsive to the unique peculiarities of the local culture in which the e-Gov project is to be implemented. After all, in order for any valid framework to stay relevant for a long time, it has to be able to respond to changes in the environment (Rabaiah and Vandijck, 2009).

A number of frameworks to benchmark e-Gov have been put forward, some of which are strategy-based (Aicholzer, 2004; Bhatnagar, 2004; Chen *et al..*, 2006; Grant and Chau, 2005; Heeks, 2006) Shahkooh and Abdollahi, 2007; Rahman and Rajon, 2012), with very little or no emphasis being laid on the different phases of the e-gov project life cycle. Furthermore, although these varying e-gov frameworks factor in the importance of the pre-initiation phase, the post-deployment phase, however, seems to be ignored. For example, Rahman and Rajon (2012) in a study to determine effective framework for implementing e-Governance in developing Countries proposed an e-Gov framework that was made up of two components: e-governance infrastructure and supporting infrastructure. In as much as the developed framework was specific as to the infrastructure requirements and ancillary infrastructure needed to kick-start an e-gov project, it failed to take cognizance of the wide array of other vital components that go into making e-gov projects successful. For example, the e-Gov framework proposed by Rahman and Rajon (2012) failed to take into consideration the different components of pre-initiation and post-deployment phases of e-Gov projects (which would be discussed later in this chapter). Furthermore, the authors' developed framework failed to capture success factors critical to each phase of the project life cycle. Though, it may be argued that the e-Gov framework being developed by the present study does not factor in e-governance infrastructure and supporting infrastructure, it should be noted that providing e-governance infrastructure and supporting infrastructure fall under the ambit of policy, a component of the pre-initiation layer discussed in Section 5.6.2.

It is important to note that the preponderance of e-Gov frameworks in the system has made it difficult for national governments to decide on which particular framework would best suit their unique context whilst at the same time yielding optimal benefits (Marthandan and Tang, 2010). The fact of the matter is that existing frameworks have their merits and demerits, as well as differences; thus, may be challenging to standardization. This situation lends support to arguments for the formulation of a standardized e-Gov benchmarking model rigorous and robust enough to overcome some of the shortcomings of existing frameworks. This is important if we wish the e-Gov framework to remain relevant for a very long time to come.

### 5.3 Classes of E-Gov Frameworks

Based on the foregoing, e-Gov frameworks can be grouped broadly into two major classes: e-readiness and strategy-based e-Gov framework; and Maturity or Stage based e-Gov framework (Klievnik and Janssen, 2009; Concha *et al*.., 2012). The difference between the two lies in the fact that e-readiness and strategy-based frameworks have pre-initiation of e-Gov projects as its focal point, whereas e-Gov maturity-based frameworks emphasize the level of development of the e-Gov project (Al-Khatib, 2009).

Several attempts have been made to develop e-Gov benchmarking frameworks. The challenge has been in how to make it all-embracing such that pertinent aspects of e-Gov such as pre-initiation and post-deployment phases of e-Gov are taken into consideration in the development of the framework. The nature of a framework is greatly influenced by how researchers and authors in the field of e-Gov view e-Gov and how best to benchmark it (i.e. 'perspectives'). A classic example can be found in the maturity or stage-based class of e-Gov framework, where 'perspectives' do play a major role (Mukabeta, Owei and Alexander, 2008; Kachwamba and Hussein, 2009); thus resulting in the generation of several variants of the stage based framework, although the key underlying architecture remains the same (Ostasius and Laukaitis, 2015). This class of framework is treated in more detail in section 5.4.

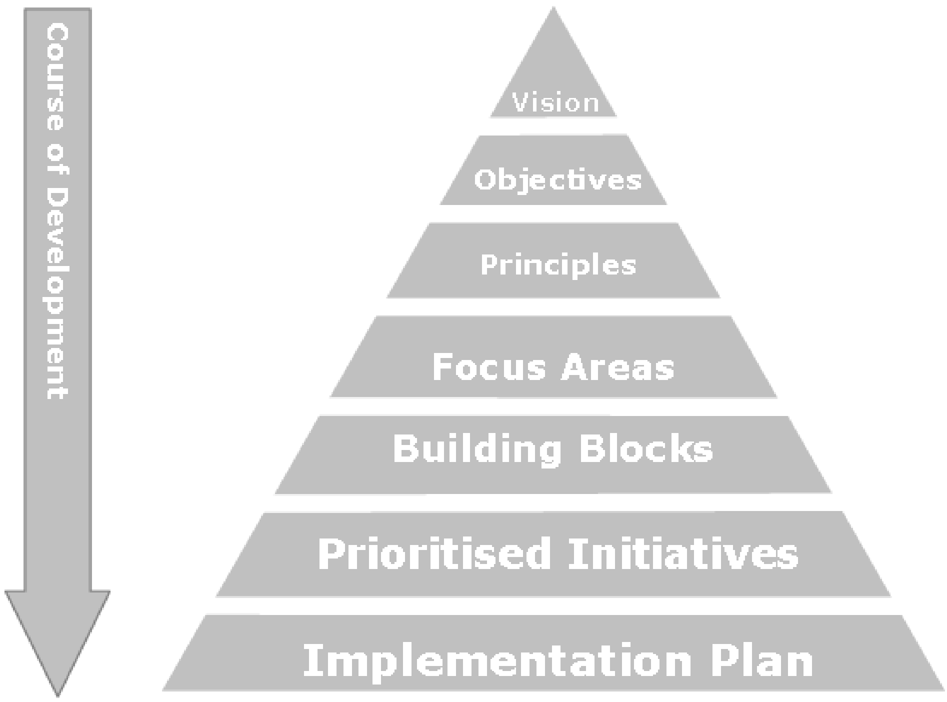
Another important factor that may influence the nature or architecture of e-Gov framework would be the purposes and the objectives undergirding the e-gov framework (Ostasius and Laukaitis, 2015). In other words, we ought to have a sound understanding of the rationale behind developing a framework and its intended purpose. For instance, an investigator more concerned about the readiness of national governments to deploy e-Gov would doubtless be more concerned about e-readiness and strategy than anything else leading to e-readiness and a strategy-based class of e-Gov framework. Persistent e-Gov project implementation failures make it difficult to determine which class of framework to fall upon. The next section explores a range of classes of e-Gov framework.

### 5.4 E-Readiness and Strategy Based e-Gov Framework

This class of framework is based on e-readiness and strategy conjectured to be important for the successful take-off of any e-Gov project. In effect, e-readiness and strategy form the basis for certain e-Gov frameworks (Rabaiah and Vandijck, 2009).

Whilst e-Gov strategy is a blueprint for the initiation of e-Gov projects that seek to make the most of management's ability to realize the goals and objectives of the organization (Heeks, 2006), e-readiness is a reference to the extent of preparedness of governments to participate in the digital world (e.g. e-Governance). It, therefore, stands to reason that e-Gov frameworks based on e-readiness and strategy care very little or nothing about the project life cycle, actual implementation (although may be interested in implementation plans) and e-Gov maturity stage.

Conducting an in-depth study of e-Gov strategies employed by various governments from both developed and developing nations, Rabaiah and Vandijck (2009) put together a framework based on strategy comprising the following common components: vision, objectives, principles, focus areas, building blocks, prioritized initiatives, and implementation plan (Figure 7). The framework essentially articulates how to convert an e-Gov vision into an implementation plan. The execution of the implementation plan is outside the scope of the framework. In the subsequent sub-sections, their work would be heavily referenced. Figure 5-1 shows the pattern of e-government strategy development.




**8. Figure 5-1: Pattern of e-Government strategy development (Source: Rabaiah and Vandijck 2009)**

Vision, Strategic objectives, Guiding principles, Focus areas, Building blocks, Prioritised initiatives and implementation plan presented in Figure 5-1 are discussed as follows:

### 5.4.1 Vision

In an e-gov development strategy, the vision embodies the government's policy statement framework on e-Gov; as such, subsequent initiatives must be aligned to the policy statement undergirding e-Gov in that country.

### 5.4.2 Strategic Objectives

For strategic objectives to be justifiable, they must have a focus reflective of the thrust behind the e-Gov initiative. An e-Gov's specific focus as captured by its strategic objectives differs from country to country. For example, in Singapore, the focus is centred on enhanced citizen satisfaction; whilst in countries like Korea and Egypt, the focus is more on citizen participation or democracy (Rabaiah and Vandijck, 2009). Conducting further analysis of strategic objectives, they found that user-centricity is the primary object of e-Gov initiatives. In other words, stakeholder participation is cardinal.

### 5.4.3 Guiding Principles

The guiding principle is the central theme of the e-gov initiative and should be relied upon by stakeholders when making a decision, executing or developing the project at each phase to ensure that the fundamental theme to be adhered upon by all participant in replicated in the whole value chain. It should be noted therefore that this theme may vary from country to country. For countries like Japan, Egypt, Australia, UK and Denmark, the guiding principle underpinning their e-Gov initiative is user-centricity – meaning user experience should be the focal point and also that no decision or requirement gathering should be conducted without having user involvement and participation. This contrasts significantly with countries like the Netherlands and Austria whose guiding principle for their e-Gov project is privacy. Privacy refers to making sure that end-user data or the citizenry information is protected in the whole value chain. Be that as it may, the most recurring guiding principle of e-Gov is to always put the first efficiency of the e-Gov initiative. Efficiency refers to the conformity of a project to a pre-determined plan along with each phase of the project lifecycle for timely completion of tasks and achievement of milestones. Examples of countries with efficiency and capacity as guiding principles are India, Jordan, The Netherlands, Egypt, Australia, New Zealand, Finland, and Austria. The second guiding principle was to design e-Gov in such a way as to facilitate maximum user experience. The design has to do with the look and functioning of the e-Gov project and interface; this is important for cultivating high rates of adoption amongst end-users. The third most important guiding principle for e-government is to achieve universal access. Universal access implies that no citizen is exempted from being able to use and benefit from the e-Gov initiative.

In summary, e-Gov project strategy should be underpinned by these guiding principles if it is to be a success: Efficiency, Stakeholder participation and Universal accessibility. Table 5-1 further details some common guiding principle of e-government with their explanations.

**Table 5-1:** Common guiding principles of e-government

| **Guiding Principle** | **Description** |
|---|---|
| Efficiency/capacity | This refers to the conformity of a project to a pre-determined plan along with each phase of the project lifecycle for timely completion of tasks and achievement of milestones. This guiding principle helps to prevent wastage of scarce resources. |
| Participatory government/Considerate administration | Refers to the involvement of the citizenry in government's decision-making process. This is to aid in consensus building. Any decisions made on such consensus is consequently widely acceptable to many, further boosting the chances of success of the e-Gov initiative in question. |
| Universal Accessibility | This guiding principle implies that no citizen is exempted from being able to use and benefit from the e-Gov initiative. Universal accessibility enhances the probability that more citizens would be impacted positively by the e-Gov solution barring any limitation. |
| User-centricity | This means user experience should be the focal point and also that no decision or requirement gathering should be conducted without having user involvement and participation. In this way, citizens develop a sense of ownership regarding the e-Gov |

| | |
|---|---|
| | initiative. |
| Convenience/Satisfaction | Satisfaction refers to the fulfilment of expectations of citizens, whilst convenience provides ease of use and comfort to customers being able to receive government services in the comfort of their homes. |
| Interoperability | This refers to the ability of e-gov initiatives to interact with other e-gov initiatives to interchange and utilise information. |
| Transparency | This refers to openness on the part of the government to its citizenry. This enhances trust-building in citizens and makes them willing to cooperate with governments in its e-Gov initiatives. |
| Personalization | This refers to the customization of e-Gov initiatives to the needs of each individual citizens. This makes citizens more responsive to the initiative. |
| Value for money | This means the worth engendered by the e-Gov initiative must be worth the money spent in procuring the initiative in the first place. |
| Security | Security refers to the protection of data and the network associated with the e-Gov initiative. This guiding principle is important as it wards off cyber-attacks from hackers and ensures the integrity of the entire e-Gov project. |
| Sustainability | This guiding principle refers to the continuance of the e-Gov initiative. The value of this principle lies in its ability to ensure that the e-Gov project does not become short-lived but continues in perpetuity. |

Adapted from Rabaiah and Vandijck (2009)

### 5.4.4 Focus Areas

Focus area is the fundamental basic social-aspect of the socio-economic aspect of the country being targeted in order to bring a solution to its shortcomings. Focus areas, in essence, are key areas where the brunt of national e-gov efforts come to bear. National governments differ in what they consider a focus area of e-Gov. These differences in considerations may be a result of varying socio-economic conditions across countries. For example, countries like India, Egypt, Canada, Germany, Austria, The Netherlands and Denmark consider service delivery a focus area. With regards to service delivery, the foregoing presupposes that the aforementioned countries seek to enhance the quality of services to the citizenry.

Table 5-2 identifies focus areas of various national governments as acknowledged by themselves in national e-Gov strategies (Rabaiah and Vandijck, 2009). Focus areas of e-Gov range from accessibility, internal efficiency, HR development, cooperation procedures and service delivery. Accessibility refers to the degree of user-friendliness an e-Gov interface provides end-users. India, Canada, UK, Finland have accessibility as their focus area. Internal efficiency refers to the optimal usage of resources within an organization. HR development deals with training and workshops conducted for value addition of staffs responsible for the operation of the e-Gov. Cooperation procedures entail the mechanisms followed by individuals in various departments of public agencies for the purpose of collaboration. However, Rabaiah and Vandijck (2009) observed also that service delivery, internal efficiencies and government networking constitute arguably the most important focus areas of e-Gov. Table 5-2 presents a description of the focus areas of e-government.

**Table 5-2:** Focus Areas of e-Government

| **Focus Areas** | **Description** |
|---|---|

| | |
|---|---|
| Service Delivery | This seeks to enhance the quality of services to the citizenry. |
| Internal Efficiency | Internal efficiency refers to the optimal usage of resources within an organization. |
| Government Networking | This refers to the interconnectedness of government computer networks across different public agencies, ministries and departments. |
| Infrastructure Development | This refers to the public structures or systems, be it physical or otherwise, put in place to aid the socio-economic development of the people. |
| Accessibility/Interface | This refers to the degree of user-friendliness an e-Gov interface provides end-users. This has implications for the enhancement of user engagement. |
| Administrative Reform | This refers to changes directed at administrative tasks in a bid to remove constraining bureaucratic bottlenecks impeding speedy socio-economic development. |
| Knowledge/Information Management | This focus area implies methodical management of data for extraction of value and for tactical and strategic advantages. |
| Legislation/Regulations | This means laws, rules and guidelines are enacted to shape how e-Gov functions |

| | |
|---|---|
| | within a country. |
| HR Development | This deals with training conducted for value addition of staffs responsible for the operation of the e-Gov so as to boost their capacity and skills. |
| PPP | PPP refers to a private-public partnership. It is a type of funding arrangement where the government partners with a private sector entity either for release of funds or expertise to initiate an e-Gov initiative. |
| Engagement of people | This focus area has to do with the extent to which stakeholders especially end-users interact with the e-Gov initiative. |
| Building confidence/trust in online services | This is a process of developing trustworthiness in e-services for maximum patronage of e-Gov initiatives by stakeholders. |
| Standardization | This focus area has to do with e-Gov stakeholders coming to an agreement on technical standards. These standards have implications for interoperability and government networking. |

Adapted from (Rabaiah and Vandijck, 2009)

### 5.4.5 Building Blocks

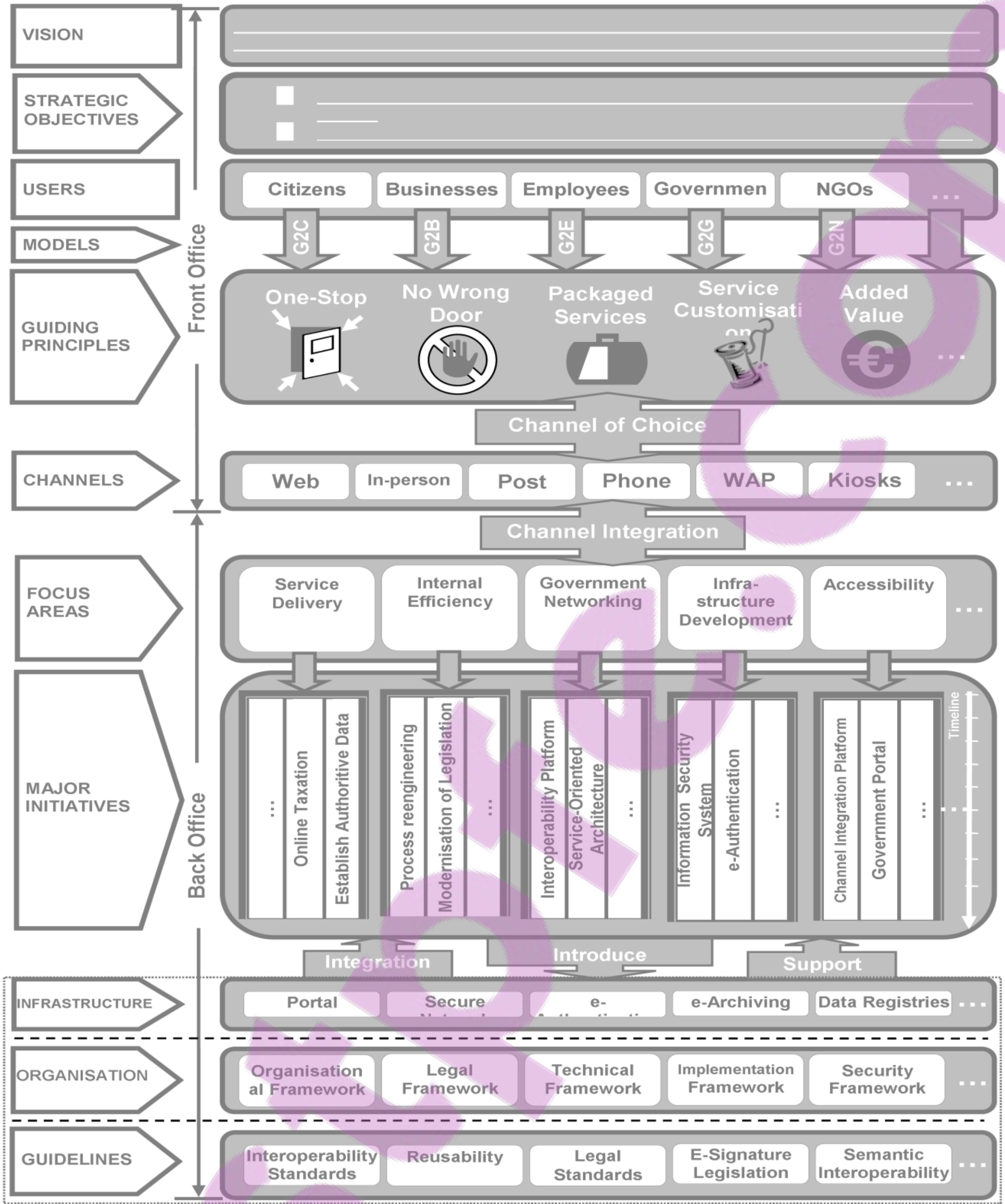
The fifth item in the pattern of e-government strategy development as seen in Figure 7(5-1) is building blocks. Building blocks in the context of the present study refers to the various individual components needed to make an e-government initiative a success. Rabaiah and

Vandijck (2009) unpack the building blocks of e-Gov along with three thematic areas namely organization, infrastructure and guidelines. Examples of identified organization building block used by countries are implementation framework and legal framework. The implementation framework refers to the model a country depends on and uses to execute its e-Gov initiative, whilst the legal framework has to do with the body of laws and regulations enacted to facilitate and regulate the development of e-Gov in a country. Meanwhile, some examples of infrastructure building blocks are e-payment systems and e-identification. E-payment systems refer to the digital mode of payments devoid of cash usage such as Mobile Money. E-identification is an electronic approach for validating the identity of citizens. With regards to guidelines building blocks, examples are reusability and interoperability standards. Reusability refers to the application of existing assets, codes and the like that was originally designed for one e-gov initiative to be used in another e-gov initiative. Interoperability standards refer to the rules guiding the level of quality associated with the ability of e-gov initiatives to interact with other e-gov initiatives to interchange and utilise information.

### 5.4.6 Prioritised Initiatives and Implementation Plan

Prioritised initiatives refer to projects that have been selected and determined to be more important than competing initiatives. National governments have finite resources. As such, for every intervention, be it e-Gov or otherwise, there are competing interventions also requiring resources. Prioritisation of initiatives is, therefore, an important building block. Meanwhile, the implementation plan building block forms the last component of e-Gov strategy development. Implementation plan refers to the blueprint used for the execution of e-Gov initiatives.

Figure 5-2 depicts pictorially the E-Readiness and Strategy Based Framework proposed by Rabaiah and Vandijck (2009). The figure is made up of two main layers comprising front office and back office. The front office comprises vision, strategic objectives, users, models, guiding principles and channels. Users may range from citizens, businesses, employees, government, and NGOs. The back office comprises focus areas, major initiatives, infrastructure, organization and guidelines. Examples of focus areas are service delivery and internal efficiency. Example of a major initiative from the figure is online taxation. Per figure 5-2, some proposed infrastructures are data registries and a website portal. The figure further shows the different aspects of the organization – legal, technical and security frameworks. The diagram, in essence, portrays that e-readiness and strategy require both front office and back office readiness, firmly grounded by strategy.




**9. Figure 5-2: E-Readiness and Strategy Based Framework (Source: Rabaiah and Vandijck, 2009)**

## 5.5 Maturity or Stage Based e-Gov Framework

A number of stage models have been put forward by researchers in the e-Gov space. Nielsen (2016) in a study focusing on e-governance and stage models alone grouped stage-models into three namely government models, holistic approach models, and evolutionary e-government maturity models. The government models are a stage-based model developed by consultants, government and academics to enable government agencies to pinpoint and boost their maturity level as regards e-gov. Meanwhile, holistic approach models are predefined models 'engineered' to help the government in e-Gov project implementation, while the evolutionary e-government maturity models emphasized sequential evolutionary steps, for instance from immature to mature e-government.

Maturity or stage-based e-Gov framework is the conceptualization of e-Gov as a process consisting of multi-steps or multi-stages with arguably no limit on the number of steps or stages. It has been used by the World Bank, United Nations, e-ASEAN Taskforce, and Deloitte (Hiller and Berlanger, 2001; Layne and Lee, 2001; Moon, 2002). Subsequent sub-sections will look at how each of the aforementioned bodies uses the stage-based framework, drawing heavily upon Jayashree and Marthandan (2010). Analyzing the individual frameworks, it would be observed that the implementation stage is lacking. This is a limitation.

### 5.5.1 World Bank 3-Stage Framework

The **World Bank-3 stage Framework** views e-Gov as a 3-stage model: Publish; Interact and Transact. Under the *publish* stage, governments of developing nations put out information to the citizenry via their website about e-Gov projects or about inviting stakeholders or technical expert to participate in the project. Moreover, documents on important government services and forms may also be made available on the website for downloading and collecting information respectively.  Many developing nations are arguably at this stage of e-Gov development. This stage is similar to the emerging presence in the UN's Five-Stage Framework.

At the second stage (*interact*), e-Gov is characterized by citizen engagement with policymakers. Here, citizens are able to interact with policymakers via asking questions, posting comments through participation on a forum on the site and so on. This stage helps foster public trust in the government.

Under the *transact* stage, e-Gov platforms are configured to be transaction-enabled such that G2C and G2B transactions can be conducted. This allows for enhanced productivity, cost reduction in service delivery, accountability and transparency via data logs.

### 5.5.2 UN's Five-Stage Framework

The United Nations and American Society for Public Administration (UNASPA, 2001), contrary to the World Bank, was of the view that Stage Based e-Gov Framework has five stages and they are: Emerging presence; Enhanced presence; Interactive presence; Transactional presence; and Seamless or fully integrated presence.

Under the *emerging presence* stage, the government begins to initiate an online presence by way of some few static web pages containing some degree of information.

In the *enhanced presence* stage of the framework, the government websites are consistently updated with new information. Moreover, the information is made available on the site are not generic in nature, but specific and dynamic. At this stage, information is considered 'specific' when detailed responses to concerns of citizens are proffered. Information is additionally considered 'dynamic' when citizens are regularly updated on new information regarding questions or concerns raised by citizens on the website.

In the third stage of the framework, *interactive presence* stage, e-Gov graduates into a portal where users are able to link up with service providers.

The fourth stage of this framework as proposed by the UN is the *transactional presence*. Under this stage, e-Gov affords the citizenry the opportunity, via a single government portal, to carry out online transactions with government agencies, departments and ministries. Transactions such as visa renewals and passport acquisitions become possible. Success in this stage of the framework depends on the level of confidence the citizens may have built up in e-Gov during the first three stages of the framework.

Under the *seamless or full integrated presence* stage, e-Gov is transformed into a single, universal, one-stop portal, through which citizens can gain instant access to all available e-services provided by government; thus, preventing multiplicity of government websites.

### 5.5.3 E-ASEAN Task Force Framework

Under this framework, a four-stage maturity framework was proposed by the Association of Southeast Asian Nations. The framework was broken into stages on the basis of teledensity (or telephone density) and personal computer (PC) penetration. The stages are:

- *Emerging* stage: This stage is characterized by < 5 % teledensity and < 1% PC penetration.
- *Evolving* stage: This stage is marked by 5-10 % teledensity and 2-5 % PC penetration
- *Embedding* stage: E-Gov with 20-40 % teledensity and 5-10% PC penetration are considered to be in the embedding stage.
- *Extending* stage: Here teledensity is more than 40 % and more than 20% PC penetration.

### 5.5.4 Deloitte Six Stage Framework

This framework under the maturity based e-Gov framework contains six stages (Deloiitte and Touche, 2001) namely, information publishing/dissemination; official two-way transaction (iii)

Multi-purpose portals; Portal personalization; Clustering of common service; Full integration and enterprise transaction.

At the *information publishing/dissemination* stage, there is enhanced access to information via e-Gov. In the second stage of the framework (*official two-way transaction*), e-Gov is transaction enabled such that government agencies and citizen-users can interact with each other via ICT tools such as e-mails, digital signatures and security keys.

In the *multi-purpose portals* stage of the e-Gov framework, the citizenry is able to access a wide array of services delivered across many government agencies through the portal.

The next stage is the *portal personalization* where users are provided with the requisite tools to tailor portals to suit them. This capability is not possible in the earlier stages.

Under the fifth stage, *clustering of common service,* unification and seamlessness of e-Gov services is the focus. This is achieved through teamwork between and among government departments so that users can have direct access to e-services without going through a go-between.

The last stage is about *full integration and enterprise transaction*. Here, e-Gov is more sophisticated. Under this stage, users can modify the website to suit their unique wants and inclinations.

Despite the fact, there are other frameworks or models under this class of framework (e.g. Layne and Lee's (2001) four-stage model; Hiller and Belanger's (2001) five-stage and Moon's (2002) five-stage model), the basic architecture underlying them remains the same.

## 5.6 Introducing Project Life Cycle to Close Existing Gaps

The previous frameworks don't even have a project discipline on which to rely to effectively deliver e-Gov systems to stakeholders for further usage but instead implicitly assumes that the derived system is seamlessly delivered. Yet in developing countries, the delivery of such systems is where things fail miserably. As such one of the key contributions of this thesis is to close that gap by introducing rigorous project management principle to the existing body of knowledge of e-gov as a starting point but also introducing many more concepts to be unpacked as we make progress (pre-initiation and post-delivery). Furthermore, none of the two classes of framework discussed above addresses or fully addresses the e-Gov project life cycle (PLC) and implementation issues. This, therefore, leaves an important gap in e-Gov literature as far as benchmarking is concerned.

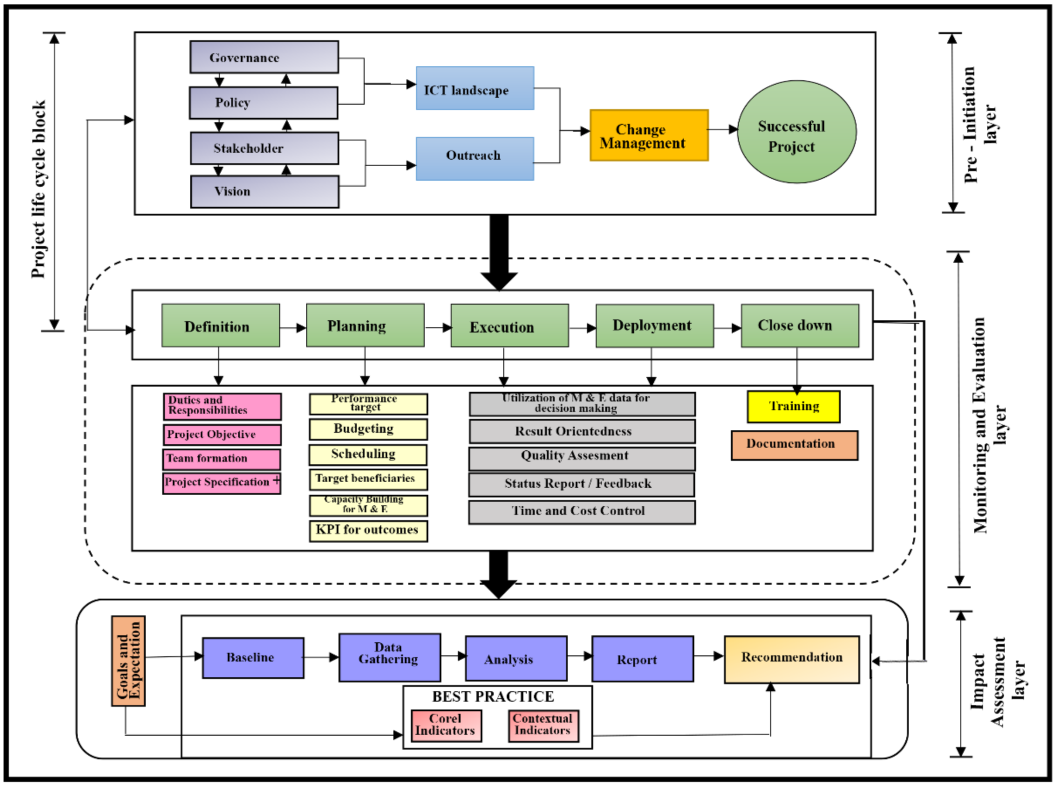
It's been noted also that there is a lack of methodology or framework that facilitates flexible and comparative measurement of e-Gov in a way that is comprehensive and fundamental (Luna-Reyes, Gil-Garcia and Romero, 2012). The foregoing is further compounded by the lack of monitoring and evaluation and critical success factors in a project which makes them more prone to failure particularly in an emerging economy context.

In view of the above, in the next section, we seek to propose an integrated framework for benchmarking e-Gov projects. This newly proposed integrated framework would be based primarily on the project life cycle as well as implementation coupled with monitoring and evaluation. The proposed integrated framework would also factor in critical success factors as well as factors central to pre-initiation.

### 5.6.1 An Integrated Framework for Benchmarking e-Gov Projects

The proposed integrated framework for benchmarking e-Gov projects consists of three layers: Pre-initiation layer; Monitoring and Evaluation layer; and, Impact Assessment Layer. The pre-initiation layer is the layer where the necessary information and 'embryonic knowledge and understanding' of the potential project are collected, compiled, and analysed sufficiently to enable a well-informed decision to proceed with initiation of the standard project starting phase. The pre-initiation layer of the e-Gov project life cycle can be seen as a project incubation or feasibility phase where the viability of the e-Gov project in question is assessed. This layer involves the determination of what the project will create (deliverables) and the change to be effected; an evaluation of what business benefits will be produced for the organization sponsoring the e-Gov project; and, a verification of whether the project is aligned with the strategic plans and objectives of the sponsoring organization (refer to Chapter 3 for more details). Meanwhile, the M & E layer was conceived by combined identified CSF of M & E and metric thereof (Figure 3-4) with our suggested e-Gov project life cycle (shown in Figure 3-2). The M & E layer mostly covers the core part of the PLC (from definition to close-down) (refer to Chapter 3 for more details). The impact assessment layer lays out the framework used to evaluate the socio-economic impact of e-Gov projects. To use this impact assessment layer, the goals and expectations for the e-Gov projects are set from which are derived the core and contextual indicators; the state of socio-economic condition of target beneficiaries are determined to serve as baseline; after deployment of the e-Gov initiative, data is gathered and analyzed; findings are then reported for the necessary recommendations to be made using both core and contextual indicators as benchmarks (refer to Chapter 4 for more details).

The integrated framework in question was developed to be customizable, generic in nature and not constrained in some country-specific characteristics. Consequently, any developing country can utilize the proposed framework to guide the implementation of its e-Gov project to significantly increase the success rate. To develop the framework, a number of steps were followed namely, literature was relied upon; existing frameworks were studied; limitations of existing frameworks were identified; a gap was found and a framework proposed to close the gap; and, finally a demonstration that the proposed framework closes such gap. The final result output is shown in Figure 5.3.




**10. Figure 5-3 Suggested Integrated Framework for Benchmarking e-Gov Projects**

### 5.6.1.1 Pre-initiation Layer

The Pre-initiation layer consists of seven key components: Governance; Policy; Stakeholder; ICT landscape, Outreach, Change management and Vision. Firstly, an e-Gov's vision is influenced by the implementing country's peculiar social, cultural, political and economic factors (Park, 2008). Unlike other frameworks, the proposed integrated framework suggests that the governance component of the pre-initiation layer is virtually the starting point of every e-Gov pre-initiation phase in that e-Gov initiation is borne out of the need to ensure citizen participation in the governance process. The foregoing notion is contrary to the tenets of the strategy based e-Gov framework developed by Rabaiah and Vandijck (2009) earlier discussed above, which made no mention of governance as a building block. The second component of the pre-initiation layer is policy. A good e-Gov policy is an offshoot of good governance (the third component of the pre-initiation layer) and for such a policy to be widely accepted, stakeholders (the fourth component of the pre-initiation layer) such as citizens, businesses, civil societies, government agencies cannot be ignored. Involving stakeholders in the pre-initiation phase of any e-Gov initiative is likely to inspire a sense of ownership amongst the stakeholders thereby increasing the chances of success of such a project.

ICT landscape forms the fifth component of the pre-initiation layer. The ICT landscape in the pre-initiation layer deals with the technical prerequisites of e-Gov initiation and the extent of ICT usage amongst target beneficiaries. Without technical prerequisites being in place, e-Gov initiation is of little or no use. Meanwhile, lack of ICT usage amongst target beneficiaries would make it difficult if not impossible for target beneficiaries to interact with the interface of an e-Gov project. Some of these technical prerequisites are internet connectivity, internet penetration, bandwidth, and ownership of ICT tools that can access an e-Gov interface. Moreover, it must be noted that the ICT landscape is a function of governance and policy in how a country is governed and what policies are adopted go a long way to shape the ICT landscape. Change management is the last but component of the pre-initiation layer. The value of the change management component lies in the need cater to any necessary adjustments in a bid to adapt to changes in the ICT landscape as well as challenges that may arise during outreach. Outreach, the last component of the pre-initiation layer has to do with sensitization and creating awareness amongst the populace regarding the e-Gov initiative.

#### 5.6.1.2 Monitoring and Evaluation Layer

This layer is a combination of stages in the project life cycle and critical success factors specific to each stage in that project life cycle. Each project goes through cycles and each cycle is unique in some way, characterized by particular critical success factors. This means that what may be a

CSF at a particular life cycle stage may be a “stumbling block’ at another stage of the same cycle.

The project life cycle component of this layer is composed of five stages namely, *definition*, *planning*, *execution*, *deployment* and *close down*. Each of these stages is unique as earlier stated, suggesting that factors critical for success would differ from stage to stage and this fact is reflected in the proposed integrated framework; thus, greatly enhancing the practicality and value of the framework. For example, the *definition* stage has as its critical success factors (CSFs) *duties and responsibilities*, *project objectives*, *team formation* and *project specification*, whilst CSFs for the *close-down* stage are *training* and documentation.

The definition stage is the first stage in the project life cycle and the CSFs undergirding it are *duties and responsibilities*, *project objectives*, *team formation* and *project specification*. Observance of these CSFs sets the pace for carrying out the e-Gov implementation plan crafted in the pre-initiation phase.

Planning is the second stage of the project life cycle. This is where the details of the e-Gov project are worked out. The CSFs underlying this stage are performance targets, budgeting, scheduling, target beneficiaries, capacity building for M & E and KPI outcomes. This stage helps prevent scope creep, delays and budget overruns.

Execution and Deployment represent the third and fourth stage of the project life cycle. This is where the e-Gov project is translated from the dream stage into actuality. Because of the close linkage between these two stages, they share common CSFs. These CSFs are the utilization of M & E data for decision making, result-orientedness, quality assessment, status report/ feedback, and time and cost control. Together with the CSFs, these two stages ensure that there is zero room for error during e-Gov implementation.

The close-down stage is the final stage in the project life cycle. Critical success factors cardinal to this stage are training and documentation. *Training* of key stakeholders as a CSF ensures the usability of the output of the e-Gov project. Furthermore, documentation helps to put down in writing lessons learned so that other similar e-Gov projects can draw insights from it.

#### 5.6.1.3 Impact Assessment Layer

This layer is characterized by goals and expectations; baseline; data gathering; analysis; report; recommendation; and, best practices. This has been dealt with in much detail in a previous chapter (Chapter 4). Simply launching an e-Gov project is not enough. The impact is and should be of the essence. That is why the proposed e-Gov benchmarking framework contains the impact assessment layer. Unfortunately, virtually all of the reviewed e-Gov frameworks fall short of this all-important layer. Figure 5-3 provides a suggested integrated framework for benchmarking e-Gov projects.

### 5.6.5 Exploitation of the Framework

The applications for the proposed integrated theoretical framework are manifold described along the following lines:

- The framework provides a systematized model for benchmarking e-Gov projects in developing countries. The developed model begins with a pre-initiation layer, followed by an M & E layer and then an impact assessment layer. Within the M & E layer, for example, is the various phases of the project life cycle and associated critical success factors.

- The developed framework can be used as a diagnostic tool for pinpointing flaws and weakness within an e-Gov project so that necessary corrective actions can be taken.

- The developed framework makes it easy to compare e-Gov projects even those initiated in different environments because of the ability of the model's automation (discussed in the next chapter) to provide a single benchmarking score for an e-Gov project. Additionally, the developed model can be used to investigate why different e-Gov projects may exhibit varying levels of success by comparing core indicators as opposed to contextual indicators. This is because core indicators may provide a common basis for comparison.

- The developed model can serve as a prescriptive tool to suggest the most important critical success factors needed to achieve breakthrough success in an e-Gov project.
- The developed model can be used to a large extent to replicate the level of success of a successful e-Gov project by using the model to identify specific elements that significantly accounted for the exceptional performance of such an e-Gov project and doing same in a similar project.

**5.7 Conclusion**

In this chapter, we sought to develop an integrated theoretical framework for benchmarking e-governance solutions in developing countries that particularly factors in the various phases of the entire e-Gov project life cycle, thus addressing objective four of this research. The research question under investigation was thus: *How can a comprehensive theoretical framework be developed to benchmark e-governance projects?* To develop the framework, a number of steps were followed namely, literature was relied upon; existing frameworks were studied; limitations of existing frameworks were identified; a gap was found and a framework proposed to close the gap; and, finally a demonstration that the proposed framework closes such gap. The proposed integrated framework for e-Gov benchmarking consists of three layers: Pre-initiation layer; Monitoring and Evaluation layer; and, Impact Assessment Layer.

The proposed framework has a number of advantages. It provides a ‘big picture’ view of the key ingredients of a successful e-Gov implementation. This is so because the integrated framework is not only concerned with core phases of the e-Gov’s project life cycle but also its pre-initiation, impact assessment and, monitoring and evaluation phases. It even goes further to account for the success factors critical to each stage of the monitoring and evaluation stage. Furthermore, the proposed integrated framework relays the understanding that any particular component of successful e-Gov implementation is not in isolation from the others, as these individual components are pieces of the same puzzle. The puzzle here, being e-Gov implementation. This in no small way contributes to the robust nature of the framework, thus making it adaptable to the e-Gov project implementation context. In the next chapter, we would look at data collection.

