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THE E-GOVERNMENT ARTIFACT IN THE CONTEXT OF A DEVELOPING COUNTRY: TOWARDS A NOMADIC FRAMEWORK

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THESIS ABSTRACT

THE E-GOVERNMENT ARTIFACT IN THE CONTEXT OF A DEVELOPING COUNTRY: TOWARDS A NOMADIC FRAMEWORK

This thesis is concerned with exploring alternative conceptualizations of the e-government artifact relevant to developing countries in Africa. The premise is that e-government, as an artifact of human conception, remains relatively poorly developed at the levels of theory, methodologies and practice. The investigation is focused on two problematic areas of e-government: its conceptualization and its operationalization as an artifact. There is evidence to suggest that conceptualization of e-government takes place at various levels: international, national, local. The thesis therefore explores how e-government is taking form by focusing on the following research question:

"How is the e-government artifact conceptualized in the context of a developing country"?

The analysis draws on various perspectives; some of which are grounded on empirical results of the study, while others are based on an analysis of literature. Under the alienating conditions of social exclusion, the emergent e-government artifact emerges as an *evolving and technical artifact, with strong managerialist orientations of augmenting and reinforcing central governments control over its polity*. To achieve this defining logic, the focus or ideology for addressing the social problem of governance is that of *information Taylorism* with an emphasis on economic rationality and some form of political rationality. Two consequences are highlighted:

- an evolution of public administration towards a technocracy, and
- increasing the efficiency of the bureaucracy through managerialization.

To address the shortcomings of this artifact concept, the study further presents literature and insights from prior analyses to underpin a *nomadic e-government model for building information infrastructures (NECE Framework)*. The emphasis of the framework is on the need to adopt long term organizing visions in building these infrastructures by focusing on using the existing installed base as a foundation. The nomadic framework, anchored on strong modular design borrowed from an information infrastructure perspective, is clustered around three major layers of building *confident local communities*; building *nomadic networks of governance* and building *flexible infrastructures*. The 'glue', cementing these layers elevates a critical need for building *social, human, digital and physical resources* targeting the individuals, various organizing forms and formal institutions, services and physical infrastructure respectively. Such an approach to building an e-government information infrastructure is postulated to minimize the unintended negative social implications of its adoption.

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DEDICATION

To the memory of my mother, Isdora Auma Ochara (1946-2004), father, Benjamin Ochara Omboga (1938-1986) and sister, Elizabeth Adhiambo Opere (1962-1992).

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CHAPTER ONE

INTRODUCTION

1.1 BACKGROUND TO THE RESEARCH PROBLEM

This thesis is concerned with exploring alternative conceptualizations of the e-government artifact relevant to African developing countries. E-Government, as a concept primarily involving the use of information and communications technologies (ICTs), has partly been spurred by a trend where many governments have been reforming their public sector in order to meet the aspirations of their citizens. E-Government is generally regarded as a way of providing government services electronically, usually by relying on the Internet infrastructure to reduce the physical character of customer transactions (Calista, D.J. & Melitsksi, J. (2007). Calista, 2007; Esteves et al, 2008) or by using Internet-based applications to enhance government functionality (Ladner, Petry and McGreedy, 2008).

The electronic provision of government services calls for an appropriate use of ICT for advancing the goals of the public sector, and is typically aimed at creating an enabling environment for social and economic growth (UN, 2008). However while e-government continues to be touted as an initiative for the transformation of government, it is still vague as a concept partly due to its recent origins (Gronlund, 2005) and the lack of an in depth recognition of its complex political and institutional environments (Yildiz, 2007). The vagueness and foreignness of e-government implies that a majority of developing countries are still in the process of exploring the meaning of the e-government artifact as an object of human conception (Muganda-Ochara, 2008). It is still a nascent concept considering that dedicated e-government journals started appearing in 2005, even though there were already written works on e-government (Gronlund, 2005). However, as a concept, its origins, in terms of formal recognition, were in the late 1990s, primarily since the advent of the Internet on a commercial scale (Grondlund, 2005; UN, 2008). Tying its recent origins to concepts of technology transfer means that it is still taking form in Africa.

Borrowing from Dabrowska's (2001) approach to the study of the meaning of telehealth, this study adopts an analytical approach to attempt to understand the meaning of e-government in Kenya and the social implications of its emerging form. The background to the articulation of the research problem is partly informed by the 'foreignness' of the concept of e-government, which Heeks (2002) demonstrates is primarily imported from Western thinking. The articulation of the

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research problem also emanates from the current dominant focus of governance reforms, critically driving the public administration systems agenda of developing countries. There is also what may be regarded as disciplinary interplay around the concept of e-government. Information Systems (IS) largely presenting a tone of the transformative potential of adoption of e-government, while Public Administration mostly presents an evolutionary tone of the potentialities of e-government. In addition, knowledge on the meaning of e-government is disproportionately biased in favor of its origins in the Western world, which conjures up possibilities as to why there have been reported failures in many developing countries (Heeks, 2002).

The research problem is thus premised on the foreignness and vagueness of the concept of e-government as a Western import into African countries and recommended as an instrument for achieving governance reforms (Heeks, 2002; Heeks and Bailur, 2007). Its recent origins therefore qualifies it as an emerging IT-based innovation, whose emergence is still characterized by 'din and confusion' and which is still in "an immature state, puzzling as to its benefits, future prospects, and long' term form" (Swanson and Ramiller (1997, pp 459). The din characterizing the emergence of the organizing vision of e-government can be glimpsed from various reported failures of e-government projects, not only in Africa, but in other sections of the world (e.g. Heeks, 2002). The images being portrayed by the reported failures of e-government initiatives projects its artifact concept as inadequate and still taking form in the African context and therefore subject to various alternative conceptualizations.

This thesis argues that e-government, as an artifact of human conception, remains relatively poorly developed at the levels of theory, methodologies and practice. The investigation is focused on two problematic areas of e-government: its conceptualization and operationalization as an artifact. Conceptually, an illumination of the nature of the e-government artifact is sought in the context of a developing country. Meanings that are attached to the concept are assumed to be influenced by the contextual conditions and therefore the critical roles of the actors is recognized in this process. Given the interwoven nature of governance, meanings of e-government are assumed to emerge at different levels. Thus the study adopts a multi-level analysis in order to delineate what meanings of the different facets of e-government emerge. A study of telehealth by Dabrowska (2001) discovered that meanings of telehealth also take place at different levels of sense making. The processes used in establishing the concepts of telehealth result in meanings that are not always obvious or that may be contradictory. In like-fashion, there is strong evidence to suggest that conceptualization of e-government takes place at various levels. At the international level, there may be best practices being propagated by countries,

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technology vendors and even supra-national organizations such as United Nations (UN). At the national level, there are those involved in policy making, implementation and at local levels of policy interventions, whose emergent meanings may be contradictory.

Through a study of these processes, it is the aim of this thesis to find out how and by whom, meanings of e-government are created, whose interests are voiced and taken into account, and what the overriding aims of e-government projects are. The answers to these should point out possible social implications of implementing e-government with a view to developing a framework for its implementation. The thesis therefore responds operationally by proposing an alternative conceptualization of the e-government artifact by exposing the not so obvious implications of its governance mandate. This is a proposal based on a conceptual move from an e-government mandate that presently seeks to reinforce existing power structures towards a more pluralistic e-government mandate espousing social inclusiveness as its mantra.

In this thesis, a Critical Realist (CR) epistemology provided the overarching stance (Chapter Three). The suitability of CR stems from its view of reality as differentiated, structured and stratified and also its largely ontological concern of the questions it attempts to answer (Danermark et al, 2002).

This research has two key research motivations. First, Kenya, a developing country recognized as a economic powerhouse in Eastern Africa, has been implementing a broad-based public reform program partly founded on an e-government vision which was officially articulated in 2004 (GOK-EGS, 2004). The e-government vision has increasingly found a voice within the government's development framework of achieving economic prosperity (Waema and Mitullah, 2007). A number of institutions have been setup to help in the attainment of this vision. For instance, the Kenya E-Government Secretariat was set up in 2004 under the Office of the President to be an oversight body to galvanize all ICT projects within government aimed at enhancing service delivery of all the ministries. The Ministry of Information and Communications was set up in 2004, for the first time in the history of Kenya, mainly to handle the wider universal access goals to enable the citizens actively participate in a global economy which is increasingly knowledge-based (MoICT, 2008). The Ministry of Health, together with a consortium of non-governmental organizations (NGOs) and other development partners and health institutions have partnered under an initiative known as Afri Afya (www.afriafya.org) with the goal of improving access to health management information through the use of various ICTs.

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This research seeks to contribute to the attainment of this vision through an in-depth analysis of its motivations to articulate the emerging concept of e-government, and expose some of the unintended impacts of its conceptualization and propose an alternative approach to address attainment of the vision. Thus this research is motivated by the need to redress possible inadequate conceptualization of the e-government artifact as an object of human conception. An understanding of emergent meanings of e-government in Kenya can provide preliminary insight into how the process might unfold in other countries in Africa

The second motivation arises from the need to contribute to the accumulation of knowledge on experiences related to ICT projects based in Africa. As a new phenomenon in Africa (evident from when governments in the world have been articulating their E-Government strategies), there is currently a dearth of studies that have given in depth analyses of experiences based in Africa. A systematic and holistic analysis of these experiences can help guide an appropriate conceptualization of the e-government (as an IT-reliant artifact) phenomenon relevant for developing countries and this research seeks to contribute to this body of knowledge. This study therefore reinforces the efforts of the International Federation for Information Processing (IFIP) Working Group 9.4 on ICT in developing countries that specifically calls for articulating the social implications of computers in developing countries by collecting, exchanging and disseminating experiences of ICT implementation in developing countries.

The remaining parts of the chapter are structured as follows. The first situates the e-government agenda within the social problem of bad governance in developing countries. The second section presents e-government in Kenya as the context of the research, while third section reflects on certain key vocabularies of the thesis. The fourth and the last section provide an overview of the structure of the thesis.