# CHAPTER 6: DATA COLLECTION

## 6.1 Introduction

In the previous chapter, the integrated framework for benchmarking e-Gov in developing countries was presented as well as approaches for its exploitation and adoption albeit its conceptual nature. The value of this chapter in the whole thesis is to lay out the process that will be used to collect data used in the validation of such a conceptualization for the purpose of ascertaining that such conceptualization will achieve its intended purpose in a real-life context from adoption and implementation perspectives.

The purpose of this chapter is to achieve one aspect of the research objective pertaining to the validation of the framework which is data gathering for analysis to aid validation and evaluation of framework, thereby tackling the research question, "*How can the proposed framework be validated and evaluated for the purpose of socio-economic development in developing countries?*" This part of the objective is that of setting the scene for the purpose of data collection by presenting the various research instruments relied upon for the collection of data for analysis in the next chapter.

This chapter, in essence, seeks to bring to light how we went about collecting data that provided the evidence for the support of the developed framework. To achieve this aim, survey-based case studies and expert opinions were conducted. The survey-based case study targeted project managers at six public sector organizations. Meanwhile, expert opinions were solicited from e-Gov experts from locally and abroad. For reasons of anonymization essential to the study, the names of these public sector organizations would not be provided.

This chapter is structured as follows: Section 6.2 discusses the survey approach and provides justification for its selection. Section 6.3 focuses on the treatment of the target organizations used for validation of the framework. An overview is provided in each case study organization. Under this section also, the individual profiles of the e-Gov experts were discussed. Section 6.4 discusses the validation of the research instruments, whilst highlighting the various research software tools employed for the processing and analyzing data. Section 6.5 provides an in-depth treatment of the study's sample design highlighting issues to do with population, sampling and sampling techniques, validity and reliability, limitations and ethical considerations. A conclusion to the chapter is provided in section 6.6.

## 6.2 Research Approach

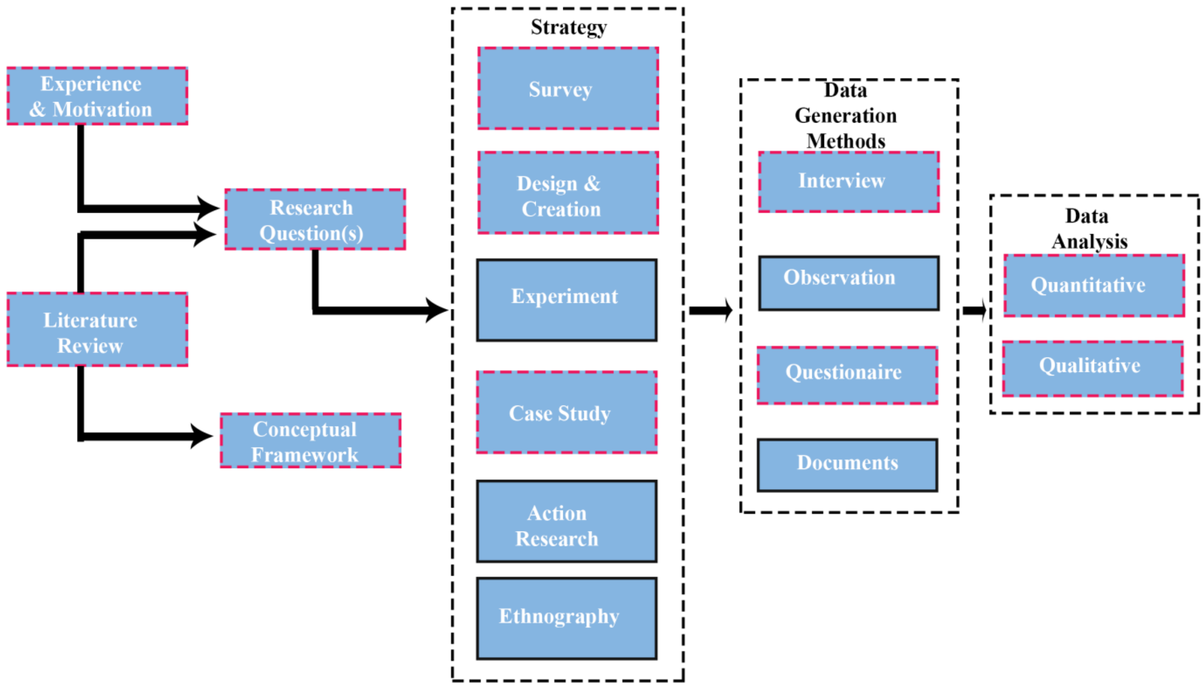
In order to validate the framework, there is the need to gather the relevant data for analysis and derivation of results aimed at ascertaining the relevance of the conceptualized framework. Data collection forms an integral part of any research endeavour and entails the acquisition of information pertinent to the answering of the research questions under investigation. There are three major types of data collection techniques: Qualitative method, Quantitative methods and Mixed method which combines the first two (Creswell, 2009; Celano, 2014). Each of these data collection techniques possesses under it, a plethora of other data collection forms largely differentiated by either being quantitative or qualitative in the type of data it collects. For example, interviewing is a form of data collection which targets the collection of non-numeric or qualitative data, whilst close-ended questionnaire-based survey seeks to extract numeric or quantitative data sometimes in the form of Likert scores or Yes/No responses. However, in the mixed method, there is a combination of both qualitative and quantitative method (Pavelek, 2013).

The type of data collected in a study is highly dependent on the research approach employed for that study. Pavelek (2013) argues that there are three different approaches to research in terms of what data gets collected. These approaches are qualitative, quantitative and mixed-method approaches. The qualitative approach is that approach that seeks to depict a phenomenon in its original environment, with the consequent qualitative data relying on inductive reasoning. On the other hand, the quantitative approach is a method for testing objective hypotheses by analyzing the relationship among factors. These factors can then be estimated, commonly on instruments, with the goal that the numerical information can be examined utilizing statistical techniques.

Quantitative research sets up factually critical determinations about a populace by examining a cross-sectional portion of an entire population.

Qualitative and quantitative methods of data collection are not as distinct as they initially seem. This is because they speak to various points on the continuum of the research variables under investigation (Creswell, 2008; Pavelek, 2013), thereby further explaining why a research inquiry may tend to be more qualitative than quantitative or the other way around. As such, qualitative and quantitative data collection methods ought not to be seen as total inverses or polarities. Mixed method type of data collection thus lies at the midpoint of the continuum of research variables. It is, therefore, safe to conclude that the mixed method type of data collection will be the most suitable to use for the present study since it fuses components of both qualitative and quantitative methodologies.

One of the main deliverables of this research study is to produce a prototyped proof of concept of the framework. This is for the purpose of demonstrating the real-life applicability of the conceptual framework, which therefore forms the basis for its plausible implementation and deployment at organizations in order to effectively and efficiently monitor the execution of the e-gov project and draw lessons learnt for future improvements.




**11. Figure 6-1: Model of Research Process and Research Strategies (Source: Yin, 2006)**

A research strategy is essentially a general arrangement expressing we intend to answer the inquiries underpinning the research undertaking (Saunders, Thornhill and Lewis, 2009). Figure 6.1 provides a model of the research process adapted from Oates (2006) with the research process for the present study highlighted in red.

Yin, (2006) in his work on the research approach identified three prerequisites for the selection of a research strategy. These prerequisites are; the nature of the research question formulated, the scope of control the researcher wields over actual behavioural events, and the extent of emphasis on contemporary as against historic events. In furtherance to the aforementioned, Table 6-1 reveals how each of these prerequisites relates to 5 major research strategies: experiments, surveys, archival analysis, histories and case studies.

**Table 6-1:** Relevant Situations for Different Research Strategies

| Strategy | Form of Research Question | Requires control of behavioural events | Focuses on contemporary events |
|---|---|---|---|
| **Experiment** | How, why? | Yes | Yes |
| **Survey** | Who, what, where, how many, how much? | No | Yes |
| **Case Study** | How, what, why? | No | Yes |
| **Archival** | How, why? | No | Yes/No |
| **History** | How, why? | No | No |

Source: Yin (2006)

For the purpose of this study, a survey-based research strategy was utilized as it was found to be the most appropriate research strategy. The rationale behind our choice is the fact that most of our research questions are in the form of *how* and *what* as reflected in Table 6-1. A look at the research questions underlying the present study attest to the aforesaid: what are the critical success factors of an e-governance project's lifecycle and how can we measure them?; what are the assessment metrics of a deployed e-governance solution and what are their measurement criteria?; what are the socio-economic indicators associated with e-governance projects in context of developing countries; how can a framework for benchmarking e-governance projects in developing countries are developed in such a way so that project leads to advancement in socio-economic development?; how can the proposed framework be validated and evaluated for the purpose of socio-economic development in developing countries?

Meanwhile, the inclusion of surveys as a research strategy to our methodology strengthened our data collection efforts in that surveys exhibit internal and external validity, efficiency, flexibility and can cover geographically spread samples (Mathers, Fox and Hunn, 2010). Another justification for the selection of survey to complement our methodology as part of the chosen research strategies for the present study was the fact that both strategies do not require control of behavioural events, a key condition for the selection of survey strategies (Yin, 2003). Furthermore, our approach makes it possible to combine both quantitative and qualitative data collection methods. The subsequent section provides a detailed look at data gathering.

We sampled real-life projects in Ghana for validating and evaluating our proposed conceptual framework. The questionnaires that were administered for data collection contained a mix of both structured and unstructured items. The questionnaire was administered to project managers working on e-Governance projects as well as experts in the field of e-Governance. The data gathered from the questionnaire administration was used to answer the study's underlying research questions.

### 6.2.1 Data Gathering

Data gathering is based on an empirical inquiry that investigates a contemporary phenomenon within its real-life context; when the boundaries between phenomenon and context are not clearly evident; and in which multiple sources of evidence are used (Yin, 2006). For the present study, therefore, these multiple sources of evidence include questionnaires, document analysis and the interviewing of e-Gov experts in a bid to solicit their expert opinions.

#### 6.2.1.1 Questionnaires

A questionnaire is an examination instrument comprising of a progression of inquiries to gather targeted at eliciting specific data from study participants (Kaptein and Avelino, 2005). The usage of questionnaires to collect data has its advantages.  It is cheap, efficient and a relatively great time saver in terms of administration and logistics, when compared to other modes of data collection, likes telephone interviews and the like. The rationale behind the use of a questionnaire is to convert enquiry data needs into simple questions easy to understand and respond to. The responses given to these question items become the data to be relied upon for further analysis. Moreover, with questionnaires, question items can either be structured to extract standardized responses so as to allow for ease of statistical analysis or unstructured to facilitate the free flow of information.

In order to collect the research data, the study utilized structured and unstructured question items to which the respondents reacted to. The instrument targeted at project managers of e-Gov projects was crafted into 3 component parts: parts A, B, and C.

Part A collected information on the background of study participants such as the age of study participants, gender, educational background, working experience, and so on. Part B of the questionnaire focused on the project life cycle of the developed framework. Part C consisted of question items focusing largely on the monitoring and evaluation component of the developed framework as well as associated critical success factors. Part C finally dealt with the impact assessment layer of the framework, whilst at the same time exploring project managers' views on what e-Gov project success looks like.

#### 6.2.1.2 Questionnaire Administration

Printed copies of the questionnaires were made and handed out to study participants; while others got theirs by means of email. Study participants were given ample time to respond to the question items in the questionnaire delivered to them. Some of the real difficulties experienced during data collection were absent-mindedness with respect to respondents wanting to respond to the polls, misplacement of the questionnaire and the like. For those who had forgotten to go through the questionnaire, we made it a point to go through it with them. The misplaced questionnaires were replaced. One of the major challenges was getting the respondents to fill the questionnaires on time. Detailed of the questionnaire may be found in Appendix C of this thesis.

### 6.2.2 Document Analysis

Review of documents is a qualitative mode of data collection which entails examining the contents of pertinent documents for information and material that may be useful in the tackling of the research objectives (Elmusharaf, Farrokhi and Mahmoudi-Hamidabad, 2012). Review of documents played a major role in this study. More than 400 documents were reviewed. The sources of these documents comprised reports, journals, research papers, conference proceedings, scientific workshop reports, working paper, websites dedicated to e-Gov, as well as corporate websites. The documents reviewed were relevant to the subject matter at hand, e-Gov to be exact.

### 6.2.3 Interviews of experts

Generally, interviews are the best modes of data collection to secure qualitative data on the experiences of individuals (Creswell, 2003; Terrell, 2012). The questionnaire-structured interview guide was used to elicit expert opinions from e-Gov experts from various reputed educational institutions. The question items were predominantly unstructured to allow respondents to freely express themselves and not be boxed in by the restrictive nature of standardized responses. Due to the geographical distances between the researcher and the e-Gov experts, the questionnaire-structured interview guide was mounted onto an online survey platform by name Survey Monkey. This approach made the collection of expert opinions easy and convenient for the experts as they could visit the survey link to answer the interview guide as and when they want. The preceding approach was useful particularly because of the busy and sometimes unpredictable schedule of the experts.

### 6.2.4 Data Description

Data collected was both quantitative and qualitative in nature. With regards to both sets of study participants however – project managers and e-Gov experts – data was extracted in its raw format. The data collected from project managers were cleaned, sorted, processed and then transformed into quantitative data. Afterwards, the collected data were analyzed statistically using Pearson Chi-square. Frequency distribution tables and charts were used in presenting the collated information. This was done to ensure the validity of the analysis. The next chapter will deal with the analysis part of the data collection.

The qualitative data extracted from the e-Gov experts were subjected to thematic analysis for identification of common themes, as they relate to different layers of the developed framework, and how they relate to each other.

Finally, the extracted data from both project managers and e-Gov experts were organized and discussed under the following headings in the next chapter in a bid to triangulate data: (i) demography of study participants, (ii) validation of pre-initiation layer of proposed framework, (iii) validation of monitoring and evaluation layer of proposed framework, and (iv) validation of impact assessment layer of the proposed framework, (v) further validation of integrated framework using inferential statistics. The insights garnered from the data contributed to the improvement of the proposed conceptual framework and further formed the basis for the development of a prototyped proof of concept of an automated version of the framework.

## 6.3 Organizations used for Validation of Framework

The framework was validated using feedback from targeted organizations involved in e-gov projects as well as expert opinions.

### 6.3.1 Target Organizations

Only public sector organizations with experience in e-Gov initiatives were included in the study. Project managers and other key stakeholders directly involved and had valuable insights into the e-Gov initiative were then randomly selected. The case studies selected in the Republic of Ghana for the purpose of this study were: Public Institution A (a government institution that serve as an authoritative body for driver vehicle licensing); Public Institution B (a government institution that ensures an efficient and effective administration of entities operating in Ghana); Public

Institution C (a state institution critical to the revenue generation efforts of the country); Public Institution D (a government institution responsible for implementing Ghana's IT policies); and Public Institution E (a state body made up of the agencies and statutory bodies that assist with the implementation of policies related to operational and regulatory framework).

As a disclaimer to this section, we have deliberately chosen to anonymize the detailed name of the foregoing public institutions in respect of the confidentiality clause described in the questionnaires during the recruitment process of participants. Nonetheless, we briefly describe in an anonymized fashion each of the participating public institutions in the following lines.

#### 6.3.1.1 Target Organization 1 – Public Institution A

Public Institution A is a public-sector organization under one of the ministries of state. It was founded in 1999 by an Act of Parliament (Act 569), 1999. By the Act, Public Institution A is to provide a regulated framework for an improved and more effective administration of stakeholders in one of the key sectors of the economy. This institution was taken off government subsidy two years ago. It has rolled out a number of ICT-based initiatives such as smart card and the deployment of a new mobile App to facilitate its services to the general public.

#### 6.3.1.2 Target Organization 2 – Public Institution B

Public Institution B was formed under the Ordinance 1950 during pre-Independence. It became a department of the ministries of state in 1961. This institution is mandated by the Government to ensure an efficient and effective administration of entities operating in Ghana. Recently, after a long wait, Public institution B has made it possible for the customers of the institution to procure services via online as opposed to being physically present at the office. The e-Certificate and e-Payment system was aimed at facilitating the registration of businesses and prevent the long delays associated with business registration.

#### 6.3.1.3 Target Organization 3 – Public Institution C

Public Institution C is a state institution critical to the revenue generation efforts of the country. The core mandate of this institution is to ensure supreme compliance of organizations with relevant laws in order to ensure a sustainable revenue stream for the government as well as the controlled and safe flow of goods across the county's borders. Institution be has initiated a number of projects aimed at enhancing efficiency in tax mobilization among others. Notable among the initiatives is the implementation of the Revenue Integrated Processing Systems (trips™).

#### 6.3.1.4 Target Organization 4 – Public Institution D

This institution is a public service institution established by Act 771 in 2008 as the ICT policy implementing arm of one of the ministries of state. This institution is responsible for implementing Ghana's IT policies. Its mandate includes identifying, promoting and developing innovative technologies, standards, guidelines and practices among government agencies and local governments, as well as ensuring the sustainable growth of ICT via research and development planning and technology acquisition strategies to facilitate Ghana's prospect of becoming a technology-driven, knowledge-and values-based economy as espoused in the e-Ghana project which ideally seeks to assist the Government generate growth and employment, by leveraging ICT and public-private partnerships. The establishment of this institution is essential for the take-off of e-Government in Ghana. E-Government, being an essential component of the e-Ghana project will contribute to improved efficiency, transparency and accountability in selected Government functions.

#### 6.3.1.5 Target Organization 5 – Public Institution E

The mission of this institution is to facilitate the development of a reliable and cost-effective world-class Communications infrastructure and services, driven by appropriate technological innovations and accessible by all citizens to enhance the promotion of economic competitiveness in a knowledge-based environment. Public institution E is made up of the agencies and statutory bodies that assist with the implementation of policies related to the operational and regulatory framework. Institution E's core functions are to; initiate and formulate ICT policies taken into account the needs and aspirations of the people, Coordinate, monitor and evaluate the efficiency and effectiveness of the performance of the Communications Sector, Develop appropriate regulations to protect consumers and stimulate competition in the communication sector., Build capacity for the ICT sector.

#### 6.3.1.6 Target Organization 6 – Public Institution F

This institution was set up in 2003 under the Office of the President with the mandate to issue biometric national ID cards and manage the National Identification System (NIS). The National Identity Register Act, 2008 (Act 750) was also passed to give authorization for collection of personal and biometric data and to ensure the protection of privacy and personal information of enrollees/applicants. Public Institution F is mandated to establish a national data centre and manage a national database, set up a system to collect, process, store, retrieve and disseminate personal data on the population (Ghanaian citizens - both resident and non-resident, and legally and permanently resident foreign nationals), ensure the accuracy, integrity and security of such data, and to issue and promote the use of national identity cards in Ghana. It is also to make data in its custody available to persons or institutions authorized by law to access the data.

### 6.3.2 Profile of e-Gov Experts

Only experts with expertise and experience in e-Gov were included in the study. The experts were largely academics with specializations in e-Gov. For instance, Expert 1 is a Senior Lecturer in the Department of Computer Science of a well-established University in South Africa; Expert 2 is the Editorial Board Member for a prestigious journal that specializes in e-Governance; Expert 3 is Professor of Development Informatics in the Institute for Development Policy and Management, part of the School of Environment, Education; Expert 4 is a Senior Lecturer and holds a key management position within the Leaders University College of Applied Sciences

As a disclaimer to this section, we have deliberately chosen to anonymize the detailed name of the foregoing experts in respect of the confidentiality clause described in the questionnaires during the recruitment process of participants. Nonetheless, we briefly describe in an anonymized fashion profile of experts in the following lines.

#### 6.3.2.1 Expert 1

Expert 1 is a Senior Lecturer in the Department of Computer Science of a well-established University in South Africa. Prior to joining that university, Expert 1 was with a South African University of Technology as a Senior Lecturer of Software Studies. Expert 1 holds a PhD and an MSc in Computer Science from a University in South Africa, South Africa, and BSc (Hons) and BSc in Computer Science from a University in West Africa. Expert 1's research interest is in Ontology Engineering, Semantic Web and application of semantic technologies in e-government, e-business and e-science. His research has appeared in peer-reviewed journals such as Lecture Notes in Computer Science (LNCS), International Journal of Web and Semantic Technology (IJWesT), Journal of Emerging Technologies in Web Intelligence (JETWI) and African Journal of Information Systems. Expert 1 has presented papers at international conferences in South Africa, Namibia, France, Slovenia, Italy, Germany and Spain.

#### 6.3.2.2 Expert 2

Expert 2 is the Editorial Board Member for a prestigious journal that specializes in e-Governance. UNPAN (United Nations Public Administration Network) in e-Governance Development Gateway Foundation and Korean Training Centre, Seoul (DGF-KTC) in e-Governance Netherland Society for Young Leadership

#### 6.3.2.3 Expert 3

Expert 3 is Professor of Development Informatics a renowned development policy institute. Expert 3 studied for a BA/MA in Natural Sciences from Cambridge and then taught science in a rural school in Nigeria. He worked as a researcher at the Universities of Leicester and

Loughborough, gaining an MPhil for his study of personal information systems. Expert 3 then undertook an ESRC/SERC-sponsored PhD at the Open University on the Indian software industry. Following his doctorate, Expert 3 joined the University of Manchester to teach, research and consult on "development informatics": the study of information and communication technologies for international development (ICT4D).

Expert 3 is one of the pre-eminent and highly-cited academics in the emerging sub-discipline of development informatics and has written 6 books, more than 40 refereed articles, and over 100 other papers and reports. Expert 3 has accepted invitations to be an associate editor for key journals in the field combined with an editorial board member for four further journals. Expert 3 has edited five journal special issues that have contributed to the foundational theorization of ICT4D. Expert 3 has organized two international conferences and four international conference tracks, and he is a regular invited keynote speaker to the UN, World Bank, donor and other international conferences.

Expert 3 has acted as an external degree examiner in the ICT4D field at universities in Europe, Africa and Asia; and as a research assessor for bodies such as the US National Science Foundation, ESRC, Nuffield and Leverhulme. Complementing this has been more than twenty advisory activities on ICT4D for bodies such as DFID, GIZ, IDRC and UNIDO. Expert 3 is also ICT4D advisor for Zunia (Development Gateway) and convenes the UK Development Studies Association's specialist group on Information, Technology and Development.

Expert 3 has been Project leader on seven major international research contracts, with grants totalling more than £650,000 and coordinating the work of partner organizations in Africa, Asia and Latin America. Responsible for the creation of five new postgraduate programmes, including the world's first Masters in ICTs for Development and the distance learning MSc in Management and Information Systems falls on this expert

### 6.3.2.4 Expert 4

Expert 4 is a Senior Lecturer and holds a key management position at within a University in Ghana. He has previously held faculty position in two (2) Universities in Ghana. Expert 4 pursued and holds a PhD in Information Science from  Southern Africa in 2013 and worked in the Education Development Sector at of an international NGO prior to his return to Ghana to start full academic position in the tertiary system.

## 6.4 Validation of Instrument

To ensure that the instruments designed to collect data deliver the expected outcome by collecting information that is coherent, comprehensible and accurate, there was the need to check both instruments for validity (Monette, Sullivan and DeJong, 2002).

### 6.4.1 Pilot Study/Piloting

**The pilot study** is deployed before the actual survey was initiated to elicit feedback from a small number of respondents (normally convenient sample) as regards understanding the questionnaire's wording and measurement, evaluate any lack of clarity in the questions and the questionnaire's reliability. The purpose of the pilot study, in essence, was to retrieve further information so that we can further improve the survey questionnaire before the actual study (Fung, 2014). The instrument was piloted within Accra Technical University, with peers, and experts at conferences and at a public institution. Comments received were used to improve on the instrument. After piloting, we arrived at the conclusion that there was a need to add a neutral option for those without opinion and reason for saying 'no' to a questionnaire item.

### 6.4.2 Research Software Tools

The research employed Microsoft Excel 2016, SPSS Version 23 and STATA 15 in scrutinizing the data collected from the study participants. The analysis was essentially descriptive and inferential. Five per cent level of significance was adopted for the Pearson Chi-square test conducted for the study.

### 6.5 Sample Design

A sample design is a framework, or road map, that serves as the basis for the selection of a survey sample (Lavrakas, 2008). This section takes an in-depth look at the sample design used for this study.

#### 6.5.1 Population

A research population is a clearly defined group of individuals with similar characteristics of interest to the inquiry. The population for the research was all stakeholders in e-governance. By virtue of limitations on movement, money and time, only a small proportion of the population was chosen and this was done by a combination of simple random and purposive sampling. A total sample size of 19 individuals was used for the study. In all, six target public institutions were sampled from which eleven stakeholders were selected. Ghana formed the main location from which the target organizations (study sample) were chosen. With regards to e-Gov experts study sample selection, only individuals with e-Gov expertise were targeted; eight experts were chosen. This was due in part to proximity and cost considerations.

#### 6.5.2 Sampling and Sampling Techniques

A sample is a component part of a whole taken from a whole and is representative of the whole. The whole, in this case, is a population. The aim of sampling is to ensure that findings made on the part can be extrapolated to the whole (Kitchenham and Pfleeger, 2002). Since it is impractical to select each entity within the research population, simple random and purposive samplings were conducted to gather 19 study participants. All could not be included because of time constraints, unavailability and unwillingness of some to participate in the study. A simple random sampling is a type of sampling technique where each individual has a 50-50 probability of being selected. Purposive sampling is done to include members of a population possessing particular characteristics of research interest to the investigators or critical to the attainment of objectives of the study (Creswell, 2003; Terrell, 2012). Simple random sampling method was used to select practising project managers and any individual with a working knowledge of e-Gov projects that is being or has been conducted within sampled case study organizations; whilst purposive sampling method was employed to include e-Gov experts in academic and research institutions as well as non-governmental organizations, with valuable insights concerning the research questions being addressed.

### 6.5.3 Validity and Reliability

The value of scientific research depends on how reliable, valid and generalizable the findings are. Reliability deals with the reproducibility of findings made from the conducted research, irrespective of who conducts it (Bloor and Wood, 2006). Another aspect of reliability describes the extent to which the designed data gathering instrument unfailingly captures the attribute(s) under investigation. Detailed records of fieldwork and documentation were cardinal to enhancing the reliability of findings. Issues of ambiguous results were attended to by combing through coded data severally to spot and correct any error or oversight.

However, the validity of research is concerned with how accurately research produces a "picture" truly representative of how the world looks like (Bloor and Wood, 2006). In other words, data collect should produce a true "picture" of what is on the ground. To ensure validity, items on the questionnaire were based on what is known from the literature. Furthermore, the internal and external validity of data was also looked to; and so, internally, the conclusions made by the researcher fit the collected data; externally, findings can be extended to populations and locations with similar characteristics as the study population and area. Gatewood and Field (2001) argue that findings are externally valid if they can be applied to external populations i.e. those not included in the study sample.

### 6.5.4 Limitations

A major limitation of the study is the selection of case study organizations from only one developing country. This would make extrapolation of findings to other developing countries a bit of a challenge as data was captured on only one developing country. Nonetheless, this limitation does not in any wise invalidate findings made from the study.

### 6.5.5 Ethical Considerations

Ethics constitute the rules and principles that inform how researchers conduct themselves as they go about their duties (Bloor and Wood, 2006). Ethics as a field of study is an aspect of philosophy that pertains to reflecting on issues such as “morality, integrity and how different “right” is from “wrong.” Due to the nature of research by Social scientists, it is only natural to see the emergence of certain ethical issues. As much a challenge as it is; what’s most important is that the methods used by the researcher in collecting data be well-grounded ethically speaking. Accordingly, Bloor and Wood (2006) indicate that a researcher can be considered ethical if he or she, as well as team members, is committed to the tenets of ethics in a bid to protect public interests. Underlying this research are two core issues: the integrity of the researcher and duties to study participant. In light of the latter, permissions to conduct research was sought from the ministry that has oversight responsibility for all e-Gov and ICT projects across all other ministries and agencies in the public sector. Consent forms were submitted to individual respondents for signing to signal a willingness to participate in the study. A copy of the letter of approval letter a sample consent form, is available at Appendix C. The study participants were also informed that they had the right to pull out of the research should they wish to at any point in time. Prior to the comment of this process, an application for ethical clearance was submitted to the UNISA College of Science, Engineering and Technologies’ (CSCET) Research and Ethics Committee and approval certificate was given accordingly Appendix D.

## 6.6 Conclusion

This chapter sets the scene for the purpose of data collection by presenting the various research instruments relied upon for the collection of data for analysis in the next chapter. Data was gathered from multiple sources of evidence including questionnaires, document analysis and the interviewing of e-Gov experts in a bid to solicit their expert opinions. Review of documents played a major role in this study. More than 400 documents were reviewed. The sources of these documents comprised reports, journals, research papers, conference proceedings, scientific workshop reports, working paper, websites dedicated to e-Gov, as well as corporate websites. Data collected was both quantitative and qualitative in nature.

Only public sector organizations with experience in e-Gov initiatives were included in the study. Project managers and other key stakeholders directly involved and had valuable insights into the e-Gov initiative were then randomly selected. Only experts with expertise and experience in e-Gov were included in the study. The experts were largely academics with specializations in e-Gov. The instrument was piloted within Accra Technical University, with peers, and experts at conferences and at a public institution. Comments received were used to improve on the instrument. After piloting, we arrived at the conclusion that there was the need to add a neutral option for those without opinion and reason to a questionnaire item. The research employed Microsoft Excel 2016, SPSS Version 23 and STATA 15 in scrutinizing the data collected from the study participants.

By virtue of limitations on movement, money and time, only a small proportion of the population was chosen and this was done by a combination of simple random and purposive sampling. In all, six target public institutions were sampled from which eleven stakeholders were selected. Ghana formed the main location from which the target organizations (study sample) were chosen from. With regards to e-Gov experts study sample selection, only individuals with e-Gov expertise were targeted. A major limitation of the study is the selection of target organizations from only one developing country. This would make extrapolation of findings to other developing countries a bit of a challenge as data was captured on only one developing country. Nonetheless, this limitation does not in any wise invalidate findings made from the study. The next chapter presents data analysis and discussion.

# CHAPTER 7: DATA ANALYSIS AND RESULTS

## 7.1 Introduction

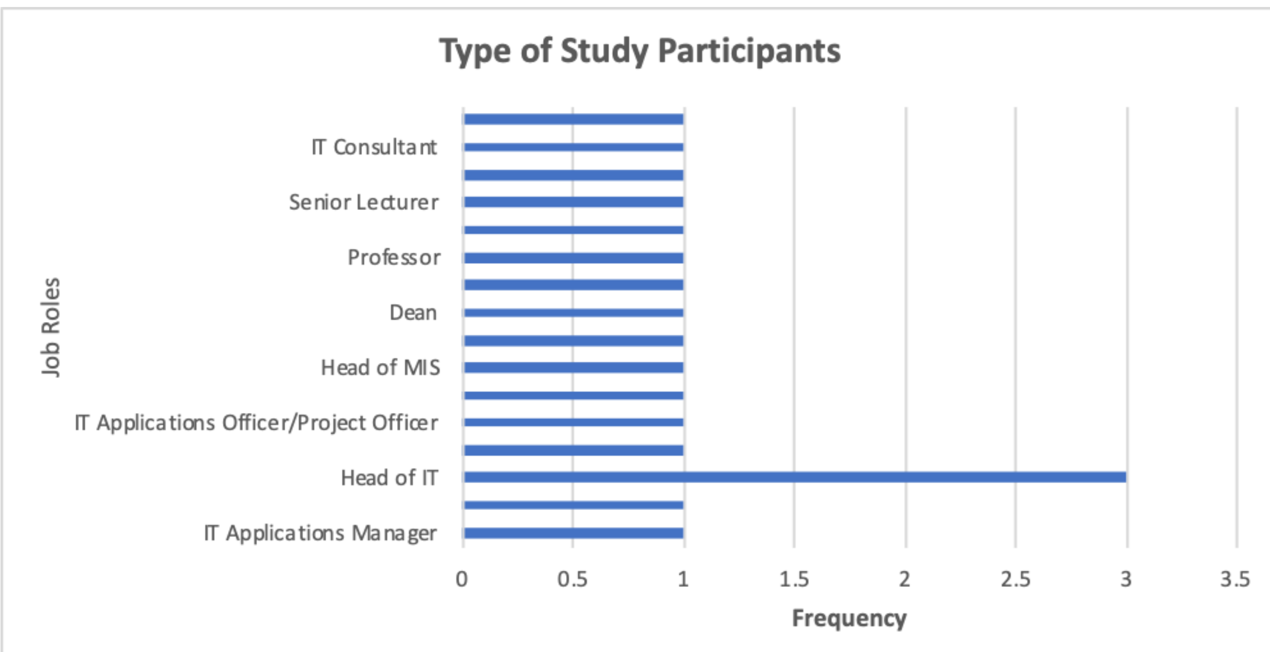
The previous chapter set the stage for the purpose of data collection by presenting the various research instruments adopted. The purpose of this chapter is to analyse collected data to draw conclusions to validate and/or improve the proposed conceptual framework. To achieve this objective, data is analysed using descriptive statistics such as frequency distribution tables and inferential statistics like the Pearson Chi-square. The value of this chapter lies in its fulfilment of the second part of the research objective on evaluation and validation (that is RO5 - Evaluate, improve and validate the developed framework through case studies and experts' contributions).

The main deliverable of this chapter, after analysing and drawing conclusions, will be the improved framework which would be relied upon for the development of a prototyped proof of concept. It is this proof of concept that will then be evaluated to demonstrate that it indeed fulfils the purpose of the framework's objective: that of serving as an enabler for benchmarking e-gov projects a their various stages namely: pre-initiation, execution and post-implementation.

This chapter is therefore structured as follows: Section 7.2 deals with the analysis of results emanated from data collected pertaining to the demographics of participants; section 7.3 analyses data collected on the pre-initiation layer of the proposed integrated framework. Under this section, analysis of experts' opinion as well as feedback from project managers will be done. Section 7.4 analyses the monitoring and evaluation layer in the proposed framework. Under this section also, analysis of the experts' opinion as well as feedback from project managers about the monitoring and evaluation layer in the proposed framework will be done. Section 7.5 analyses the impact assessment layer of proposed integrated framework. This section will also analyse experts' opinion and feedback from project managers about the impact assessment layer of the proposed integrated framework. Section 7.6 further validates the integrated framework using inferential statistics. Section 7.7 presents the key findings garnered from the analysis of data collected; In Section 7.8 the improved e-governance framework is presented based on the recommended summarised results from the previous section. We further discuss in this section applications of the integrated framework, and section 7.9 concludes the chapter.

## 7.2 Demographics of Study Participants

There were 19 study participants, 8 of which were experts in e-gov and e-gov related issues representing a proportion of 42.1%. The remaining 11 (57.9%) of the study participants were project managers and they constituted the majority of the study's sample. Project managers were targeted because the focus was on validating the framework which mostly deals with e-gov project phases and benchmarking for M & E rather than the technical details on the execution of projects. As such, project managers appear to be the most important stakeholders. Figure 7-1 below details the category types of this study's participants.



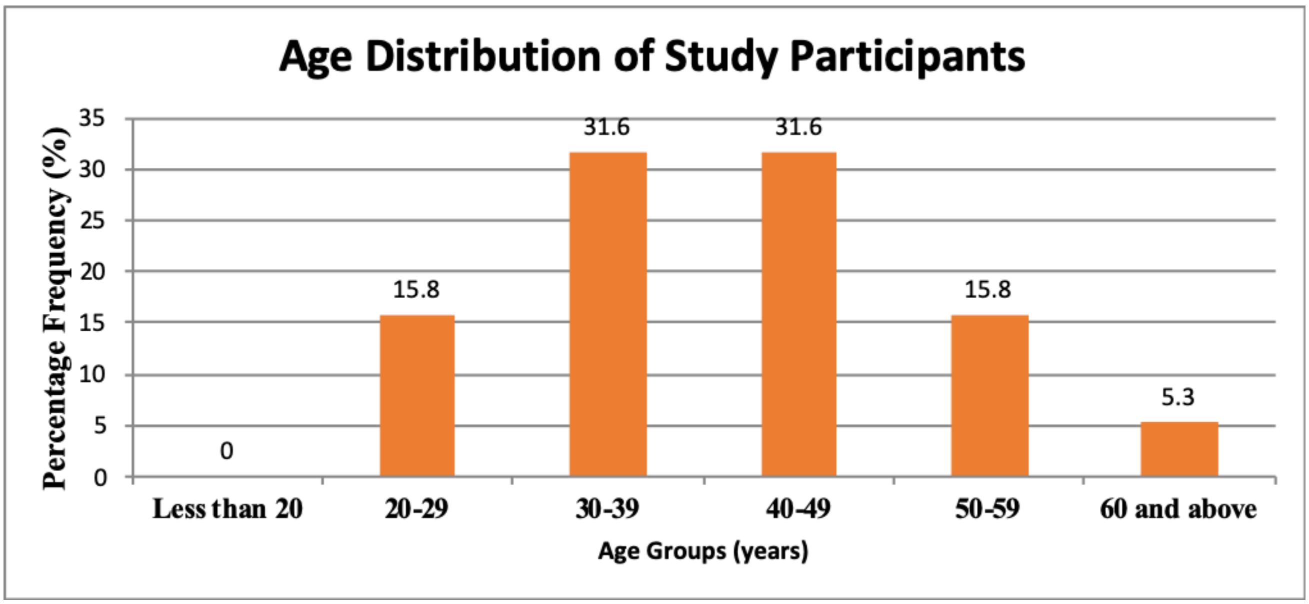

**12. Figure 7-1: Categories of Study Participants**

### 7.2.1 Gender

With respect to gender, there were a total of 15 males and 4 females. This means majority of respondents (78.9 %) were males. It is important to note also that all the experts, 8 of them, who participated in the study, were males. This was because we were not able to reach out to female experts in the field of e-Gov. Nonetheless the gender disparity has no impact on the purpose of the study.

### 7.2.2 Age

The age groups that registered the highest percentage frequencies were 30-39 and 40-49 years as shown in Figure 7-2. This means that majority of study participants (63.2 %; n = 12) were between 30 and 49 years. The age group that registered the least percentage frequency (5.3 %) was 60 and above years, which means that only 1 person fell within this age group. Figure 7-2 describes the age distribution of study participants.




13. **Figure 7-2: Age Distribution of Study Participants**

### 7.2.3 Highest Level of Education

From Table 7-1 below, it can be observed that master's degree recorded the highest percentage frequency of 52.6 % (n = 10) implying that more than half of study participants had a master's degree. Table 7-1 below shows the distribution of respondents' highest level of education.

**Table 7-1:** Distribution of Respondents' Highest Level of Education

| Highest Level of Education | Frequency | Percentage Frequency |
|---|---|---|
| Diploma/HND | 1 | 5.3 |
| Degree/Professional | 2 | 10.5 |
| Master's Degree | 10 | 52.6 |
| Doctorate Degree | 6 | 31.6 |
| Post-doctoral | 0 | 0 |
| *Total* | 19 | 100 |

Source: Primary Data

This was followed by doctorate degree which recorded the second highest percentage frequency of 31.6 % (n = 6). Together, master's and doctorate degree dominated as they accounted for a whopping 84.2 % of study participant's highest level of education. This therefore presupposes that the study participants are highly educated and are thus wont to be knowledgeable about the subject of investigation vis-à-vis e-Gov implementation.

### 7.2.4 Job Roles of Study Participants

The job roles of experts were found to be: Dean (1), Head of Department (1), Professor (1), Assistant Professor (1), Senior Lecturer (1), Researcher (1), IT Consultant (1), and Chair of Development Informatics (1). Meanwhile, the job roles of the project managers were observed to comprise of IT Applications manager (1), Head of Infrastructure (1), Head of IT (3), e-Gov Analyst, IT Applications Officer/Project Officer (1), Director of IT (1), Head of MIS (1) and Assistant Applications Officer (1). Only one respondent failed to provide data on job role.

### 7.2.5 Length of Working Experience at Current Organization

Table 7-2 below shows the length of work experience at current organization.