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1.2 THE SOCIAL PROBLEM OF GOVERNANCE

This section provides a background to the empirical context in which e-government is taking form by grounding it within the domain of governance. The social problem that e-government seeks to redress in developing countries is that of improving good governance. Goldsmith (2007) contends that the overriding rationale for the quest for good governance reforms has been a belief that reforms can boost economic growth. That if good governance (in the form of transparent, accountable and inclusive governance) measures are established, then the consequence is an increase in performance of nation-states.

To provide further provide credence to the link between good governance and national development, the United Nations (2004) with their Millennium Development Goals (MDGs) features good governance as a means to bringing about development and fighting poverty (Goldsmith, 2007), and that they are also a basis for sustained economic growth and employment creation (UN, 2005). Empirical studies highlight that non-transparent, unaccountable, and restricted governance is detrimental to development and welfare, while the opposite tendency is advantageous (Acemoglu, Johnson, and Robinson 2001; Rodrik, Subramanian, and Trebbi 2004; Goldsmith, 2007). These findings reinforce the idea that realistic improvements in governance could raise per capita incomes significantly over the long run, and often have positive effects even over relatively short periods (Kaufmann, Kraay, and Mastruzzi, 2006).

Mekolo and Restas' (2005) analysis of the conceptualization of governance in Africa revealed that the debate is also in line with the thinking that good governance results in development. While recognizing that governance is linked to specific country contexts, the authors highlight that it has also emerged as a concept in Africa within the framework which take cognizance of MDGs, Poverty Action Strategies, the Heavily Indebted Poor Countries Initiative, the New Partnership for Africa's Development (NEPAD), the Brussels Programme of Action, as well as many initiatives currently underway in Africa (Mekolo and Resta, 2005). Within the framework of NEPAD, the authors argue that good public governance has a central role to play in reaching certain socio-economic objectives with key functional areas being *E-Government and Knowledge Management; developing Human Capital within the public sector; Public Participation (citizen/government relations); and Service Delivery Innovation/Re-engineering.* Of note is that for African countries to achieve good governance, they not only need to straddle the challenge of resource limitations, but also address the weak institutional structures of inter (between local authorities) *local government* and strategic planning, central guidance as well as *coordination among governance institutions* (Mekolo and Resta, 2005).

In order to handle governance challenges, African countries have evolved a converged concept of governance anchored on agreed evaluative parameters such as involvement of citizenry in governance, positive perceptions of citizenry towards governance, security of people and businesses and poverty eradication. Thus the converged concept of governance is seen as an outcome of evaluation processes as well as a pro-active leadership espousing values of efficiency and fairness and to the adherence of certain universal values. The attainment of this converged concept of good governance is now touted as critically dependent on e-government as a reform instrument (Heeks, 2002, Muganda-Ochara, 2008).

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1.3 THE CONTEXT OF THE CASE STUDY

When the converged concept of good governance in Africa is assessed within the context of Africa and its institutions, then certain policy texts becomes quite illuminating. For instance in Kenya, Prof. Anyang' Nyong'o, a former Kenyan minister for planning and national development (2002-2005) made this comment during the inauguration of the Economic Strategy for Wealth and Employment Creation (GOK-ERS, 2004):

> During the past two decades, we have seen Kenya slide systematically into the abyss of underdevelopment and hopelessness. Poverty has increased, unemployment has become rampant, insecurity has visited almost every homestead, hunger is prevalent among the poor, and the health condition of the people has declined significantly, while corruption and bad governance became entrenched as political oppression weighed heavily on the people.
>
> We now realize that the unfinished business of **reforming the state and its operations** so that **good governance** can prevail under democracy and the rule of law is vital to the recovery process. While maintaining a sound macro-economic framework, this Recovery Program gives priority to **good governance and the rule of law** as the foundation of our economic growth.

The policy perspective highlighted in the above comments points to the link between good governance and economic progress. While the Economic Recovery Strategy (GOK-ERS, 2004) dwelt at length about the role of a number of sectors in achieving economic progress, the role of ICT, which provides the organizational dimension of the e-government problematic was also given prominence in the policy document. For instance under the Macro-Economic objectives, ICT is touted to contribute significantly to the overall growth, increasing by an annual average growth rate of 5 per cent. Under the Budgetary and Public Expenditure reforms, the focus is on:

> Improving reporting and accountability by establishing regular reporting of flows in and out of government accounts, implementing the Integrated Financial Management System (IFMIS), strengthening oversight bodies and automating the internal audit function (GOK-ERS, 2004)

Under Public Sector Reforms as well as the Trade and Industry sectors, the focus is on:

- Developing an ICT policy for the civil service […] to progressively transform into an e-government in a coordinated manner. This will increase efficiency in government and at the same time help to reduce pilferage and misappropriation of funds;
- Operationalizing the ICT policy in the public service including full implementation of all ICT programmes such as the Integrated Payroll and Personnel Database (IPPD) system for both the civil service and the teachers' service to provide a basis for improved establishment control and integrity of the payroll system;
- Computerize the entire system of investment-related offices including the immigration, customs, security vetting services, lands office, and registrar of companies (among others) to ensure that investors and the Investment Authority have real time access to relevant data and information;

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In addition, the Economic Recovery Strategy identifies ICT as a cross-cutting sector that has potential economic value both in the rural and urban areas. ICT is important to the realization of the required improvement in productivity and empowerment of the citizenry. The sector has however not been able to achieve its objectives due to low penetration of ICT usage in Kenya especially in the rural and marginal areas due to high cost of equipment, poor telephone communications service, and lack of power supply. In general however, ICT has been bedeviled by the lack of awareness, priority, focus, coordination, resources and capacity (GOK-ERS, 2004).

It is in light of these challenges that the Government of Kenya drew up specific measures by establishing an Inter-Ministerial Committee to 'mainstream' ICT into government operations so as to enhance efficiency and productivity, continuous investment in adequate ICT education and training, implement a well targeted tax reduction and/or tax incentives on both computer software and hardware to make them affordable to micro-enterprises and low-income earners, and developed a master plan for e-government by end of June 2004.

It is within the quest for governance reforms, as voiced in the Economic Recovery Strategy, that Kenya's E-Government Strategy has its birthplace - but recognizing that these reforms are meant to achieve good governance. The policies addressing the e-government goals are analyzed in Chapter Four of the thesis. However, it suffices at this point to recognize the alignment of e-government within the converged concept of governance reforms in Africa. This is in line with proposals for Critical Realist studies of the need to highlight the social problem that the study seeks to resolve beforehand, as opposed to the traditional research questions characteristics of other philosophical leanings (Fairclough, 2005).

Kenya's E-Government vision has been expressed in other policy documents as well, notably, the National ICT Strategy (GOK-KNICT, 2006) and the E-Government Strategy (GOK-EGS, 2004). All these policy texts envisage accelerating the ongoing governance reforms and more specifically, those under the Kenya Local Government Reform Program (KLGRP) such as expanding the coverage of an Integrated Financial Management System (IFMIS), strengthening monitoring and implementing the local Government reform initiatives; and introducing information technology in personnel management. These initiatives are expected to lead to improvement in performance and promote good governance. In this thesis, the choice of an e-government initiative within the Ministry of Local Government is due to the vantage point that they occupy in the quest for realization of a responsive and decentralized governance structure (GOK-ERS, 2004) even though there is recognition that:

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> Unlike many other countries in Africa, there has been no serious attempt to decentralize powers and resources in Kenya in recent years, although there are currently constitutional reform proposals for extensive devolution. What there has been is a Local Government Reform Program (KLGRP), starting in the mid-1990s, initially funded by World Bank. This program has sought to strengthen the existing local governments, many of which were in a parlous state and some of which were completely insolvent (Lewa, M., and Devas, N., 2004).

Therefore, justification for zeroing in on local authorities at the micro-level is based on Danermark et al (2002) who argue that the choice of a critical case is based on the *property of interest(improved service delivery through e-government)being found, but in all likelihood missing in the selected case(s).* The interpretation adopted in this thesis is that local authorities should be the epitome of e-government realization, but by all intents and purposes, this is largely absent or barely present in the context of e-government in Kenya. E-Government is currently a substantive issue of reform for many governments throughout the world with its promise to improve governance.

The sub-section that follows provides some background to reform initiatives that have led to the adoption of e-government within the Ministry of Local Government (MoLG). Some background information on Kenya is provided which touch on the telecommunications sector, as a key sector that provides the infrastructure for e-government. The presentation of context in the first chapter borrows from Navarra (2007), who did a study of e-government activities in the context of Jordan.

1.3.1 KENYA: BACKGROUND

Kenya shares borders with Ethiopia, Sudan, Uganda, Tanzania and Somalia (Figure 1.1). The population groups in Kenya are mainly black Africans (99%), with a small number of non-Africans (1%). The two official languages are Kiswahili and English. Kiswahili is the main language for conducting business transactions and is also used in government offices since for 99% of the population, English is considered as a second, third or even fourth language.

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Figure 1.1 Kenya Map (Source: CIA, 2008)

Table 1.1 provides key socio-economic indicators for Kenya. The population estimate for 2008 is based on a projected rate of 2.8% natural population increase [UN-WPP, 2008]. This gives an estimate of about 38,550,000 in 2008.

Table 1.1 Key Indicators of Kenya

Indicator	Number	Source
Population (2008 Estimate)	38,550,000	UN-WPP, 2008
Literacy (2007)	85.1%	CIA, 2008
GDP (2007 Estimate)	US$ 59 Billion	PRB, 2008
Telephone (Mainlines) (March 2008)	286,729	CCK, 2008
Telephone (Cellular) (March 2008 estimate)	11,986,007Million	CCK, 2008
Internet Users (2008)	3.5 Million	CCK, 2008
Number of Computers(2008 estimate)	1.7 Million	Håndværksrådet, 2006

Kenya's economy has grown steadily since 2003 (4.9% in 2004, 5.8% in 2005 and 6.1% in 2006; 2007 estimate is 6.4% and this trend is expected to continue despite a possible slowdown due to the unrest and the chaos that marred the December 2007 elections and the cooling of the global economic climate. The services sector has always played a strong role in the growth of the economy. Services contribute an average of 56% to the growth, agriculture 27%, while manufacturing contributes about 17%. The government is striving towards a sustained economic

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growth rate of 10% annually over the next 25 years in order to achieve its developmental goals (Gakuru, 2007).

The liberalization of the telecommunication sector has been ongoing since the 1990s. Major policy changes in the sector can be traced to the enactment of the Kenya Communications act 1998 (KCA) and the repeal of the Kenya Posts and Telecommunications Corporation (KP & TC) Act [www.cck.go.ke]. The KCA of 1998 resulted in the unbundling of the KP & TC (sole telecommunications operator in the country prior to 1998) into three entities: Communications Commission of Kenya (CCK); Telkom Kenya (as a national telecommunications provider) and Posta (for postal services). The history of the Internet in Kenya however dates back to 1994 when the African Regional Center for Computing (ARCC) was set up to offer full Internet connectivity in the country through the support of the US National Science Foundation (Kenya Institute of Management, 1999). The liberalization of the sector also resulted in the creation of a National Task Force on electronic commerce in May 1999 with a view to providing an enabling environment for electronic trade in the country. As a result, awareness of the potential of Internet and its related activities such as e-government, increased with many stakeholders indicating interests in applying Internet in their business. By 2000 it was estimated that the number of Internet users was around 30,000-50,000 with a total of 34 Internet Service Providers (ISPs) (Odero and Mitula, 2007). The next section reflects on the background of ICT adoption in various government ministries by focusing on the MoLG.

1.3.2 LOCAL GOVERNMENT REFORMS IN KENYA

The mandate of the Ministry of Local Government (MoLG) of Kenya is to formulate and implement local authorities' policy geared towards ensuring:

- Oversight, management and development support to cities, municipalities, towns and county councils by-laws for local authorities (LAs).
- Support for capacity building for LAs
- Provide oversight and management support to the various provident, trust and pensions funds that the LAs need to support their service delivery mandates.

There are a total of 175 semi-autonomous LAs in Kenya distributed throughout the country. Under the local government act of Kenya, these LAs form the basis of providing certain services such as building and maintaining roads, education, health, water provision, etc. However, over the years, they have faced challenges in service provision and management which prompted the central government through the MoLG to initiate reforms meant to rationalize central-local financial relations, improving LA financial management and improving service provision. The

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MoLG therefore set up secretariat, known as the Kenya Local Government Reform Program (KLGRP) to spearhead these reforms. Therefore, all reform initiatives of the LAs are under the KLGRP. One of the reform initiatives connected to the improvement of financial management and service provision is the continued implementation of the Local Authority Integrated Financial Management Information Systems (LAIFOMS) which the 2007 Minister of Local Government regards as encouraging use of e-government which will help centralize information on usage of monies given to LAs (Kombo, 2007).

Therefore, LAIFOMS is regarded as part of the overall e-government initiative as a new approach capable of enhancing the management of LAs in Kenya since the late 1990s (section below). Its emergence is linked to the ongoing computerization efforts, which culminated in the articulation of Government intentions in the National ICT Strategy and the E-Government Strategy. When considered as an innovation, Rogers (1995) recommends an assessment of prior conditions of a particular innovation in order to understand how the need for it arose (Rogers, 1995). In the case of LAIFOMS (analyses in Chapter Three and Seven), the need for its adoption is intertwined with the reform agenda in Kenya since the early 1990s (Kelly, 2003). Thus a brief on why the reforms initiatives arose can aid in pinpointing the 'push' for the LAIFOMS in local authorities (Las).

On attaining independence from Britain in 1963, Kenya inherited a dual system of government consisting of LAs and de-concentrated units of Central Government Ministries. The LAs were relatively empowered institutions with their own revenue bases as well as grants from the Central Government. The activities of the local government were captured in the Local Government Act, which was first enacted in 1963. Soon after independence, there was a systematic process of dis-empowering the LAs. This process was largely driven by the civil servants and subsequently the politicians (JICA, 2007). The politicians claimed that having many centers of power in the country threatened the unity if the country.

The centralization of power by the national government took away major functions and powers of the LAs, through transfer of these powers to other line ministries or other parallel service provision channels. The Graduated Personal Tax, one of the major sources of revenue for LAs was abolished in 1974, which severely crippled the viability of LAs. In addition, the Central Government, through political maneuvers, sub-divided some of these LAs, and continued to exert their authority through the appointment of senior staff (Town Clerks or Chief Executive Officers) to run these LAs. Through the 1970s and 1980s, both the various Line Ministries and the structure of Provincial Administration (running from the Office of the president down to the sub-locations), became stronger, whereby the latter, apart from its traditional role of overseer of

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law and order, also became the coordinator of development. During these two decades, the Line Ministries became the major service providers, working through offices at the province, district and locational level, directly managing delivery of services (JICA, 2007). By the early 1990s, most of the LAs were completely 'toothless' and unviable, with their formally recognized role being that of disposing of the dead (Stamp, 1986).

Therefore, earlier sanguine expectations of successfully transplanting British local government in Kenya were completely shattered by the start of the 1990s. The result was:

> Chaos and bankruptcy of local councils; [.....], democracy emptied of content, with local participants being deprived both of authority to make decisions and of financial resources (Mawhood, 1983; p. 1).

The future of local government, espousing democratic participation in decision making and equitable allocation of resources was therefore predicted as rather bleak (Oyugi, 1983). The emasculation of the LAs and its effects were largely unnoticed by the Central Government in the 1960s, 1970s and the 1980s since the Kenyan economy was doing well during those decades.

However, there was a 'jolt' in 1982 from an attempted *coup de tat* which signaled some discontent in the populace concerning various issues, not least among them service delivery and increasing poverty. This prompted the government to initiate the District Focus for Rural Development (DFRD); ostensibly to spearhead development initiatives at the local levels, in parallel to whatever development the LAs were still able to undertake. The DFRD was the first serious attempt at noticing the disconnect that resulted from emasculating the LAs. This was eventually followed by the Poverty Reduction Strategy Paper (PRSP), which was enacted after a series of consultations with the public and other citizens. These consultations arose because the late 1980s and early 1990s were generally periods of political disquiet in Kenya especially after a general breakdown of governance structures and local service delivery towards the end of the 1990s (Muiruri, 2004).

The 1990s also saw the involvement of development partners such as World Bank 'tying' their aid to certain conditionalities such as the Structural Adjustment Programs (SAPs). The emergence of reforms and the link of LAIFOMS adoption can therefore be traced to these conditions in the macro environment.

Since the 1990s, with prompting from development partners, the Government of Kenya has been involved in a number of reform initiatives characterized by various phases. These governance reforms have been targeted at the public sector to ensure enhancement of service delivery and

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goods to the public (Odhiambo, 2002). There have been three distinct phases that have been associated with these reforms: Phase I - focused on Cost Containment; Phase II on Performance improvement while Phase III has been focusing on refinement, consolidation and sustenance of these reforms (Odhiambo, 2002; Mitullah and Waema, 2007).

The mantra from the government and its supporters since the inception of the reforms has been that with better governance, there will be economic prosperity. One of the aspects that have been captured since adoption of Phase II of the reforms initiatives is the important role played by IT in achieving good governance. Phase II recognized widespread adoption of IT in Government as one of the priorities for achieving performance improvement. To this end, IT would aid in automation of information in Government as well as address the information infrastructure for the entire public service. Additionally, the government was to commence the path of developing a national ICT policy. There was also specific mention of the adoption of an Integrated Payroll and Personnel Database (IPPD) system (Odhiambo, 2002). IPPD system's goal was to aid in rationalization of staffing levels in the government in order to manage the wage bill.

While the Government of Kenya had been using ICT in various forms before, the attempt to link better governance with ICT can therefore be deemed to have been from 1998 with the commencement of Phase II. Figure 1.2 captures the various phases specifically linked to local government reforms.

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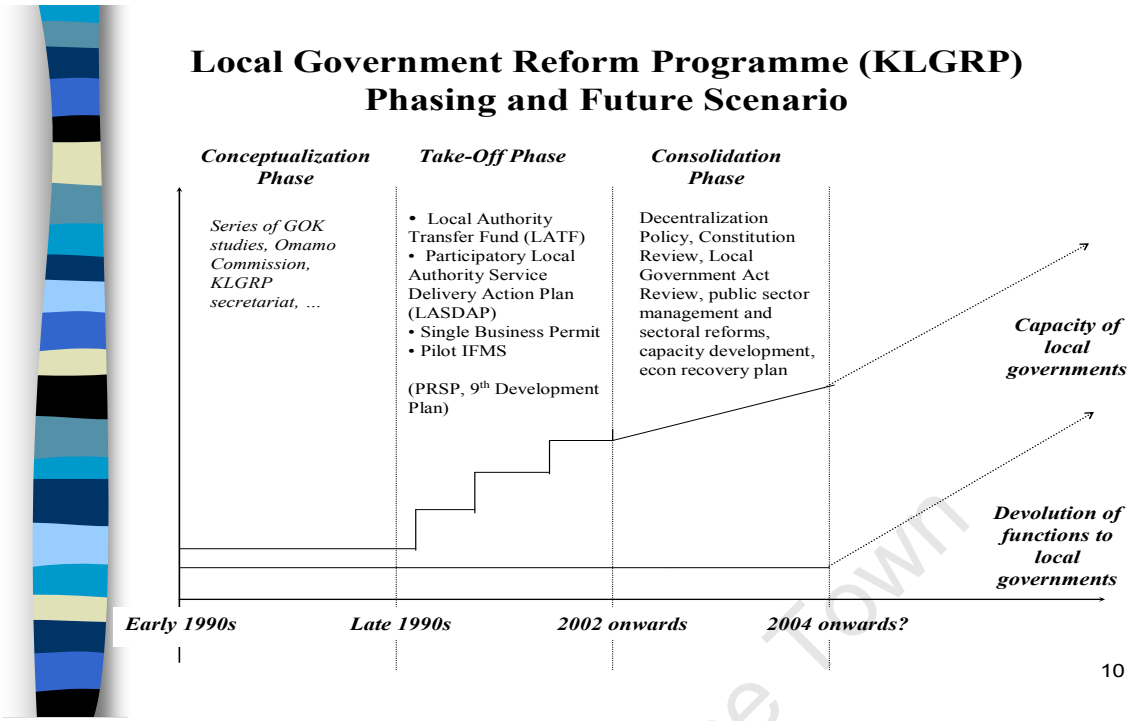

Figure 1.2: Local Government Reform Phases

In the contexts highlighted above, achieving the goals of reform initiatives is one of the highest priorities of the current administration (2002-2012) which won elections on a reform agenda. Thus in a premise to the forthcoming analysis of e-government in Kenya at various levels, the preliminary claim is that the country's engagement with e-government is linked to the social problem of the need to improve governance. This link is therefore studied in various chapters to gain a deeper understanding of the conceptualization of the e-government artifact in the context of Kenya.