**Table 7-2:** Length of Work Experience at Current Organization

| Length of Work Experience at Current Organization | Frequency | Percentage Frequency |
|---|---|---|
| Less than 6 months | 0 | 0 |
| 6 months- 1 year | 1 | 5.26 |
| 1-2 years | 0 | 0 |
| More than 2 years | 17 | 89.47 |
| N/A | 1 | 5.26 |
| Total | 19 | 100.00 |

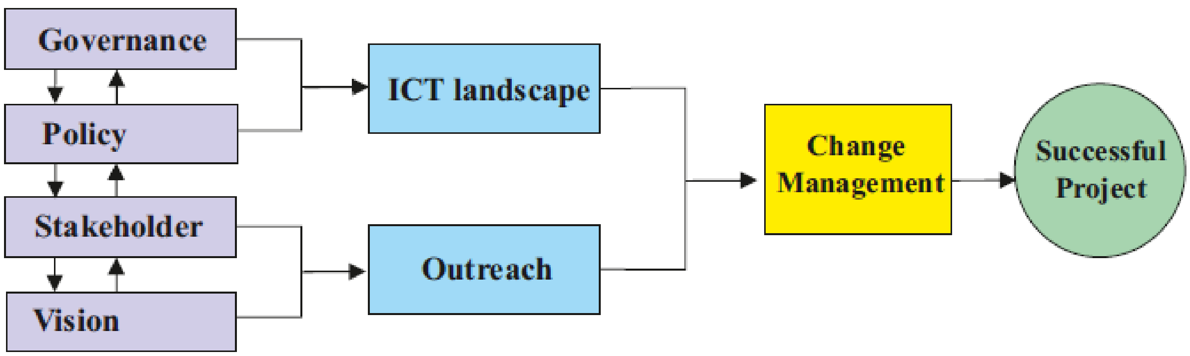
Source: Primary Data

Seventeen out of nineteen respondents representing 89.47 % indicated that they've been at their current organization for more than 2 years. Only one person said he has been at current organization for between 6 months and 1 year (Table 7-2).

### 7.3 Analysis of the Pre-Initiation Layer of Proposed Integrated Framework

This section seeks to validate the pre-initiation layer of the proposed integrated framework. The various elements of the layer such as governance, policy, vision, stakeholder participation, outreach and ICT landscape were subjected to experts and project managers opinion to test validity and or their theoretical/philosophical and practical soundness. A number of questions were thus posed to the experts to elicit their views on the proposed framework. The respondent experts originated from public organizations in Ghana and various Universities in Africa, the middle east and Europe as presented in the previous chapter.

Below is a standalone diagram of the pre-initiation layer in the proposed framework as shown in Figure 7-3:




**14. Figure 7-3: Pre-initiation layer of Proposed Framework**

The diagram above in Figure 7-3 shows that the pre-initiation layer is made up of the following elements: governance, policy, stakeholder, vision, ICT landscape, outreach, and change management.

### 7.3.1 Analysis of Experts Opinion

When asked the question, *"Based on your depth of expertise, how do governance and policy shape the ICT landscape of a developing country looking to deploy e-governance initiatives?"* Three experts acknowledged the importance of governance and policy in shaping ICT landscape while five of them articulated on some limitations pertaining to materialization in a real-life context with regard to the implementation of those policies. Among other things, some experts pointed out that governance and policy shape the ICT landscape of a country by providing impetus, focus and direction.

There was however some sceptical experts who held the view that governance and policy do not really shape the ICT landscape in that in most instances, "policy remains on paper". Unfortunately, the notion that "policy remains on paper" most often than not tends to largely hold true for a number of developing countries, Ghana inclusive, perhaps because of unavailability of or limited resources needed to pursue such e-Gov policy objectives. According to another expert, policy in the pre-initiation layer is most vital as it sets the infrastructural and institutional background to e-Gov thus shaping the ICT landscape of a country. However, that same expert felt that the shaping of an ICT landscape depends on the type of governance being exhibited by the leadership of a developing country. This thus presupposes that the nature and content of a nation's governance system may have a lot to do with how that country's ICT landscape is shaped. This corroborates with Löfgren (2013) who observed that *policy* and the composition of actors (in this case government) were critical to e-Gov development. The foregoing notion aligns with the response of another expert:

> *"It is true that good governance and conducive policies are enablers for ICT adoption in favour of e-governance; but in my opinion, the scenario in Africa and in developing countries in general, is that there are often good policies that provide guidelines for ICT adoption in favour of e-governance without good governance in the countries; therefore, from the perspective of the proposed integrated framework, is this reality being considered in the pre-initiation phase?"*

Based on the aforementioned, it appears that the respondent experts had some level of misgivings with regards to the efficacy of *policy* and *governance* in shaping the ICT landscape of a developing country. This is because: firstly, *policy* tends to remain largely on paper; secondly, the efficacy of the *governance* element in shaping the ICT landscape of a country appears to vary in direct proportion with the nature and content of that developing country's governance system. These two reasons have one thing in common: Political influences. Why? Because political influences is the singular most important factor that accounts for the successful implementation of policies and good governance that positively impacts the shaping of a developing country's ICT landscape.

The concern of experts was thus whether political influence on the pre-initiation layer had been appropriately factored into the proposed integrated framework. The answer is affirmative. It was for this very reason why the *policy* and *governance* elements were incorporated into the pre-initiation layer of the framework. In effect, the impact of government on ICT landscape of a developing country is captured in the *policy* and *governance* elements of the pre-initiation layer.

Stakeholder participation is key in any successful e-government initiative in a country; not only in developing countries. The respondent experts were asked to indicate some of the ways *stakeholder participation* and the crafting of an e-Gov *vision* promoted *outreach* prior to e-Gov implementation in a developing country. Three experts acknowledged the importance of stakeholder participation and the crafting of an e-Gov *vision* to the promotion of *outreach* while five of them articulated on the role of stakeholder participation and vision in developing a sense of ownership amongst the target beneficiaries. Data collected showed that the experts opined that, one of the key ways *stakeholder participation* and the crafting of an e-Gov *vision* promoted *outreach*, was to create and instil a sense of ownership amongst target beneficiaries through such initiatives as community consultations and engagement. This sense of ownership creates enthusiasm that results in stakeholders becoming users and advocates for such projects. Readiness assessment, public education, seeking expert advice, and private sector stakeholder engagement were reported by the experts to be some of the other ways stakeholder participation and crafting of an e-Gov vision can promote outreach.

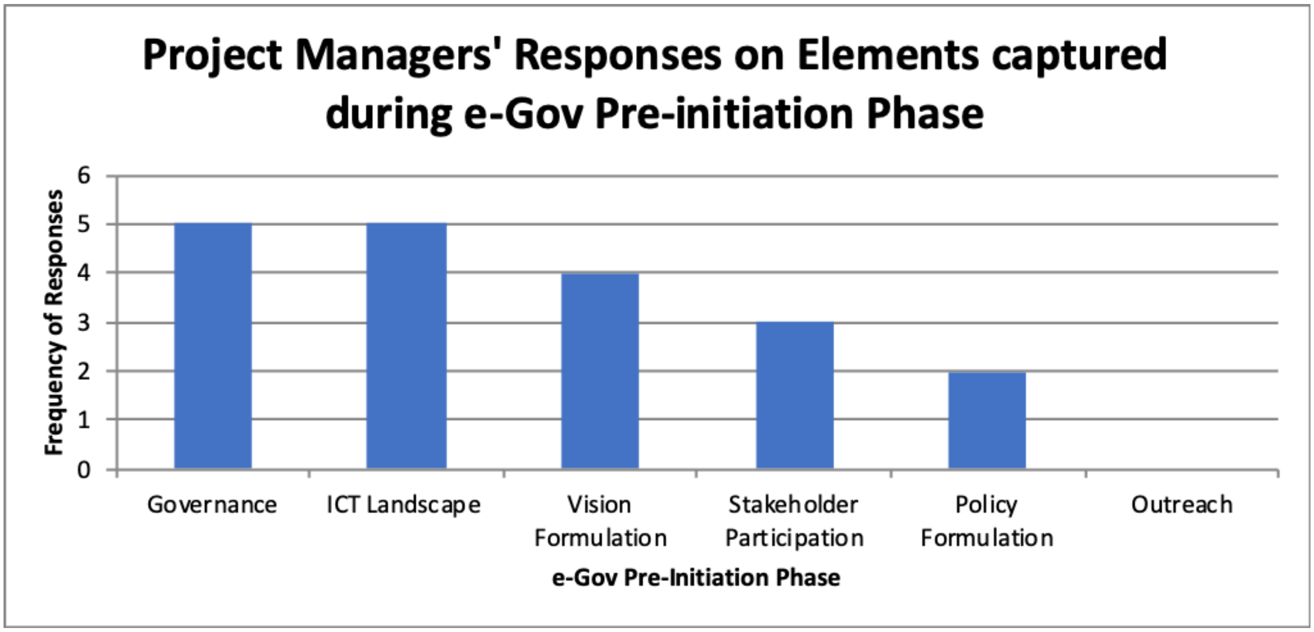
To further validate the components of the pre-initiation layer, the experts were asked, *"Do you agree with the components of the pre-initiation layer?"* Four of the experts responded neutral to the question whilst the remaining four articulated their response to the question. Out of the four experts who articulated their response to the question, three of them representing 75 % said, 'Yes' whilst only one person said 'No'. The expert who gave the 'No' response was of the view that the pre-initiation phase was irrelevant.

The experts were further asked, "*Is the pre-initiation layer comprehensive enough*?" Four experts assumed a neutral response to the question, whilst the other four experts elaborated on their response. Out of the four experts who elaborated on their response, two said 'Yes' and the other two said, 'No', implying a mixed response regarding the comprehensiveness of the pre-initiation layer. The 'no' response was not backed by any clear argument due to the fact that the expert was not familiar with this concept in project management. Nonetheless, the experts felt the pre-initiation layer was good and 87.5 % of the experts agree that the pre-initiation layer was comprehensive enough. They were further of the view that "*every concern at this stage* [pre-initiation layer] *of an e-government initiative is captured nicely.*"

### 7.3.2 Analysis of Feedback from Project Managers

Five out of the 11 project managers, representing a proportion of 45.5 %, indicated that pre-initiation constituted a vital stage in their project management cycle; of the remaining 6 experts 36.4 % (n=3) of them provided neutral responses, suggesting that they somehow agreed that pre-initiation constituted a vital stage in their project management cycle. However, 18.2 % (n=2) said 'No' due to the fact that they were not familiar with this new construct in project management. This presupposes that 8/11 representing 72.7 % of the experts agreed with the fact that pre-initiation constituted a vital stage in their project management cycle. The pre-initiation stage as already indicated elsewhere is made up of six elements: *Governance, Policy formulation, Vision formulation, Stakeholder participation, ICT landscape* and *Outreach*. When asked which of the foregoing elements is/are captured during the conduct of e-Gov pre-initiation phase, it was observed that the project managers considered all the elements important and so captured them with the exception of the *Outreach* element which failed to gain selection by any of the project managers.

Looking at Figure 7-4 it may be tempting to think that the frequency label on the y-axis is referring to the number of respondents, because of the seeming appearance that most of the respondents were in favour that all components except outreach form part of the pre-initiation phase. However, the frequency label in the figure is referring to the frequency of *responses* and not the frequency of *respondents*. The seeming appearance that most of the respondents were in favour that all components except outreach form part of the pre-initiation phase is due to the fact that that project managers were not limited to the selection of only one element for the pre-initiation phase when they were asked to select which element(s) is/are captured during the conduct of e-Gov pre-initiation phase. Figure 7-4 presents frequency distribution of responses of project managers' on elements captured during e-gov pre-initiation phase.



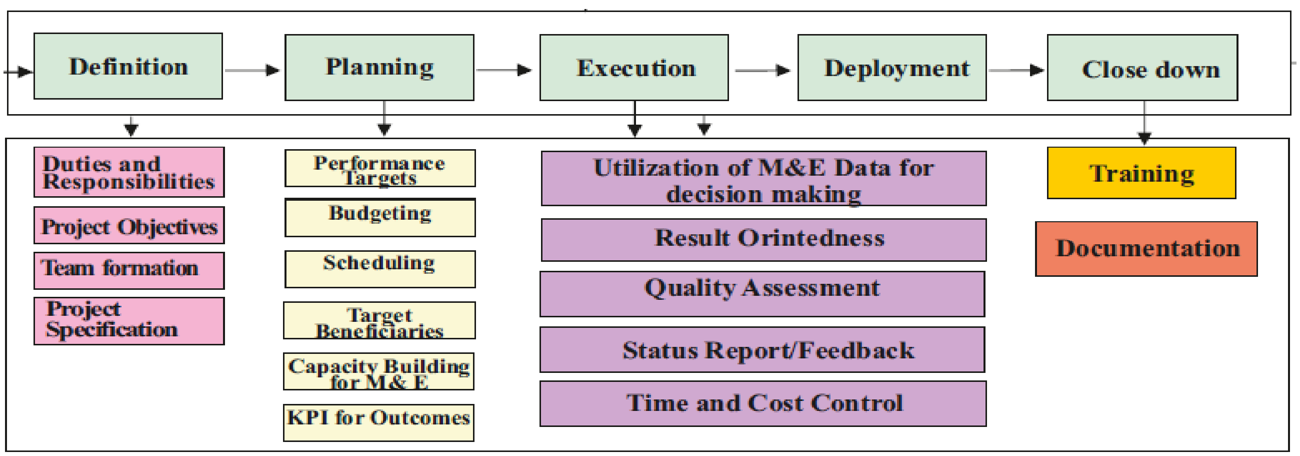

**15. Figure 7-4: Frequency Distribution of Responses of Project Managers' on Elements captured during e-Gov Pre-initiation Phase**

The foregoing observation thus appears to suggest that project managers seem not to regard the *Outreach* element as crucial to the success of the pre-initiation layer. But then the *Outreach* element entails identifying project benefits to community, achieving community buy-in into project, articulation of project benefits to community, and creation of project awareness to facilitate heavy adoption by stakeholders. The fact that no project manager selected the *outreach* element seems to suggest a lack of customer-centricity or in this case citizen-centricity in the design of e-Gov projects.

Analysis of Figure 7-4 seems to indicate that *governance* and the *ICT landscape* were equally considered crucial, by the project managers, to the e-Gov pre-initiation layer. This is because among all the pre-initiation elements investigated, *governance* and the *ICT landscape* were the elements unanimously agreed upon by project managers who responded ‘Yes’. Furthermore, it is interesting to note however that while expert opinion appeared to give more weight to *policy* *formulation* and *governance*, project managers on the other hand seemed to view *governance* and the *ICT landscape* as more crucial to the pre-initiation phase. This therefore means that *governance* arguably maybe the most critical element to the success of the pre-initiation layer, which once again brings to the fore the thorny issue of political influence and how it impacts e-Gov initiatives for the better or for worse.

### 7.4 Analysis of the Monitoring and Evaluation Layer in the Proposed Framework

This section provides an analysis of data gathered from respondents with regard to the monitoring and evaluation layer of the proposed integrated framework. To achieve the foregoing, the M & E layer was subjected to expert opinion and later followed by field testing by project managers of e-Gov projects. Below is a standalone diagram of the monitoring and evaluation layer:




**16. Figure 7-5 Monitoring and Evaluation Layer of Proposed Framework**

The diagram above depicts the monitoring and evaluation layer consisting of two blocks of elements: project life cycle and critical success factors. Below each element of the project life cycle is the associated with critical success factors. For example, the definition project life cycle is associated with the following critical success factors: duties and responsibilities, project objectives, team formation, and project specification.

### 7.4.1 Analysis of Experts Opinion

Respondents were asked the question, "*Do you agree with the components of the M & E layer*?" Four experts provided a neutral response acknowledging the importance of components of the M & E layer, whilst the remaining four experts responded with an argument. In all, 3 out of 8 experts strongly agreed and 1 out of 8 provided some argument but 100 % of the respondents were fine with the layer.

Only an expert was willing to further comment on their response to, "*Do you agree with the components of the M & E layer*?" This expert was of the view that the monitoring and evaluation layer "*represents a standard, rationalist project life cycle approach to e-Gov".* The question thus emerges whether e-Gov initiatives, in practice, actually follow the project life cycle captured in the M & E layer. This is where the field test by project managers comes in. This particular expert was of the view that if e-Gov projects follow the project life cycle as portrayed in the M & E layer of the integrated framework, then the framework can be regarded as useful. The usefulness of the framework thus lies in its ability to benchmark the e-Gov initiative.

Experts were further asked, *"Based on your expertise, which stage in the project life cycle can be considered as the most critical and why?"* Some of the responses given were as follows:

> *"The planning stage is the most critical in my opinion as it is the stage where the most important CSFs for the implementation of an e-governance project are set."*

> *"Hard to answer because of course, all are critical; however, upstream definition and planning tend to set the tone for the whole project."*

> *"Planning, if well done, deviation from target and impact of the e-Gov initiative during the execution and deployment stages will be minimal."*

Based on the above, planning followed by definition appears to be the most critical stage in the project life cycle as they both lay the foundation for what follows next. This is no surprise considering the fact that proper and rigorous planning was observed to have the ability to significantly reduce budget overruns by a factor of 23.1 % (Boateng, 2015) and the fact that both planning and definition phases are closely intertwined.

The experts were further asked if the Monitoring and Evaluation layer was comprehensive enough, once again four were neutral and thus agree somehow with the comprehensiveness of the M & E layer; the remaining four articulated on the comprehensiveness of the M & E layer of which 1/ 4 said 'Yes' strongly agreeing with the comprehensiveness of the M & E layer and 3/4 said, 'No' without any clear argument indicating that they were not familiar with the importance of M & E.

Although 100 % of respondent experts had already indicated that they agree with the components of the M & E layer, 4 out of the 8 experts said they agree with the fact that each stage in an e-Gov project life cycle requires particular critical success factors if e-Gov implementation was to be successful. The foregoing therefore seems to take away in terms of weight from the 'No' responses given as regards the comprehensiveness of the M & E layer of the proposed integrated framework.

### 7.4.2 Analysis Feedback from Project Managers

Various variants of the project management life cycle (PMLC) process was presented to respondent project managers in the questionnaire. They were then asked to select the one which they believed best describes the process they follow in the project management life cycle. The responses of project managers on the various variants of PMLC given are shown in the table below:

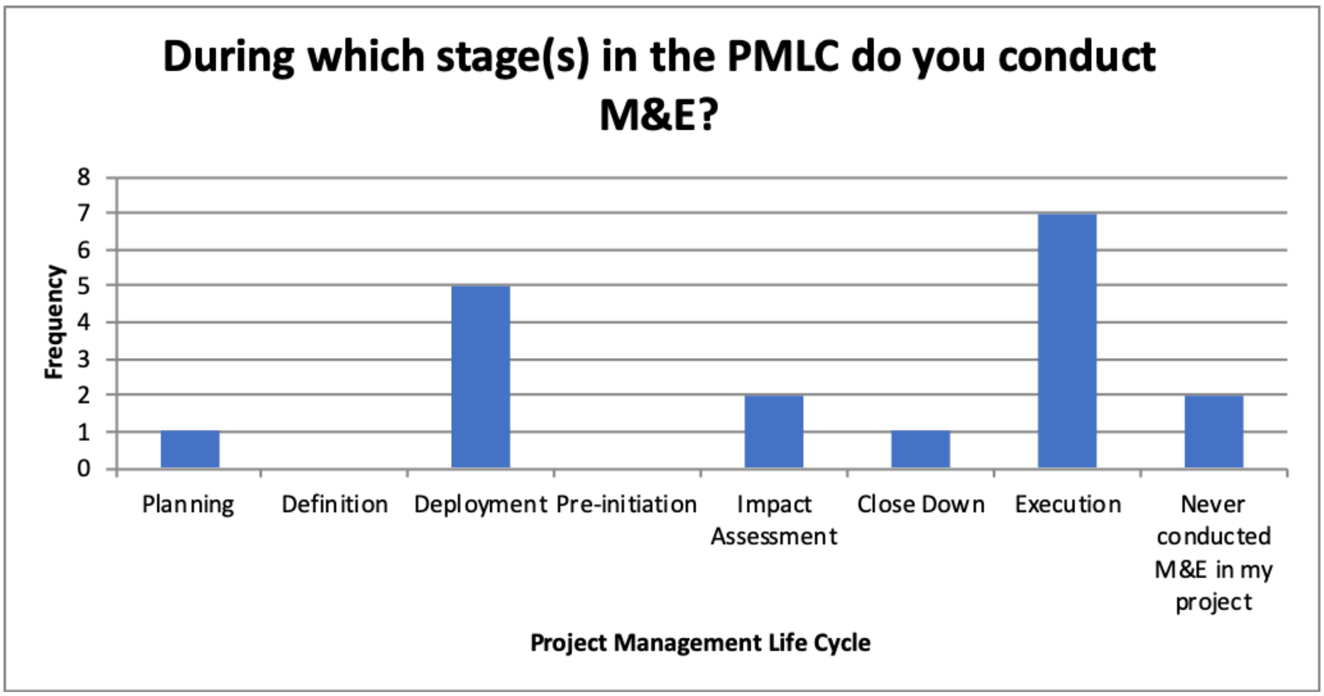
**Table 7-3:** Project Managers' Responses on Project Management Life Cycle Process

| S/N | **Project Management Life Cycle Process** | **% Freq.** |
|---|---|---|
| 1 | *Definition -> Planning -> Execution -> Deployment -> Close Down -> Impact Assessment* | 36.4 (4) |
| 2 | *Pre-initiation -> Definition -> Planning -> Execution -> Deployment -> Close Down -> Impact assessment* | 27.3 (3) |
| 3 | *Definition -> Planning -> Execution -> Deployment -> Close Down* | 18.2 (2) |
| 4 | *Pre-initiation -> Definition -> Planning -> Execution -> Deployment -> Close Down* | 9.1 (1) |
| 5 | *N/A* | 9.1 (1) |
| | *Total* | 100.0 (11) |

The results in Table 7-3 above shows project managers' responses on the PMLC process. Most of the respondents (36.4%) said that "*Definition -> Planning -> Execution -> Deployment -> Close Down -> Impact Assessment"* make up the PMLC process respondent project managers follow in the project management life cycle. This, therefore, suggests that project managers appear to give less importance to the pre-initiation phase of the project management life cycle in comparison to phases such as impact assessment.

The PMLC process, "*Pre-initiation -> Definition -> Planning -> Execution -> Deployment -> Close Down -> Impact assessment"* registered the second-highest percentage frequency of 27.3%, implying that managers who selected this PMLC process may have shown value for the pre-initiation phase of the project as well as the impact assessment phase. The PMLC process, "*Pre-initiation -> Definition -> Planning -> Execution -> Deployment -> Close Down*" registered the lowest frequency of 9.1 %. Only one project manager failed to give any response to the various variants of the PMLC.

Project managers were asked, "*During which stage(s) in the project management life cycle do you conduct monitoring and evaluation?*" Seven out of the 11 project managers, representing 63.6 %, said they carried out the monitoring and evaluation during the execution phase of the project management life cycle (Figure 7-6). The execution phase thus formed the majority suggesting that project managers tend to perform monitoring and evaluation during the execution stage of the project management life cycle. This was followed by the deployment and impact assessment phases.




**17. Figure 7-6 Stages in the PMLC during which M & E is conducted**

However, two out of the 11 respondent project managers said they had never conducted M & E in their projects. These project managers did not carry out M & E in their projects because they felt that M & E was time-consuming and too costly.

Further analysis was carried out to ascertain the specific elements captured by project managers during the monitoring and evaluation process (Table 7-4). *Setting of performance targets* were found to be the most frequently (11.1 %) captured element during M & E. This was followed by *Setting of KPIs for outcomes* (10 %), *Budgeting* (7.8 %), *Training* (7.8 %), *Scheduling* (6.7 %), and *status report feedback* (6.7 %). The foregoing thus means that six out of the 17 elements were observed to be the most frequentlements captured by project managers during the M & E process as together they accounted for 50 % of the frequency distribution.

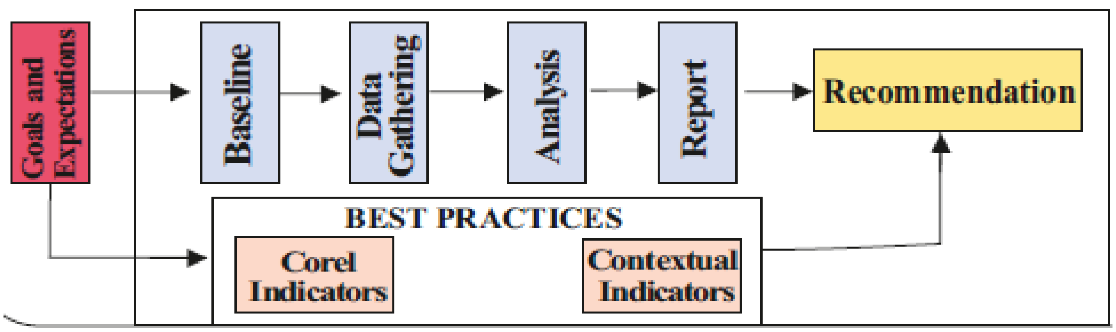
**Table 7-4:** Elements Captured During the Monitoring and Evaluation Process

| S/N | **Key Elements** | **Frequency** | **% Frequency** |
|---|---|---|---|
| 1 | Setting of performance targets | 10 | 11.1 |
| 2 | The setting of KPIs for outcomes | 9 | 10.0 |
| 3 | Budgeting | 7 | 7.8 |
| 4 | Training | 7 | 7.8 |
| 5 | Scheduling | 6 | 6.7 |
| 6 | Status report feedback | 6 | 6.7 |
| 7 | Defining target beneficiaries | 5 | 5.6 |
| 8 | Defining duties and responsibilities | 5 | 5.6 |
| 9 | Utilization of M & E data for decision-making | 5 | 5.6 |
| 10 | Quality assessment | 5 | 5.6 |
| 11 | Setting Project objectives | 4 | 4.4 |
| 12 | Documentation | 4 | 4.4 |
| 13 | Result-orientedness | 4 | 4.4 |
| 14 | Time and cost control | 4 | 4.4 |
| 15 | Capacity building for M & E | 3 | 3.3 |
| 16 | Team formation | 3 | 3.3 |
| 17 | Project specification | 3 | 3.3 |
| | *Total* | 90 | 100.0 |

## 7.5 Analysis of Impact Assessment Layer of Proposed Integrated Framework

This section provides an analysis of data gathered from respondents with regard to the impact assessment layer of the proposed integrated framework. To achieve the foregoing, the various elements of the impact assessment layer such as goals and expectations, baseline, data gathering, analysis, report, core and contextual indicators and recommendation were subjected to experts' opinion and later followed by field testing by project managers of e-Gov projects.

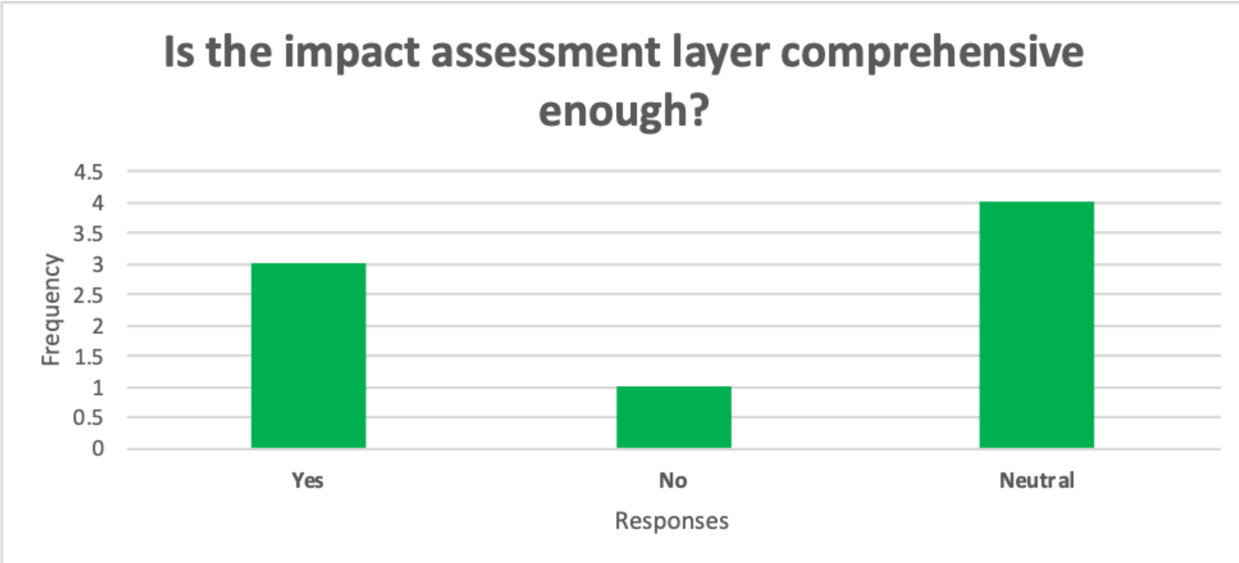
Below is a standalone diagram for the impact assessment layer:




**18. Figure 7-7 Impact Assessment Layer of Proposed Framework**

### 7.5.1 Analysis of Experts' Opinion

When asked whether the impact assessment layer was comprehensive enough, 4 of the 8 experts gave a neutral response, implying they somehow agree with the comprehensiveness of the impact assessment layer. Of the remaining four, three said 'Yes' suggesting they strongly agree with the comprehensiveness of the impact assessment layer and one said 'No' without any clear argument indicating that they were not familiar with the importance of the impact assessment layer. The foregoing presupposes that 87.5 % (7/8) of the experts agreed with the comprehensiveness of the impact assessment layer.




**19. Figure7-8: Expert Responses on Comprehensiveness of Impact Assessment Layer**

### 7.5.2 Analysis of Feedback from Project Managers

Field testing of the proposed integrated framework by project managers showed that all the elements in the Impact Assessment layer of the framework were captured during impact assessment (Table 7-5). The foregoing result agrees with that of the experts.

**Table 7-5:** Elements Captured during the conduct of an e-Gov Impact Assessment

| Elements | Frequency | % Frequency |
|---|---|---|
| Data gathering | 5 | 22.7 |
| Report/Recommendations | 5 | 22.7 |
| Analysis of data | 4 | 18.2 |
| Goals and Expectations | 3 | 13.6 |
| Baseline | 3 | 13.6 |
| Best practices | 2 | 9.1 |
| | 22 | 100.0 |

Source: Primary Data

To determine the frequency distribution of how success looks like in e-Gov initiatives, the project managers were presented with a list of seven (7) e-Gov project success measures. Analysis of data collected showed that the commonest e-Gov project success measure used by project managers was *participation by target beneficiaries* as this particular measure registered the highest percentage frequency of 34.8 % (n = 8) (Table 7-6).

**Table 7-6:** Frequency Distribution of e-Gov Project Success Measures

| e-Gov Projects Success Measures | Frequency | % Frequency |
|---|---|---|
| Participation by target beneficiaries was very encouraging | 8 | 34.8 |
| Heavy adoption by stakeholders | 4 | 17.4 |
| The completed project was within the right predetermined quality levels | 4 | 17.4 |
| Overall project costs were within the stipulated budget | 2 | 8.7 |
| No scope creeps | 2 | 8.7 |
| The completed project has made the desired impact | 2 | 8.7 |
| The project was completed within the stipulated time | 1 | 4.3 |
| *Total* | 23 | 100.0 |

Source: Primary Data

This was followed by the success measures, *heavy adoption by stakeholders* (17.4 %; n = 4), and *completion of project within the right predetermined quality levels* (17.4 %; n = 4). The success measure, *project completion within the stipulated time*, recorded the least percentage frequency of 4.3 %, showing that e-Gov projects may have the tendency of not been completed at the stipulated time.

### 7.6 Further Validation of Integrated Framework using Inferential Statistics

This section seeks to further validate elements of the proposed integrated framework by subjecting the data collected to inferential statistics. A Pearson chi-square test was conducted to assess all possible two-way relationship between and among the different project management life cycle processes and the different dimensions of project success as presented to project managers during the survey. The various project management life cycle processes presented to project managers during the survey were:

*Definition* → *Planning* → *Execution* → *Deployment* → *Close Down* (A)

*Pre-initiation* → *Definition* → *Planning* → *Execution* → *Deployment* → *Close Down* (B)

*Pre-initiation* → *Definition* → *Planning* → *Execution* → *Deployment* → *Close Down* → *Impact Assessment* (C)

*Definition* → *Planning* → *Execution* → *Deployment* → *Close Down* → *Impact Assessment (D)*

The only statistically significant association resulting from the analysis were registered between: project management life cycle process (C) and *no scope creeps* ($X^2$ = 6.5185; $p$ = 0.011), implying that the proposed project management life cycle model may be effective in curbing scope creep in e-Gov projects thereby justifying the inclusion of both pre-initiation and impact assessment in the traditional life cycle as none of the other models indicated above showed a significant association with any of the success dimensions; the e-Gov project success dimensions, *overall project costs were within stipulated budget* and *project was completed within stipulated time* ($X^2$ = 4.9500; $p$ = 0.0126), suggesting that these two success dimensions may be strongly interlinked which further implies that project delays may lead to budget overruns; the e-Gov project success dimensions, *heavy adoption by stakeholders* and *completed project has made the desired impact* ($X^2$ = 4.2778; $p$ = 0.039), implying that heavy adoption of e-Gov projects among project beneficiaries may be the difference between e-Gov project success or failure in terms of changed lives; the e-Gov project the success dimensions, *project was completed within stipulated time* and *the completed project has made the desired impact* ($X^2$ = 4.9500; $p$ = 0.026), suggesting completing the e-Gov project on time may enhance the likelihood of achieving the desired impact for which the e-Gov project was intended; the e-Gov project success dimension, *overall project costs were within stipulated budget* and *completed project* *was within the right predetermined quality levels* ($X^2$ = 4.2778; $p$ = 0.039), indicating budget overruns may contribute towards the erosion of predetermined quality levels of e-Gov projects.

Using the Pearson Chi-square test, further analysis was conducted to determine the degree of association between identified critical success factors for e-Gov project implementation and e-Gov project success dimensions. The results of the analysis showed that not all critical success factors (CSFs) registered a significant association with e-Gov project success dimensions. Results showing statistically significant associations were registered between: the CSF, *defining duties and responsibilities* and the success dimension, *heavy adoption by stakeholders* ($X^2$ = 7.5429; $p$ = 0.006), implying clearly defining the roles and responsibilities of e-Gov team members could contribute towards the rapid adoption of the e-Gov project by stakeholders; the CSF, *setting of project objectives* and the success dimension, *completed project has made the desired impact* ($X^2$ = 4.2778; $p$ = 0.039), suggesting that the impact of e-Gov project on a community may greatly be influenced by the clarity of the project objectives communicated at onset; the CSF, *team formation* and the success dimension, *completed project has made the desired impact* ($X^2$ = 6.5185; $p$ = 0.011), indicative of the import of team formation to the realization of the e-Gov project success in terms of achieving intended objectives; the CSF, *project specification* and the success dimension, *no scope creep* ($X^2$ = 6.5185; $p$ = 0.011), implying project specification helps to avoid occurrence of scope creep; the CSF, *result-orientedness* and the success dimension, *project was completed within stipulated budget* ($X^2$ = 6.5185; $p$ = 0.011), suggesting that focus on results could be key in ensuring e-Gov project gets completed within stipulated time.

## 7.7 Key Findings

This section discusses the results of the study as regards the pre-initiation, monitoring and evaluation, and impact assessment layers of the proposed integrated framework.

### 7.7.1 Pre-Initiation Layer of Proposed Framework

There was a mixed response amongst the experts with regards to the comprehensiveness of the pre-initiation layer. This was because they were of the view that *policy*, a component of the pre-initiation layer, tends to remain largely on paper; secondly, the efficacy of the *governance* element in shaping the ICT landscape of a country appears to vary in direct proportion with the nature and content of that developing country's governance system. Nonetheless, the experts felt the pre-initiation layer was good. They were further of the view that "*every concern at this stage* [pre-initiation layer] *of an e-government initiative is captured nicely."*

More than 50 % of the experts agreed with the fact that pre-initiation constituted a vital stage in their project management cycle. Five out of the 11 project managers, representing a proportion of 45.5 %, indicated that pre-initiation constituted a vital stage in their project management cycle; of the remaining 6 experts 36.4 % (n=3) of them provided neutral responses, suggesting that they somehow agreed that pre-initiation constituted a vital stage in their project management cycle. However, 18.2 % (n=2) said 'No' due to the fact that they were not familiar with this new construct in project management. This presupposes that 8/11 representing 72.7 % of the experts agreed with the fact that pre-initiation constituted a vital stage in their project management cycle.

Expert opinion appeared to give more weight to *policy formulation* and *governance*, whereas project managers, on the other hand, seemed to view *governance* and the *ICT landscape* as more crucial to the pre-initiation phase. This, therefore, means that *governance* arguably maybe the most critical element to the success of the pre-initiation layer.

On the whole, the experts felt the pre-initiation layer was good and 87.5 % of the experts agree that the pre-initiation layer was comprehensive enough.

### 7.7.2 Monitoring and Evaluation Layer of Proposed Framework

All of the experts were fine with the monitoring and evaluation layer of the proposed framework. In fact, the monitoring and evaluation layer was viewed as a representation of "*a standard, rationalist project life cycle approach to e-Gov"*. Furthermore, about 62.5 % of the experts indicated satisfaction with the comprehensiveness of the M & E layer. However, the remaining

37.5 % who said, ‘No’ had no clear argument to back their response, an indication of a lack of familiarity with the importance of M & E.

The planning stage followed by the definition stage was found to be the most critical stages of the project life cycle. Various reasons were proffered for that. Chief among them was the fact that it was at this stage that the key critical success factors for the implementation of an e-gov initiative were set. Some experts also opined that the planning stage was most important because upstream definition and planning tend to set the tone for the whole e-Gov project.

Although 100 % of respondent experts had already indicated that they agree with the components of the M & E layer, half of the experts articulated that each stage in an e-Gov project life cycle requires particular critical success factors if e-Gov implementation was to be successful.

The PMLC process, “*Pre-initiation -> Definition -> Planning -> Execution -> Deployment -> Close Down -> Impact assessment”* registered the second-highest percentage frequency of 27.3%, implying that project managers who selected this PMLC process may have shown value for the pre-initiation phase of the project as well as the impact assessment phase.

Seven out of the 11 project managers, representing 63.6 %, said they carried out the monitoring and evaluation during the execution phase of the project management life cycle. The execution phase thus formed the majority suggesting that project managers tend to perform monitoring and evaluation during the execution stage of the project management life cycle. This was followed by the deployment and impact assessment phases.

Furthermore, the result from a Pearson chi-square test conducted to assess all possible two-way relationship between the different project management life cycle processes and the different dimensions of project success as presented to project managers during the survey showed that the only statistically significant association resulting from the analysis were registered between the project management life cycle process, "*Pre-initiation -> Definition -> Planning -> Execution -> Deployment -> Close Down -> Impact assessment*" (C) and *no scope creeps* ($X^2$ = 6.5185; $p$ = 0.011). This implies that the proposed project management life cycle model may be effective in curbing scope creep in e-Gov projects thereby justifying the inclusion of both pre-initiation and impact assessment in the traditional life cycle as none of the other PMLC models showed a significant association with any of the success dimensions.

Results from the analysis show that not all critical success factors (CSFs) registered a significant association with e-Gov project success dimensions. Results showing statistically significant associations were registered between:

- the CSF, *defining duties and responsibilities* and the success dimension, *heavy adoption by stakeholders* ($X^2$ = 7.5429; $p$ = 0.006), implying clearly defining the roles and responsibilities of e-Gov team members could contribute towards the rapid adoption of the e-Gov project by stakeholders;

- the CSF, *setting of project objectives* and the success dimension, *completed project has made the desired impact* ($X^2$ = 4.2778; $p$ = 0.039), suggesting that the impact of the e-Gov project on a community may greatly be influenced by the clarity of the project objectives communicated at onset;

- the CSF, *team formation* and the success dimension, *completed project has made the desired impact* ($X^2$ = 6.5185; $p$ = 0.011), indicative of the import of team formation to the realization of the e-Gov project success in terms of achieving intended objectives;

- the CSF, *project specification* and the success dimension, *no scope creep* ($X^2$ = 6.5185; $p$ = 0.011), implying project specification helps to avoid the occurrence of scope creep;

- the CSF, *result-orientedness* and the success dimension, the *project was completed within stipulated budget* ($X^2$ = 6.5185; $p$ = 0.011), suggesting that focus on results could be key in ensuring the e-Gov project gets completed within the stipulated time.