1.4 DEFINITIONS OF KEY THESIS CONCEPTS

The terms that are considered integral and central to this thesis are unpacked and defined in this section. The terms E-Government, E-Government Artifact, Governance are defined/re-defined in the following paragraphs and also discussed in other chapters of the thesis.

1.4.1 E-GOVERNMENT

E-Government is regarded as an Internet-based innovation for the transformation of government service delivery. When viewed from an Information Systems (IS) perspective, the organizational basis of e-government recognizes the struggle by public sector organizations (government departments and agencies, quasi-government institutions or quangos) to make sense of the role of

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ICT in improving government functionality, how this fits in the governments' change process in service delivery and how the vision is sustained. The sense making activities normally result in many buzzwords, because the set of understandings that define applicability and use of the new innovation are still incomplete and unstable (Swanson and Ramiller, 1997). The nascent state of the concept of E-Government is also characterized by terms such as digital government, E-Governance, online government (Ladner et al, 2008).

1.4.2 E-GOVERNMENT ARTIFACT

The dominance of a search for e-government conceptualizations brings to the fore the technology artifact concept. This thesis adopts Orlikowski & Iacono (2001) definition of the artifact in which they regard the IT artifact as bundles of material and cultural properties which are packaged in some *socially recognizable form*. While calling for a need to refocus on the artifact concept as the core of the IS discipline, Orlikowski & Iacono (2001) IT-based artifact is contextual, thus suggesting that this socially and humanly recognizable IT 'form' differs, not only in essence but also in its effects. The IT artifact conceptualization was used as a basis for theorizing the e-government artifact since it relies on a cluster of various information technologies. The e-government artifact is therefore considered as the *essence* of public sector application of IT.

The argument (further advanced in Chapter Two) is that for the E-Government artifact to emerge in some recognizable social form, public sector organizations need to envisage *it* as a certain whole, in order for its effects to be recognizable. The need for understanding the socially recognizable form of E-Government is exacerbated because of its dependence on a cluster of technologies. Thus its properties (material, cultural and historical) are evidenced through the intentional actions of actors and the resultant effects. Thus in this thesis, the e-government artifact concept provides an anchoring metaphor for directing attention towards a search for the meanings of e-government in the context of Kenya.

1.4.3 GOVERNANCE

The thesis argues that the adoption of e-government is taking form within the greater quest for the attainment of effective governance goals of developing countries. A number of literature sources aids in grounding this perspective. Goldsmith (2005) suggests that the concept of governance has been proposed as a "knee-jerk" solution to inefficient government, and critiqued the concept of governance due to its vagueness, especially in its use in the literature. Lamour (1995) pointed out two connotations of governance. The first is the *good governance* perspective, which refers to the governments' focus on transparency, accountability, democracy,

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legitimacy and the placing of limits on state power (Goldsmith, 2005). The second connotation of the concept of governance and which is propounded by the supranational organizations such as World Bank and the UN- is that of *effective government*. Goldsmith (2005, p. 106) argues that

> This tension points to longstanding theoretical struggles in the social sciences: *good* government models draw on the traditions of pluralism and elitism, where politics are determinant in the final instance; *effective* government models draw on economically determinist approaches to politics, such as traditional Marxism, corporatism and contemporary neo-liberalism.

A debate on which perspective is right is not the agenda of this thesis. Recognizing that the governance agenda is complex and characterized by changing expectations over time, the definition adopted recognizes that the mandate pursued in developing countries in Africa is largely advocated by the international development community and often fervently embraced by domestic reformers. Many developing countries have embraced, willingly or otherwise, the importance of effective governance as a precondition for effective development and poverty alleviation and have added to the list of factors that are essential for it (Grindle, 2004).

The *effective governance* model has largely been influenced by the management paradigm of New Public Management (NPM) since the mid 1980s (Homburg, 2004). The argument is that NPM has now found a voice with the emergence of the e-government. Homburg (2004, Pp547), in his cryptic analysis of the analysis of the 'marriage' of NPM and e-government, argues that,

> The use of modern information technologies, like new public management techniques, affects the chief characteristics of the classic public administration paradigm, and therefore, they reshape the production, coordination, control, and direction processes that take place within the public sector.

1.4.4 ONTOLOGY

The concept of ontology and its relevance within a critical realist research agenda is explored further in Chapter Three. However for the clarity of the developing research argument, the attraction of critical realism as used in this thesis is its focus on ontology. Accordingly, reality is considered as complex, but it cannot be reduced to our interpretation of it. It does exist, and it is composed of three interrelated levels: (i) the real (deep) level of structures and generative mechanisms; (ii) the actual level of events and states of affairs; (iii) the empirical level of observed phenomena, perceptions and impressions. A search for the conceptual and real meaning(s) of the e-government artifact is argued in this thesis to be best underpinned by critical realism philosophical orientation, especially because there maybe conflictual view points.

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While not predicating the thesis argumentation in the next chapters, ontology is defined here as a set of assumptions about the nature of the reality of e-government (Heeks and Bailur, 2007). Ontology is therefore assumed to be focused on the rationality that ought to underpin the concept of e-government.

1.5 RESEARCH MAP

This thesis is divided into nine chapters. *Chapter One* provides a background to the main themes developed throughout the thesis. The research topic is introduced with its rationale; the research questions and approach are also highlighted. Definitions of various terms relevant for this thesis are provided.

Chapter Two is a presentation of various literature sources in order to place the current research endeavor within wider debates on the concept of e-government. The chapter lays out the thesis argumentation by discussing relevant literature in order to contextualize the research within the domain of Information Systems.

Chapter Three presents the adopted research framework and methods. Given the multi-level analysis, which involves analysis in four chapters, pointers as to the approaches used in the chapters are presented. However, the two main approaches given attention are the case study and the survey. Critical Realism, as the underpinning philosophy is also discussed.

Chapter Four provides the analytical approach and results of the analysis of policies related to e-government vision in Kenya. By using the qualitative approach of various readings and backed by various theoretical concepts, an interpretive analysis of three policy documents is undertaken. These are the E-Government Strategy; Freedom of Information Policy and the National ICT Policy.

Chapter Five presents a qualitative analysis of Internet diffusion in Kenya. The discussion proceeds by arguing that the Internet infrastructure is critical for e-government adoption. A

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qualitative framework is then used to assess the Internet diffusion pathway along several dimensions. In addition, implications for the way Internet is diffusing are presented in the chapter.

Chapter Six presents statistical analysis results of the survey components of the study. The survey reveals the perceptions of implementers of e-government in various ministries of the Kenya government. The perceptions are structured around how they conceptualize e-government and the expected impacts of e-government adoption. The results of factor analysis, reliability, correlation and canonical analysis are discussed. The interpretation of the statistical analysis is also presented.

Chapter Seven presents the analysis, interpretation and results of the case study. A description and analysis of the case study is presented using actor-network theory. Additional theoretical concepts are also employed to tease out the meaning of e-government in local contexts. The results of the case study are presented with possible implications of the meanings that are emergent.

Chapter Eight synthesizes the various results of the analyses chapters based on the social implications of the adoption of e-government in Kenya. These implications are highlighted and possible alternatives on how to resolve them are discussed. A framework for adoption of e-government is then presented based on the results and synthesis of other literature.

Chapter Nine contains the summary and evaluation of the study. The evaluation assesses the practical, theoretical and methodological contribution of the study. The focus of the summary is on the contribution of the thesis in the various chapters as well as the overall contribution in answering the research questions. The limitations of the study and suggestions for future research are also presented.

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CHAPTER TWO

THEORETICAL FOUNDATIONS OF THE E-GOVERNMENT ARTIFACT

2.1 INTRODUCTION

The chapter lays out a discussion of relevant literature in order to contextualize the research within IS. Two problematic aspects of the sense making process/artifact formation process of e-government are argued - the inadequacy of the current universal objectification of e-government which presumes ontological nihilism – which ignores that reality can be stratified (from realist view) and that universal objectification of the e-government artifact may result in 'poor and narrow practice' (Heeks & Bailur, 2007). Consequently, how the inquiry fits within the critical realist paradigm is positioned from an argument that e-government represents a multifaceted object of inquiry and therefore of necessity, multi-disciplinary from an academic perspective. The theoretical perspectives presented in this chapter recognize this multifaceted nature of e-government and narrows down to two main ones: Public Administration and Information Systems. The disciplinary perspective of Public Administration is used to illuminate certain aspects of the social problem of governance as a key anchor in this study.

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The Information Systems (IS) perspective adopted recognizes that the discipline deals with socio-technical hybrids, which are neither classified as natural or as human science, but rather is a composite set of technical and human resources for the management and deployment of information technology in organizations, institutions and the society at large (Ciborra, 2004). From this view, the thesis adopts the Organizing Vision (OV) metaphor of Swanson and Ramiller (1997) as a structuring device to understand how e-government is conceptualized within various focal communities struggling to make sense of the concept. The IS perspective is also used to argue for an Information Infrastructure view of building e-government infrastructure. Further, a preliminary review of literature on the transfer of ICT innovations was also relevant in order to understand how they are conceptualized and the likely impacts of these innovations in recipient developing countries.

2.2 THE ORGANIZING VISION OF E-GOVERNMENT

The organizing vision (OV) concept of Swanson & Ramiller (1997) is used as a structuring metaphor for this section of the thesis. The two authors consider an OV as a focal community *idea* for applying IS related technologies in organizations-which apostates well with the definition of e-government in the previous chapter. They later characterize an OV as a construction in discourse emergent from heterogeneous collectives comprising parties such as technology vendors, consultants, industry pundits, prospective adopters, business and trade journalists, and academics (Swanson & Ramiller, 2004). OVs are focal in shaping the diffusion of IS innovations in three ways. Firstly, an organizing vision shapes an innovation's purpose through various *interpretative activities*[1]*s*. Secondly, an organizing vision's underlying rationale is shaped through various *legitimization activities*. Thirdly, the vision helps *mobilize* the entrepreneurial and market forces to support the material realization of the innovation through various *mobilization activities*. Thus in a preliminary sense, the language of the OV is employed as a structuring devise to examine how e-government acquires meanings, the claims that are made for its adoption and how these become legitimized.

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2.2.1 INTERPRETATION: E-GOVERNMENT OBJECTIFICATION

The interpretation activities of the OV framework are linked to what is referred to as e-government objectification. From the metaphor of OV, this can be regarded as a process of institutionalizing the concept of e-government in various communities of individuals, states or countries in the world through discourse. Through the various discourses as a mode of meaning formation or sense making, a common narrative or 'story' is developed in order to describe the nature of the innovation (Klecun-Dabrowska, 2002). E-Government is considered as novel, given that as an idea, the usage of the term is considered to be fairly recent (Heeks & Bailur, 2007).

[1] During *interpretation* a common 'story'[…] is developed to describe the innovation's nature and explains its purpose […] Such an interpretation is then complemented by the process of *legitimization* of the innovation, when the rationale for adopting the innovation is being built, and when questions of why we should adopt it are being addressed. […] *mobilization* entails all activities leading to activating, motivating and structuring the entrepreneurial, institutional and market forces that emerge to support the material realization of an innovation. (Klecun-Dabrowska & Conford, 2002, p. 1208).

The global and national institutionalization or objectification of e-government has been taking place since the mid-1990s which has resulted in various stage models (UN, 2008). A review of literature shows that its shaping has been influenced by individual researchers or proposed by institutions (Table 2.1). Over the years, the proposition on the nature and form of e-government has led to some form of normative pressure on what the innovation is. The consideration for the adoption and diffusion of the innovation of e-government in both the developed and developing world has been influenced by these conceptualizations that have taken rule-like status. This is consistent with the process of institutionalization where societal expectations of appropriate organizational form and behavior take on rule-like status in social thought and action (Covaleski & Dirsmith, 1988; Meyer & Rowan, 1992).

Table 2.1: Reviewed Literature on E-Government

Title of Model	Year	Individual/Institution
Gartner's Four Phases of E-Government Model	2000	Baum & Di Maio (Gartner Group)
Global Survey of E-Government	2001	United Nations and American Society for Public Administration
Privacy Strategies for Electronic Government	2001	Hiller, J., & Bélanger, F. (2001)
The citizen as customer:	2001	Deloitte & Touche
Developing fully functional e-government: a four stage model	2001	Layne and Lee
The evolution of E-Government among municipalities: rhetoric or reality?	2002	Moon
A Definition of E-Government	2003	World Bank

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Later attempts to make sense of the nature of the e-government concept have relied on earlier discourses. For instance, Siau & Long (2005) through a meta-synthesis process presents a synthesized stage mode of e-government. They present what they refer to a comprehensive e-government model comprising five stages – web presence, interaction, transaction, transformation, and e-democracy. They map the interrelationships between the various stages along a time/integration/complexity and benefits/costs dimension as depicted in figure 2.1.

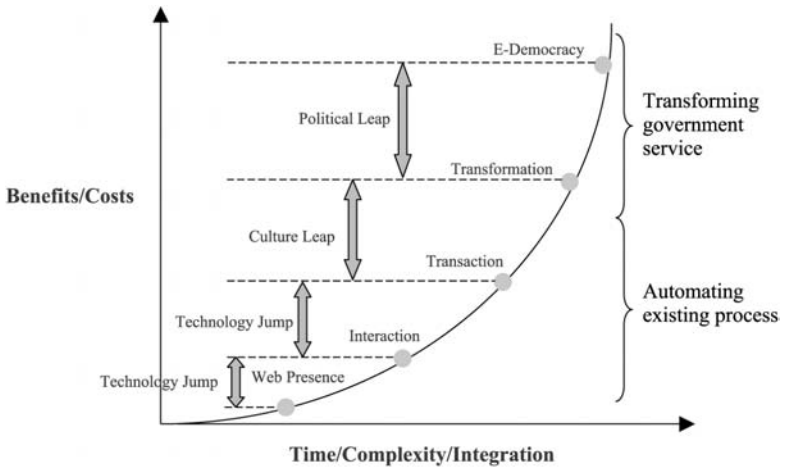

Figure 2.1. Five Stage model of E-Government (Source: Siau & Long, 2005)

Siau & Long (2005) premised their model on the long term goal of electronic democracy (e-democracy). To achieve e-democracy, government agencies require *automation* of existing government *processes* and *transformation* of government service delivery. Automation of government processes demand establishing a *web presence*, initiating *interaction* between government and users and developing online *transactions* capability. The foundation for achieving government process automation rests on the need for prior existence or a leap to a *technological* and *cultural* platform. Transformation of service delivery is mediated by a re-engineering of governmental operations (transformation) aimed at achieving e-democracy. The foundation for transforming government service is what Siau & Long (2005) characterize as political leap targeting political decision making through tools such as online voting, polling and surveys.

Andersen & Henriksen (2006) propose what they term Public Sector Process Rebuilding (PPR) model which they claim emphasizes the development of activity and customer centric applications as opposed to earlier models which elevated technological capability. That real change in government is attainable if the focus of e-government becomes the end-users instead of a predominant focus on technological capability which symbolically represents crisis in previous IT applications in government.

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> E-government applications and strategies are cultivating a better-safe-than-sorry strategy escorted by horizontal and vertical integration of back-office and front-end systems at the expense of exploring new areas and dimensions of interaction with the end-users. As such, e-government might be more a symbol of crisis of previous generations IT quests in government than an indicator of change in government (Andersen & Henriksen, 2006, p. 241).

And that the 'e' in earlier conceptualizations of e-government such as Layne & Lee's (2001) model; manifest Rob Kling's label of utopian optimism and technological centric beliefs stipulating that a digital front-end is in itself is a mechanism of change (Kling, 1996; Andersen and Henriksen, 2006). Further, Andersen & Henriksen (2006) argue that earlier models had a technology push bias propagated by international organizations and governments. Their model provides a reflective re-orientation from a technology perspective towards strategic front-end digitalization of core activities for the benefit of end-users (Andersen & Henriksen, 2006).

The PPR model is depicted in figure 2.2. In the figure, the strategic ambitions of revolutionizing government are premised on having widely applied activity-centric applications which are generally available to a wide customer-base irrespective of internal government integration efforts. In all, the model makes the claim of having a stakeholder focus as the foundation for achieving e-government maturity.

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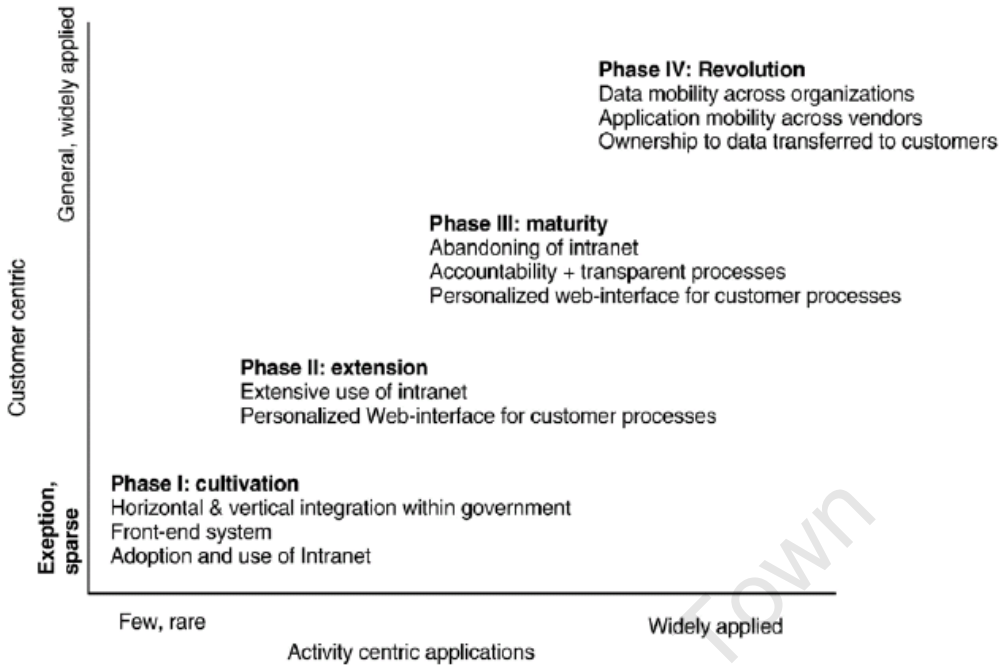

Figure 2.2. The PPR Maturity Model (Andersen & Henriksen, 2006).

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The UN has also over the years been attempting regular re-orientation of the focus and hence the meaning of the concept of e-government. In the latest *UN E-Government Survey 2008: from E-Government to Connected Governance*, the dominant trend is what is termed an e-government-as-a-whole concept which focuses on the provision of services at the front-end supported by integration, consolidation and innovation in back-end processes and systems to achieve maximum cost savings and improved service delivery (UN, 2008). The dominant rationalization is the connected government concept derived from this e-government-as-a-whole approach which is premised on the knowledge management paradigm of Milton et al (1999). This approach elevates knowledge, people and processes and rebuts the continued compartmentalization of government agencies as being inappropriate for public sector service delivery. The meaning of e-government in the 2008 survey exalts public value and inter/intra-governmental co-operation by claiming that:

> Connected or networked governance revolves around governmental collective action to advance the public good by engaging the creative efforts of all segments of society. […] ICT-based connected governance efforts are aimed at improved cooperation between government agencies, allowing for

> an enhanced, active and effective consultation and engagement with citizens, and a greater involvement with multi-stakeholders regionally and internationally. This emerging approach to public sector service delivery stipulates […] an integrated approach focusing on enhancing the ***value*** of services to the citizen. A by-product of this focus on the value for citizen is the recognition that an increase in the value of services is not possible without consolidating the way the back-end systems and processes work to bring about the front-end service delivery (UN, 2008, p. xv).