### 7.7.3 Impact Assessment Layer of Proposed Framework

About 87.5 % (7/8) of the experts agreed with the comprehensiveness of the impact assessment layer. When asked whether the impact assessment layer was comprehensive enough, 4 of the 8 experts gave a neutral response, implying they somehow agree with the comprehensiveness of the impact assessment layer. Of the remaining four, three said 'Yes' suggesting they strongly agree with the comprehensiveness of the impact assessment layer and one said 'No' without any clear argument indicating that they were not familiar with the importance of the impact assessment layer.

The commonest e-Gov project success measure used by project managers was *participation by target beneficiaries* as this particular measure registered the highest percentage frequency of 34.8 %. This was followed by the success measures, *heavy adoption by stakeholders* (17.4 %; n = 4), and *completion of project within the right predetermined quality levels* (17.4 %; n = 4). The success measure, *project completion within the stipulated time*, recorded the least percentage frequency of 4.3 %.

Furthermore, statistical analysis revealed a significant association between the following project success measures:

- the e-Gov project success dimensions, *overall project costs were within stipulated budget* and *project was completed within the stipulated time* ($X^2$ = 4.9500; $p$ = 0.0126), suggesting that these two success dimensions may be strongly interlinked which further implies that project delays may lead to budget overruns;

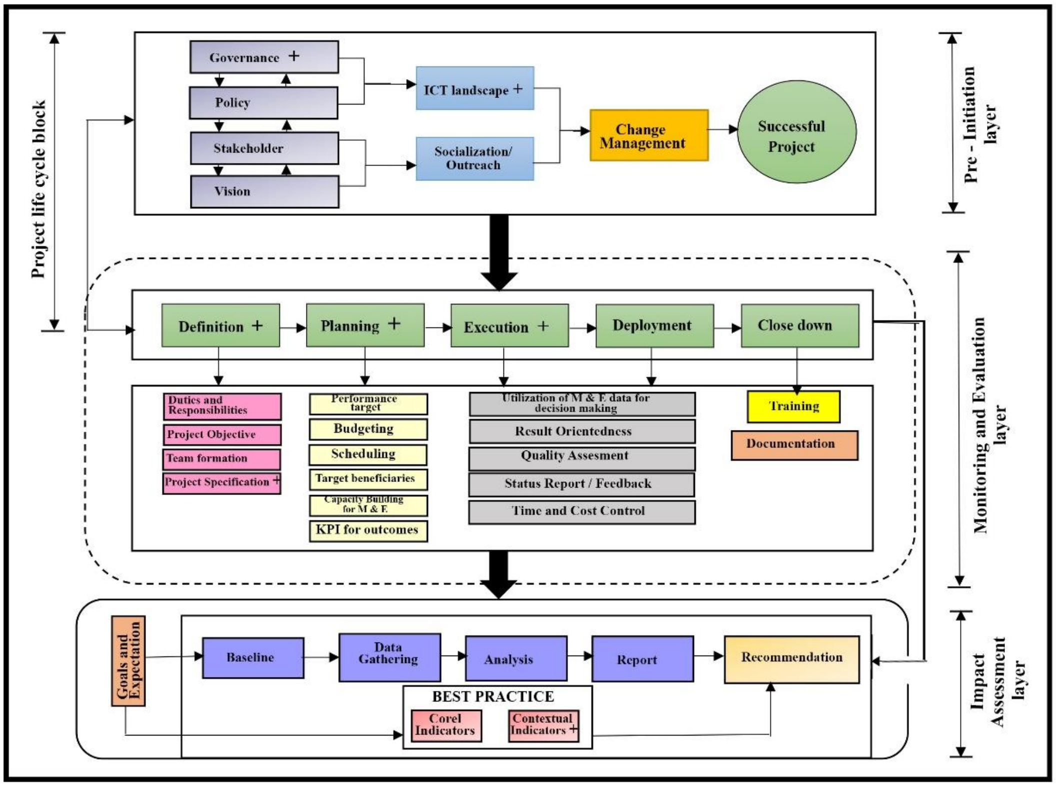
- the e-Gov project success dimensions, *heavy adoption by stakeholders* and *completed project has made the desired impact* ($X^2$ = 4.2778; $p$ = 0.039), implying that heavy adoption of e-Gov projects among project beneficiaries may be the difference between e-Gov project success or failure in terms of changed lives;

- the e-Gov project the success dimensions, *project was completed within stipulated time* and *the completed project has made the desired impact* ($X^2$ = 4.9500; $p$ = 0.026), suggesting completing the e-Gov project on time may enhance the likelihood of achieving the desired impact for which the e-Gov project was intended;

- the e-Gov project success dimension, *overall project costs were within the stipulated budget* and *completed project was within the right predetermined quality levels* ($X^2$ = 4.2778; $p$ = 0.039), indicating budget overruns may contribute towards the erosion of predetermined quality levels of e-Gov projects.

### 7.8 Improved e-Governance Framework

This section presents the alterations made to yield an improved or final e-Governance framework and the various applications for the developed integrated framework. Figure 7-9 presents the proposed integrated framework.




**20. Figure 7-9 Proposed Integrated Framework**

The proposed integrated framework for benchmarking e-Gov was largely accepted, with suggestions of the need for a few alterations. One expert suggestion was that the element 'Outreach' within the pre-initiation layer be renamed as 'Socialization' since it is at that stage that training, orientation, engagement, and sensitization of stakeholders do occur, not to mention awareness creation.

Moreover, there were suggestions by some experts that the e-Gov framework be capable of undergoing iterations (i.e. be iterative in nature). But then iterations have already been built into each phase of the proposed e-Governance framework in that every phase along the e-Gov project life cycle is iterated during monitoring and evaluation and so there was no need to go back to initiate the process all over again. The foregoing means that activities may be repeated and iterated in a single phase in order to make sure that the outcome of that phase meet the prescribed benchmark and deliver good/excellent result. As such, the project manager is not permitted to move to the next phase unless M & E meet the minimum standard benchmark/threshold. This is to enable the avoidance of backtracking as it will be extremely time consuming and resource consuming for the project.

To further avoid wastage of time, it must be noted that entire layers of the framework are not subjected to iteration. Instead, iteration for a layer of the proposed framework is done by restricting such iterations to a particular block element of that layer. For such a block element within a layer to be selected that block element should be amenable to corrections and have the ability to provide some sort of feedback which can be relied upon to draw insights for the iteration process. Using the foregoing criteria, for the pre-initiation layer we can iterate in socialization/outreach and the change management blocks; execution block for the monitoring and evaluation layer; data gathering block for the impact assessment layer.

The applications for the developed integrated framework are manifold. First and foremost, the framework provides a systematized model for benchmarking e-Gov projects in developing countries. The developed model begins with a pre-initiation layer, followed by an M & E layer and then an impact assessment layer. Within the M & E layer, for example, is the various phases of the project life cycle and associated critical success factors. Secondly, the developed framework can be used as a diagnostic tool for pinpointing flaws and weakness within an e-Gov project so that necessary corrective actions can be taken. Thirdly, the developed framework makes it easy to compare e-Gov projects even those initiated in different environments because of the ability of the model's automation (discussed in the next chapter) to provide a single benchmarking score for an e-Gov project. Additionally, the developed model can be used to investigate why different e-Gov projects may exhibit varying levels of success by comparing core indicators as opposed to contextual indicators. This is because core indicators may provide a common basis for comparison.

Fourthly, the developed model can serve as a prescriptive tool to suggest the most important critical success factors needed to achieve breakthrough success in an e-Gov project. Fourthly, the developed model can be used to a large extent to replicate the level of success of a successful e-Gov project by using the model to identify specific elements that significantly accounted for the exceptional performance of such an e-Gov project and doing same in a similar project.

### 7.9 Summary and Conclusion

The purpose of this chapter was to analyse collected data in order to draw conclusions to be relied upon to validate and/or improve the proposed conceptual framework. The value of this chapter laid in its fulfilment of part 2 of the research objective on evaluation and validation (that is research objective 5 - Evaluate, **improve** and validate the developed framework through case studies and experts' contributions). The main deliverable of this chapter after analysing and drawing conclusion was an improved framework which would be relied upon for the development of a prototyped proof of concept. It is the prototyped proof of concept that will then be evaluated in order to demonstrate that it indeed fulfils the purpose of the framework which is that of serving as an enabler for e-Gov benchmarking, e-Gov project pre-initiation, during execution and post-implementation.

In sum, the various layers of the proposed integrated framework for benchmarking e-Gov were on the whole considered comprehensive enough by both experts and project managers. The analysis justified the inclusion of both pre-initiation and impact assessment in the traditional life cycle as none of the other investigated PMLC models showed a significant association with any of the success dimensions with the exception of "*Pre-initiation -> Definition -> Planning -> Execution -> Deployment -> Close Down -> Impact assessment"* (C).

However, issues such as political influence and lack of action on the part of decision-makers to follow through with laid down policies at the pre-initiation layer constituted some key concerns raised by experts. These issues were thought to have the potential to diminish the validity of the proposed integrated framework if not addressed by the framework. Fortunately, the proposed framework tackled these issues through some of its component elements such as *Policy* and *Governance*. The next chapter would be on Prototyping and is titled "Prototyping and Proof of Concept". This chapter will tackle automation of the developed integrated framework.

# CHAPTER 8: PROTOTYPING AND PROOF OF CONCEPT

## 8.1 Introduction

In the previous chapter, the collected data was analysed to draw conclusions that were then relied upon to validate and/or improve the proposed conceptual framework. The findings were thus used to develop the final framework that now forms the basis of the prototype and proof of concept that this chapter will be discussing. In this chapter, the Software Development Life Cycle (SDLC) is employed to translate the improved e-gov framework into an automated platform for benchmarking e-gov projects. This follows Jirava's (2016, p. 59) approach: “The SDLC is a phased approach to analysis and design that holds that systems are best developed through the use of a specific cycle of analyst and user activities”. There is, however, disagreement as to the exact number of phases found in Software Development Life. The value of this chapter lies in the fact that it presents a breakdown of the logic detailing the steps used in translating the improved e-gov Framework into an automated platform for benchmarking e-gov projects.

This chapter addresses Research Objective 5 (RSQ5), “*Evaluate, improve and validate the developed framework through case studies and experts' contributions*” thereby tackling the validation component of research question 5, “*How can the proposed framework be validated, improved and evaluated for the purpose of socio-economic development in developing countries*?”

To address the objective of this chapter, the SDLC (software development life cycle) model was employed because it works by bringing down the expenditure associated with software development while at the same time enhancing quality and shortening creation time (Stackify, 2017). Software development life cycle accomplishes these evidently unique objectives by following an approach that expels the regular traps to software development initiatives. That approach begins by assessing existing frameworks for flaws. Next, it characterises the requirements of the new system. The automated product is then produced via the phases of design, development, testing, and deployment. By envisioning expensive mix-ups like neglecting to approach the end client for feedback on the framework being translated into an automated platform, SLDC can take out worthless rework and after-the-fact fixes (Stackify, 2017).

This chapter is structured as follows: Section 8.2 tackles prototype development. In this section, a requirement analysis is required to put together a conceptual architecture of the automation/platform and present the designs of both the logical and physical architectures of the platform. The section also covers the implementation/deployment of the platform and the user interface; section 8.3 provides proof of concept. In this section, the mode of usage of the system is detailed step by step and the expected results rendered; section 8.4 looks at the value proposition of the proof of concept. In this section we demonstrate to the reader that if such a system is deployed in real-life it will achieve the desired outcome in the entire e-gov project lifecycle; Finally, section 8.5 concludes the chapter.

## 8.2 Prototype Development

It must be noted that in developing the prototype, the software development life cycle (SDLC) was employed to translate the improved e-gov framework into an automated platform for benchmarking e-gov projects.

### Requirement analysis

This sub-section provides the requirements for the development of an automated platform/framework for benchmarking e-gov projects. These requirements are divided into two; Functional Requirements specification and Non-functional Requirements specification as follows:

- **Functional Requirements**

The functional requirements of the developed prototyped are specified as follows:

| | |
|---|---|
| **Dashboard** | **FR1** |
| **Requirement ID** | FR1.01 |
| **Title** | Dashboard/General |
| **Description** | The system shall support the real-time monitoring and tracking of the ongoing activities of Key Performance Indicators of the Dashboard, as per the privileges of the user. |
| **Requirement ID** | FR1.02 |
| **Title** | Dashboard/KPIs |
| **Description** | The system shall provide the major evaluation KPIs such as *Low Performance (in Red Color), Attention Required (in Amber Color) and Good Performance (in Green Color).* |
| **Requirement ID** | FR1.03 |
| **Title** | Dashboard/Recommendations |
| **Description** | The system shall display the recommendations upon clicking on the respective KPI. |

**Administration FR2**

| | |
|---|---|
| **Requirement ID** | **FR2.01** |
| **Title** | Administration/Users |
| **Description** | The system shall support the concept of a user. Every user of the system has a username and a password. The username must be unique within the system. In addition, every user has a basic set of properties: *Type of User, Full Name, e-mail and Password*. |
| **Requirement ID** | **FR2.02** |

| | |
|---|---|
| **Title** | Administration/User Authorisations |
| **Description** | The system shall determine what of its functionality available to the authenticated user according to its type. |
| **Requirement ID** | **FR2.03** |
| **Title** | Administration/User List |
| **Description** | The system shall provide the list of the created users. The system shall also provide the selection of user to view its details. |
| **Requirement ID** | **FR2.04** |
| **Title** | Administration/User Profile Management |
| **Description** | The system shall provide editing of the created user. |

**Projects FR3**

| | |
|---|---|
| **Requirement ID** | **FR3.01** |
| **Title** | Projects/Creation |
| **Description** | The system shall support the concept of the project. Every project has a basic set of properties: *Project Title, Team Leader, Project Cost, Benchmark Status (Read-Only) and Points (Read-Only).* |

| | |
|---|---|
| **Requirement ID** | **FR3.02** |
| **Title** | Projects/Project List |
| **Description** | The system shall provide the list of the created projects. The system shall also provide the selection of project to view its details. |

| | |
|---|---|
| **Requirement ID** | **FR3.03** |
| **Title** | Projects/Project Information Management |
| **Description** | The system shall provide editing of the created project. |

| | |
|---|---|
| **Requirement ID** | **FR3.04** |
| **Title** | Projects/Benchmarking |
| **Description** | The system shall provide to view the score of completed benchmark or to update the scores of ongoing benchmarking. |

| | |
|---|---|
| **Requirement ID** | **FR3.05** |
| **Title** | Projects/Bird's Eye View |
| **Description** | The system shall provide to view overall all graphical representation of the selected project. |

**Benchmarking FR4**

| | |
|---|---|
| **Requirement ID** | **FR4.01** |
| **Title** | Benchmarking/General |
| **Description** | The system shall provide a "*5-point Likert scale*" like selection control to take benchmarking user input. |

| | |
|---|---|
| **Requirement ID** | **FR4.02** |
| **Title** | Benchmarking/General |
| **Description** | The system shall provide wizard control for taking input one building block at a time. |

| | |
|---|---|
| **Requirement ID** | **FR4.03** |
| **Title** | Benchmarking/Pre-Initiation Layer/Vision |
| **Description:** | The system shall allow the user to take user input as per the following table: |

| S. No. | Vision metrics | Weight/age Factor | Maximum Score |
|---|---|---|---|
| 1. | Vision is defined | 6 | 30 |
| 2. | Vision is articulated in terms of statements | 4 | 20 |
| 3. | Vision is disseminated to all stakeholders | 2 | 10 |
| 4. | Vision is agreed to by all stakeholders | 3 | 15 |
| 5. | Vision is understood by all stakeholders | 3 | 15 |
| 6. | Vision is signed off by all stakeholders | 2 | 10 |
| | **Total** | | 100 (15%)** |

** The 100% is equivalent to the maximum best practice score (15%) of the Vision building block within the pre-initiation layer.

| | |
|---|---|
| **Requirement ID** | **FR4.04** |
| **Title** | Benchmarking/Pre-Initiation Layer/Stakeholders |
| **Description** | The system shall allow the user to take user input as per the following table: |

| S. No. | Stakeholders metrics | Weight/age Factor | Maximum Score |
|---|---|---|---|
| 1. | All stakeholders identified | 4 | 20 |
| 2. | All stakeholders role and responsibility defined | 4 | 20 |
| 3. | Stakeholders engagement model defined | 4 | 20 |
| 4. | Stakeholder participation schedule clarified | 4 | 20 |
| 5. | Stakeholder participation schedule clarified | 4 | 20 |
| | **Total** | | 100 (10%)** |

** The 100% is equivalent to the maximum best practice score (10%) of the Stakeholders building block in the pre-initiation layer.

| | |
|---|---|
| **Requirement ID** | **FR4.05** |
| **Title** | Benchmarking/Pre-Initiation Layer/Policy |
| **Description** | The system shall allow the user to take user input as per the following table: |

| S. No. | Policy metrics | Weight/age Factor | Maximum Score |
|---|---|---|---|
| 1. | Policy defined | 4 | 20 |
| 2. | Policy statements articulated | 4 | 20 |
| 3. | Policy domain articulated | 2 | 10 |
| 4. | Policy domain owners known | 2 | 10 |
| 5. | Policy disseminated to stakeholders | 4 | 20 |
| 6. | Policy compliance enforced | 4 | 20 |
| | **Total** | | 100 (10%)** |

** The 100% is equivalent to the maximum best practice score (10%) of the Policy building block in the pre-initiation layer.

**Requirement ID** **FR4.06**

**Title** Benchmarking/Pre-Initiation Layer/Governance

**Description** The system shall allow the user to take user input as per the following table:

| S. No. | Governance metrics | Weight/age Factor | Maximum Score |
|---|---|---|---|
| 1. | Roles and responsibility defined | 4 | 20 |
| 2. | Business model defined | 4 | 20 |

| | | | |
|---|---|---|---|
| 3. | Governance Process defined | 4 | 20 |
| 4. | Governance framework defined | 4 | 20 |
| 5. | Governance framework implemented | 4 | 20 |
| | **Total** | | 100 (15%)** |

** The 100% is equivalent to the maximum best practice score (15%) of the Governance building block in the pre-initiation layer.

**Requirement ID** **FR4.07**

**Title** Benchmarking/Pre-Initiation Layer/ICT Landscape

**Description** The system shall allow the user to take user input as per the following table:

| S. No. | ICT Landscape metrics | Weight/age Factor | Maximum Score |
|---|---|---|---|
| 1. | Penetration of Computers known | 6 | 30 |
| 2. | Internet penetration known | 4 | 20 |
| 3. | Mobile phone penetration known | 2 | 10 |
| 4. | Internet connectivity assessed | 5 | 25 |
| 5. | Affordability of data established | 3 | 15 |
| | **Total** | | 100 (10%)** |

**The 100% is equivalent to the maximum best practice score (10%) of the ICT Landscape building block in the pre-initiation layer.

| | |
|---|---|
| **Requirement ID** | **FR4.08** |
| **Title** | Benchmarking/Pre-Initiation Layer/Outreach |
| **Description** | The system shall allow the user to take user input as per the following table: |

| S. No. | Outreach metrics | Weight/age Factor | Maximum Score |
|---|---|---|---|
| 1. | Identification of project benefits to the community | 5 | 25 |
| 2. | Community buy-in into the project | 4 | 20 |
| 3. | Articulation of project benefits to the community | 6 | 30 |
| 4. | Project awareness campaigns created | 5 | 25 |
| | **Total** | | 100 (15%)** |

**The 100% is equivalent to the maximum best practice score (15%) of the Outreach building block in the pre-initiation layer.

| | |
|---|---|
| **Requirement ID** | **FR4.09** |
| **Title** | Benchmarking/Pre-Initiation Layer/Change Management |
| **Description** | The system shall allow the user to take user input as per the following table: |

| S. No. | Change Management metrics | Weight/age Factor | Maximum Score |
|---|---|---|---|
| 1. | The allowance made for contingencies | 4 | 20 |
| 2. | Risk registers are created | 4 | 20 |
| 3. | Risks are assigned to 'risk owners' | 4 | 20 |
| 4. | Listing of risk management practices | 4 | 20 |
| 5. | Risk management practices enforced | 4 | 20 |
| | **Total** | | 100 (10%)** |

**The 100% is equivalent to the maximum best practice score (10%) of the Change Management building block in the pre-initiation layer.

**Requirement ID** **FR4.10**

**Title** Benchmarking/Pre-Initiation Layer/Pre-initiation Successful

**Description** The system shall allow the user to take user input as per the following table:

| S. No. | Pre-initiation Successful metrics | Weight/age Factor | Maximum Score |
|---|---|---|---|
| 1. | The allowance made for contingencies | 7 | 35 |
| 2. | Risk registers are created | 7 | 35 |
| 3. | Risks are assigned to 'risk owners' | 6 | 30 |
| | **Total** | | 100 (15%)** |

**The 100% is equivalent to the maximum best practice score (15%) of the Pre-initiation Successful building block in the pre-initiation layer.

**Requirement ID** FR4.11

**Title** Benchmarking/Monitoring and Evaluation Layer/Definition

**Description** The system shall allow the user to take user input as per the following table

| S. No. | Definition metrics | Weight/age Factor | Maximum Score |
|---|---|---|---|
| 1. | Duties and responsibilities defined | 5 | 25 |
| 2. | Project objectives formulated | 5 | 25 |
| 3. | Team formed | 5 | 25 |
| 4. | Project specification done | 5 | 25 |
| | **Total** | | 100 (20 %)** |

**The 100% is equivalent to the maximum best practice score (20%) of the Definition building block in the Monitoring and Evaluation layer.

**Requirement ID** FR4.11

**Title** Benchmarking/Monitoring and Evaluation Layer/Planning

**Description** The system shall allow user to take user input as per the following table:

| S. No. | Planning metrics | Weight/age Factor | Maximum Score |
|---|---|---|---|
| 1. | Performance target set | 4 | 20 |
| 2. | Budgeting done | 4 | 20 |
| 3. | Target beneficiaries defined | 4 | 20 |
| 4. | Capacity building for M & E done | 4 | 20 |
| 5. | KPI for outcomes determined | 4 | 20 |
| | **Total** | | 100 (25%)** |

**The 100% is equivalent to the maximum best practice score (25%) of the Planning building block in the Monitoring and Evaluation layer.

**Requirement ID** **FR4.12**

**Title** Benchmarking/Monitoring and Evaluation Layer/Execution and Deployment

**Description** The system shall allow user to take user input as per the following table:

| S. No. | Execution and Deployment metrics | Weight/age Factor | Maximum Score |
|---|---|---|---|
| 1. | M & E data is utilised for decision making | 2 | 10 |
| 2. | Result oriented | 1 | 05 |
| 3. | Status Report/feedback is regular | 1 | 05 |
| 4. | Capacity building for M & E is done | 2 | 10 |
| 5. | KPI for outcomes determined | 2 | 10 |
| | | | **Baseline Score** |
| 6. | Project within schedule (Duration) | 4 | 20 |
| 7. | Project expenses within allocated budget (Cost) | 4 | 20 |
| 8. | Project within specifications (Quality) | 4 | 20 |
| | **Total** | | 100 (45%)** |

**The 100% is equivalent to the maximum best practice score (45%) of the Execution and Deployment building block in the Monitoring and Evaluation layer.

| | |
|---|---|
| **Requirement ID** | **FR4.13** |
| **Title** | Benchmarking/Monitoring and Evaluation Layer/Close Down |
| **Description** | The system shall allow user to take user input as per the following table: |

| S. No. | Close Down metrics | Weight/age Factor | Maximum Score |
|---|---|---|---|
| 1. | Training conducted | 10 | 50 |
| 2. | Documentation done | 10 | 50 |
| | **Total** | | 100 (10%)** |

**The 100% is equivalent to the maximum best practice score (10%) of the Close Down building block in the Monitoring and Evaluation layer.

**Requirement ID** **FR4.14**

**Title** Benchmarking/Impact Assessment Layer/Goals and Expectations

**Description** The system shall allow user to take user input as per the following table:

| S. No. | Goals and Expectations metrics | Weightage Factor | Maximum Score |
|---|---|---|---|
| 1. | Identification of problem | 7 | 35 |
| 2. | Change desired determined | 6 | 30 |
| 3. | Project expectations set | 7 | 35 |
| | **Total** | | 100 (20%)** |

**The 100% is equivalent to the maximum best practice score (20%) of the Goals and Expectations building block within the Impact Assessment layer.

**Requirement ID** **FR4.15**

**Title** Benchmarking/Impact Assessment Layer/Baseline

**Description** The system shall allow user to take user input as per the following table:

| S. No. | Baseline metrics | Weight/age Factor | Maximum Score |
|---|---|---|---|
| 1. | Cost of completion of similar projects | 7 | 35 |
| 2. | Time of completion of similar projects | 6 | 30 |
| 3. | Project quality level of similar projects | 7 | 35 |
| | **Total** | | 100 (20%)** |

**The 100% is equivalent to the maximum best practice score (20%) of the Baseline building block within the Impact Assessment layer.

**Requirement ID** **FR4.16**

**Title** Benchmarking/Impact Assessment Layer/Data Gathering

**Description** The system shall allow user to take user input as per the following table:

| S. No. | Data Gathering metrics | Weight/age Factor | Maximum Score |
|---|---|---|---|
| 1. | Type of data to be collected determined | 6 | 30 |
| 2. | Data sample size determined | 6 | 30 |
| 3. | Project quality level of similar projects | 6 | 30 |
| 4. | Data collation | 2 | 10 |

| | | | |
|---|---|---|---|
| | **Total** | | 100 (15%)** |

**The 100% is equivalent to the maximum best practice score (15%) of the Data Gathering building block within the Impact Assessment layer.

**Requirement ID** **FR4.17**

**Title** Benchmarking/Impact Assessment Layer/Analysis

**Description** The system shall allow user to take user input as per the following table:

| S. No. | Analysis metrics | Weight/age Factor | Maximum Score |
|---|---|---|---|
| 1. | Data cleaning conducted | 7 | 35 |
| 2. | Type of analysis to be used determined | 7 | 35 |
| 3. | Findings from analysed data validated | 6 | 30 |
| | **Total** | | 100 (15%)** |

**The 100% is equivalent to the maximum best practice score (15%) of the Analysis building block within the Impact Assessment layer.

**Requirement ID** **FR4.18**

**Title** Benchmarking/Impact Assessment Layer/Report

**Description** The system shall allow user to take user input as per the following table:

| S. No. | Report metrics | Weight/age Factor | Maximum Score |
|---|---|---|---|

| | | | |
|---|---|---|---|
| 1. | Report is comprehensive | 7 | 35 |
| 2. | Report is actionable | 7 | 35 |
| 3. | Report contains recommendations | 6 | 30 |
| | **Total** | | 100 (15%)** |

**The 100% is equivalent to the maximum best practice score (15%) of the Report building block within the Impact Assessment layer.

| | |
|---|---|
| **Requirement ID** | **FR4.19** |
| **Title** | Benchmarking/Impact Assessment Layer/Recommendation |
| **Description** | The system shall allow user to take user input as per the following table: |

| S. No. | Recommendation metrics | Weight/age Factor | Maximum Score |
|---|---|---|---|
| 1. | Recommendations are clear | 7 | 35 |
| 2. | Recommendations are specific | 7 | 35 |
| 3. | Recommendations are based on analysed data | 6 | 30 |
| | **Total** | | 100 (15 %)** |

**The 100% is equivalent to the maximum best practice score (15%) of the Recommendation building block within the Impact Assessment layer.

| | |
|---|---|
| **Requirement ID** | **FR4.20** |
| **Title** | Benchmarking/Score Computation |

| | |
|---|---|
| **Description** | The system shall determine the overall score of the project benchmarking. |

Non-Functional Requirements

| **Deployment** | **NR1** |
|---|---|
| **Requirement ID** | NR1.01 |
| **Title** | Deployment/Setup |
| **Description** | The setup of the system server must be well-defined and well-documented procedure. The experienced system administrator shall be able to set up the system within reasonable time. |
| **Requirement ID** | **NR1.02** |
| **Title** | Deployment/Patch |
| **Description** | The patch of the system must be a particular case of the setup (NR1.01) and fulfil the same requirements. The patch shall preserve all user data. |

| **User Interface** | **NR2** |
|---|---|
| **Requirement ID** | NR2.01 |
| **Title** | User Interface/Standards |
| **Description** | Under the condition, that the device supports HTML5 standards of W3C.org. The system will ensure the HTML5 mark-up standard throughout the system. |

| | |
|---|---|
| **Requirement ID** | **NR2.02** |
| **Title** | User Interface/Compatibility |
| **Description** | The system shall support user interfaces and layouts for: **Common PC, Tablets and Smartphones.** The system shall be accessible from these devices. |

| **Documentation** | **NR3** |
|---|---|

| | |
|---|---|
| **Requirement ID** | **NR3.01** |
| **Title** | Documentation/Online Help |
| **Description** | The system shall provide the on-line user documentation and the help subsystem. The on-line user documentation provides context-dependent help for all user interface functionality. |
| **Requirement ID** | **NR3.02** |
| **Title** | Documentation/Indexing and Searching |
| **Description** | The documentation shall contain table of contents and index. The user must be able to perform search in both on-line user documentation and help subsystem. |

| **Maintainability** | **NR4** |
|---|---|

| | |
|---|---|
| **Requirement ID** | NR4.01 |
| **Title** | Maintainability/Warranty Period |
| **Description** | Not Applicable |
| **Requirement ID** | **NR4.02** |
| **Title** | Maintainability/Bug fixing |
| **Description** | 'Critical bugs' are defined as errors with severity showstopper and patch. 'Non-critical bugs' are defined as errors with severity high, medium and low. The time period |

from finding a critical bug until it is fixed should on average take no longer than 2 weeks. There must be a monthly hot fix package release that fixes major critical bugs. Non-critical bugs must be fixed within two months after being found.

| **Performance** | **NR5** |
|---|---|
| **Requirement ID** | NR5.01 |
| **Title** | Performance/Response Time |
| **Description** | Under the condition that the host system and client system hardware fulfill the minimal hardware requirements, the system shall have the response time. |

| **Scalability** | **NR6** |
|---|---|
| **Requirement ID** | NR6.01 |
| **Title** | Scalability/Performance |
| **Description** | The overall performance (in the terms of NR5.01) of the system must grow if more powerful hardware used for host part of the system. |

| **Security** | **NR7** |
|---|---|
| **Requirement ID** | NR7.01 |
| **Title** | Security/General |
| **Description** | The system shall protect the data and services from unauthorised access. The system shall also provide authentication and secure transaction. |

| | |
|---|---|
| **Requirement ID** | **NR7.02** |
| **Title** | Security/Authentication |
| **Description** | The system shall provide a mechanism of user authentication to unambiguously identify a user. |

| | |
|---|---|
| **Requirement ID** | **NR7.03** |
| **Title** | Security/Authorisation |
| **Description** | The system shall implement user type-based access control model. |

| | |
|---|---|
| **Requirement ID** | **NR7.04** |
| **Title** | Security/Auditing |
| **Description** | The system shall audit some business activities performed by user. The audit entries must be tamperproof or at least tamper evident and be stored in a secured storage. All audit entries must at least contain: **Username, Timestamp and Action.** Activities that must be audited: **Global events (such as logon, logoff and password changes), Major actions and All security exceptions.** |

| | |
|---|---|
| **Requirement ID** | **NR7.05** |
| **Title** | Security/Integrity |
| **Description** | The system shall ensure secure and tamper-proofed data storage and data exchange between parts of the system and the user using the best encryption standards of Data At-Rest and Data In-Transit. |

| Reliability | NR8 |
|---|---|

| | |
|---|---|
| **Requirement ID** | NR8.01 |
| **Title** | Reliability/Availability |
| **Description** | The system shall be available for use at 24 hours a day, 7 days a week. The data storage shall be available for use 24 hours a day, 7 days a week. |

| | |
|---|---|
| **Requirement ID** | **NR8.02** |
| **Title** | Reliability/MTBF |
| **Description** | The Mean Time Between Failures (MTBF) must be at least 300 hours. |

| | |
|---|---|
| **Requirement ID** | **NR8.03** |
| **Title** | Reliability/MTBR |
| **Description** | The average time between failure and being returned to service (MTBR) must not exceed 2 hours*)* |

| | |
|---|---|
| **Requirement ID** | **NR8.04** |
| **Title** | Reliability/Failure |
| **Description** | The system must be marinating the automatic backups on the remote locations, after every 2 hours. In case of failure, the system can be shifted to the pre-configured disaster recovery setup with the latest backups within an hour. |

| Usability | NR9 |
|---|---|

| | |
|---|---|
| **Requirement ID** | **NR9.01** |

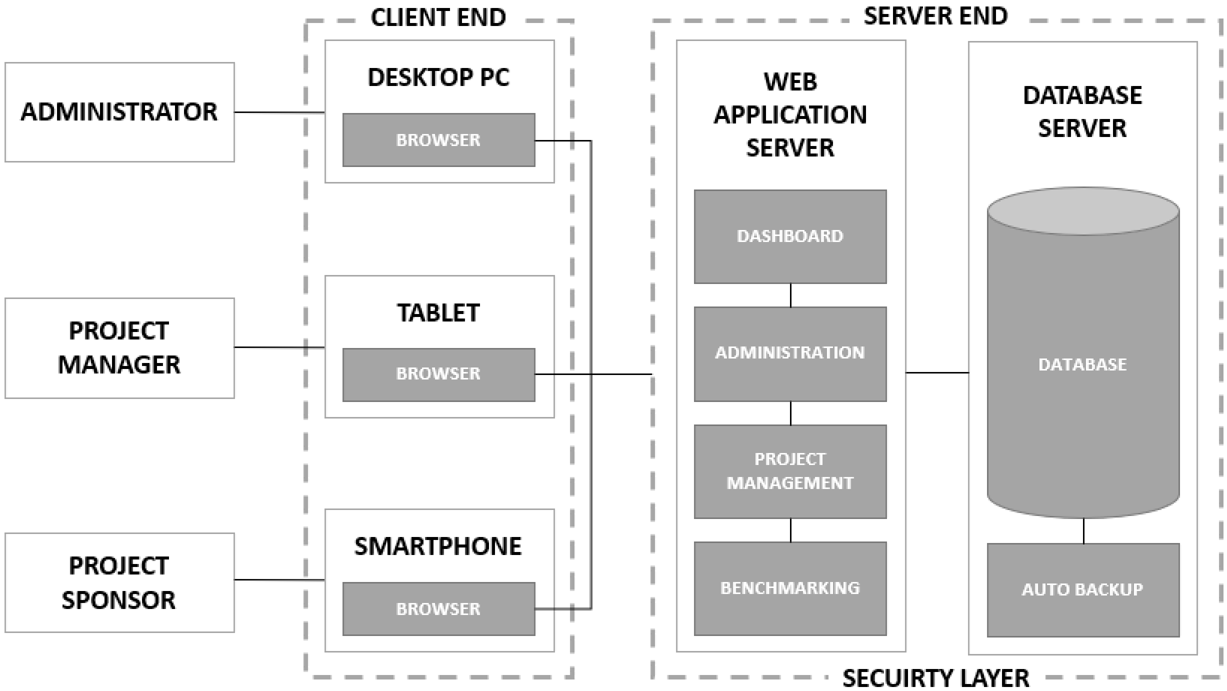
| | |
|---|---|
| **Title** | Usability/User Training |
| **Description** | The experienced computer user must be able to use the system productively. |

| | |
|---|---|
| **Requirement ID** | NR9.02 |
| **Title** | Usability/Documentation |
| **Description** | The system documentation shall be sufficient to start using the basic functionality of the system immediately. The documentation shall describe all implemented system functionality. |

| **Extensibility** | **NR10** |
|---|---|
| **Requirement ID** | NR10.01 |
| **Title** | Extensibility/General |
| **Description** | The system shall be capable to extend upon the future business requirements and features. |

## 8.3 Conceptual Architecture of the Framework/Platform

Hf\' Whilst the web application server is made up of the dashboard, administration, project management and benchmarking, database server constitutes database and auto backup.