The 2008 UN conceptualization is underpinned by three main phases of e-government strategy and activity to encapsulate the focus and challenges facing the pubic sector. The three interrelated and often overlapping phases of e-government are as follows:

- *Infrastructure:* Creating an information infrastructure both within the public sector and across society at large, one based upon reliable and affordable Internet connectivity for citizens, businesses and all stakeholders in a given jurisdiction;

- *Integration*: Leveraging this new infrastructure within the public sector in order to better share information (internally and externally) and bundle, integrate, and deliver services through more efficient and citizen-centric governance models encompassing multiple delivery channels; and

- *Transformation:* Pursuing service innovation and e-government across a broader prism of community and democratic development through more networked governance patterns within government, across various government levels and amongst all sectors in a particular jurisdiction.

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UN (2008) recognizes the need for a more holistic framework which recognizes that E-Government is both an internal driver of transformation within the public sector and an external driver of societal learning and collective adaptation for the jurisdiction as a whole. The UN conceptualization recognizes that the current trend towards connected governance (emphasizing value for services) has been evolving from traditional modes of service delivery (traditional government) and electronic services (e-government). Accordingly, both developed and developing countries are increasingly seeking to articulate a vision of e-government that encompasses cumulatively aims at attaining maturity of the various phases (infrastructure, integration and transformation) towards connected governance. Overall, the UN (2008) model

hopes to inspire public sector focus on value of services to stakeholders (summarized in Figure 2.3).

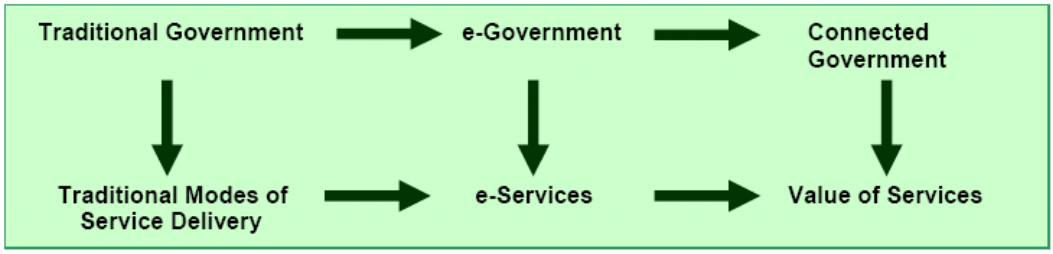

Figure 2.3 Evolving Approach to Public Service Delivery (Adapted from UN, 2008)

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In conclusion, e-government objectification has captured the sense making rationale of the individual and institutional actors that have been shaping it over the years. While there may be major or subtle differences in various interpretations, there is a dominance of an evolutionary stance, in which adoption of e-government is perceived to occur through various stages. The view inadvertently elevates the notion of maturity at various levels-that portrays the picture that a later phase is better than an earlier one but recognizing that they can occur simultaneously (Andersen & Henriksen, 2006).

The differing interpretations may be regarded as an attempt by various stakeholders to develop a social account (Jepperson, 1991) that explicates e-government as an IS innovation within the broader social, technical and economic domain (Swanson & Ramiller, 1997). All the interpretations claim to offer something distinct from others with notions of transformation towards better government inexorably linked to the meanings. Thus these meanings can be claimed to be linked to notions of progress and prosperity (Peters, 2008) couched in the language of having a revolutionary impact as an IS innovation.

The quest for objectification of the e-government artifact by the various role players in this section, which are by no means claimed to be representative of all, reveals a continued search for its meaning:

> An essential aspect of social life is the very existence of conflicts and power struggles over whose concepts will be valid and who will eventually have the power to define reality. In this context, we do not usually talk of different conceptual frameworks 'but rather different 'viewpoints'. […] Therefore it is often not a question of different ways of seeing thinks, but that we see different things (Danermark et al, 2002, p. 29).

From a global perspective, the emerging meanings, lately crystallized by the UN (2008) are seen as a collective quest to make e-government, not only a national agenda, but also as a global imperative.

2.2.2 LEGITIMIZATION: GOVERNANCE PROBLEMATIC

The conceptualization of e-government established through interpretive activities is communicated, rationalized and legitimated through legitimization activities in the form of claims about e-government. Legitimization activities concretize the focal communities' 'group think' in terms of why the innovation is being adopted. Swanson & Ramiller (1997) assert that in fact, the OV grounds the legitimization of a particular innovation by linking the innovation to some aspect of the organization which is of current interest. This grounding is further achieved by the focal community assessing the "reputation and authority of those who promulgate it, and through the identities of those who undertake the innovation" (Swanson & Ramiller, 1997, p. 461).

In the case of e-government, these legitimization activities can be analyzed in terms of the claims- benefits and challenges (Klecun-Dabrowska, 2002), as well as evaluation exercises carried out to assess e-government initiatives. Legitimization points out the tensions generally as per the lack of agreement with regard to these claims, as well as the bias inherent in the evaluation efforts. The effort is geared towards unearthing 'group think' (Janis, 1972) with regards to the rationale for e-government that underlies its OV. The rationale for e-government presented in various outlets cannot be fully articulated in this thesis. The analysis in this section recognizes the contribution of various researchers who have consolidated various viewpoints on the rationale of e-government.

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For instance, Gouscos et al (2006), while discussing the e-government perspective in the context of the European Union, point out that the expected impact of e-government is in the realization of a 'one-stop-government' as well as the 'modernization' and improvement of administrative services. Ma, Chung and Thorson (2005) also argue that, despite apparent din in what has been emerging from policy documents in the Chinese context, the normative rationale for e-government adoption in China is 'modernization' as well as an enabler of economic development.

An additional perspective(s) is captured by OECD-Public Management Unit (OECD-PMU) (2003) in their assertion that e-government is aimed at transformation of governance as well as an innovation catalyst. Closer scrutiny of these 'ideal' benefits captures two multi-dimensional aspects of e-government, i.e. 'modernization' and governance re-orientation. That modernization ethos has to do with restructuring of processes and changing the overall culture of public administration in order to enhance public administration. Re-orientation of governance resonates with the concepts of structures of governance to make them more customer - focused and accessible in order to maximize value per user and users per service.

Mau et al (2005), while undertaking a comparative analysis of differences amongst context, pointed out that the expectation of the United States government (US) is dissimilar from that of China. From their analysis, the priority of the US government deals with management reform in terms of improving the efficiency of government agencies (reduce costs and layers of organizational processes, restructuring of relationships, and 'one-stop' shopping), improving government to business interactions as well as improving service to citizens and enhance governance (citizen-centric e-government, empowering individual citizens, increase of social inclusion and citizen participation as well as enhance open communication, transparency and democratic accountability).

The UN's (UN, 2004) rationale for e-government is that ICTs will enable 'opportunity capability', i.e. ability of ICT to address issues related to *human progress, sustainable development* and the *digital divide*. These issues are related to country policy issues that comingle with governance. Thus the UN portrays e-government as one of the alternatives for

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addressing these issues related to governance. Thus, while seemingly making a break from the others, the UN, as a supra-national organization aiming at 'group think' in a wide variety of issues, attempts to capture the centrality of e-government, albeit couched in hazy connotations. The 2008 UN E-Government survey succinctly captured the rationale of e-government by pointing out that e-government's end goal of connected governance efforts is that of *better service delivery* in public sector organizations (UN, 2008).

What emerges from the various rationalization claims about e-government is the link to public sector reforms in various countries. E-Government is positioned by various interest groups as a vehicle for achieving public sector reforms and improvements aimed at enhancing service delivery. E-Government therefore occupies a vantage point as a recent vehicle or a means for the attainment of reforms that date back to 1980s, particularly those associated with the management movement of new public management. The predominant mantra of customer and citizen-centric focus has been specifically linked to NPM even though other management philosophies have shared this emphasis (UN, 2008),

NPM has been characterized as a management approach that inspires more management flexibility and market and competitive forces which place customer service as the end goal. This calls for emphasis on measuring service delivery and focusing on bottom line performance. From the organizing vision perspective, the various evaluative measures that have been adopted can be seen as part of the legitimization efforts of E-Government (Kunstelj & Vintar, 2004). Thus the era of NPM has resulted in more public sector experimentation in what has been christened 'agency' models which are organizationally autonomous units empowered to improve service and performance in a particular niche area (UN, 2008). The traditional approach to NPM has predominantly been aimed at introducing results based measures that monitor service improvements by these autonomous units. For instance, there are various levels of national governance, local government and various semi-autonomous government agencies which are monitored against certain performance metrics. NPM (with e-government as its extension) has therefore been propagated to improve public sector performance (Heeks, 2002).

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However, while NPM has been predominantly concerned with decentralizing service improvement, e-government presents a much more collaborative and partially centralizing mindset in recent years. Collaboration is argued to stem from opportunities for sharing information and aligning service offerings across different providers. The result is a networked architecture model of service delivery, predicated on more seamless governance, as is reflected in what the UK and other jurisdictions at times refer to as 'joined up' government (UN, 2008). The quest for having a joined up government may therefore capture the overriding rationale for using e-government as a vehicle for NPM as captured in the quote:

> From a technology perspective, the pursuit of greater interoperability across enterprise-wide architectures (important elements of a platform for service delivery) for the public sector as a whole has often become a centralizing force. Yet a significant novelty in this digital environment is the manner by which centralization and collaboration are viewed as complementary (UN, 2008, p. 50).

Therefore in accord with the OV framework, the evolving vision of e-government has been rationalized on the basis that e-government presents an opportunity for achieving the public sector reform objective of improved governance. This is therefore considered as the 'business problematic' (Wang, 2001) for this thesis, predicated on the notion that e-government is being rationalized as a means for realizing the quest for good governance in African economies, especially given that it originates outside the African continent (Heeks, 2002). According to the OV theory (Swanson & Ramiller 1997), a *business problematic* is considered as a difficult organizational predicament shaped by forces largely outside the visions generative community (Wang, 2001). E-Government, as an extension of NPM in the African context, is envisaged to respond to this bad governance problematic and is largely propagated by interest groups outside the continent.