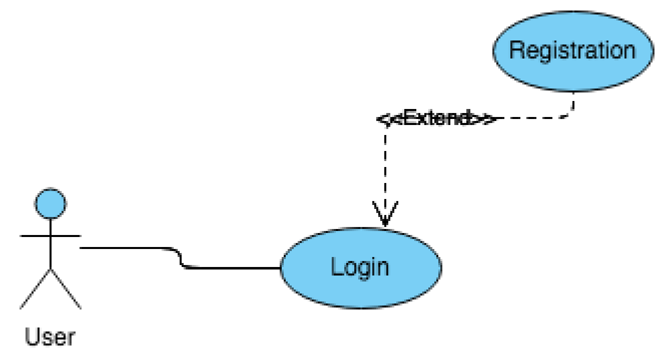

**21. Figure 8-1 A top level view of the system**

## 8.4 Logical Architecture of the Platform

This section presents the logical architecture of the platform which is a structural plan that gives as much detail as could reasonably be expected without restricting the plan to a specific environment or technology. The logical architecture is detailed in the diagram (Figure 8.2) below

| | |
|---|---|
| **Use case** | **UC1** |
| **Title** | Register, Login |
| **Reference** | FR2 |
| **Description** | The user must be login to enter in the system. It implies that registration is a must after registration. |

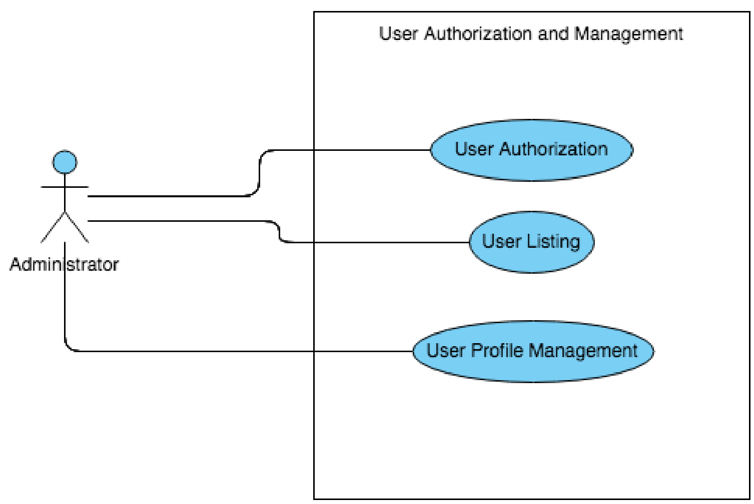
**Diagram**




22. **Figure 8-2 Register, Login (UC1)**

| | |
|---|---|
| **Use case** | **UC2** |
| **Title** | User Management and Authorisation |
| **Reference** | FR2 |
| **Description** | The system shall provide a different level of user management and authorisation control. |

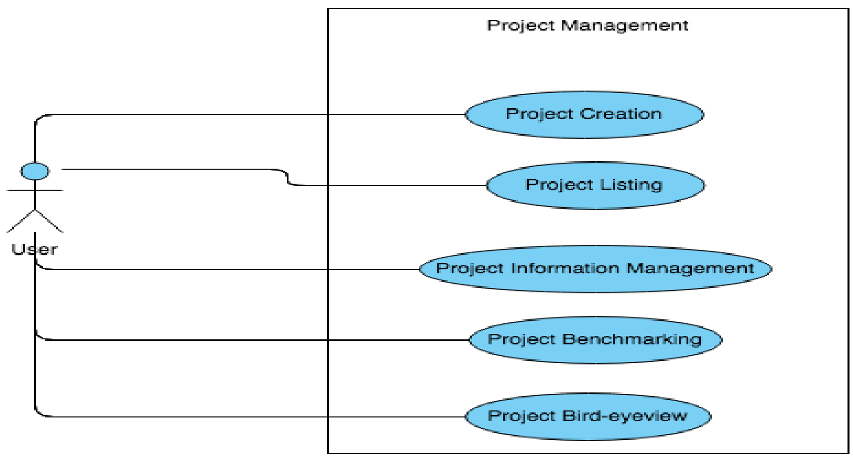
**Diagram**




23. **Figure 8-3 User Management and Authorization (UC2)**

| | |
|---|---|
| **Use case** | **UC3** |
| **Title** | Project Management |
| **Reference** | FR3 |
| **Description** | The system shall support the concept of creation, listing, management, benchmarking and Bird's-eye view of projects. |

**Diagram**



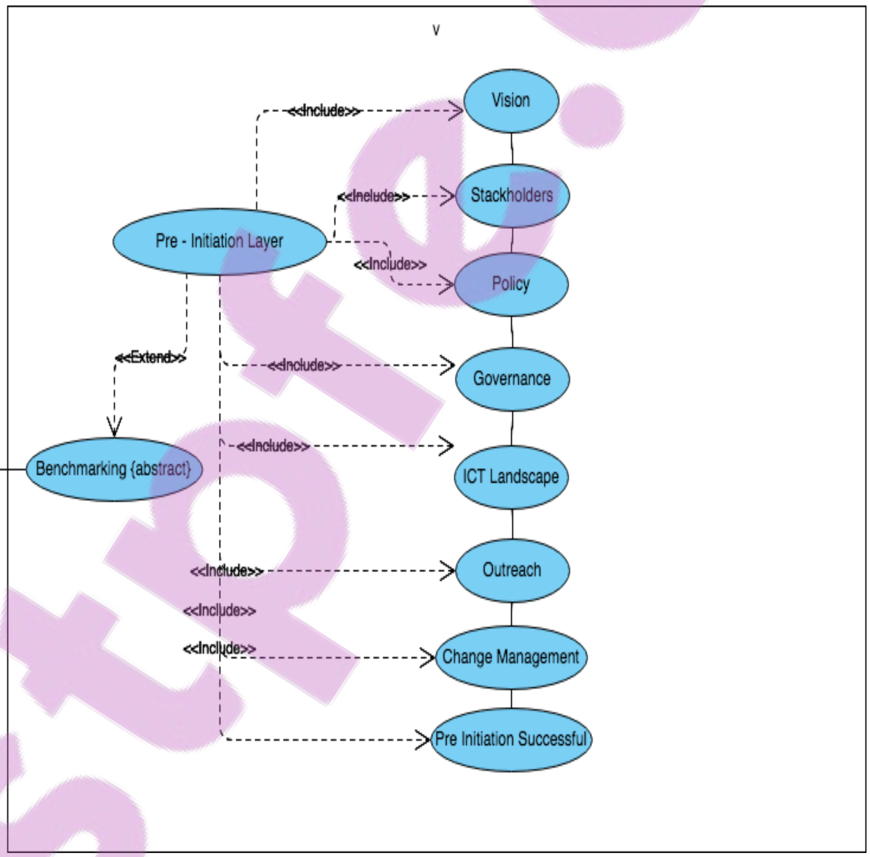

24. **Figure 8-4 Project Management (UC3)**

| | |
|---|---|
| **Use case** | **UC4** |
| **Title** | Benchmarking |
| **Reference** | FR4 |
| **Description** | The system shall provide wizard control for taking a "5-point Likert scale" e.g. selection control to take benchmarking user input. |


25. **Figure 8-5 Benchmarking (UC4)**

| | |
|---|---|
| **Use case** | **UC5** |
| **Title** | Benchmarking / Pre-Initiation Layer |
| **Reference** | FR4 |
| **Description** | The system shall allow a user to give input on a given building block of Pre-Initialisation layer. |

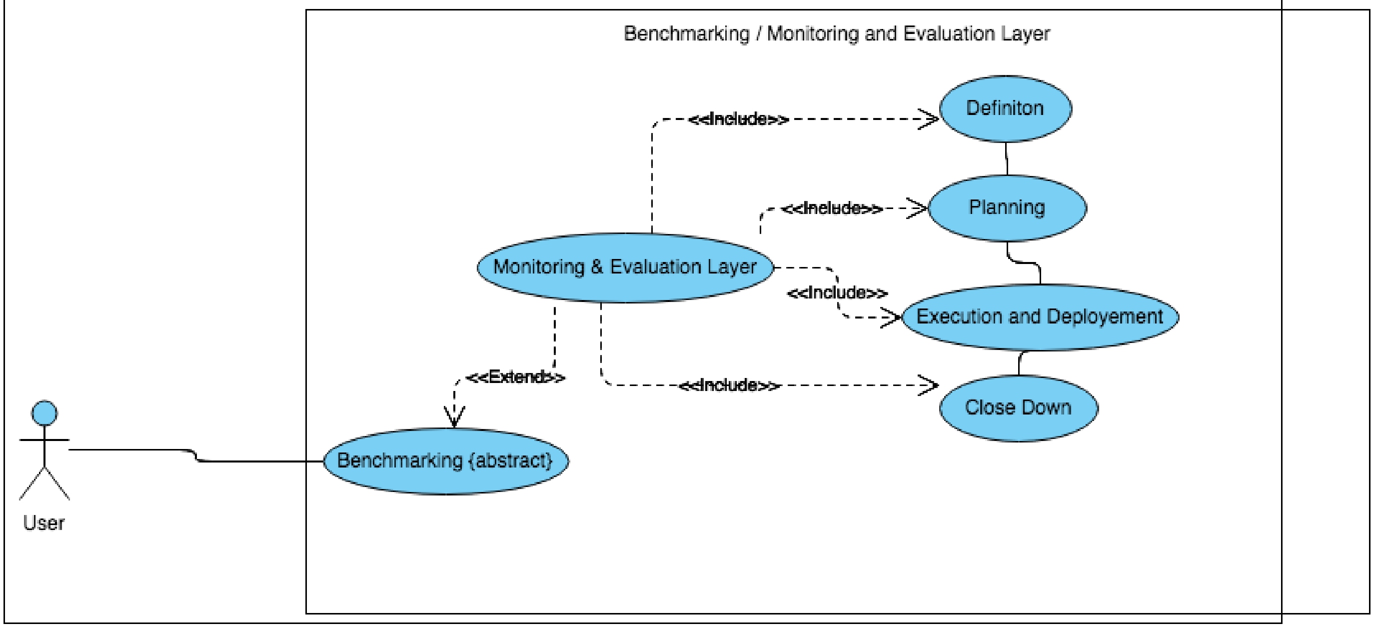
**Diagram**




26. Figure 8-6: Benchmarking/Pre-initiation layer (UC5)

| | |
|---|---|
| **Use case** | **UC6** |
| **Title** | Benchmarking/Monitoring and Evaluation Layer |
| **Reference** | FR4 |
| **Description** | The system shall allow a user to give input on a given building block of Monitoring and Evaluation Layer. |

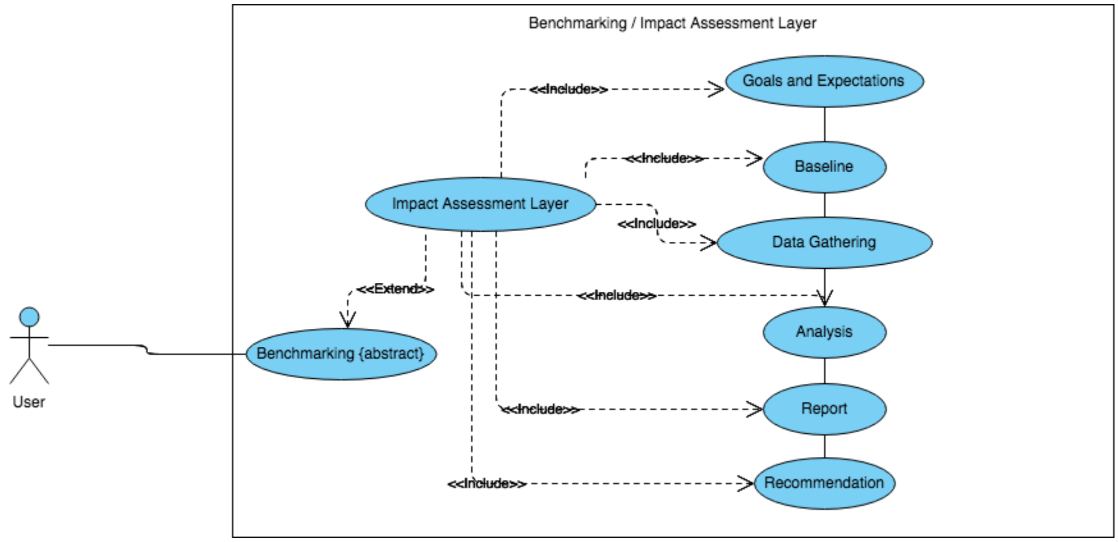
**Diagram**




**27. Figure 8-7 Benchmarking/Monitoring and Evaluation Layer (UC6)**

| | |
|---|---|
| **Use case** | **UC7** |
| **Title** | Benchmarking/Impact Assessment Layer |
| **Reference** | FR4 |
| **Description** | The system shall allow a user to given input on a given building block of Impact Assessment Layer. |

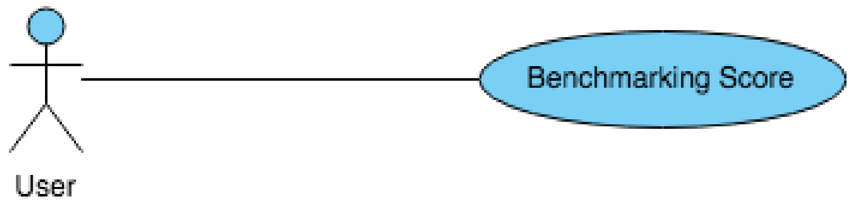
**Diagram**




28. **Figure 8-8: Benchmarking/Impact Assessment Layer (UC7)**

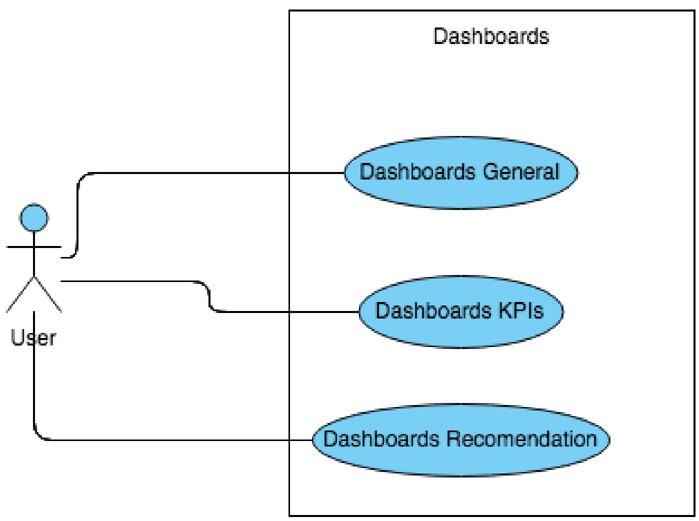
| | |
|---|---|
| **Use case** | **UC8** |
| **Title** | Benchmarking/Score Computation |
| **Reference** | FR4 |
| **Description** | The system shall determine the overall score of the project benchmarking as per the equation. |

**Diagram**




29. **Figure 8-9 Benchmarking/Score Computation (UC8)**

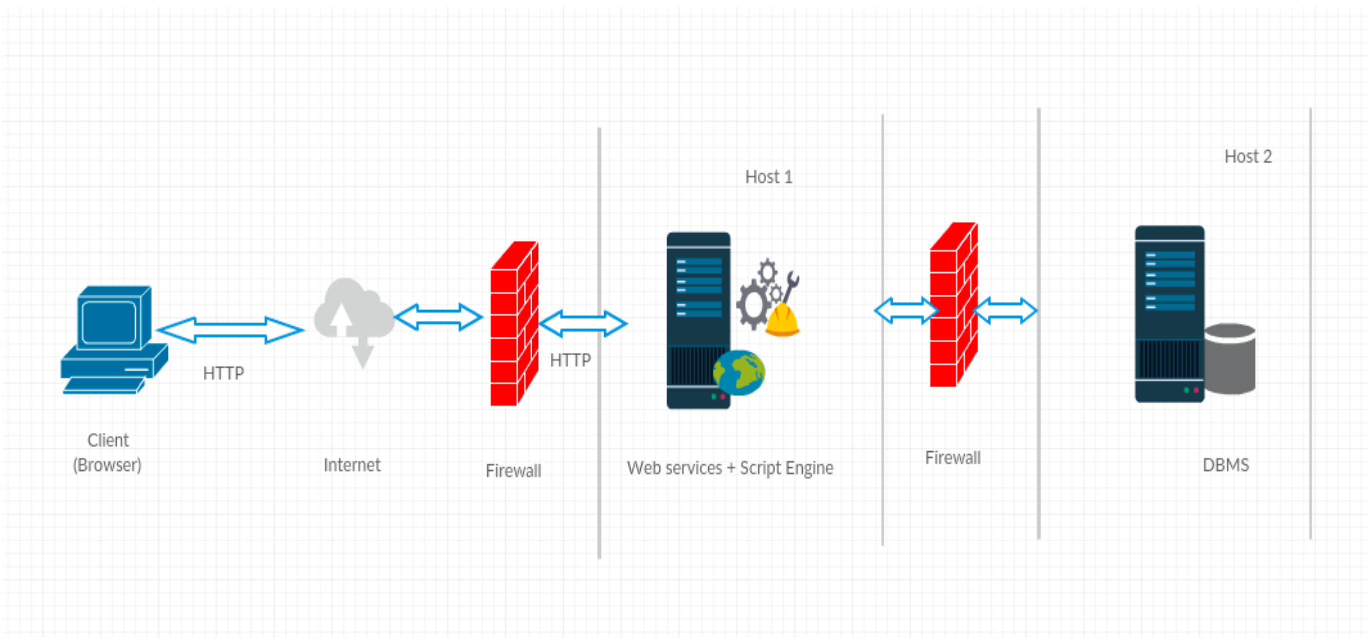
| **Use case** | **UC9** |
|---|---|
| **Title** | Dashboards |
| **Reference** | FR1 |
| **Description** | The system shall determine the overall score of the project benchmarking as per the equation. |




**30. Figure 8-10 Dashboards**

## 8.5 Physical Architecture of the Platform

This section takes a look at the physical architecture of the platform which comprises the client, Internet, with the first Firewall sandwiched between the Internet and Web services + Script Engine (Host 1) and the second fire wall sandwiched between Web services + script engine and the Database Management System (DBMS) (Host 2).




**31. Figure 8-11 Physical architecture of the system**

## 8.6 Implementation/Development of the Platform

This section details the implementation/development of the platform. The section is structured into three parts: development environment (details the software/hardware platform/tools used to develop the prototype: front end highlights the front end of the system; backend – provides details on the system's backend).

### 8.6.1 Development environment

This section details the software/hardware platform/tools used to develop the prototype.

- **Software Requirements**

**Client Software**
**■ PC Web**

Table 8-1 shows the technical requirements for different browser types. The technical requirement varies with each browser type.

**Table 8-1:** Technical requirements for different Browser Types for PC Web

| Browser | Technical Requirement |
| --- | --- |
| Chrome | v61+ |
| Firefox | v60+ |
| Safari | v12+ |
| Internet Explorer | v11* |
| Edge | v42+ |

**■ Mobile Web**

Table 8-2 shows the technical requirements for different browser types for mobile web.

**Table 8-2:** Technical requirements for different Browser Types for Mobile Web

| Browser | Technical Requirement |
|---|---|
| iOS | iOS 11+ with Safari 12+ or Chrome 56+ |
| Android | Android 8+ with Chrome 56+ |

*Source: Author's construct*

- **Server Software**
  - Apache Tomcat 7.x or later
  - Ubuntu 14.04, Ubuntu 16.04, Debian Jessie, CentOS 6.6+, CentOS 7.1+, RedHat Enterprise Linux 6.6+, Red Hat Enterprise Linux 7.1+, Oracle Linux 6.6+, Oracle Linux 7.1+, Windows 7+, Mac OS X+
  - JRE 7.0 or later.
- **Database Software**
  - MySQL 5.6, 5.7, 8
  - Oracle DBMS.

- **Hardware Requirements**

Usage of CPU, RAM and storage space can vary significantly based on user behavior. These hardware recommendations are based on traditional deployments and may grow or shrink depending on how active our users are.

- Minimum Memory: 1 GB
- Recommended Memory: 2 GB for Windows Platform, 1 GB for non-Windows Platform
- Minimum Disk Space: 1 GB
- Recommended Disk Space: 2 GB'.
- Use a Firewall between the Web Services server and External / Publicly Accessible Networks
- Use a Firewall between the Web Services and DBMS server.

### 8.6.2 Description of implementation

The project shall be implemented using Waterfall methodology. Components were built step by step and then later integrated all at once. The list of major task and modules are as follows:

- **Major Tasks and Modules**

| | |
|---|---|
| **Module** | **M1** |
| **Title** | User Registration and Login Module |
| **Reference** | UC1 |
| **Description** | User Registration and Login Module to implement UC1 use case. |
| **Module** | **M2** |

| | |
|---|---|
| **Title** | User Authorisation and Management Module |
| **Reference** | UC2 |
| **Description** | User Authorisation and Management Module to implement UC2 use case. |

- **Module** **M3**

| | |
|---|---|
| **Title** | Project Management Module |
| **Reference** | UC3 |
| **Description** | Project Management module to implement UC3 use case. |

- **Module** **M3.1**

| | |
|---|---|
| **Title** | Projects/Project Creation Module |
| **Reference** | UC3 |
| **Description** | Project Creation module to implement UC3 use case. |

- **Module** **M3.2**

| | |
|---|---|
| **Title** | Projects/Project List Module |
| **Reference** | UC3 |
| **Description** | Project List module to implement UC3 use case. |

- **Module** **M3.3**

| | |
|---|---|
| **Title** | Projects/Project Information Management Module |
| **Reference** | UC3 |
| **Description** | Project Information Management module to implement UC3 use case. |

- **Module** **M3.4**

| | |
|---|---|
| **Title** | Projects / Benchmarking Module |
| **Reference** | UC3 |
| **Description** | Project Benchmarking module to implement UC3 use case. |

- **Module** **M3.5**

| | |
|---|---|
| **Title** | Projects/Bird's eye view Module |
| **Reference** | UC3 |
| **Description** | Project Bird eye view module to implement UC3 use case. |

- **Module** **M4**

| | |
|---|---|
| **Title** | Benchmarking Module |
| **Reference** | UC4 |
| **Description** | Benchmarking Module to Implement UC4 use case. |

- **Module** **M4.1**

| | |
|---|---|
| **Title** | Benchmarking/Pre-Initiation Layer Module |
| **Reference** | UC5 |
| **Description** | Benchmarking/Pre-Initiation Layer Module to Implement UC5 use case. |

- **Module** **M4.2**

| | |
|---|---|
| **Title** | Benchmarking/Monitoring and Evaluation Layer Module |
| **Reference** | **UC5** |

**Description** Benchmarking/Monitoring and Evaluation Layer Module to Implement UC6 use case.

- **Module** **M4.3**

  **Title** **Benchmarking/Impact Assessment Layer Module**

  **Reference** **UC7**

  **Description** Benchmarking/Impact Assessment Layer Module to Implement UC7 use case.

- **Module** **M4.4**

  **Title** Benchmarking/Score Computation Module

  **Reference** UC8

  **Description** Benchmarking/Score Computation Module to Implement UC8 use case.

- **Module** **M5**

  **Title** Dashboard Module

  **Reference** UC9

  **Description** Dashboard Module to Implement UC9 use case.

- **Module** **M5.1**

  **Title** Dashboard/General Module

  **Reference** UC9

  **Description** Dashboard/General Module to Implement UC9 use case.

- **Module** **M5.2**

  **Title** Dashboard/KPIs Module

  **Reference** UC9

  **Description** Dashboard/KPIs Module to Implement UC9 use case.

- **Module** **M5.3**

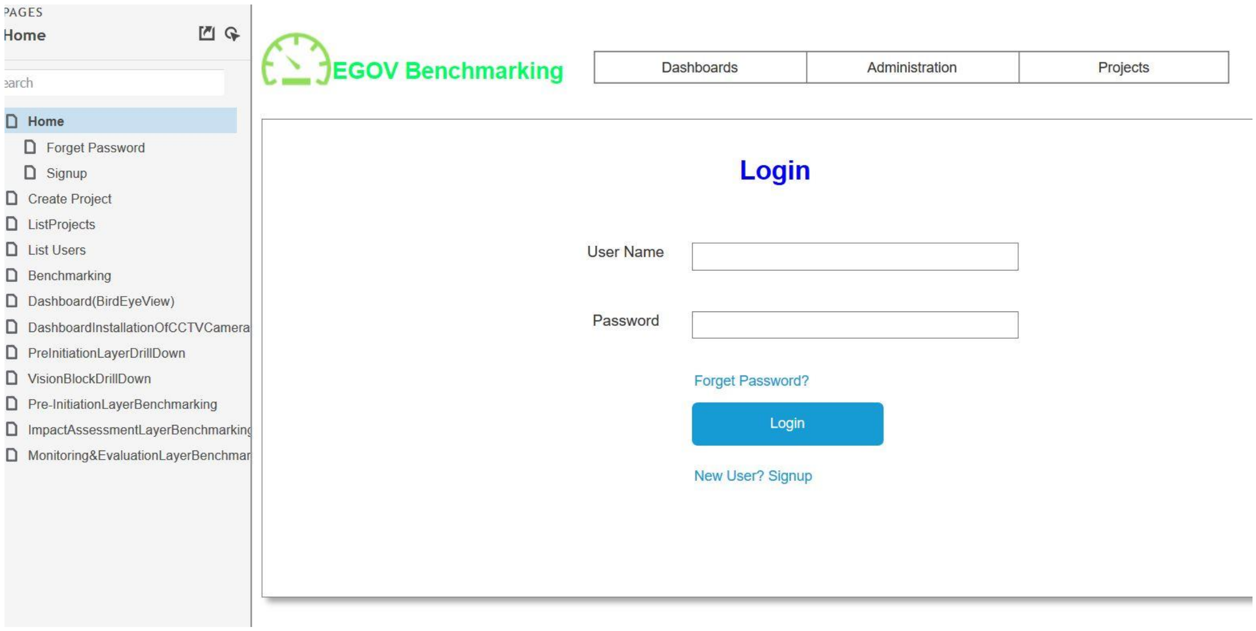
  **Title** Dashboard/Recommendations Module

  **Reference** UC9

  **Description** Dashboard/Recommendations Module to Implement UC9 use case.

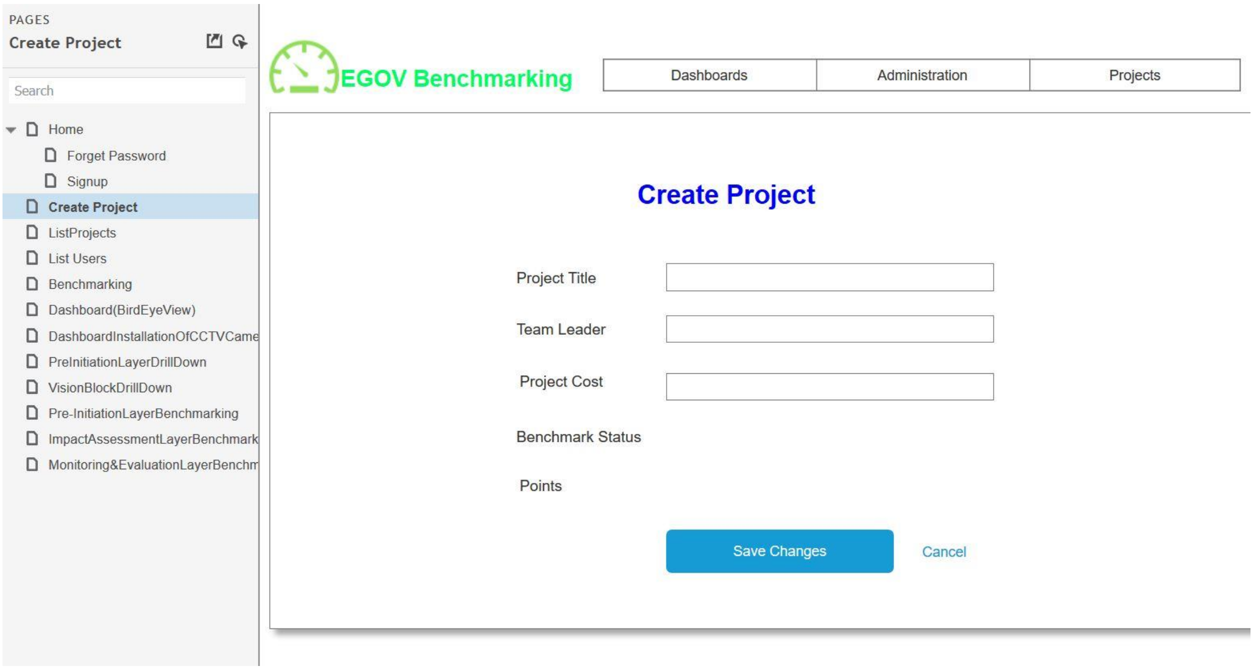
### 8.6.3 Front end

This section highlights the front end of the system. Figure 8.12 below shows the user login. This is the first interface a user meets to key in credentials for entry into the system.

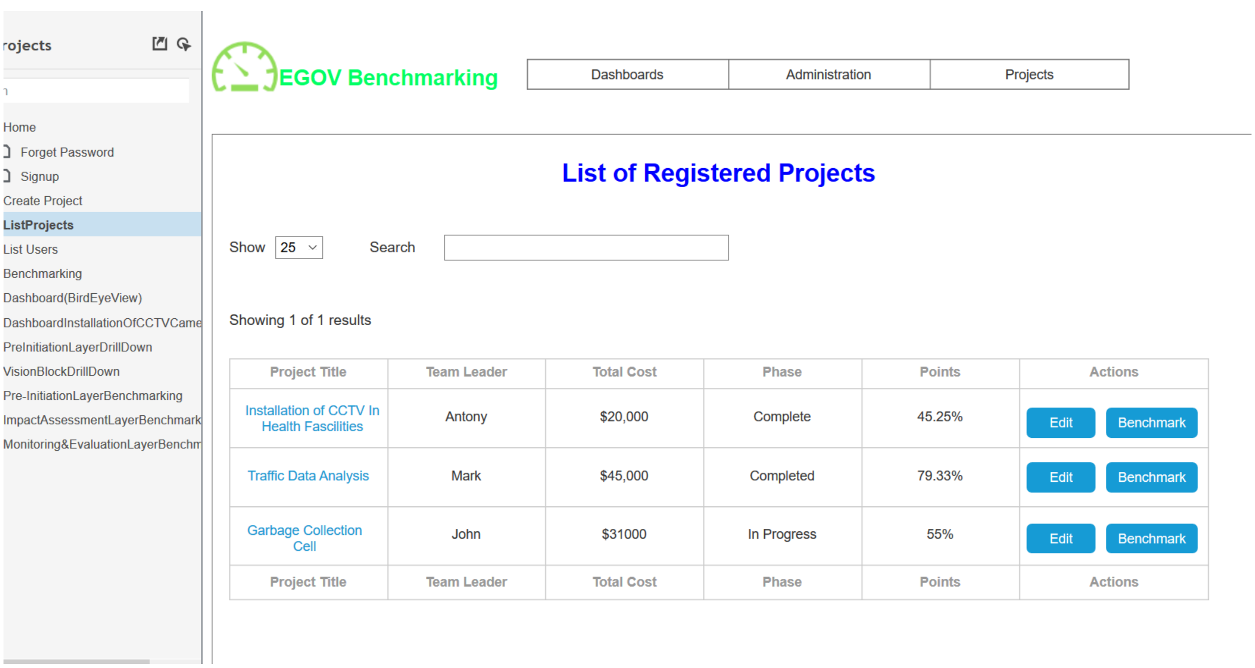



32. **Figure 8-12 User Login**

Figure 8.13 below shows the ‘Create Project’ interface where the details for new projects are entered by user.




33. **Figure 8-13 Create project**

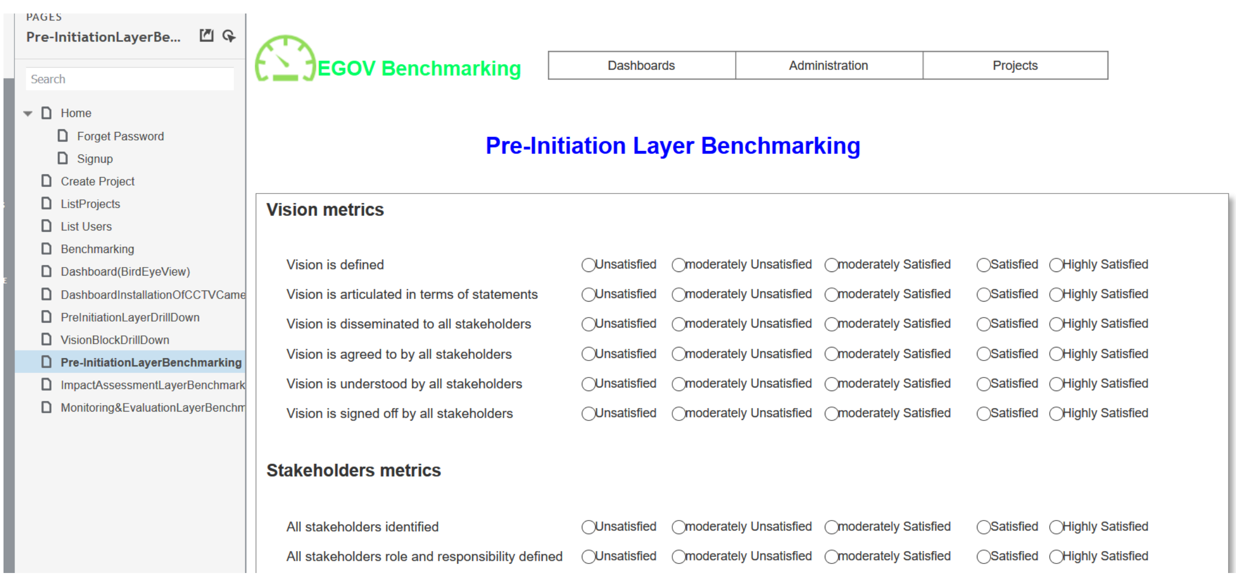


34. **Figure 8-14: List of registered users**

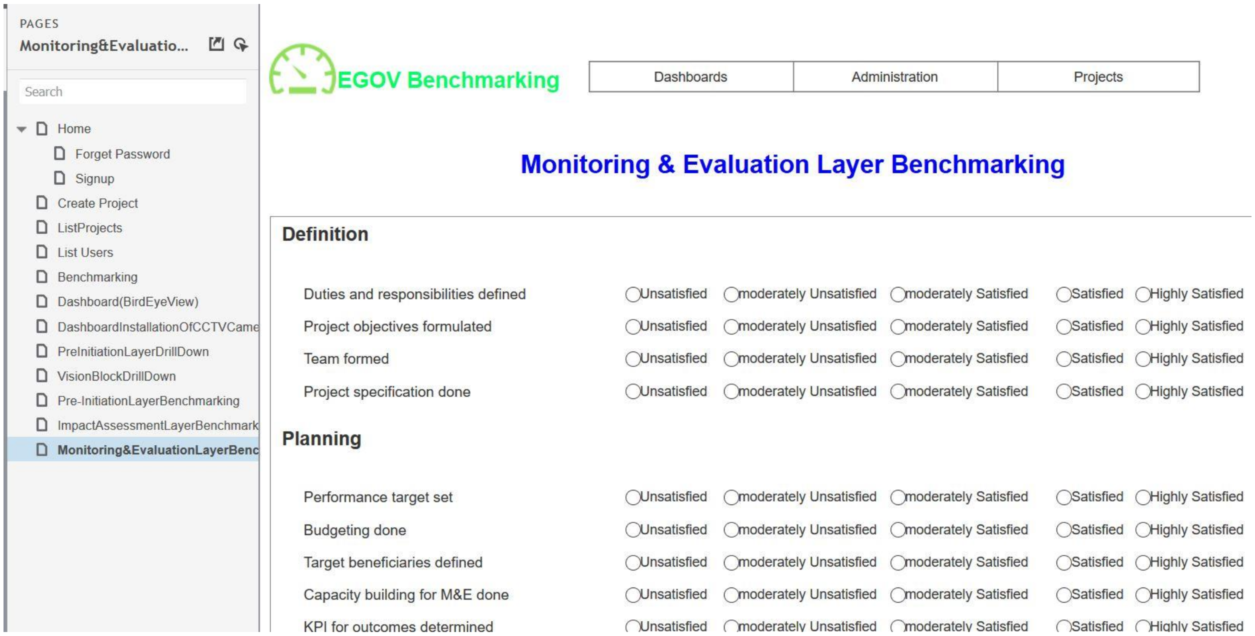
## 8.7 User Interface

This section presents each user interface, that is, sample user interface developed in the platform: where users provide input, where data is processed in the backend; where administrators access the system for maintenance.

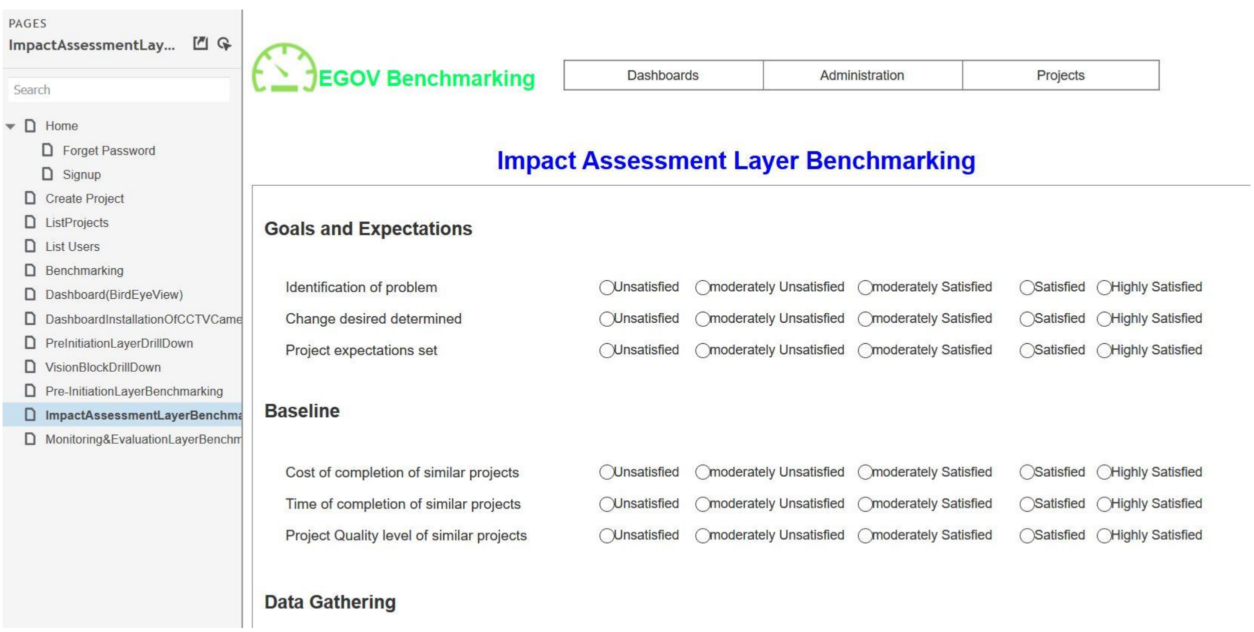
### 8.7.1 User interface for user input




35. **Figure 8-15 Pre-initiation layer of benchmarking**



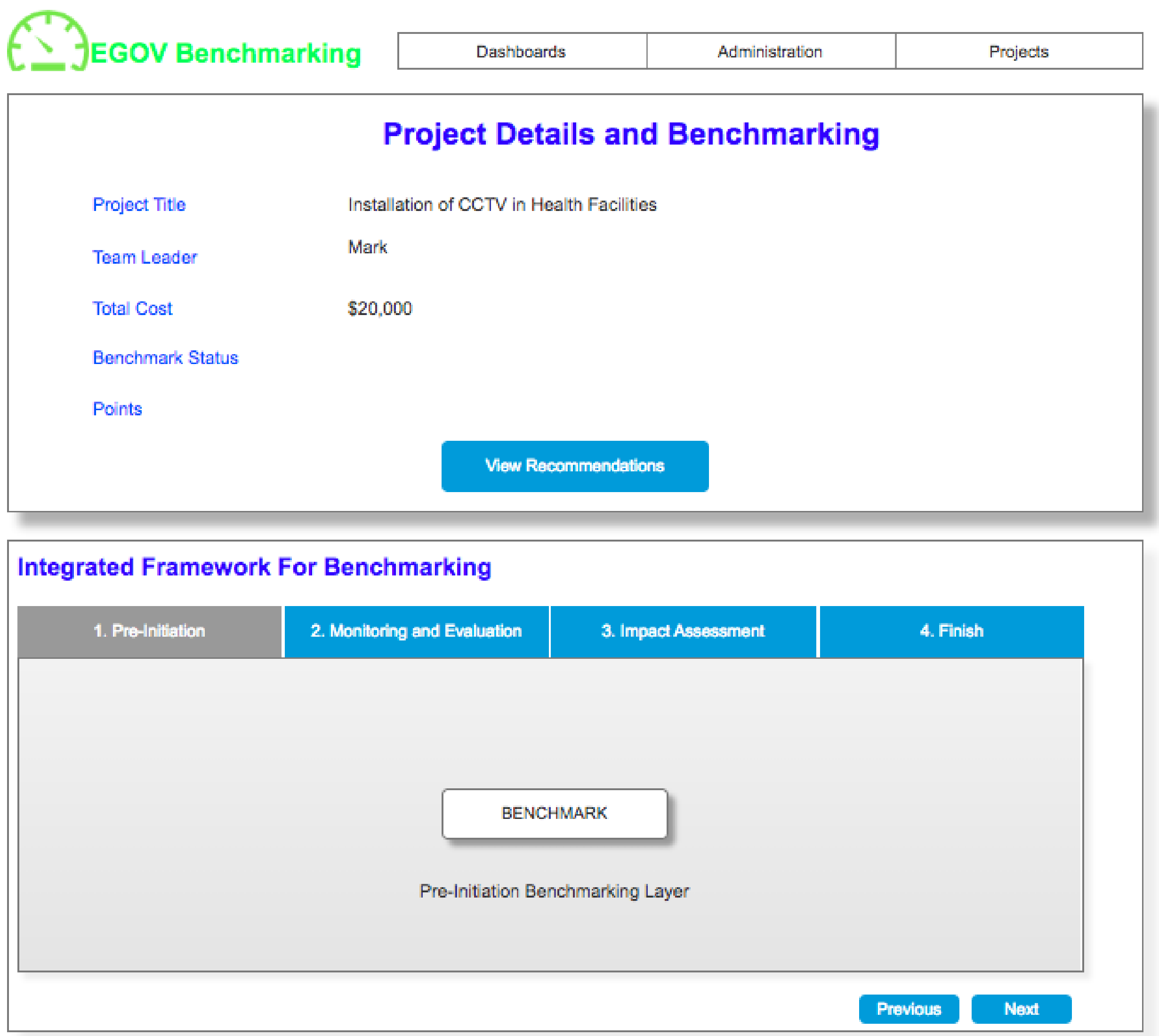

36. **Figure 8-16 Monitoring and Evaluation Layer benchmarking**



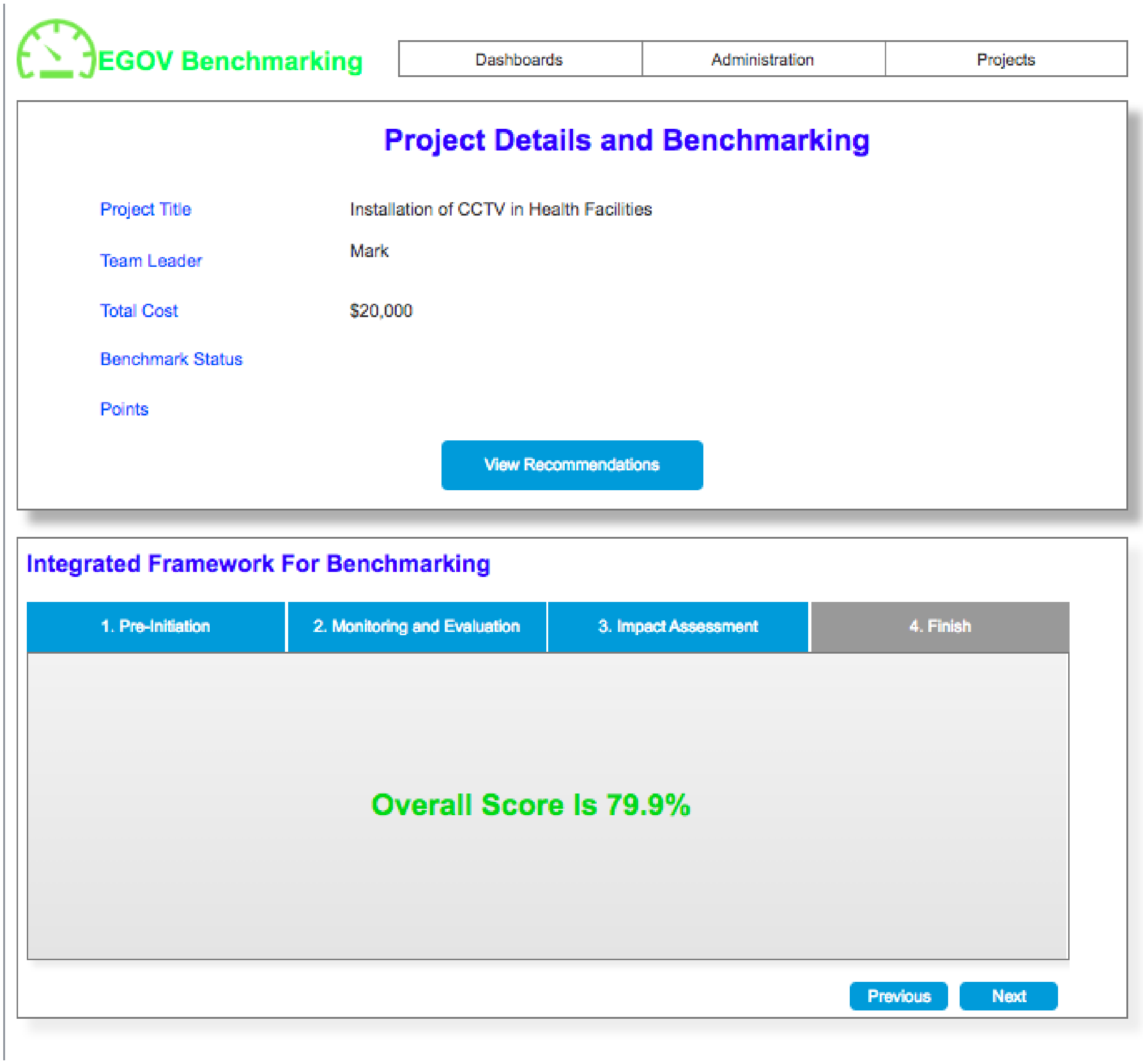

**37. Figure 8-17 Impact Assessment Layer Benchmarking**

### 8.7.2 User interface for data processing

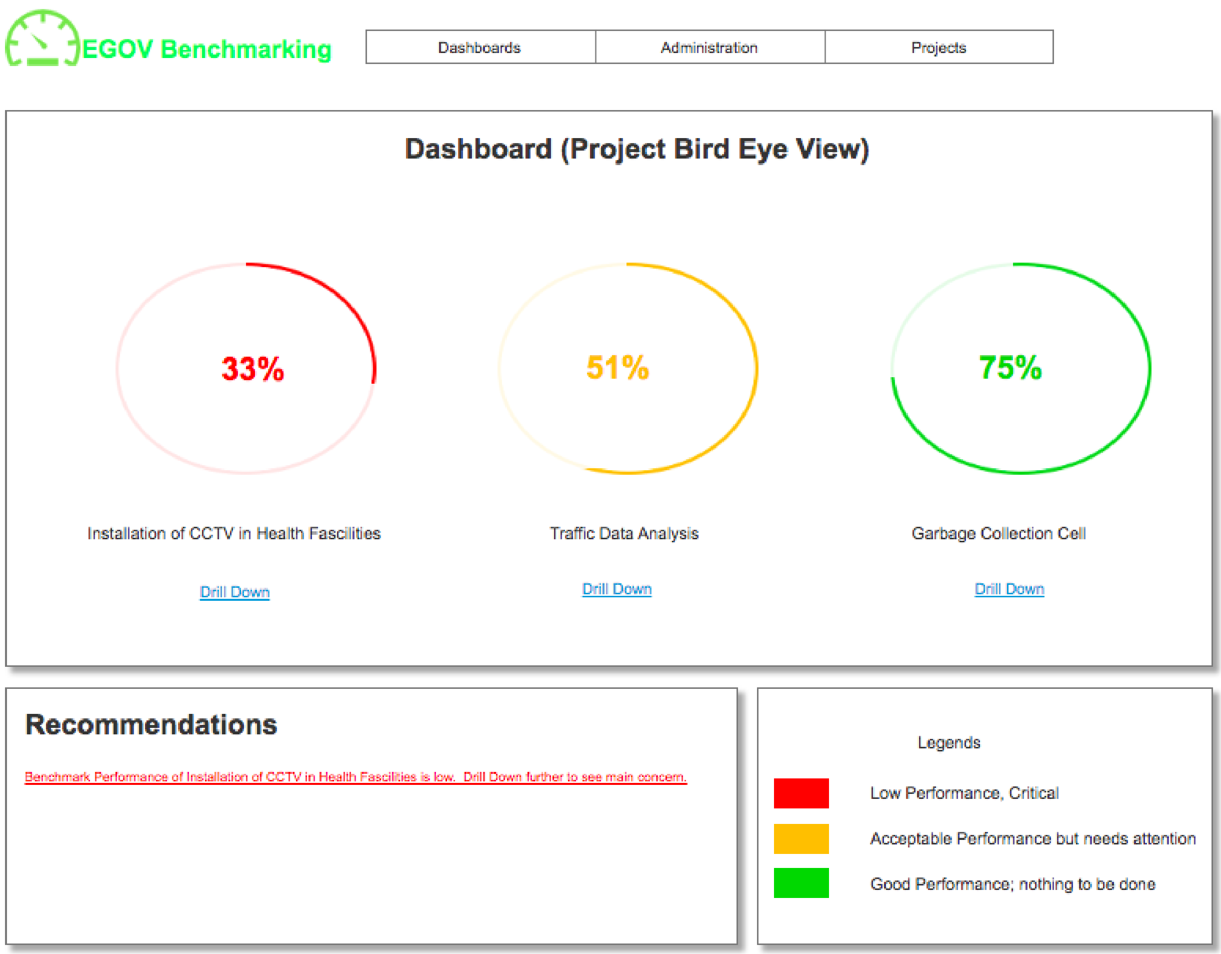
This section presents the interface used in data processing.



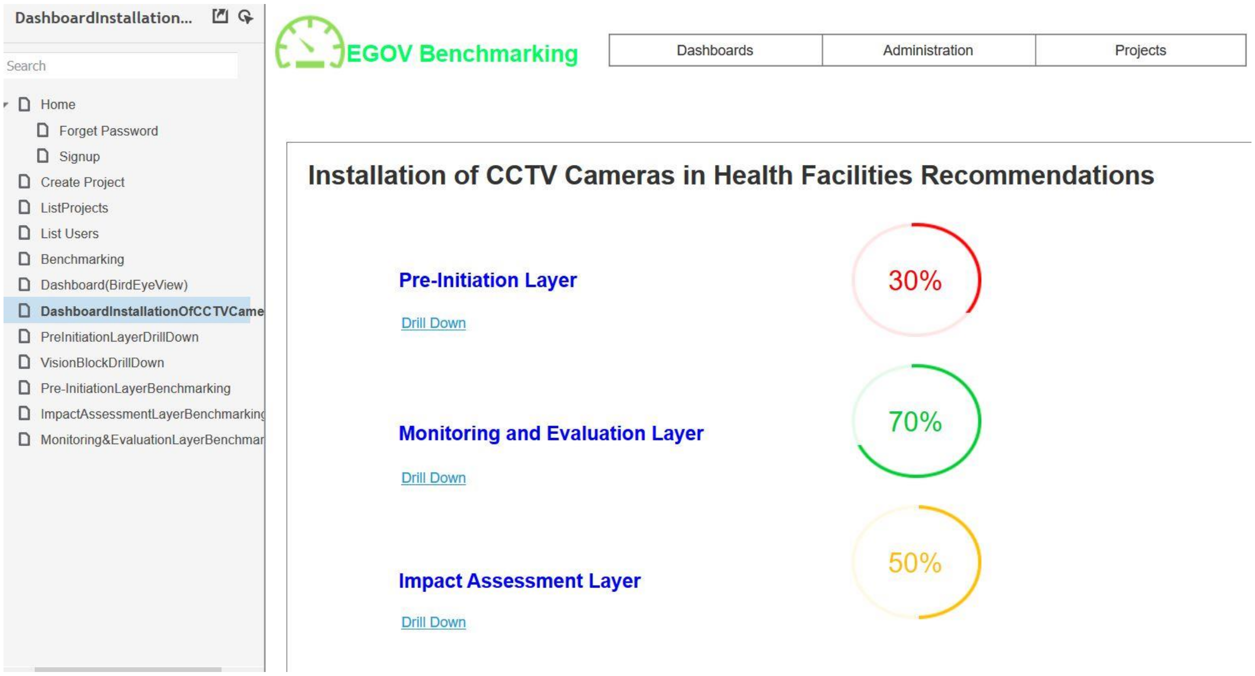

**38. Figure 8-18 Project Details and Benchmarking**



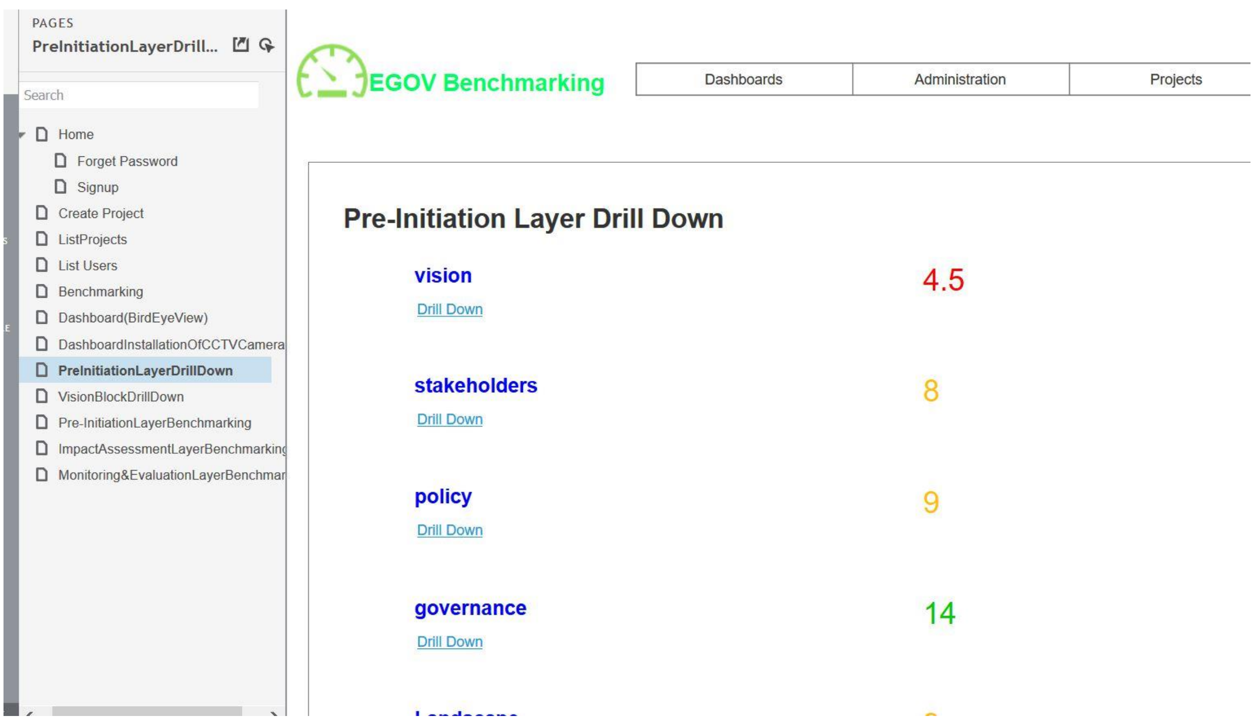

**39. Figure 8-19 Interface for scoring benchmarked project**



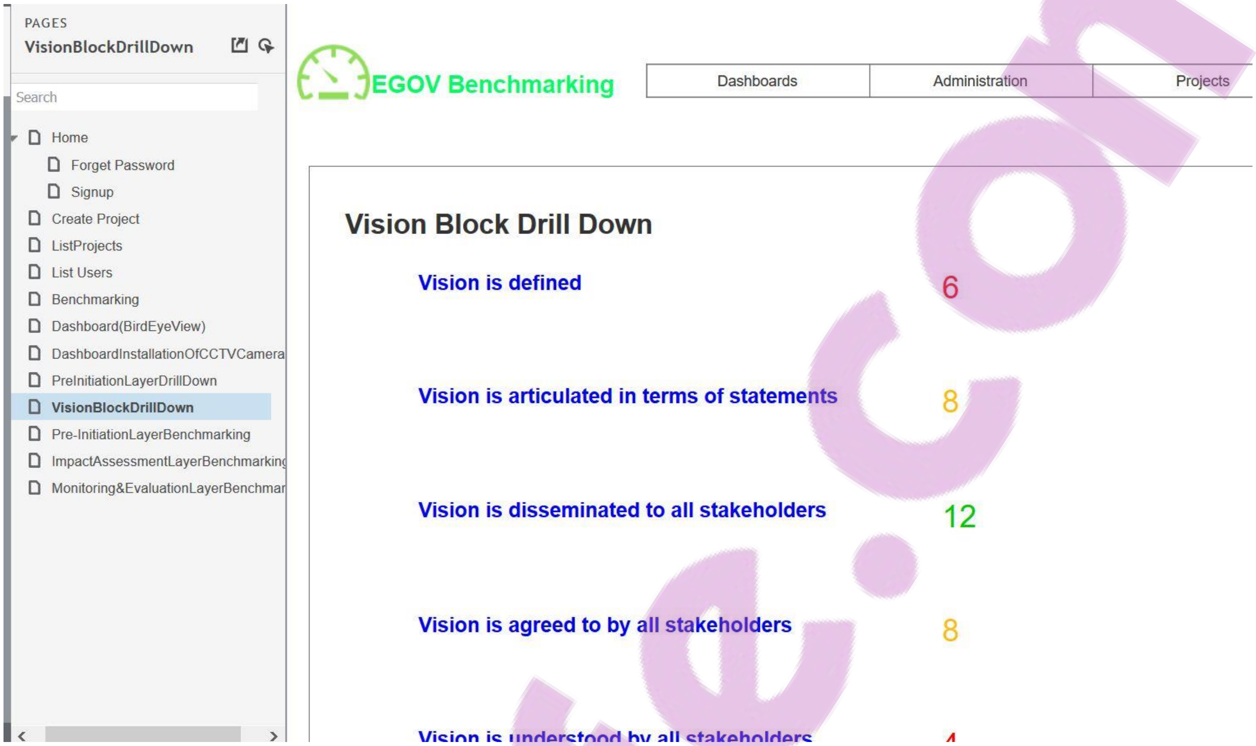

**40. Figure 8-20 Project Scoring interface**




41. Figure 8-21: Dashboard (Bird's Eye-view)



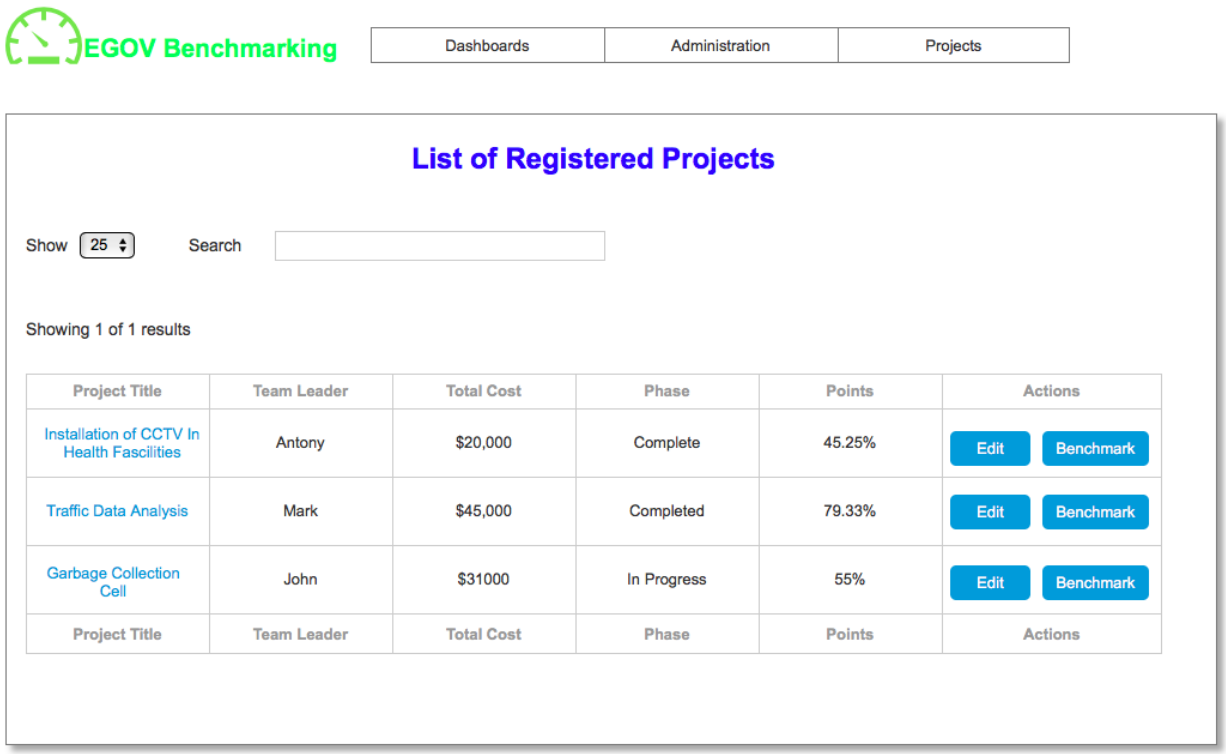

42. Figure 8-22: Dashboard (Project view)




**43. Figure 8-23 Dashboard (Layer view)**

### 8.7.3 User interface for administrator access for maintenance

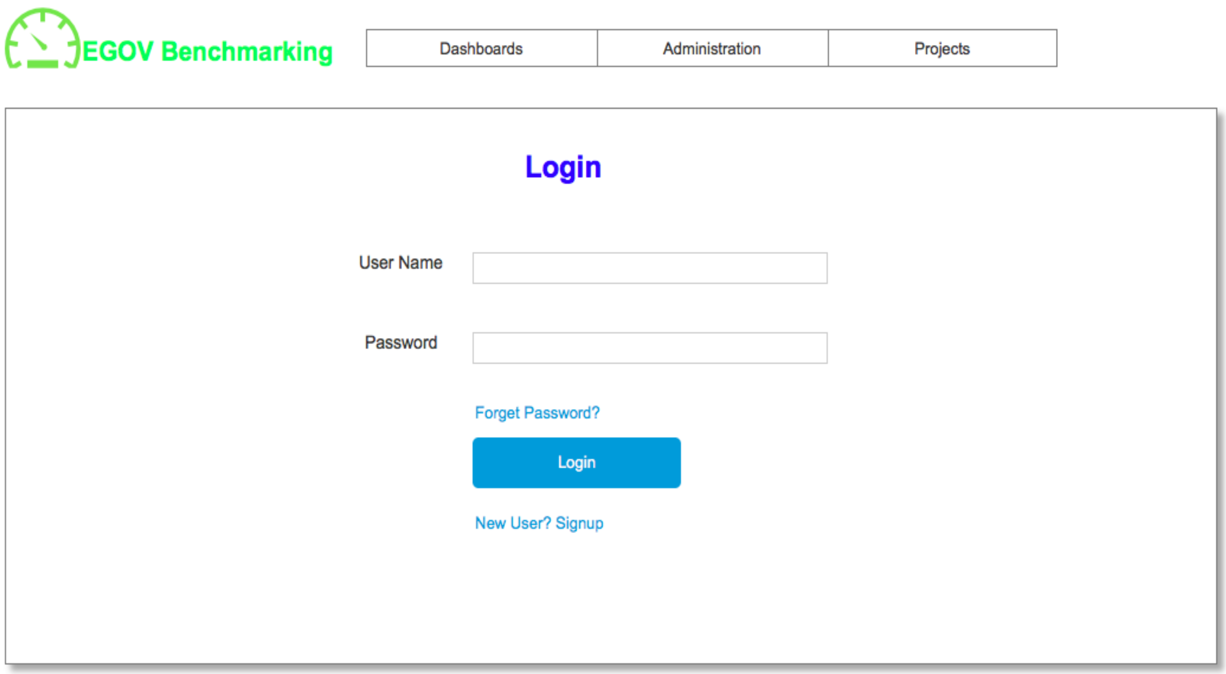
This section provides the interface that grants access to the administrator for maintenance of system and associated data.




**44. Figure 8-24: List of registered projects**

## 8.8 Proof of Concept: Prototype Usage

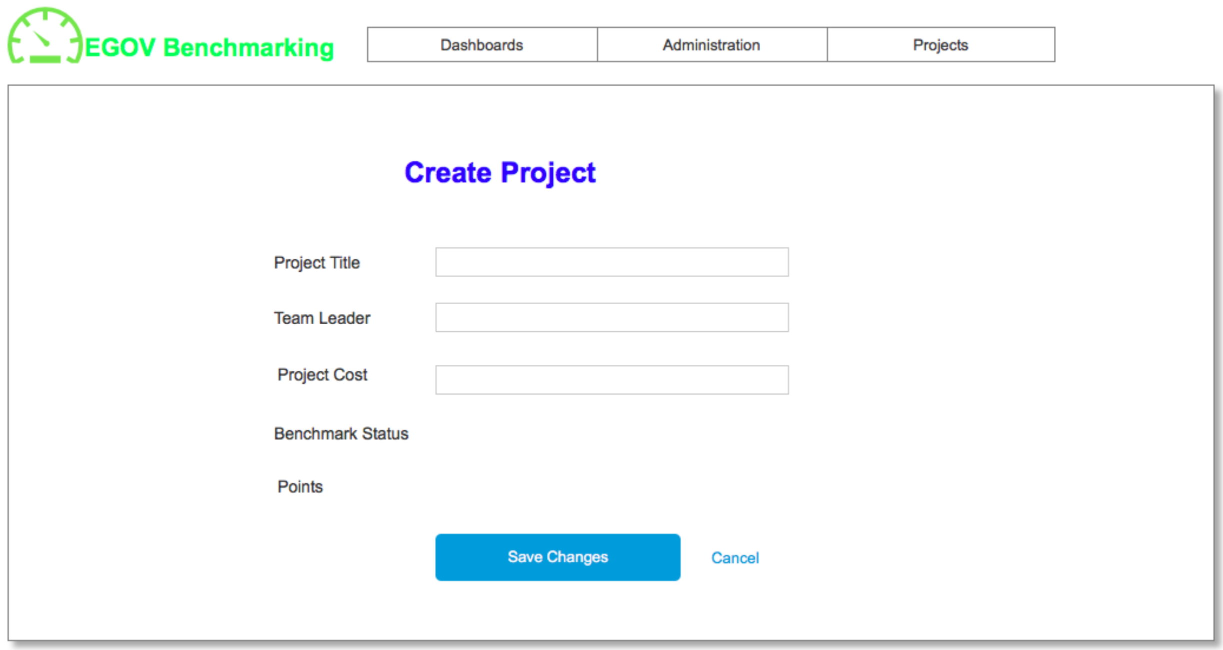
In this section, a step-by-step walk though of the system is used to show the expected rendered results.




*45*. **Figure 8-25 User Login**

### 8.8.1 Login screen

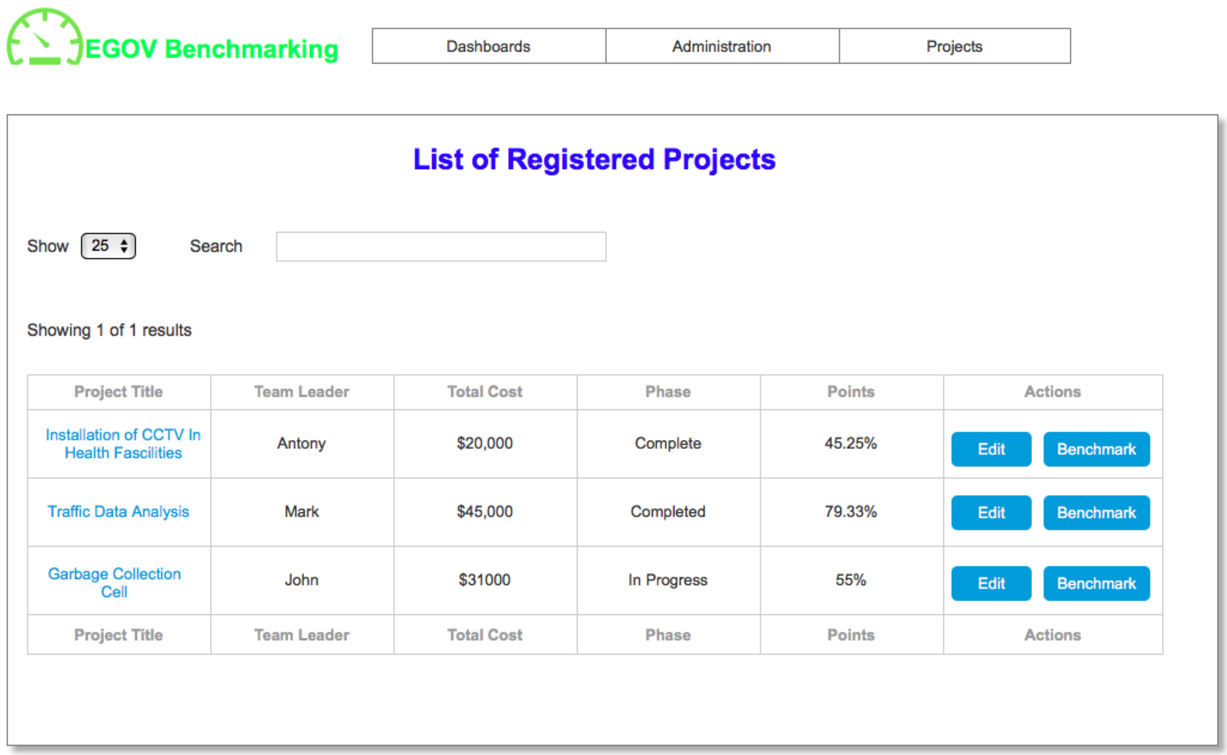
- User can log in with their credentials
- User can also click on sign up
- User can provide valid Email ID and Password
- User can click on login to redirect to the main dashboard screen




**46. Figure 8-26 Create  project**

### 8.8.2 Project creation

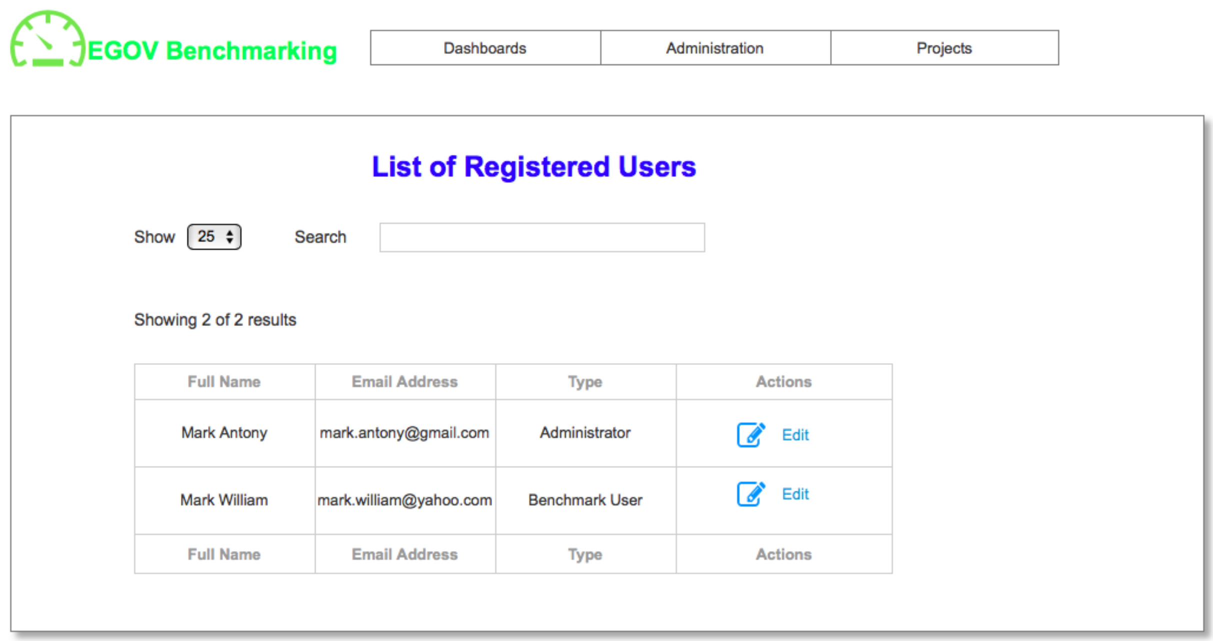
- By clicking on Create Projects sub-menu bar, the user will be redirected to the Project Creation screen
- The user can add relevant details related to the project.
- The user can click on Save Changes to create and save a new project.




**47. Figure 8-27: List of registered projects**

### 8.8.3 Project listing

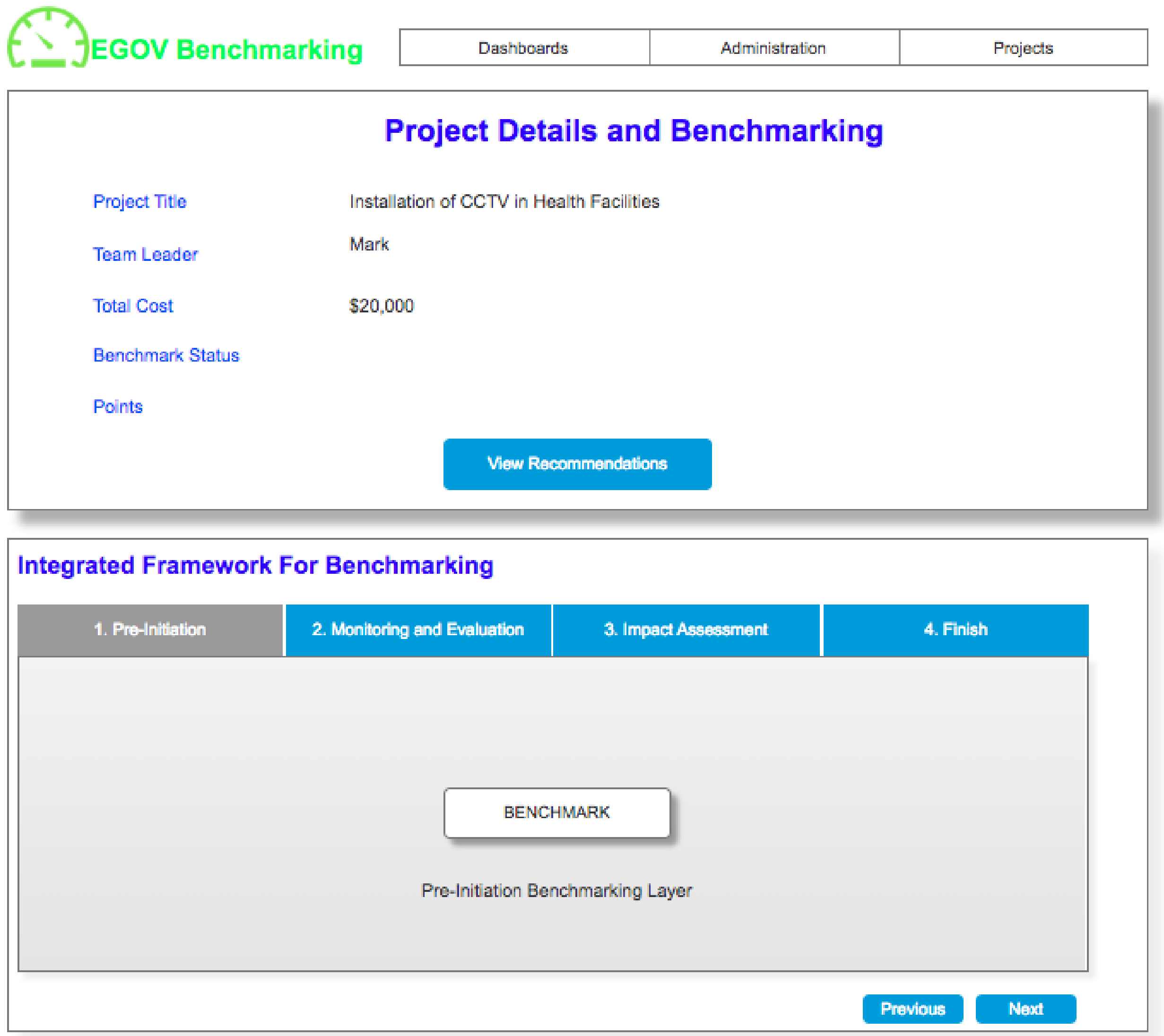
- By clicking on List of Projects sub-menu bar, the user will be redirected to the Project List screen
- The user can see all the active Projects
- The user can view, edit or benchmark on any part of the project.




**48. Figure 8-28 List of registered users**

### 8.8.4 User listing

- By clicking on List of Users sub-menu bar, the user will be redirected to the User List screen.
- The user can see all the users.
- The user can edit the users and change their type.

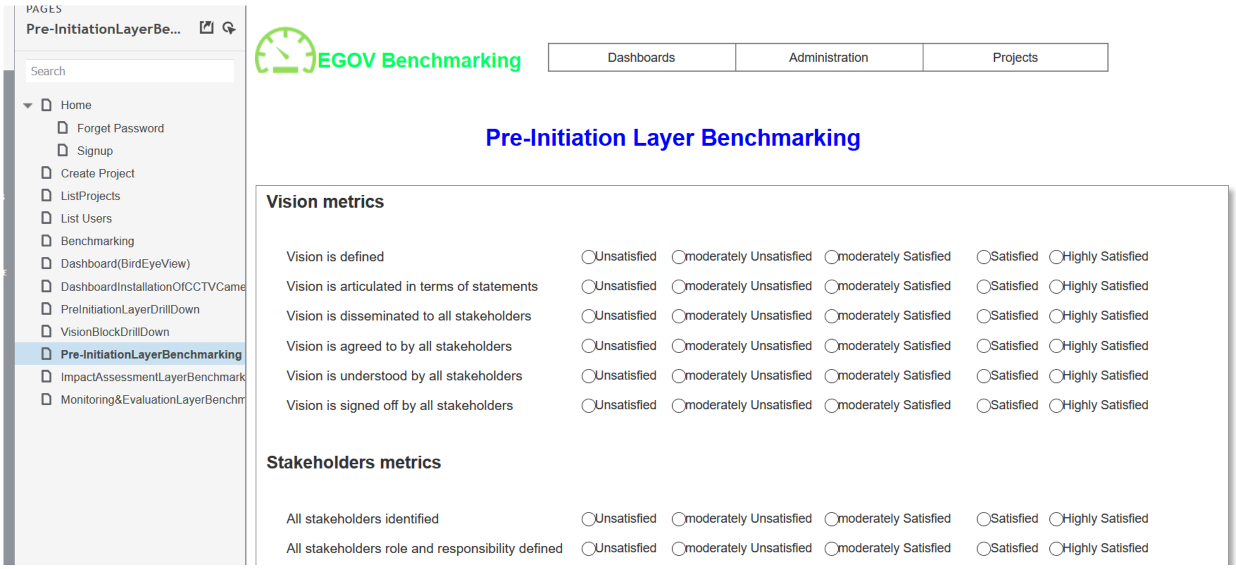



49. **Figure 8-29: Project Details and Benchmarking**

### 8.8.5 Project details and benchmarking

- By clicking on any project, the user will be redirect to Project Details and Benchmarking Screen.

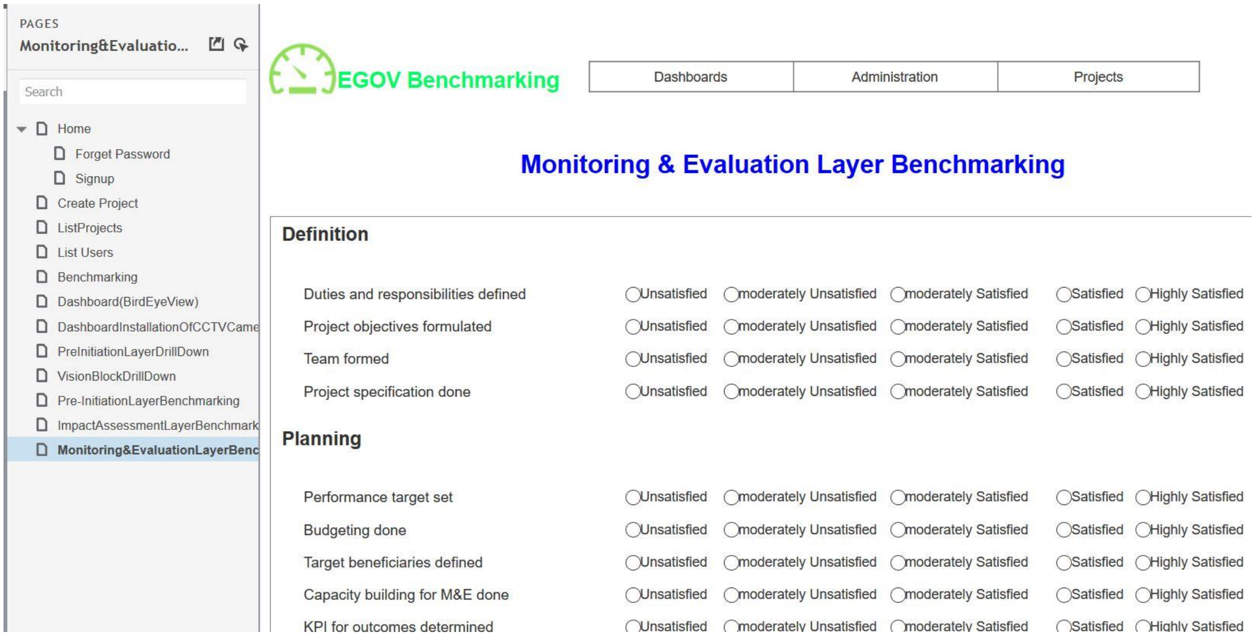
- The user can see the project details.
- The user can see different benchmarking tabs.
- The user can start benchmarking project by clicking on the benchmark.




**50. Figure 8-30: Pre-initiation layer of benchmarking**

### 8.8.6 Pre-initiation benchmarking

- By clicking on benchmarking in the pre-initiation tab, the user will be redirected to the pre-initiation benchmarking screen.
- The user can benchmark every layer and their factors on a scale of five.
- Once done, the user may then click on save changes to go back.