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2.2.3 MOBILIZATION ACTIVITIES-ARTIFACT TRANSFER

Another aspect of the OV is the mobilization activities, which:

> serves the dynamic function of helping to activate, motivate, and structure the entrepreneurial and market forces that emerge to support the material realization of the innovation. (Swanson & Ramiller, 1997, p.461)

These mobilization activities enable a particular innovation to gain traction in the focal community as interested parties mobilize resources to further generate interest (Curie, 2004). Curie (2004) captures the effect of mobilization activities by referring to "countless conferences, trade fairs and exhibitions" on various aspects of the innovation. These events are sponsored, not only by leading industry players, but also by governments to generate widespread interest in the OV.

In the case of e-government, it may be argued that mobilization activities are also noticed in the many conferences of e-government, as well as the many journals that invite publications about e-government. In so far as these conferences act as platforms for voicing the rationale for e-government, then they are pointers to activities that inform an underlying OV for e-government. For instance, Gronlund & Horan (2004) mentions a number of conferences such as the European DEXA, US Digital Government Conference, HICSS, ECIS, IFIP'S I3E, AMCIS and the Bled eConference. Other forums are in the form of workshops or working groups such as the International Federation of Information Processing (IFIP) WG 8.5 and the European Group of Public Administration, etc. These have been characterized as mixed conferences with participation from practitioners, academia and even governments, indicating the 'need' for these groups to find the common 'pedestal' they need to stand on when discussing e-government. 5 (2005) also cites the role of supranational organizations that may not specifically focus on e-government only, but rather tries to capture its role in the contemporary society. Some of the conferences are by the World Summit on the Information Society (WSIS), and the preparatory World Forum on the Information Society and WITFOR (World IT FORum), sponsored by UN and UNESCO.

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While conferences, journals, workshops and other publications may be seen as activities for motivating and sustaining interest in e-government, its activation on a global basis is attributable to three developments: Y2K (the year 2000 bug problem); the growth of the Internet and its associated applications; and a continued search for a successful public sector management paradigm. Reflecting on the emergence of the Internet since the 1990s, its role in altering the mindset and strategies of private sector organizations have has resulted in tremendous growth especially in the e-commerce. For instance the growth and expansion in the online population is

projected to reach 1.8 billion by 2010 (ClickZ, 2008) while modest global economic activity has been possible in a manner that was unthinkable some decades ago (Andal-Ancion et al; 2003). In the US alone, online retail sales are projected to top US$ 120 billion and similar growth trends are expected in developing countries (UN, 2008). The Internet has also induced efficiency gains for the private sector in many spheres. Thus for governments, these Internet-induced changes in the private sector are considered relevant for improving government's own operations towards better service delivery. The success of the Internet use in the private sector has pressured public sector organizations to explore how to make the need for efficiency in government the nexus for using the Internet and its related technologies in public sector agencies (McIver & Elmagarmid; 2002). Therefore governments, especially those in the Western hemisphere, have attempted to rally public sector organizations to adapt to the new online realities of a networked environment.

The aftermath of the Y2K phenomenon led to what became the underlying logic of e-government adoption especially amongst OECD countries. The e-government imperative for these countries implied that public sector cannot afford to not have leading-edge technologies – and the capacities to deploy and manage them, in an increasingly digital and networked environment (OECD, 2001). This imperative arose from the prospects for IT –disaster in the late 1990s due to the inability of computers to recognize the year 2000 in their software and operating systems (christened the Y2K bug). The prospect for IT-disaster became an important parallel force that galvanized technology expansion within government, with senior managers and politicians' recognizing the prominence of electronic systems and the perils of ignoring the critical infrastructure (OECD, 2001). The Y2K issues was therefore leveraged as an opportunity for upgrading systems and putting forth strategic visions of technology as an architecture for innovation and improved service delivery (UN, 2008). The emergence of the e-government vision in governments in developed countries is therefore partly linked to the Y2K issue and the resultant parallel force to those of the growth of the Internet as well as a continued search for public sector management paradigms (with NPM and its variants currently prominent).

The growth of the Internet in Africa has also played a significant role in informing the formation of the vision of e-government. However, the packaging of the e-government message for developing countries has been linked to the governance crisis prevalent in most developing countries. This is similarly the case in Africa where it is taken as a given that systems of governance are in a crisis and that the crises are being addressed by recourse to NPM as a

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Western model of governance (Heeks, 2002). The imported model of e-government (as part of NPM) is transferred to African countries as a panacea to bad governance by carriers such as international donor agencies, consultants, Information Technology vendors and Western-trained civil servants (Heeks, 2002). E-Government hence is part of a package of needed governance reforms in Africa (Chapter 1) even though African governments have been using Information Technology for more than 40 years; first, for automating internal workings of government (old model), but also increasingly to support and transform the external workings of government by processing and communicating data(new model) (Heeks, 2002). Overall, the imperative for e-government in African countries is therefore as a result of Western interest groups 'exporting' it as public sector management paradigm for resolving African governance crises.

2.2.4 SUMMARY OF THE E-GOVERNMENT ORGANIZING VISION

The intent in this section was to 'frame' how the OV of e-government is being created, and what emerges is that the process is not straightforward, but multi-dimensional. In a preliminary sense, the activities captured under the different dimensions provide initial indications that all activities of the OV of e-government are still underway, which creates a need to 'unearth' its organizing vision in the different contexts in which it is being formed.

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The next sections extend the review of literature from three perspectives on the premise that the research problem is multi-faceted. The first is from the disciplinary perspective of Public Administration, which is used to illuminate the role of NPM in the e-government discourse. The second is about ICT innovations and their transfer to developing countries. The third perspective presents an Information Systems infrastructure perspective in order to give the research problem a specific focus as the home of this thesis.

2.3 PUBLIC ADMINISTRATION AND E-GOVERNMENT

The Public Administrative (PA) perspective of e-government is approached from the concern by governments of the need to undertake administrative reforms. This may be viewed from both a *demand-side* and a *supply-side* perspective.

2.3.1 DEMAND-SIDE PERSPECTIVE

The *demand-side* explanation gravitates around national challenges of governance based on two assertions. The first is that administrative reforms are closely intertwined with political reform aimed at strengthening the ability and capacity of elected officials to produce results (Cheung, 2005). The success of the elected officials, as leaders, are increasingly being measured by the benefits they are creating for their constituents who demand top performance and efficiency, proper accountability and public trust, and a renewed focus on delivering better services and results (UN, 2008). Thus the demand-side explanation is partly hinged on the politicization of the reform agenda which can be driven internally (bureaucracy), politician-driven as well as society-driven (see Hojnacki, 1996).

A second orientation of the demand side explanation is the 'political nexus triad' (PNT) in which politicians, bureaucrats and citizens negotiate their political interests regarding the function and structure of government (Moon, Myung-jae, Ingraham, 1998). The dominant interests therefore emerge to shape the structure and function of government. In the Kenyan context, after having a highly centralized government since gaining independence from Britain in 1963, the general elections of December, 2007 brought to the fore serious issues of governance which culminated into a shift of governance structure to some form of parliamentary system. This change of governance was 'forced' on the PNT after a break out of civil unrest (citizens' demands as part of the PNT) for almost three months.

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2.3.2 SUPPLY-SIDE PERSPECTIVE

The *supply-side* perspective rests on the notion that reform practices such as NPM are being spread or exported by reform pioneering countries, institutions or leaders to imitator countries, such as those in developing countries (Cheung, 2005). This perspective is characterized by a number of viewpoints:

- Firstly, despite the international origins of these administrative best practices, their adoption has to be distilled by national politics (Cheung, 2005). That is, the actual policy-

making and implementation process still remains local and need to be approached from that perspective.

- Secondly, national governments are faced with various strategic choices, since most of these reform packages do not represent a single set of reform instruments or strategies. For instance, NPM comprises a number of strategies categorized under the four "Ms" of Maintaining, Modernizing, Marketizing and Minimizing the public sector (see Pollit & Bouchaert, 2000).
- Thirdly, the noted divergence of NPM reform initiatives, which is predominantly noted for a discursive and decisional convergence, but very rarely convergent with regard to practice and results (Pollit, 2001). Thus there is concurrence on what NPM entails, however its implementation has resulted in mixed results and maybe approached from different perspectives in different contexts.

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The three viewpoints have been predominant in supply-side explanations of NPM. However, an increasingly common post-NPM claim is the emphasis on the importance of the civil society as a source of push for better governance (Polidano & Hulme, 2001). This may be indicative of two different versions of the supply-side explanation: one which is highly *managerial-oriented* under the banner of NPM, whilst another is more *socially rooted* under the 'good governance' notion (Cheung, 2005). The good governance perspective finds traction from citizens' needs and expectations and goes beyond public administration to:

> Address the more fundamental questions of how to strengthen government and other institutions in society to help solve problems and meet challenges, entailing government-market, government-society, and intra governmental relationships. Under the good governance paradigm, public management reform is necessary in many developing countries whose public sector has been tainted by uneven revenue collection, poor expenditure control and management of a bloated civil service (Cheung, 2005; p. 261).

The supply-side explanation therefore appears to be a combination of a push from pioneering countries to implement NPM-related reforms as well as that from the civil society in order for government to meet citizen expectations. The good governance banner in developing countries is therefore a combination of a managerially-oriented NPM as well as a quest for more citizen involvement.