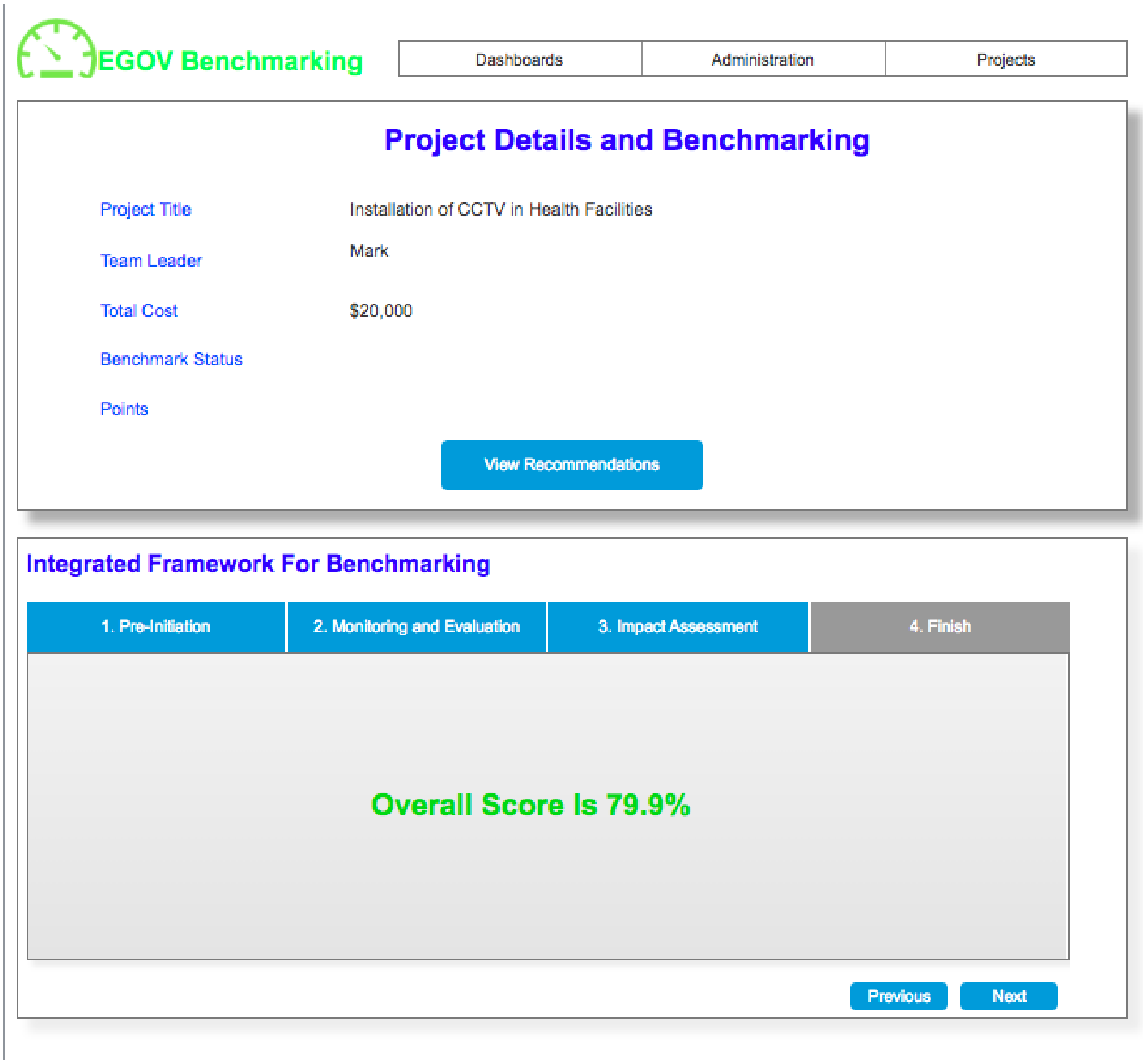

**51. Figure 8-31: Monitoring and Evaluation Layer benchmarking**

### 8.8.7 Monitoring and evaluation benchmarking

- By clicking on benchmarking in Monitoring and Evaluation Tab, the user will be redirected to the pre-initiation benchmarking screen.
- The user can benchmark Layers and their factors on a scale of five.
- Once done, the user can then click on save changes to go back.

### 8.8.8 Impact assessment benchmarking

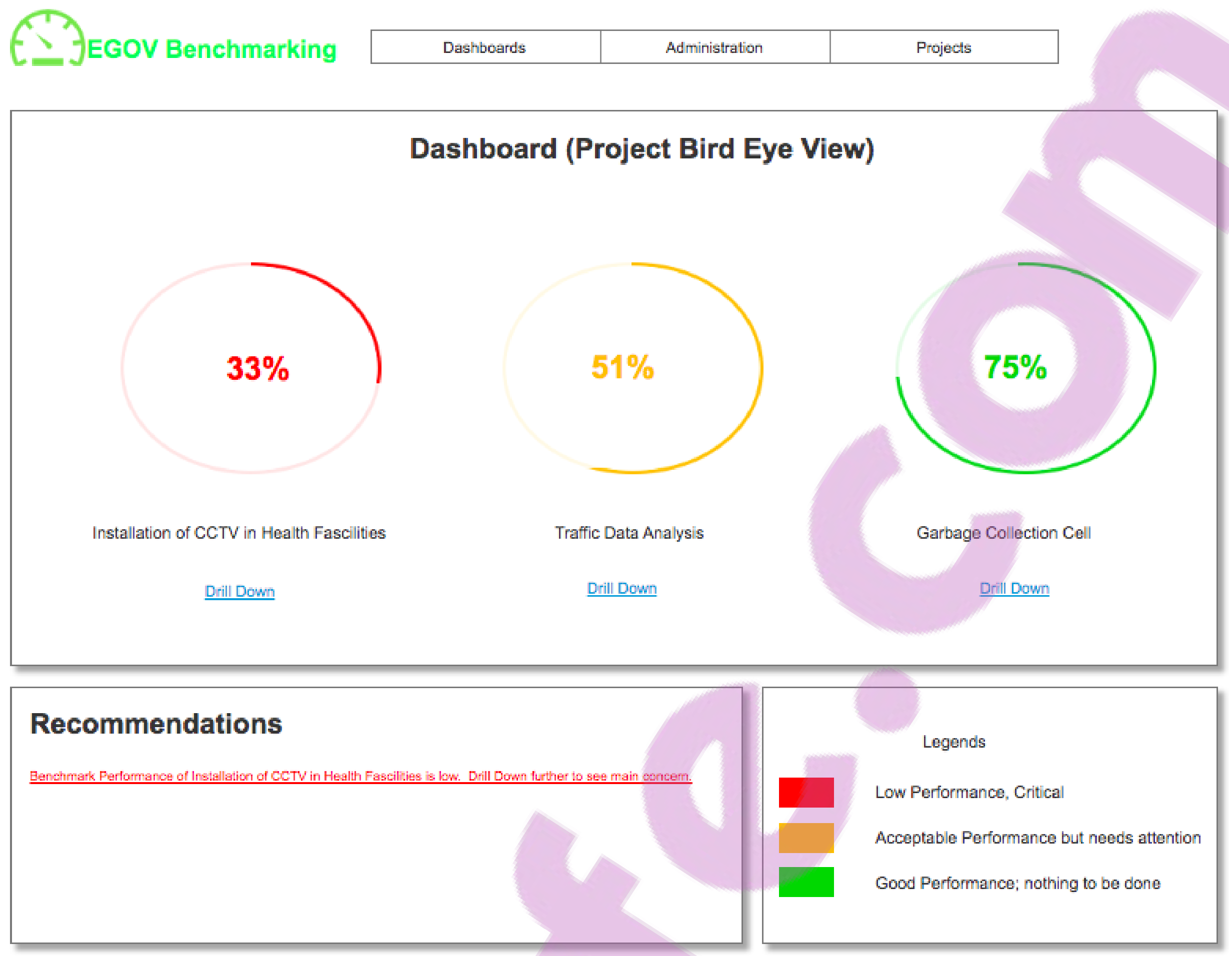
- By clicking on benchmarking in Impact Assessment Tab, the user will be redirected to Pre-Initiation Benchmarking Screen.
- The user can benchmark layers and their factors on a scale of five.
- Once done, the user can then click on save changes to go back.




52. **Figure 8-32: Interface for scoring benchmarked project**

### 8.8.9 Project scoring

- Once done with benchmarking, the user will be redirected to the Finish tab where final scores will be displayed.

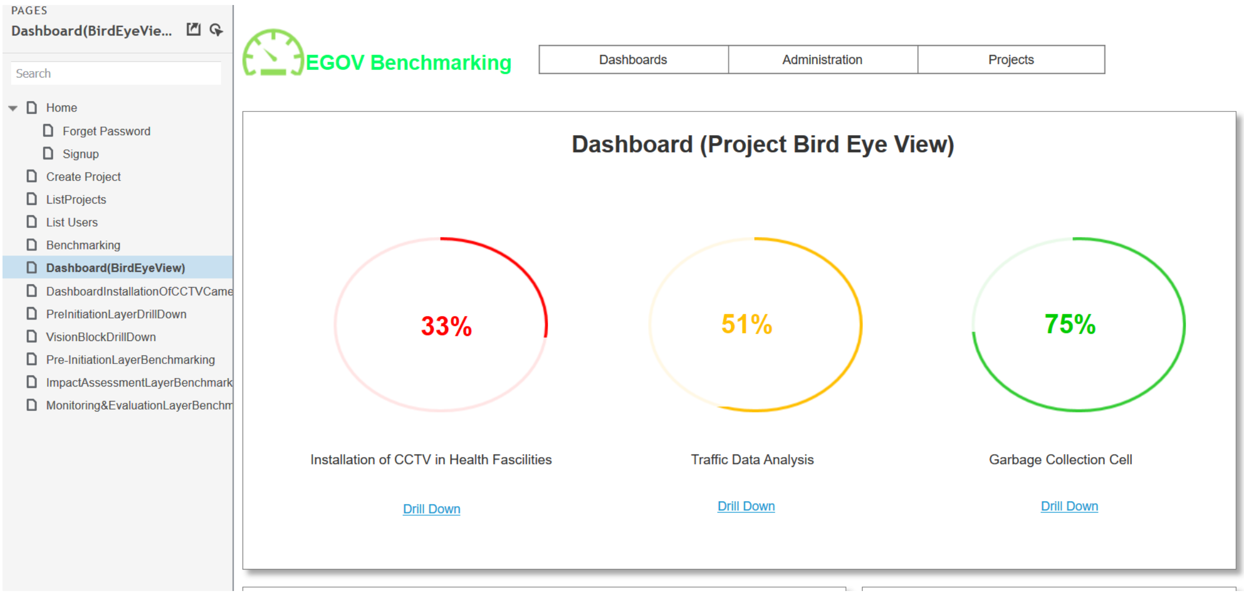



53. **Figure 8-33: Project Scoring interface**

### 8.8.10 Dashboard (Bird's Eye View)

- By clicking on the dashboard in the menu bar, the user will be redirected to a screen with a bird's eye view of all projects.
- Here user can see all projects with a progress bar and scores with the different colour legend.
- The user can drill down on any project to see further details.
- User can also see and click on recommendations.

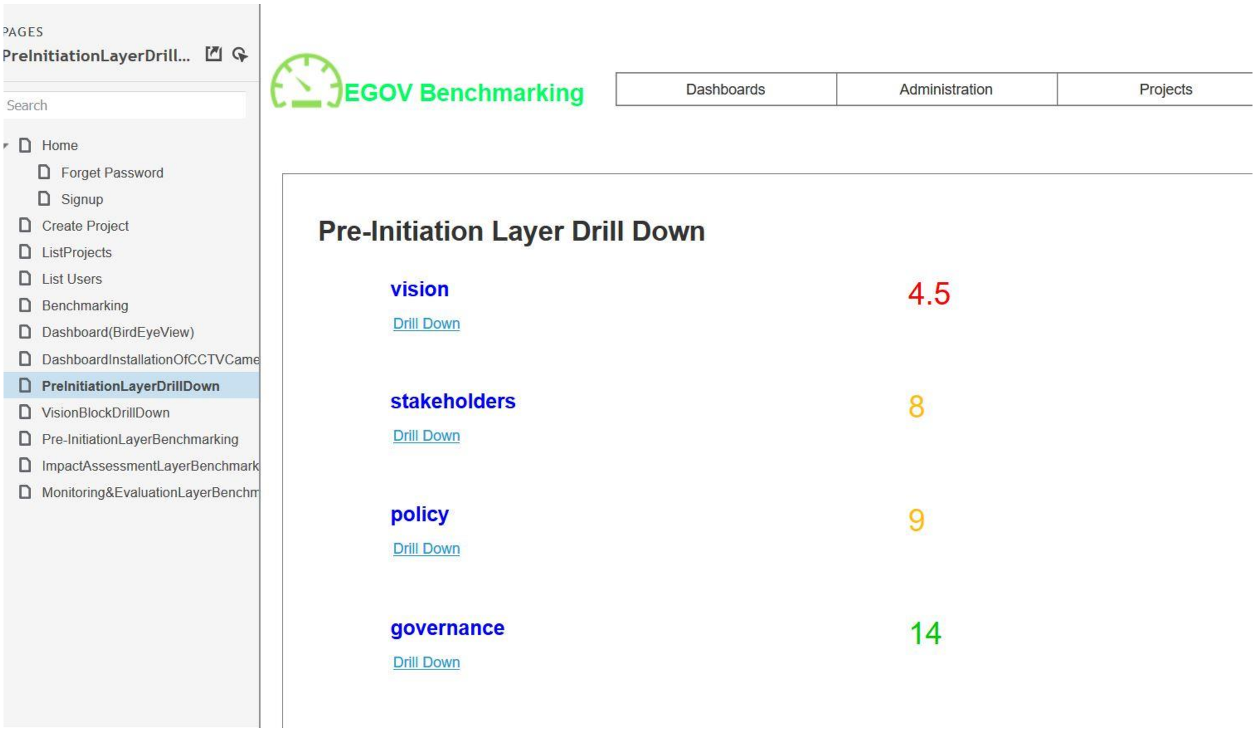
- User can see the legend.




54. **Figure 8-34: Dashboard (Bird's Eye-view)**

### 8.8.11 Dashboard (Project View)

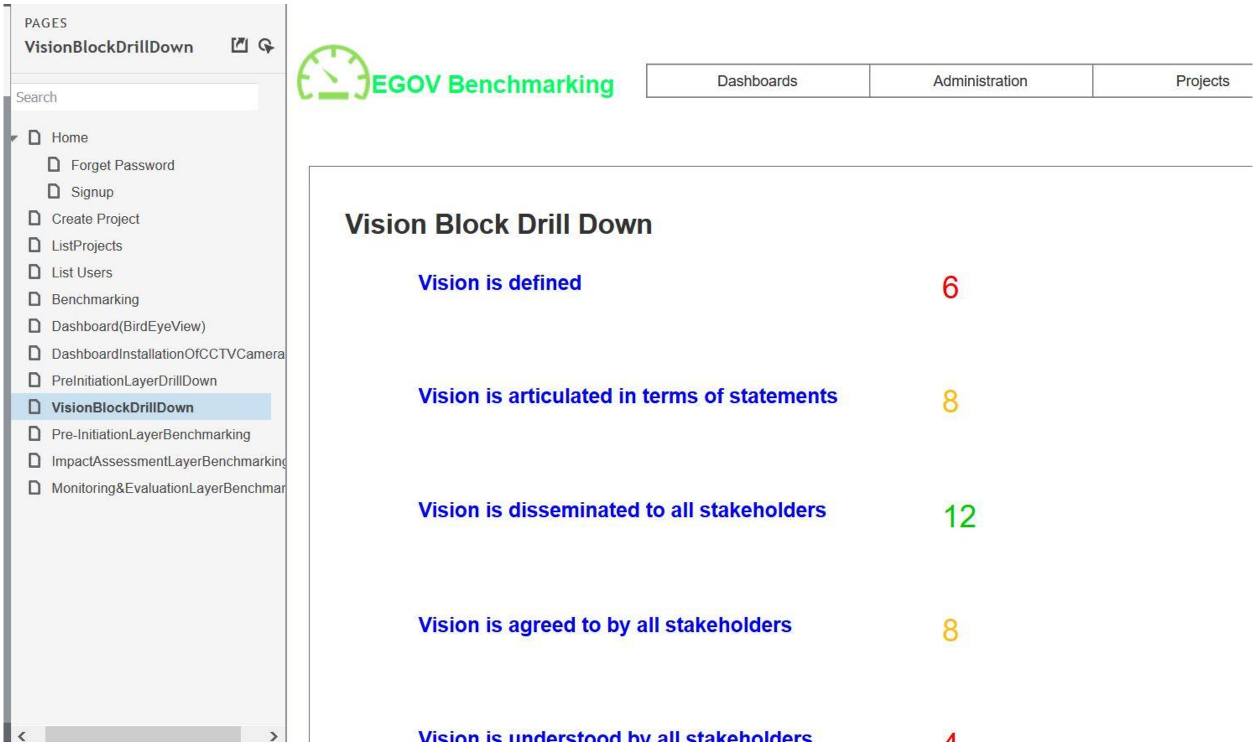
- By clicking on Project in General Dashboard screen, the user will be redirected to a screen with detail level project analytics.
- Here the user can see all the assessment layers and their scores with a different colour legend.
- The user can drill down on any layer to see further details.
- The user can also see and click on recommendations.
- The user can view legend.




55. **Figure 8-35: Dashboard (Project view)**

### 8.8.12 Dashboard (Layer View)

- By clicking on any Layer or recommendation in the Project Detail dashboard, the user will be redirected to a screen with detailed Layer level analytics.
- Here the user can see all factors in a Layer with scores in the different colour legend.
- The user can drill down on any Layer to see further details.
- The user can also see and click on recommendations.
- User can view legend.




56. **Figure 8-36: Dashboard (Layer view)**

### 8.8.13 Dashboard (Layer Factor View)

- By clicking on any factor or recommendation in layer view dashboard, the user will be redirected to a screen with detail Layer factor level analytics.
- Here user can see all factors in a Layer with scores in the different colour legend.
- User can also view recommendations and Legend.

## 8.9 Value Proposition of Proof of Concept

In this chapter, we translated the improved integrated e-gov framework into an automated platform. A prototyped proof of concept was produced. Details of prototype development, the conceptual architecture of system, logical architecture of the system, the physical architecture of the system, implementation of the platform, user interface and prototype usage were presented. The prototyped proof of concept presented in this chapter is ground-breaking, in that to the best of this researcher's knowledge there is virtually no automated platform designed specifically for benchmarking e-gov projects. Without a doubt, if the prototyped system is deployed in a real-life scenario, it is sure to achieve the desired outcome in the entire e-gov project life cycle. It must be noted also that effective M & E is covered at the pre-initiation stage based on historical CSFs available in the knowledge base and lessons learnt from previous projects.

Moreover, the prototyped proof of concept effectively addresses monitoring and evaluation in projects (especially e-gov projects across the project life cycle e.g. pre-initiation, execution and even post-implementation). This is because the proto-type has the unique ability for helping stakeholders keep track of project progress while facilitating the monitoring of allocated time, cost and quality and ensuring that project objectives are being met and that there will be post-implementation by providing insightful recommendations where the project falls short.

Furthermore, the nature and inherent design of the proof of concept ensures accountability on the part of project managers and other stakeholders by the instrumentality of the computed benchmarked scores provided by the system, not to mention the ease of monitoring and evaluation of projects the prototype affords stakeholders. The computed benchmarked score is a type of scoring system that compares actual performance to what is expected. This feature in the system, without doubt, goes a long way to keep project managers on their toes.

## 8.10 Conclusion

The purpose of this chapter is to translate the previously improved framework that was derived based on findings from analysed data presented in Chapter 7 into an automated system that can be relied upon to monitor an evaluate e-gov projects in a real-life setting. The automated solution presents the sections above used by stakeholders in various phases of a project to ascertain that the work being carried out is indeed delivering the desired outcome by relying on metrics from previously undertaken project or benchmark metrics documented in the platform from best practice knowledge. The next chapter presents the summary, conclusions and future recommendations.

# CHAPTER 9: SUMMARY, CONCLUSIONS AND FUTURE WORK

## 9.1 Introduction

In the previous chapter, the proposed integrated framework was prototyped and a proof of concept developed. This last chapter of the study presents the summary, conclusions and future work. The purpose of this chapter is to demonstrate that the main objective, and therefore the main research question of the thesis, has been achieved throughout the previous chapters. The main objective of the study was to develop a framework for benchmarking e-governance projects for socio-economic development in developing countries.

This chapter is structured as follows: Section 9.1 summarises the entire study and presents the research output; section 9.2 presents the research overview; section 9.3 presented the conclusions; section 9.4 discussed future work; section 9.5 discusses future research with suggestions for a research project of limited scope, a medium-scale research project and an advanced research project.

## 9.2 Summary

This section summarises each chapter of the study; but, firstly a table is presented in which research objectives/question/chapters are summarised.

**Table 9-1:** Chapter(s) in which Resech Questions/Objective were answered:

| **Research Objectives** | **Research Questions** | **Chapter(s) in which Research Question/Objective was answered** |
|---|---|---|
| **Research Obj. 1:** Investigate socio-economic indicators associated to e-governance in developing countries. | **Research Quest. 1:** What are the socio-economic indicators associated with e-governance projects in the context of developing countries? | **Chapter 2:** explored the literature on socioeconomic indicators with a view of identifying socioeconomic indicators for e gov projects. |
| **Research Obj. 2:** Investigate critical success factors in the lifecycle of e-governance projects. | **Research Quest. 2:** What are the critical success factors of an e-governance project's lifecycle and how can we measure them? | **Chapter 3 and 4:** Chapter 3 focused on the pre-initiation and core part of the project life cycle whilst in Chapter 4 the emphasis was put on the post-deployment (impact assessment) phase of the project life cycle. |
| **Research Obj. 3:** Explore success criteria and assessment metrics of deployed e-governance solutions. | **Research Quest. 3:** What are the assessment metrics of a deployed e-governance solution and what are their measurement criteria? | **Chapter 3 and 4:** Chapter 3 focused on the on the pre-initiation and core part of the project life cycle whilst in Chapter 4 the emphasis was put on the post-deployment (impact assessment) phase of the project life cycle. |

| | | |
|---|---|---|
| **Research Obj. 4:** Develop a framework for benchmarking e-governance projects in developing countries. | **Research Quest. 4:** How can a framework for benchmarking e-governance projects in developing countries are developed in such a way so that project leads to advancement in socio-economic development? | **Chapter 5:** developed a framework for benchmarking e-governance projects in developing countries, using rigorous literature review and analysis. |
| **Research Obj. 5:** Evaluate, improve and validate the developed framework through case studies and experts' contributions. | **Research Quest. 5:** How can the proposed framework be validated and evaluated for the purpose of socio-economic development in developing countries? | **Chapter 6** dealt with data collection.<br><br>**Chapter 7**: tackled data analysis and discussion. **Chapter 8**: handled prototyping and proof of concept |

The general objective of the research was to develop a framework for benchmarking e-governance projects for socio-economic development in developing countries. Table 9-1 provides an overview of the research, stating each research objective and demonstrating which chapter(s) tackled each research objective, section by section, to reach the main outputs of the study. This general objective was split into five specific objectives.

- The first objective (RO1) is to investigate socio-economic indicators associated with e-governance in developing countries;
- the second objective (RO2) seeks to investigate critical success factors in the lifecycle of e-governance projects;
- the third objective (RO3) explores success criteria and assessment metrics of deployed e-governance solutions;

- the fourth objective (RO4) is to develop a framework for benchmarking e-governance projects in developing countries; and,
- the fifth objective (RO5) seeks to evaluate, improve and validate the developed framework through case studies and experts' contributions.

The first objective of an investigation of socio-economic indicators associated with e-governance in developing countries is to conduct a rigorous literature review. The results of the literature review and analysis are discussed with particular emphasis on definition, history and development of socio-economic indicators, as well as their characteristics. In addition, the ICT for development (ICT4D) of socio-economic indicators in which ICT4D indicators of e-governance projects in both developed and developing countries are compared. The outcome is a table of ICT4D socio-economic indicators and how they are measured.

Objectives 2 and 3 spans across two chapters (Chapters 3 and 4) whereby chapter 3 addresses CSF and metrics from pre-initiation up to deployment; but chapter 4 addresses CSF and metrics for post-deployment ie impact assessment. Rigorous literature review and analysis was conducted for both chapters. For chapter 3, the resulting discussion from the review and analysis explored the e-gov project life cycle, with the traditional lifecycle and the proposed e-gov project life cycle. Then follows a discussion of the monitoring and evaluation process coupled with the extraction of CSFs. The next section provides a proposal of the framework for monitoring and evaluation of e-gov projects, which is followed by an analysis of monitoring and evaluation of e-gov projects and a discussion of the logic model as M & E. Section 3.7 provides a discussion of some challenges of M & E in ICT projects, which includes a discussion of the benefits of the proposed frameworks and an exploration of the critical success factors of e-gov projects. However, with regards to chapter 4, the output from the literature review and analysis was structured as follows: section 4.2 provided an overview of the concept of impact assessment. Section 4.3 centred on impact assessment methodologies whilst section 4.4 under this chapter looked at the impact assessment of e-gov projects. A proposal of a framework for socio-economic impact assessment of e-gov projects was also tackled in section 4.5.

The fourth objective is to develop a framework for benchmarking e-governance projects in developing countries, For this, a rigorous literature review and analysis is conducted. An extensive literature review is carried out on e-gov and on e-gov related projects to develop the framework. The output from the literature review and analysis is structured as follows: Section 5.2 provides an overview of the classes of e-gov benchmarking frameworks. Section 5.3 centres on e-readiness and strategy-based e-gov framework whilst section 5.4 under this chapter look at maturity or stage-based e-gov framework. Meanwhile, section 5.5 introduces project life cycle and implementation based integrated framework for benchmarking e-gov; section 5.6 details some of the various ways the proposed framework can be applied.

To realise the fifth objective to evaluate, improve and validate the developed framework through case studies and experts' contributions the data collection, data analysis and discussion and the production of a prototyped proof of concept which can be tested in live environments are leveraged. Whilst Chapter 6 deals with data collection, Chapter 7 tackles data analysis and discussion. Chapter 8 describes prototyping and proof of concept.

The purpose of the data collection chapter is to achieve the validation of the framework: data gathering for analysis to aid validation and evaluation of the framework. The output from the data collection done in Chapter 6 is structured as follows: Section 6.2 discusses the survey approach and provides justification for its selection. Section 6.3 focuses on the treatment of the target organisations used for validation of the framework. An overview is provided for each case study organisation. Under this section also, the individual profiles of the e-gov experts are discussed. Section 6.4 discusses the validation of the research instruments, whilst highlighting the various research software tools that are employed for processing and analysing collected data. Section 6.5 provides an in-depth treatment of the study's sample design highlighting issues to do with population, sampling and sampling techniques, validity and reliability, limitations and ethical considerations.

However, the purpose of Chapter 7 is to analyse collected data to draw conclusions to be relied upon to validate and/or improve the proposed conceptual framework. The output of the data analysis from Chapter 7 is structured as follows: Section 7.2 deals with the analysis of results emanated from data collected pertaining to the demographics of participants; section 7.3 analyses data collected on the pre-initiation layer of the proposed integrated framework. Under this section, analysis of experts' opinion, as well as feedback from project managers, is done. Section 7.4 analyses the monitoring and evaluation layer in the proposed framework. Under this section also, analysis of experts' opinion, as well as feedback from project managers in terms of the monitoring and evaluation layer in the proposed framework, was done. Section 7.5 analyses impact assessment layer of the proposed integrated framework. This section also analyses experts' opinion and feedback from project managers as regards impact assessment layer of the proposed integrated framework. Section 7.6 further validates integrated framework using inferential statistics. Section 7.7 presents the key findings garnered from the analysis of data collected; in Section 7.8 the improved e-governance framework is presented based on the recommended summarised results from the previous section with a further discussion on applications of the integrated framework.

The chapter on prototyping and proof of concept tackles the second part of the fifth objective (R05), which is "to evaluate, improve and validate the developed framework through case studies and experts' contributions". The output generated in this chapter is structured as follows: Section 8.2 discusses prototype development; Section 8.3 looks at the conceptual architecture of the framework/platform; Section 8.4 emphasizes the logical architecture of the platform; Section 8.5 explores the physical architecture of the platform; Section 8.6 details the implementation/development of the platform; Section 8.7 looks at the user interface; Section 8.8 explores the proof of concept laying emphasis on prototype usage; Section 8.9 discusses the value proposition of the proof of concept; Section 8.10 concludes the Chapter.

In short, it took three chapters to realise the fifth objective, whilst the tackling of objectives 3 and 4 spanned across two chapters. Objectives 1 and 2 were each successfully addressed with a single separate chapter as follows:

### 9.2.1 Chapter 1 Summary

Chapter One introduced the entire study. It set the pace for the study by presenting the background and motivation for the study. The chapter is made up of nine sections; namely, background and motivation, problem statement, research objectives, research questions, research methodology and design, research contributions, scope and limitations and chapter overview. Chapter one is thus further summarised as follows:

E-governance in the context of this study refers to the use of ICTs to govern. It is the use of ICTs to provide the essential services that citizens expect from the government such as using ICTs to manage and provide social grants, issue passports and VISAs, pay and manage utility bills such as water, electricity, gas, births and death registration. Investigations reveal that the failure rate of e-governance projects in developing countries is between 35% and 50% where 35% is classified as a total failure and 50% are considered partial failures (Heeks, 2004). The cause attributed to the failure of many e-governance projects is manifold and can be attributed to a range of reasons. This study sought to develop a framework for benchmarking e-governance projects for socio-economic development in developing countries. The main research question is: How can a framework for benchmarking e-governance projects be developed and used as a tool for supporting socio-economic development in developing countries? The research methodologies used for the study are a literature review, rigorous analysis, modelling, design, prototyping, survey-based case study and experts' evaluation. Based on findings from the literature, the design science paradigm is viewed as the most suitable approach for creating, applying, and reflectively evaluating an artefact developed for evaluating features of information systems in e-government initiatives. The main scope of the study is the development of a framework for benchmarking e-governance projects for socio-economic development in developing countries.

### 9.2.2 Chapter 2 summary

Chapter two explored the literature on socio-economic indicators with a view of identifying such indicators for e-gov projects. The value of this chapter lies in the list or table of socio-economic indicators that could be depended on to show that an implemented e-governance project is yielding the expected returns. The list of socio-economic indicators helped to ascertain whether stakeholders are happy with implemented e-gov project and are reaping the benefit of such a project. This chapter is further summarised as follows: In the context of the present study socio-economic indicators is defined as a range of well-defined, quantifiable and qualifiable metrics that are used to gauge the current wealth and health of a nation. The notion of social and economic indicators appears to have originated in 1962 in a project executed by American National Aeronautics and Space Administration. The outcome of this project shows that the socio-economic consequences of the space programme are essential and often unexpected. Consequently, this motivated some of the participants to turn their attention to the more general issue of monitoring the changing socio-economic conditions (indicators) of society. This brings us to the issue of ICT for Development (ICT4D) which refers to the use of information and communication technologies (ICTs) in the fields of socio-economic development, international development and human rights. A list of socio-economic indicators for both developed and developing countries were then tabulated, together with data on how to measure them.

Some common socio-economic indicators for measuring the impact of e-government projects include the e-readiness index, the e-government readiness index, the networked e-readiness index, the web measure index, the e-government assessment model, including telecommunications infrastructure index, online and the human capacity index. Nevertheless, one of the studies on the socio-economic indicators associated with e-government projects showed that the most relevant socio-economic indicators were: the size of municipalities, the participation in e-government development, and (the school drop-out rate. Therefore, from this insufficient information, no direct relationship could be made between socio-economic indicators and e-governance.

### 9.2.3 Chapter 3 summary

Chapter 3 presented a discussion of critical success factors of an e-governance project's lifecycle and how these factors are measured. The value of this chapter in the whole thesis lies in the production and delivery of a comprehensive list of CSFs metrics that can be used for M & E throughout an e-gov project lifecycle. This should happen after the identification of success factors that are critical to e-gov projects in developing countries for enhanced monitoring and evaluation success. To address the research objective for this chapter, the research questions are subjected to rigorous literature review and analysis. This chapter is made up of ten sections. The first section introduces the chapter; the second section discusses the E-gov project life cycle, with subsections as the traditional lifecycle and the proposed E-gov project life cycle; in the third section, there is a discussion of the monitoring and evaluation process coupled with the extraction of CSFs. The fourth section provides a proposal of the framework for monitoring and evaluation of E-gov projects. The fifth section discusses the monitoring and evaluation of E-gov projects. The sixth section discusses the logic model as M & E. The seventh section provides a discussion of some challenges of M & E in ICT projects. Section eight discusses the benefits of the proposed frameworks, whilst section nine explores the critical success factors of e-gov projects with section ten concluding that chapter.

This chapter explored the traditional project life cycle of four different stages - defining, planning, execution and closing – which have been modified to suit e-gov projects. This was because of e-gov's unique context. As such, e-gov projects are thought to be composed of these stages – pre-initiation phase, implementation phase and post-deployment phase, thereby proposing a new project life cycle. Furthermore, in this chapter, the importance of M & E to the success of e-gov is highlighted and it is argued that as important as monitoring and evaluation of ICT projects is, it has its own peculiar challenges. The lack of well-developed monitoring and evaluation indices is a key issue that may affect the efficacy of M & E efforts. Limited resources and capacities for monitoring and evaluation are found to be yet another challenge.

The chapter defined critical success factors (CSFs) as the limited number of areas in which satisfactory results will ensure successful monitoring and evaluation. This implies that if CSFs for M & E were not in place, virtually every monitoring and evaluation effort exerted would be wasted. In other words, there are certain factors are critical to the success of M & E of e-gov projects (also known as critical success factors). Some of these are a clear definition of what constitutes monitoring and evaluation; involvement of stakeholders in the design of M & E from start to finish; capacity building of team members involved in M & E; as well as feedback and flexibility. Monitoring and evaluation are seen as the tool to help keep the entire project on track regardless of changes in the internal and external environment of the project. Critical success factors metrics for Successful M & E of e-gov projects are also determined. Some of the determined CSF metrics costs were estimated to complete remaining work (ETC), estimated completion cost (ECC), and actual completion cost (ACC).

Furthermore, with the proposed new project lifecycle, M & E would not be performed only at the core part of the project life cycle but in all phases, which certainly would minimise e-gov project failure. The chapter also advances the argument that if e-gov projects in developing countries were going to enjoy enhanced success rates, there is the need to make monitoring and evaluation an integral part of the project and impact assessment a component part of the project lifecycle, since the reason e-gov projects are initiated is to effect socio-economic development. In summary, monitoring and evaluation cannot be ignored if a lasting sustainable e-gov project is desired.

### 9.2.4 Chapter 4 summary

Chapter 4 examined the impact assessment of e-gov projects and the success criteria and assessment metrics of deployed e-governance solutions are also explored. A brief overview of impact assessment reveals that impact assessment is a challenging task for many developing and even developed nations. The literature review shows that the e-gov impact assessment has two levels of analyses – project and programme.

In terms of tangible and quantifiable economic benefits, the rationale behind this chapter lies in the revelations of an EU report of more than 100 e-gov projects which shows that impact assessment of deployed e-gov projects is still insignificant (Steenson, 2000). The main aim of Chapter 4, therefore, was to explore the impact assessment of e-gov projects. The sub-themes treated in this chapter are: ■ the concept of impact assessment, ■ impact assessment methodologies, ■ impact assessment of e-gov projects and ■ a proposal of a framework for socio-economic impact assessment of e-gov projects.

Over the years, Impact assessment (IA) has gone through some changes spurred on by shifting development paradigms; evolving from modernism to social development and empowerment. Impact Assessment has become a blend of quantitative and qualitative methodologies. A critical analysis of the different impact assessment methodologies showed that there was no such thing as a one-size-fits-all impact assessment methodology.

It is, therefore, not too far-fetched to deduce that impact assessment faces a number of challenges. Some of these include assessing the process as against actual impact, placing more weight on external rather than against community centred indicators of impact. There is also the matter of weak (or absence of) baselines. A participatory IA approach is then advanced as a possible remedy for those shortcomings. The approach contains eight stages: ■ defining the questions to be answered; ■ defining the geographical and time limits of the project; ■ identifying and prioritising locally-defined impact indicators; ■ deciding which key impact assessment methods to use, and testing them; ■ deciding which sampling methods and sampling size to use; ■ assessment of project attribution;■ triangulation; ■ obtaining feedback and ■ verifying the results with the community.

Most often than not, baseline studies fail to be conducted for such projects and so it becomes difficult later to ascertain objectively whether the deployed e-gov initiative significantly improved the socio-economic conditions of target beneficiaries or not. This lack of an assessment framework tends to result in subjective assessment/value judgment from the small number of individuals and authorised bodies. Consequently, this does not make a strong case for continual injection of funds by donor partners – be it private or multilateral – into the e-gov sector as the whole IA framework may be lacking in rationality and objectivity. A framework for socio-economic impact assessment was then put together to address the deficiency in this situation. The framework was made up of eight components: ■ Goals and Expectations; ■ Baseline; ■ Data gathering; ■ Analysis; ■ Report; ■ Recommendation; ■ Core indicators; and ■ Contextual indicators.

### 9.2.5 Chapter 5 Summary

Chapter 5 proposed an e-governance project framework. The essence of this chapter is to lay out a framework/blueprint that enables e-gov projects to be effectively translated into tangible socio-economic development outcomes. The main aim, therefore, is to develop an integrated theoretical framework for benchmarking e-governance solutions in developing countries that particularly factors in the various phases of the entire e-gov project life cycle. The sub-themes this chapter addresses are: ■ classes of e-gov benchmarking frameworks; ■ e-readiness and strategy-based e-gov framework; ■ maturity or stage-based e-gov framework; ■ introduction of a project life cycle and implementation based integrated framework for benchmarking e-gov; and ■ suggestions on the various ways the proposed framework can be applied.

The proposed integrated framework for e-gov benchmarking consisted of three layers: Pre-initiation layer; Monitoring and Evaluation layer; and, Impact Assessment Layer. The pre-initiation layer is the layer where the necessary information and “embryonic knowledge and understanding” of the potential project is collected, compiled, buffered, and analysed sufficiently to enable a well-informed decision to proceed with initiation of the standard project starting phase. The M & E layer was conceived by a combination of identified CSF of M & E and metric thereof with this study’s suggested e-gov project life cycle. The M & E layer mostly covers the core part of the PLC (from definition to close-down). Meanwhile, the impact assessment layer lays out the framework used to evaluate the socio-economic impact of e-gov projects.

The proposed framework has a number of advantages. It provides a 'big picture' view of the key ingredients of a successful e-gov implementation. This is because the integrated framework is not only concerned with core phases of the e-gov's project life cycle but also its pre-initiation, impact assessment and, monitoring and evaluation phases. It even goes further to account for the success factors critical to each stage of the monitoring and evaluation stage. Furthermore, the proposed integrated framework relayed the understanding that any particular component of successful e-gov implementation was not in isolation from the others, as these individual components are pieces of the same puzzle. The puzzle here, being e-gov implementation. This in no small way contributes to the robust nature of the framework, thus making it adaptable to the e-gov project implementation context.

#### 9.2.6 Chapter 6 Summary

The sixth chapter dealt with data collection. The value of this chapter is to lay out the process that would be used to collect data for the validation of proposed conceptualization to ascertain that such conceptualization would achieve its intended purpose in a real-life context from adoption and implementation perspectives. This chapter presents the various research instruments relied upon for the collection of data for analysis in the next chapter. Data were gathered from multiple sources of evidence including questionnaires, document analysis and the interviewing of e-gov experts in a bid to solicit their expert opinions. A review of documents played a major role in this study; more than 400 documents were read which comprise reports, journals, research papers, conference proceedings, scientific workshop reports, working paper, websites dedicated to e-gov, as well as corporate websites. Data collected were both quantitative and qualitative in nature.

Only public sector organisations with experience in e-gov initiatives were included in the study. Project managers and other key stakeholders directly involved in e-gov initiatives were then randomly selected for their valuable insights. The experts were largely academics with specialisations in e-gov. The instrument was piloted within Accra Technical University, with peers, and experts at conferences and at a public institution. Comments received were used to improve on the instrument. After piloting, this researcher arrived at the conclusion that there was a need to add a neutral option for those without opinion as well as the reason for opting for one of the questionnaire items. The research employed Microsoft Excel 2016, SPSS Version 23 and STATA 15 in scrutinising the data collected from this study's participants.

By virtue of limitations on movement, money and time, only a small proportion of the population was chosen and this was done by a combination of simple random and purposive sampling. In all, six target public institutions were sampled from which eleven stakeholders were selected. Ghana formed the main location from which the target organisations (study sample) were chosen. With regards to e-gov experts in this study's sample selection, only individuals with e-gov expertise were targeted. A major limitation of the study is the selection of target organisations from only one developing country. This would make extrapolation of findings to other developing countries a bit of a challenge as data was captured on only one developing country. Nonetheless, this limitation does not in any wise invalidate findings made from the study.

### 9.2.7 Chapter 7 summary

The seventh chapter dealt with data analysis and discussion. The purpose of this chapter is to analyse collected data to draw conclusions that could be relied upon to validate and/or improve the proposed conceptual framework. The value of this chapter lies in its fulfilment of Part 2 of the research objective on evaluation and validation (that is RO5 - Evaluate, **improve** and validate the developed framework through case studies and experts' contributions). The main deliverable of this chapter after analysis and drawing conclusions is an improved framework which could be relied upon for the development of a prototyped proof of concept. It is the prototyped proof of concept that is then evaluated to demonstrate that it indeed fulfils the purpose of the framework which is that of serving as an enabler for e-gov benchmarking, e-gov project pre-initiation, during execution and post-implementation.

In sum, the various layers of the proposed integrated framework for benchmarking e-gov are on the whole considered comprehensive enough by both experts and project managers. The analysis justifies the inclusion of both pre-initiation and impact assessment in the traditional life cycle as none of the other investigated PMLC models show a significant association with any of the success dimensions with the exception of "*Pre-initiation -> Definition -> Planning -> Execution -> Deployment -> Close Down -> Impact assessment"* (C).

However, issues such as political influence and lack of action on the part of decision-makers to follow through with laid-down policies at the pre-initiation layer constituted some of the key concerns raised by experts. These issues are thought to have the potential to diminish the validity ofthe proposed integrated framework if not addressed by the framework. Fortunately, the proposed framework tackles these issues through some of its component elements such as **Policy** and **Governance**.

### 9.2.8 Chapter 8 Summary

Chapter eight presented the prototyping and proof of concept. The value of this chapter lies in the production of a prototyped proof of concept, which can be tested in live environments. This chapter thus lays down the procedures that underpin the automation of the proposed integrated framework for benchmarking e-governance projects in developing countries. The automation sought to benchmark ongoing or finished e-governance projects against best practices as put forward by the proposed integrated e-governance framework.

Seven (7) major steps were relied upon to produce a prototyped proof of concept. These steps essentially made up the 'engine' of the automation. These steps are:

- Firstly, Get User Input;
- Secondly, Computation of Points Scored by the Project for Each Building Block within a Particular Layer;

- Thirdly, Proceeding to the Next Building Block within a Particular Layer;
- Fourthly, Getting of Input from the user with regard to business rules amongst building blocks and Compute the score;
- Fifth, Computation of total scores earned by e-governance project for a particular layer and drawing of conclusions;
- Sixth, steps 1 to 5 are repeated for the other layers (i.e. Impact Assessment and Monitoring and Evaluation layer) of the integrated framework, with the relevant dashboard displayed; and
- Seventh, a consolidated dashboard for the whole project/programme no matter the current level of achievement was provided. Metrics and best practice scores for the different layers of the proposed integrated framework are determined and used to produce a prototyped proof of concept. In the chapter also, mode of usage of prototyped proof of concept was also demonstrated.

## 9.3 Output of research

The outputs of the research are as follows: production of a list or table of socio-economic indicators that can be depended on to show that an implemented e-governance project is yielding the expected returns. This list of socio-economic indicators helps to:

- ascertain whether stakeholders are happy with the implemented e-gov project and are reaping the benefit of such implementation;
- produce and deliver a comprehensive list of CSFs metrics that can be used for M & E throughout an e-gov project lifecycle after identification of success factors that are critical to e-gov projects in developing countries for enhanced monitoring and evaluation success;
- produce an enhanced project lifecycle that recognises both pre-initiation and post-deployment phases;
- produce a framework for monitoring and evaluation of e-gov projects;
- produce a framework for socio-economic impact assessment of e-gov projects;

- deliver a framework for benchmarking e-gov projects;
- develop a prototyped proof of concept; and,
- generate an automation that enables stakeholders to benchmark e-gov projects.

At the end of this section therefore, this study has successfully attained the main research objectives and research questions that it set out to achieve as revealed in the list of publications that have emerged from this research study (Figure 9-2).

**Table 9-2:** List of Publications

| **Authors** | **Year of Publication** | **Citation** |
|---|---|---|
| S. Hatsu & E.K. Ngassam | 2017 | i. S. Hatsu and E. K. Ngassam, "An integrated framework for benchmarking e-government projects," *2017 IST-Africa Week Conference (IST-Africa)*, Windhoek, 2017, pp. 1-9. doi: 10.23919/ISTAFRICA.2017.8102412 |
| S. Hatsu & E.K. Ngassam | 2017 | ii. S. Hatsu and E. K. Ngassam, "A framework for assessing the socio-economic impact of e-governance projects in developing countries," *2017 Conference on Information Communication Technology and Society (ICTAS)*, Umhlanga, 2017, pp. 1-7. doi: 10.1109/ICTAS.2017.7920648 |
| S. Hatsu & E.K. Ngassam | 2016 | iii. S. Hatsu and E. K. Ngassam, "A framework for the monitoring and evaluation of e-governance projects in |

| | | | |
|---|---|---|---|
| | | | developing countries," *2016 IST-Africa Week Conference*, Durban, 2016, pp. 1-7. doi: 10.1109/ISTAFRICA.2016.7530619 |
| S. Hatsu & E.K. Ngassam | 2015 | iv. | S. Hatsu and E. K. Ngassam, "An exploration of critical success factors for e-governance project initiation: A preliminary framework," *2015 IST-Africa Conference*, Lilongwe, 2015, pp. 1-8. doi: 10.1109/ISTAFRICA.2015.7190547. |

## 9.4 Conclusions

From the literature review, this study was able to produce a list or table of socio-economic indicators that can be depended on to show that an implemented e-governance project is yielding the expected returns. The list of socio-economic indicators is designed to:

- help ascertain whether stakeholders are happy with implementations of the e-gov project and are reaping the benefits of such a project;
- produce and deliver of a comprehensive list of CSFs metrics that can be used for M & E throughout an e-gov project lifecycle after identification of success factors that are critical to e-gov projects in developing countries for enhanced monitoring and evaluation success;
- produce an enhanced project lifecycle that recognises both pre-initiation and post-deployment phases;
- produce a framework for monitoring and evaluation of e-gov projects; and, produce a framework for socio-economic impact assessment of e-gov projects;
- deliver a framework for benchmarking e-gov projects.

From the conceptual framework, this research has learnt that project life cycles were important to the effective functioning of e-gov systems. The revelation that previous e-gov frameworks do not have a project discipline to effectively deliver e-gov systems to stakeholders for further usage. Instead they have assumed that the derived system is seamlessly delivered. Yet it has been seen that in developing countries, the delivery of such systems is where failures happen and it has been one of the key contributions of this research to close that gap by introducing rigorous project management principle to the existing body of knowledge of e-gov as a starting point.

Furthermore, none of the two classes of framework discussed in Chapter 5 addresses or fully addresses e-gov project life cycle (PLC) and implementation issues. This, therefore, leaves an important theoretical gap in e-gov literature as far as benchmarking is concerned. It is also noted that there is a lack of methodology or framework that facilitates flexible and comparative measurement of e-gov in a way that is comprehensive and fundamental (Luna-Reyes, Gil-Garcia, and Romero, 2012). This is further compounded by the lack of monitoring and evaluation and critical success factors in a project which then makes projects more prone to failure particularly in the context of an emerging economy. In the present study, therefore, the aforementioned theoretical gap is filled by the newly proposed integrated framework for benchmarking e-gov. This newly proposed integrated framework was based primarily on the project life cycle and the implementation coupled with monitoring and evaluation.

From the improved conceptual framework, this research showed that not all critical success factors (CSFs) at the M & E layer registered a significant association with e-gov project success dimensions. Another lesson learnt from the improved conceptual framework was the fact that the **governance** element in the pre-initiation layer of the improved conceptual framework was found to be perhaps the most critical element to the success of the pre-initiation layer.

The prototyped proof of concept and the outcome of this thesis would enable stakeholders to effectively automate the process of benchmarking e-gov projects for socio-economic developments. From the theoretical perspective, findings from the present study would be useful in filling theoretical gaps in the existing body of knowledge on e-gov implementation. Additionally, in terms of the value the proposed developed prototyped proof of concept would add is expressed in the applicability of the prototyped proof of concept in the tackling of practical challenges that affect e-gov implementation in developing countries.

## 9.5 Benefits to be Derived from Adopting the Proposed Developed Prototyped Proof of Concept

The practical contributions of the proposed integrated theoretical framework to stakeholders are manifold. First and foremost, the framework provides stakeholders with a systematised model for benchmarking e-gov projects in developing countries. The developed model begins with a pre-initiation layer, followed by an M & E layer and then an impact assessment layer. Within the M & E layer, for example, is the various phases of the project life cycle and associated critical success factors.

Secondly, the developed framework can be used as a diagnostic tool for pinpointing flaws and weakness within an e-gov project so that necessary corrective actions can be taken.

Thirdly, the developed framework makes it easy to compare e-gov projects even those initiated in different environments because of the ability of the model's automation to provide a single benchmarking score for an e-gov project. Additionally, the developed model can be used to investigate why different e-gov projects may exhibit varying levels of success by comparing core indicators as opposed to contextual indicators. This is because core indicators may provide a common basis for comparison.

Fourthly, the developed model can serve as a prescriptive tool to suggest the most important critical success factors needed to achieve breakthrough success in an e-gov project.

Fifthly, the developed model can be used to a large extent to replicate the level of success of a successful e-gov project by using the model to identify specific elements that significantly accounted for the exceptional performance of such an e-gov project and doing same in a similar project.

## 9.6 Future Work

This section looks at the future research motivated by the present study. The future research is broken down according to different degrees of difficulty and requirements. In this section, a range of research challenges to further enrich the literature with more outcome pertaining to this body of knowledge will be proposed to the scientific community. The details are presented under the following outlines: section 9.4.1 details the research projects of limited scope; section 9.4.2 presents medium-scale research projects; and section 9.4.3 looks at advanced research project.

### 9.6.1 Research projects of limited scope

Assessment of the impact of the newly proposed e-gov benchmarking framework on e-gov project success.

- **Problem statement**: E-gov project failures remain a thorny issue, especially in developing countries. An empirical determination of the role of the newly proposed e-gov benchmarking framework as regards project success was outside the scope of the present study.

A study exploring the prevalence of pre-initiation and post-deployment phases in the e-gov project life cycle in selected e-gov projects.

- **Problem statement**: Pre-initiation and post-deployment phases in the e-gov project life cycle, though very crucial, are most often than not left out in standard e-gov project management life cycles. For instance, in the present study, less than 50% of project managers surveyed perceived pre-initiation as a vital stage in their project management life cycle.

### 9.6.2 Medium-scale projects

The relationship between critical success factors and e-gov project success: a case study comparison of e-gov projects in Francophone and Anglophone African countries.

- **Problem statement**: Francophone and Anglophone African countries may differ considerably in terms of the social, economic and cultural landscape and how the populace from such respective blocs relate to e-gov. As such, it is likely that CSFs important for project success in Anglophone African countries may significantly differ to project success in Francophone African countries.

A study exploring the prevalence of pre-initiation and post-deployment phases in the e-gov project life cycle in selected developing countries.

- **Problem statement:** Pre-initiation and post-deployment phases in the e-gov project life cycle, though very crucial, are not only normally left out in standard e-gov project management life cycles; but this situation may differ from one developing country to another developing country.

### 9.6.3 Advanced research projects

A study to further validate the newly proposed e-gov benchmarking framework in different sub-regions of Africa.

- **Problem statement:** Africa is a highly diverse continent with no two sub-regions exactly alike. As a result, differences in performance of the proposed e-gov benchmarking framework is to be expected. Thus, the need to validate the framework in different sub-regions of Africa.

## 9.7 Summary and Final Recommendations

In summary, the general research objective to develop a framework for benchmarking e-governance projects for socio-economic development in developing countries was achieved. The developed framework vitally addressed all the key phases of e-gov implementation by not excluding pre-initiation, monitoring and evaluation and impact assessment phases. A major output of this study was the development of a prototyped proof of concept. This prototyped proof of concept is a very important instrument for tracking the effectiveness and efficiency (and impact thereof) of e-governance projects in developing countries in order to not only ensure that they are delivered in time, at the right quality, within budget and scope, but also to gauge whether its impact on the citizenry fulfils its intended goal. More so, the developed framework can be productized in that a project can be undertaken by appropriate government entities to translate the suggested prototype into a working software platform for benchmarking all e-gov projects. The power of such product will be the availability of a central knowledge base containing prior metrics for a prior project not only within the country but also maintaining regional knowledge base such that when embarking on new projects, lesson learnt from the past are considered. This invariably leads to the maximization of success rates of e-gov projects in developing countries. Such a platform will help significantly reduce the failure rate of e-gov project and would surely guarantee a high success rate, thereby reversing the current tendency of 35-50 % failure rate to for example, 65%, 85%, 95% success rate in a short, medium, long terms respectively provided that the knowledge base is consistently enriched with data.

# Appendices

## Appendix A

UNISA university of south africa

**PARTICIPANT INFORMATION SHEET**

Ethics clearance reference number:
Research permission reference number (if applicable):

Friday, January 20, 2017
**Title: A Framework for Benchmarking e-Governance Projects in Developing Countries**

**Dear Prospective Participant**

My name is **Sylvester Hatsu** and I am doing research with **Prof. Dr. Ernest Ketcha Ngassam**, a professor, in the Scholl of Computing, Department of information System towards a PhD at the University of South Africa. We are inviting you to participate in a study entitled **A Framework for Benchmarking E-Governance projects in Developing Countries**

**WHAT IS THE PURPOSE OF THE STUDY?**

This research seek to investigate the critical success factors of e-governance projects in a developing country's context and identity the success criteria of deployed e-governance projects and eventually develop a framework for benchmarking e-governance projects. The output will the development of comprehensive e-governance implementation framework which can be adopted and used by any stakeholder in an e-governance project for benchmarking e-governance projects in developing countries and the world at large

**WHY AM I BEING INVITED TO PARTICIPATE?**

Why did you choose this particular person/group as participants?
Describe how *[from whom?]* you obtained the participants' contact details and why you chose this particular person/group of participants *[the Protection of Personal Information Act, nr 4 of 2013, necessitates the disclosure of how access was gained to the personal information of prospective participants]*. Indicate the approximate number of participants *[this is useful information to assist the participant to make an informed choice whether to participate in the proposed study – potential breaches of confidentiality increase with a small sample size]*.

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**WHAT IS THE NATURE OF MY PARTICIPATION IN THIS STUDY?**

Describe the participant's actual role in the study.
The study involves *questionnaires. The questions basically duel on your assessment of the proposed framework from your expert point of view. The duration of your participation is last for approximately 2 hours*

**CAN I WITHDRAW FROM THIS STUDY EVEN AFTER HAVING AGREED TO PARTICIPATE?**

Participating in this study is voluntary and you are under no obligation to consent to participation. If you do decide to take part, you will be given this information sheet to keep and be asked to sign a written consent form. You are free to withdraw at any time and without giving a reason.

**WHAT ARE THE POTENTIAL BENEFITS OF TAKING PART IN THIS STUDY?**

The output of this research will be very valuable to the research community and to e-Governance project practitioners and managers who are tasked with the difficult task of executing and managing e-Governance projects in developing countries.
Describe the presence or absence of possible benefits for the participant, the participants as a group, the scientific community and/or society *[This section can be integrated in the section that describes the purpose, but it is critical information to assist with voluntary informed consent].*

**ARE THEIR ANY NEGATIVE CONSEQUENCES FOR ME IF I PARTICIPATE IN THE RESEARCH PROJECT?**

There are no negative consequences for you if you participate in this research project.

**WILL THE INFORMATION THAT I CONVEY TO THE RESEARCHER AND MY IDENTITY BE KEPT CONFIDENTIAL?**

Any information you convey to the researcher and your identity will be kept confidential

**HOW WILL THE RESEARCHER(S) PROTECT THE SECURITY OF DATA?**

Hard copies of your answers will be stored by the researcher for a minimum period of five years in a filing cabinet at the archive of Accra technical University for future research or academic purposes; electronic information will be stored on a password protected computer. Future use of the stored data will be subject to further Research Ethics Review and approval if applicable. Indicate how information will be destroyed if necessary *hard copies will be shredded andr electronic copies will be permanently deleted from the hard drive of the computer through the use of a relevant software programme.*

**WILL I RECEIVE PAYMENT OR ANY INCENTIVES FOR PARTICIPATING IN THIS STUDY?**
There will be no payment to you as aparticipant, however, if you incur any cost during the process of this research, the researcher shall reimburse you.

**HAS THE STUDY RECEIVED ETHICS APPROVAL**

This study has received written approval from the Research Ethics Review Committee of the School of Computing Unisa. A copy of the approval letter can be obtained from the researcher if you so wish.

**HOW WILL I BE INFORMED OF THE FINDINGS/RESULTS OF THE RESEARCH?**

If you would like to be informed of the final research findings, please contact Sylvester Hatsu on +233543937818 or slyhatsu@gmail.com. The findings are accessible for <insert time frame>. Please do not use home telephone numbers. Departmental and/or mobile phone numbers are acceptable.
Should you require any further information or want to contact the researcher about any aspect of this study, please contact **Sylvester Hatsu, +233543937818, slyhatsu@gmail**. Should you have concerns about the way in which the research has been conducted, you may contact Prof. Ernest **Ngassam, eketcha@gmail.com, +27-(0)12-429 6865**. Contact the research ethics chairperson of the <insert name of the committee, the name of the research ethics chairperson and contact details here, including email, internal phone number and fax number> if you have any ethical concerns.

Thank you for taking time to read this information sheet and for participating in this study.
Thank you.

Sylvester Hatsu

**Appendix B**

*In case of reply the **number** and*
***date** of this letter should be **quoted***

*Tel No: +233-(0)30-266-6465*
*Fax No:+233-(0)30-266-7114*

**Republic of Ghana**

**MINISTRY OF COMMUNICATIONS**
**P. O. BOX M.38**
**ACCRA**

My Ref. No: SCR/HA 277/297/018

Your Ref. No:

2nd May, 2017

The Ag. Director General
National Information Technology Agency
Accra

**RE: REQUEST TO UNDERTAKE RESEARCH IN A FRAMEWORK FOR BENCH MARKING E-GOVERNANCE PROJECTS IN DEVELOPING COUNTRIES**

The Ministry is in receipt of a letter dated 20th March 2017 from Mr. Sylvester Hatsu, Doctoral Student, School of Computing at the University of South Africa seeking to undertake a research on a framework for benchmarking e-governance projects in developing countries.

In this regard, we request NITA to grant audience and support the gentleman to carry out the research.

Find enclosed a questionnaire in that direction for your response.

Thank you.

**DESMOND BOATENG**
**DIRECTOR/PPME**
**FOR: MINISTER**

cc: Mr. Sylvester Hatsu
School of Computing
Dept. of Information System
University of South Africa

**Appendix C**

**SURVEY QUESTIONNAIRE FOR E-GOVERNANCE EXPERTS**

**An Integrated Framework for Benchmarking e-Gov Implementation in Developing Countries**

**Dear Respondent,**

This survey is part of a research project to develop an integrated framework for benchmarking e-Gov implementation in developing countries. You are kindly requested to indicate your *expert* opinion by ticking one of the responses and also provide answers where necessary which best fits the actual situation.

You are assured that the information gathered shall strictly be used for academic purposes only. Thank you for taking time out of your busy schedule to respond to these questions.

**Section A: Demographics**

1. Gender [ ] Male [ ] Female

2. Age Group? **a.**20 - 29 years [ ] **b.** 30-39 years [ ] **c.** 40-49 years [ ] **d.** 51- 59 years [ ] **e.** 60 and above [ ]

3. Job Title ..................................................

4. How long have you worked in the current position (please tick applicable)?**a.** 0-5 years [ ] **b.** 6-10 years [ ] **c.** 11-20 years [ ] **d.** 21-30 years [ ] **e.** Over 30 years [ ]

5. Area of specialty ...........................................................

6. Name of Institution of Affiliation................................................

7. Highest level of Education? **a.** Master's degree [ ] b. Doctorate degree [ ] **c.** Post doctoral [ ]

**Section B: Pre-Initiation Layer**

8. Based on your depth of expertise, how does governance and policy shape the ICT landscape of a developing country looking to deploy e-governance initiatives?.......................................................................................................................
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9. In what ways does stakeholder participation and the crafting of an e-Gov vision promotes outreach prior to e-Gov implementation in a developing country?
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10. Do you agree with the components of the pre-initiation layer? **Yes** [ ] **No** [ ]

11. Is the pre-initiation layer comprehensive enough? **Yes** [ ] **No** [ ]

12. Any suggestions/comments on the pre-initiation layer?..........................................................
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**Section C: Monitoring and Evaluation (M&E) Layer**

13. Do you agree with the components of the M&E layer? **Yes** [ ] **No** [ ]

14. Is the monitoring and evaluation layer comprehensive enough? **Yes** [ ] **No** [ ]

15. Each stage in an e-Gov project life cycle requires particular critical success factors if e-Gov implementation is to be successful. **Yes** [ ] **No** [ ]

16. Based on your expertise, which stage in the project life cycle can be considered as the most critical and why?

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17. Any suggestions/comments on the monitoring and evaluation layer?..................................
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**Section D: Impact Assessment Layer**

18. Do you agree with the components of the Impact Assessment layer? **Yes** [ ] **No** [ ]

9. In what ways does stakeholder participation and the crafting of an e-Gov vision promotes outreach prior to e-Gov implementation in a developing country?
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10. Do you agree with the components of the pre-initiation layer? **Yes** [ ] **No** [ ]

11. Is the pre-initiation layer comprehensive enough? **Yes** [ ] **No** [ ]

12. Any suggestions/comments on the pre-initiation layer?........................................................
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**Section C: Monitoring and Evaluation (M&E) Layer**

13. Do you agree with the components of the M&E layer? **Yes** [ ] **No** [ ]

14. Is the monitoring and evaluation layer comprehensive enough? **Yes** [ ] **No** [ ]

15. Each stage in an e-Gov project life cycle requires particular critical success factors if e-Gov implementation is to be successful. **Yes** [ ] **No** [ ]

16. Based on your expertise, which stage in the project life cycle can be considered as the most critical and why?
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17. Any suggestions/comments on the monitoring and evaluation layer?..................................
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**Section D: Impact Assessment Layer**

18. Do you agree with the components of the Impact Assessment layer? **Yes** [ ] **No** [ ]

19. Is the impact assessment layer comprehensive enough? **Yes** [ ] **No** [ ]

20. Any suggestions/comments on the pre-initiation layer?.......................................................
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**Section E: Integrated Framework**

21. The artifact depicted in Figure 1 is an actual representation of the reality of successful e-Gov implementation in developing countries. **Yes** [ ] **No** [ ]

22. The artifact captures the salient building blocks of a successful e-Gov implementation framework in developing countries. **Yes** [ ] **No** [ ]

23. What is your general impression about the proposed integrated framework?
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24. Any suggestions and or recommendations to improve the framework?...............................
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25. Would you agree with the proposition that the proposed artifact/integrated framework in Figure 1 adequately capture the peculiarity of e-gov implementation in developing countries, with explanation? ..................................................................
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**Appendix D**

UNIVERSITY OF SOUTH AFRICA

**School of Computing**

INTEGRATED FRAMEWORK FOR BENCHMARKING E-GOV IMPLEMENTATION IN DEVELOPING COUNTRIES

---

**Ethical clearance #:**

**Research permission #:**

COVER LETTER TO AN ANONYMOUS SURVEY

Dear Prospective participant,

You are invited to participate in a survey conducted by **Sylvester Hatsu** under the supervision of **Prof. Dr. Ernest Ketcha Ngassam**, a Professor, in the Department of Information Systems towards a PhD at the University of South Africa.

The survey you have received has been designed to study "**An Integrated Framework for Benchmarking e-Governance Projects in Developing Countries**." You were selected to participate in this survey because of your role in the implementation of e-Governance projects. By completing this survey, you agree that the information you provide may be used for research purposes, including dissemination through peer-reviewed publications and conference proceedings.

It is anticipated that the information we gain from this survey will help us to validate and help tp improve the Integrated E-Governance Project Framework. You are, however, under no obligation to complete the survey and you can withdraw from the study prior to submitting the survey. The survey is developed to be anonymous, meaning that we will have no way of connecting the information that you provide to you personally. Any identifying information that is obtained in connection with this survey will remain confidential and will be disclosed only with your permission or as required by law. If you choose to participate in this survey it will take up no more than 60 minutes of your time. You will not benefit from your participation as an individual, however, it is envisioned that the findings of this study will help improve e-Governance Project Success and, serve as a guide to development agencies in developing countries, to improve upon the mechanisms for managing e-governance projects in developing countries. We do not foresee that you will experience any negative consequences by completing the survey. The researcher(s) undertake to keep any information provided herein confidential, not to let it out of our possession and to report on the findings from the perspective of the participating group and not from the perspective of an individual.

The records will be kept for five years for audit purposes where after it will be permanently destroyed. Hard copies will be shredded and electronic versions will be permanently deleted from the hard drive of the computer. You will not be reimbursed or receive any incentives for your participation in the survey.

The research was reviewed and approved by the Ethics Committee of the School of Computing, University of South Africa. The primary researcher, Sylvester Hatsu, can be contacted during office hours at +233 543 937 818 and at e-mail address: slyhatsu@gmail.com between the hours 0800 to 1800 GMT. Should you have any questions regarding the ethical aspects of the study, you can contact the chairperson of the Ethics Committee of the School of Computing, University of South Africa, Dr Adele da Velga, via this email socethics@unisa.ac.za. Alternatively, you can report any serious unethical behaviour at the University's Toll Free Hotline 0800 86 96 93.

**Section A: Demographics**

1. Gender [ ] Male [ ] Female

2. Age Group? **a.** Less than 20 years [ ] **b.**20 - 29 years [ ] **c.** 30-39 years [ ] **d.** 40-49 years [ ] **e.** 51- 59 years [ ] **f.** 60 and above [ ]

3. Job Title ………………………………………………..

4. How long have you worked in the current position (please tick applicable)? **a.** 0-5 years [ ] **b.** 6-10 years [ ] **c.** 11-20 years [ ] **d.** 21-30 years [ ] **e.** Over 30 years [ ]

5. What is your highest level of Education? **a.** Diploma/HND [ ] **b.** Degree/ Professional [ ] **c.** Master's degree [ ] **d.** Doctorate degree [ ] **e.** Post doctoral [ ]

6. Email address …………………………………

**Section B: Project Life Cycle**

7. Please tick the stage(s) that make up your project management life cycle:

   i. *Planning* [ ]
   ii. *Definition* [ ]
   iii. *Deployment* [ ]
   iv. *Pre-initiation* [ ]
   v. *Impact Assessment* [ ]
   vi. *Close Down* [ ]
   vii. *Execution* [ ]

8. Which of the following project management life cycle process (PMLC) best describes the process you follow in the PMLC (Please tick only one)?

   i. *Definition → Planning → Execution → Deployment → Close Down* [ ]

   ii. *Pre-initiation → Definition → Planning → Execution → Deployment → Close Down* [ ]

   iii. *Pre-initiation → Definition → Planning → Execution → Deployment → Close Down → Impact* [ ]
   iv. *Assessment*

   v. *Definition → Planning → Execution → Deployment → Close Down → Impact Assessment* [ ]

   vi. *Others* [please state ] ……………………………………………………………………………………

**Section C – Monitoring and Evaluation**

9. (a) During which stage(s) in the project management life cycle do you conduct monitoring and evaluation? (as and when appropriate to your response, you may tick more than one response).

   i. *Planning* [ ]
   ii. *Definition* [ ]
   iii. *Deployment* [ ]
   iv. *Pre-initiation* [ ]
   v. *Impact Assessment* [ ]
   vi. *Close Down* [ ]
   vii. *Execution* [ ]
   viii. *Never conducted M&E in my project* [ ]

(b) If **response (viii)** (i.e. *never conducted M&E in my project*) was selected, please give reason(s):

*It is too costly* [ ]
*It is irrelevant* [ ]
*It is time consuming* [ ]
*It is not necessary* [ ]
Other (please specify) ………………………………………………………………………………

**10. Project Maturity/Maturity of Work Approach**

Using a Likert scale of 5 choices, ranging from "disagree completely" (1) to "agree completely" (5), please tick the box which corresponds to the appropriate response

| Statements | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| i. All project participants are positive towards the demands their projects may place on them | | | | | |
| ii. The organisation has a positive attitude to developing steadily better internal project management competence | | | | | |
| iii. There is a positive attitude to the well-planning of all sides of project work, both technical and human | | | | | |
| iv. There is a positive attitude in the organisation to the benefits of working across disciplinary borders when running projects | | | | | |
| v. The organisation has a clear picture of how to map resource requirements and risks in its projects | | | | | |
| vi. The organisation has a good understanding of the way effective project work must be organised and executed | | | | | |
| vii. The organisation has a good understanding of the complexity and difficulty in defining good project goals | | | | | |
| viii. The organisation has a good general competence in initiating and executing projects | | | | | |
| ix. The organisation has an approved Project Handbook or manual for the way internal projects should be initiated and run. | | | | | |
| x. There is a good interplay between the projects, the functional line managers, and stakeholders outside the project organisation | | | | | |
| xi. All projects have access to good IT support | | | | | |
| xii. All projects are executed in a professional manner, | | | | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| | and they achieve their goals within the planned time and budget | | | | | |
| xiii. | There is a positive will to attach organisational challenges through the use of simultaneous or successive projects | | | | | |
| xiv. | There is a great will amongst managers to avoid bureaucratic structures in executing project programs | | | | | |
| xv. | The organisation puts a lot of effort into combining technical projects with projects that enhance organisational development and competence building for individuals | | | | | |
| xvi. | Project managers and sub-project managers are not occupied by "territorial" fights, but concerned with working across projects and support other projects when appropriate | | | | | |
| xvii. | The organisation has a good knowledge of the way development work and can be better executed through project programs, i.e. several projects building on each other | | | | | |
| xviii. | The organisation has a good understanding for the need for ongoing projects to be supplied by new projects, or being terminated, when new and better projects ideas come up | | | | | |
| xix. | There is a mutual understanding that own organisations often can achieve even better goals and missions through establishing good project programs, i.e. combinations of projects that depend and support each other | | | | | |
| xx. | There is a good understanding of the benefits of having functional line work and project work integrated in order to better achieve intentions behind larger R&D efforts | | | | | |
| xxi. | The organisation has one or several project programs that are clearly defined and well aligned towards the achievement of specific aims within the organisation's overall mission | | | | | |
| xxii. | The project programs in the organisation are executed in close co-operation between project management and line management | | | | | |
| xxiii. | The organisation has an effective administrative | | | | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| | support system for the execution of project programs | | | | | |
| xiv. | The organisation has introduced working methods that effectively support the execution of its project programs | | | | | |
| xxv. | There is willingness in the organisation to create a project portfolio that include both high-risk and low-risk projects | | | | | |
| xvi. | There is willingness in the organisation to involve all staff in the development of new project ideas | | | | | |
| xvii. | There is willingness in organisation to involve all competent staff in the creation of both “hard” (technical) and “soft” (organisational development or HRM) projects | | | | | |
| viii. | There is willingness in the organisation to create a project portfolio with projects across functional disciplines | | | | | |
| xix. | The management has a good understanding of how to select projects for the organisation’s project portfolio | | | | | |
| xxx. | The organisation has a good knowledge in how to prioritise resources between projects within a project portfolio | | | | | |
| xxi. | The management has a good picture of how the project portfolio supports the current and future goals of the organisation | | | | | |
| xxii. | The management has a good perspective of which projects the organisation currently are dealing with, and how they are connected | | | | | |
| xiii. | The organisation has a clear strategy for the selection and control of the project portfolio | | | | | |
| xiv. | The organisation has good routines for both terminating current projects and including new ones in their project portfolio if conditions so demand | | | | | |
| xxv. | The organisation has good methods and systems for reporting and communicating between all projects within the project portfolio | | | | | |
| xvi. | The organisation has a Project Office, a Project Coordinator, or similar, who tracks and overviews all ongoing projects in the organisation | | | | | |

11. Please tick the key elements you capture during the monitoring and evaluation process

| | | |
|---|---|---|
| i. | Setting of performance targets | [ ] |
| ii. | Budgeting | [ ] |
| iii. | Scheduling | [ ] |
| iv. | Defining target beneficiaries | [ ] |
| v. | Capacity building for M&E | [ ] |
| vi. | Setting of KPIs for outcomes | [ ] |
| vii. | Defining duties and responsibilities | [ ] |
| viii. | Setting Project objectives | [ ] |
| ix. | Team formation | [ ] |
| x. | Training | [ ] |
| xi. | Documentation | [ ] |
| xii. | Project specification | [ ] |
| xiii. | Utilization of M&E data for decision-making | [ ] |
| xiv. | Result-orientedness | [ ] |
| xv. | Quality assessment | [ ] |
| xvi. | Status report feedback | [ ] |
| xvii. | Time and cost control | [ ] |

12. If you did tick pre-initiation in item #7 above, kindly tick which element(s) below is/are captured during the conduct of your e-Gov pre-initiation phase:

| | |
|---|---|
| *Governance* | [ ] |
| *Policy formulation* | [ ] |
| *Vision formulation* | [ ] |
| *Stakeholder participation* | [ ] |
| *ICT landscape* | [ ] |
| *Outreach* | [ ] |

13. If you did tick impact assessment in item #7 above, kindly tick which element(s) below is/are captured during the conduct of your e-Gov impact assessment:

| | |
|---|---|
| *Goals and expectations* | [ ] |
| *Baseline* | [ ] |
| *Data gathering* | [ ] |

*Analysis of data* [ ]

*Report Recommendations* [ ]

*Best Practices* [ ]

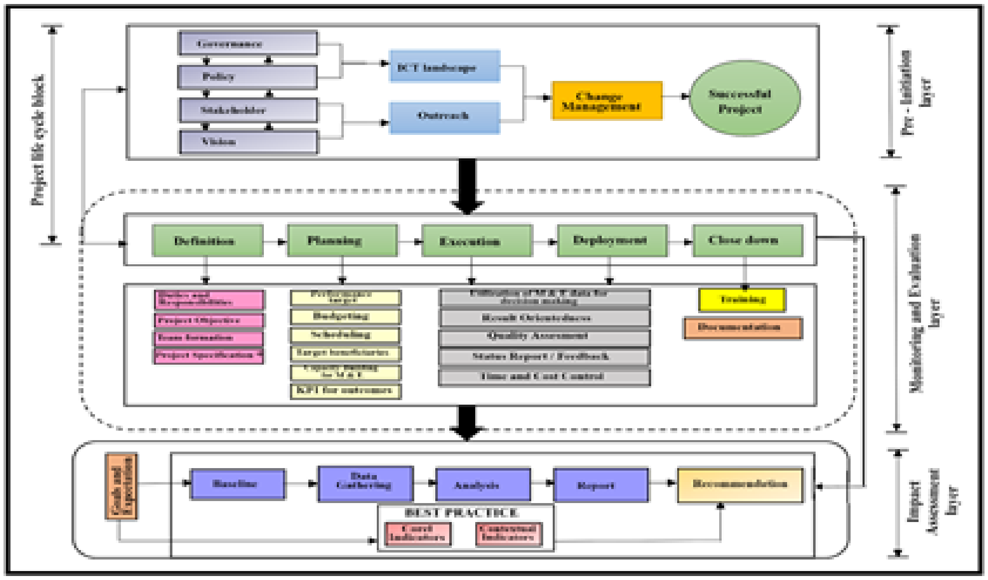
**14.** Would you consider your e-Gov project(s) a success? **Yes** [ ] **No** [ ]

If '**Yes**' please proceed to *question 15*.

If '**No**', please provide reason(s) …………………..……………………………………………….……….
…………………………………………………………………………………………………………...…
…………………………………………………………………………………………………………...…
……………………………………………………………………………………………………………...

15. In what ways would you consider your e-Gov project a success (Please tick the applicable)?

[ ] Overall Project costs were within stipulated budget
[ ] Project was completed within stipulated time
[ ] No scope creeps
[ ] Heavy adoption by stakeholders
[ ] Completed project was within the right predetermined quality levels.
[ ] The completed project has made the desired impact
[ ] Participation by target beneficiaries was very encouraging




1. The above framework is made up of three layers:
   - Pre-initiation layer
   - Monitoring and Evaluation layer
   - Impact Assessment layer

2. **The pre-initiation layer**

   The 7 key components are:
   - **Governance** – refers to the political environment
   - **Policy** – refers to government policies on ICT and e-gov within the country
   - **Stakeholders** – entails the players with interest in the project such as citizens, businesses, civil societies, government agencies
   - **Vision** – captures the goal or purpose of the e-Gov.
   - **Outreach** - sensitization and awareness creation among target beneficiaries
   - **ICT landscape** - deals with the technical prerequisites of e-Gov initiation and the extent of ICT usage amongst target beneficiaries.
   - **Change management** - The value of the change management component lies in the need cater to any necessary adjustments in a bid to adapt to changes in the ICT landscape as well as challenges that may arise during outreach.

3. **Monitoring and Evaluation Layer**

This layer is a combination of stages in the project life cycle and critical success factors specific to each stage in that project life cycle.

- The project life cycle component of this layer is composed of five stages namely, *definition, planning, execution, deployment* and *close down.*

4. **Impact Assessment Layer**
    - This layer is characterized by goals and expectations; baseline; data gathering; analysis; report; recommendation; and, best practices.

**Appendix E**

UNISA university of south africa

**UNISA COLLEGE OF SCIENCE, ENGINEERING AND TECHNOLOGY'S (CSET) RESEARCH AND ETHICS COMMITTEE**

18 September 2017

Ref #: 030/SH/2017/CSET_SOC
Name: S. Hatsu
Student #: 55406998

Dear Mr. S. Hatsu

**Decision: Ethics Approval for five years (Humans involved)**

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OFFICE OF THE EXECUTIVE DEAN
College of Science, Engineering and Technology

**Researcher:** S. Hatsu,
P.O. Box LG. 4., Legon, Accra Ghana
55406998@mylife.unisa.ac.za, +233 543 937 818

**Supervisor (s):** Prof E.K. Ngassam
eketcha@gmail.com, +27 82 355 2519

**Proposal:** A Framework for Benchmarking e-Governance Projects in Developing Countries

**Qualification:** PhD Information Systems

Thank you for the application for research ethics clearance by the Unisa College of Science, Engineering and Technology's (CSET) Research and Ethics Committee for the above mentioned research. Ethics approval is granted for five years from 18 September 2017 to 18 September 2022.

1. The researcher will ensure that the research project adheres to the values and principles expressed in the UNISA Policy on Research Ethics.
2. Any adverse circumstance arising in the undertaking of the research project that is relevant to the ethicality of the study, as well as changes in the methodology, should be communicated in writing to the Unisa College of Science, Engineering and Technology's (CSET) Research and Ethics Committee. An amended application could

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be requested if there are substantial changes from the existing proposal, especially if those changes affect any of the study-related risks for the research participants.

3. The researcher will ensure that the research project adheres to any applicable national legislation, professional codes of conduct, institutional guidelines and scientific standards relevant to the specific field of study.
4. Only de-identified research data may be used for secondary research purposes in future on condition that the research objectives are similar to those of the original research. Secondary use of identifiable human research data require additional ethics clearance.

*Note:*

*The reference number 030/SH/2017/CSET_SOC should be clearly indicated on all forms of communication with the intended research participants, as well as with the Unisa College of Science, Engineering and Technology's (CSET) Research and Ethics Committee*

Yours sincerely

Adele da Veiga

Dr. A Da Veiga

Chair: Ethics Sub-Committee School of Computing, CSET

Prof I. Osunmakinde

Director: School of Computing, CSET

(PROF IW ADDERTON)

Prof B. Mamba

Executive Dean: College of Science, Engineering and Technology (CSET)



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## Appendix F

15th January 2019

**TO WHOM IT MAY CONCERN**

This is certify the I have English language edited the following Ph D dissertation

**A FRAMEWORK FOR BENCHMARKING E-GOVERNANCE PROJECTS IN DEVELOPING COUNTRIES**

by

**SYLVESTER HATSU**

College of Science, Engineering and Technology

at the

University of South Africa

Regards.

Signed

Kathleen Wood (ID no 4603190074083)
Academic Language Editor

## Appendix G

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Turnitin Originality Report

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