From a developing countries perspective, the supply-side notion of the origins of public sector reforms is regarded as more plausible, even though situations in which change of governance systems such as occurred in Kenya can be partly claimed from a demand-side explanation. However, over the years, the supply-side origins of public sector reforms have been predominant, since citizen interests have largely been propagated by civil society organizations in developing countries (Muiruri, 2004). This emanates from a widespread sentiment that systems of governance in Africa are in a crisis and therefore in need of solutions which lie outside the continent (Heeks, 2002). The export of NPM, with its origins in Western countries and Western neo-liberalism, has therefore been pushed as a dominant reform paradigm for African countries. As a reform program, with multiple strategies, practices and benchmarks to choose from, NPM has come in various guises, with e-government emerging lately either as an extension or a component of NPM (Heeks, 2002; Navarra, 2007). Therefore from a Public Administration view, *good governance* as an imperative for reforms in developing countries is predominantly explained from a supply-side perspective, in which e-government is transferred to African countries from four main groups: international donor agencies, consultants, IT vendors and Western-trained civil servants (Heeks, 2002). Thus the interest in the search for the meaning of the concept of e-government stems from its supply-side introduction into most African countries, which is, exporting e-government as a reform package.

Chadwick & May (2003) undertook a comparative assessment of the evolution of key policy statements of e-government reform in USA, Britain and other European Union countries. They assert that as a result of the Internet in the developed world, many states have institutionalized the concept of government online, with the issue of concern being what form it should take. The interactive potential of the state and its citizens through e-government rests on the policy priorities spelt out for its use. Looking at the history of the deployment of ICTs in government, what emerges is that guidelines and priorities for the use of ICTs in government have predominantly been crafted as contractual agreements between government as purchasers and other companies as the providers of the technological means. This was mostly driven by lack of technical and financial resources by the government to enable them to build systems and hardware from scratch, leading them to outsource software development to private suppliers (Chadwick & May, 2003).

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The Public Administration perspective recognizes that e-government has had a home in public administration under the banner of good governance in NPM (Cheung, 2005). Therefore, the reform prescription of NPM is a Western 'export' which the African governments 'localize' in their context in order to be relevant. Thus an analysis of e-government needs to recognize that it does not originally emanate from the local practices of target countries, but is based on an infrastructure paradigm upon which most Western e-government programs are based (Heeks, 2002). Therefore, from a Public Administration perspective, e-government reveals itself as a reform agenda under the NPM initiative, or is in itself an extension of the NPM imitative (Chadwick & May, 2003; Heeks, 2002; Navarra, 2007). This perspective is based on what may be regarded as a supply-side explanation, in which, e-government as a concept, is 'supplied' or 'exported' to developing countries, yet it is based on a computing and technological infrastructure perspective to which most African governments still fall short.

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2.4 INFORMATION INFRASTRUCTURE PERSPECTIVE OF E-GOVERNMENT

From an IS perspective, the core and hence the orientation of the discipline can be captured from an academic as well as a practical, industry-oriented perspective (Avison & Elliot, 2005). From an academic perspective, a strong sentiment expressed by top scholars in the field as well as key writers is the view that IT is currently the prime mover for change in institutions, organizations and the society at large (Castells, 2004; Benbasat & Zmud, 2003). An industry perspective has mainly been captured over the years with reference to key issues of information systems management (CSC, 2004; Luftman & McLean, 2004). A summary of two of the studies is shown in table 2.2:

Table 2.2: Comparison of Key IS/IT Issues for Executives 2003	
CSC International Study 2003	**SIM/TCB USA Study 2003**
• Maximize the return on IT for business • Enterprise architectures for business agility • Safeguarding information assets • Driving competitive advantage through innovation • Selecting and managing sourcing options • Structuring for global organizations • Managing business relationships • Managing business change • Connecting with CEOs and peers • Adopting new roles and responsibilities	• IT and business alignment • IT strategic planning • Security and privacy • Attracting /retaining IT professionals • Measuring value of IT • Measuring performance of IT • Creating information architecture • Reducing complexity • Speed and agility • IT Governance

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A majority of the studies have been undertaken in the context of developed nations with little representation of countries in Africa. Only a few studies have enumerated key IS management issues in developing countries. For instance, Johnston, Muganda and Theys (2007) undertook a study of critical IS issues in South Africa amongst Chief Information Officers (CIOs) and other managers in charge of ICT in their organizations. The top five issues that were identified included security and control, building a responsive IT infrastructure, IT value management, Service delivery and improving IS strategic planning. Overall, the concern for CIOs was about infrastructure and business processes. While South Africa is not completely representative of African countries, the concern of the CIOs as well as the academic perspective of IS as a discipline provided some foundational core for this study. Scaling up the concern for infrastructure and processes to government level therefore requires a further scrutiny of the concept of infrastructure.

Infrastructures are considered as *large, shared, open, standardized* and *heterogeneous networks of socio-technical actors* (McGarty 1992; Star and Ruhleder 1996; Hanseth, 1998). The information infrastructure (II) notion was first coined by the Clinton administration as a political plan aimed at building a nation-wide network and information resource premised on the Internet and WWW (Branscomb & Kahin 1996; Kahin & Abbate 1995; McGarty 1992). The EU later followed with the Bangemann report for the establishment of a European information infrastructure as the basis of the information society (Bangemann Report, 1994). Subsequently, the concept of II has gradually gained prominence by being developed on different theoretical approaches in Information Systems. The concept of II has for instance been applied as a theoretical tool for studying the nature of the evolution of communication platforms (Jansen & Nielsen, 2005). While there are various II perspectives, the thesis highlights four different perspectives that have had an impact on IS research over the years. The four perspectives are discussed next.

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2.4.1. PHYSICAL INFRASTRUCTURE PERSPECTIVE

The physical infrastructure perspective regards IIs as an *extension of the existing physical infrastructure* such as roads, schools, power plants, transport systems, and communication systems (Webster, 1978 cited in Jansen & Nielsen, 2005). Arising from this perspective, IIs are regarded as a multi-layered collection of various resources used for communication by relying on various ICTs and the necessary organizational and human structures to develop and maintain it (Jansen & Nielsen, 2005).

A Physical Infrastructure perspective of e-government would recognize that the various multilayered subsystems form the underlying foundation for its realization. Part of this substructure is the Internet infrastructure, and of interest would be how it diffuses in a country and how the state of diffusion influences the inclusiveness of e-government applications. The state bureaucracy, comprising the institutions, the humanware and the technologies applied for the provision of government services also provide a physical substructure for the realization of e-government.

2.4.2 SOCIO-TECHNICAL PERSPECTIVE

The socio-technical perspective regards II as a "shared, evolving, open, standardized, heterogeneous and a socio-technical construction" (Hanseth, 2002, p. 7). The shared metaphor captures the diversity of users, user communities and types of applications (Ciborra et al., 2000), while the evolving characteristic is reminiscent of IIs as being based on an already existing technological base upon which it is built. The diversity of various applications and technologies upon which they are based requires some form of standardization, whilst heterogeneity recognizes diversity in technological bases as well as the geographical and institutional complexity of these IIs. Thus overall, it represents a *socio-technical construction* of both the human and the non-human.

As shared, evolving, open, standardized, heterogeneous and socio-technical systems (Hanseth, 2002), an II perspective partly emphasizes that e-government is a means or facility that helps to achieve certain goals (Star & Ruhleder, 1996). Therefore e-government as a concept becomes an invisible structure for achieving the objects of governance. As a *means* towards achieving certain objects of government, the foundation for its realization rests on technically heterogeneous government systems, geographically dispersed administrative and technical systems, and institutional complexity of government largely underpinned by the bureaucratic state. Thus the evolution of the existing systems (both technical and social) forms the substructure for the realization of e-government. Heterogeneity of the substructure of e-government requires that it be based on common platform of protocols to ensure interoperability, stability, reliability and persistence (Lyytinen & Yoo 2002).

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2.4.3 NETWORK ECONOMICS PERSPECTIVE

The network economics perspective considers II as evolving according to network effects such as increasing returns, positive feedback, network externalities, path dependency and lock-in (Jansen & Nielsen, 2005). As the network attracts new users, the value of the network increases (Arthur, 1994), and when the user base reaches a certain threshold, the II will attract new users for enrollment almost by itself. The explosive growth of the user-base of services such as mobile

telephony and faxes has been attributed to the behavior of networks based on this perspective. The network economics perspective brings into focus its value, as users are enrolled into the network. E-Government can only be argued to be of value if it is being used. Of importance, therefore, is to understand whether the introduction of e-government in developing countries are evidently of value in terms of the users it attracts. The social inclusiveness of the e-government infrastructure, in terms of how it is able to attract a critical mass of a multiplicity of users, therefore becomes a key component of unearthing its form.

2.4.4 RELATIONAL PERSPECTIVE

The relational perspective is based on the premise that the implementation of an II is intended at the outset to serve certain communities, while recognizing that its deployment is based on certain practices and benchmarks, even though as open systems, they allow for innovation and change (Jansen & Nielsen, 2005). Heterogeneity of components, physical artifacts, actors and the ways actors appreciate and interpret various components related to their perspectives and interest is recognized. Due to different interpretations and appreciations, there may be unintended consequences as various choices are based on the context in which they are deployed. This perspective reveals how choices and politics embedded in such systems become articulated components (Jansen and Nielsen, 2005). A Relation Perspective of e-government would therefore capture innovation and change, which possibly conflict with existing conventions of governance. This view recognizes that in the implementation of e-government, the drive may emanate from some shared intentions and efforts among the various stakeholders such as users (demand-side), designers and developers (supply-side). Thus, from a change and innovations orientation, e-government finds traction as a reform agenda which can be captured from the relational perspective of II.

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2.4.5 THE INFORMATION INFRASTRUCTURE VIEW AND THE LINK TO PUBLIC ADMINISTRATION PERSPECTIVE

The complex and multidimensional character of e-government recognizes that the various II perspectives (from IS) can be useful in understanding its adoption in developing countries. An II view from an IS perspective supports the PA perspective. As a reform instrument, recognized as

part of NPM, its export to African governments can be claimed to be based on Western ideals. Adoption of e-government models should recognize the practices of e-government from which they emanate. IS recognizes from an II perspective that e-government is based on various technologies are exported to African governments in order to realize the NPM reform initiatives. Conceptualizing e-government based on the various technological clusters is not wholly based on a Western conceptualization when they arrive, but are of necessity re-conceptualized to realize e-government in the local contexts of African governments.

The substructures for e-government from the various II perspectives underlined are continually *evolving* (Hanseth & Monteiro,1998) and essentially historical in character, implying that changes are related to what already exists (David,1985). The emphasis is therefore on the significance as well as the constituents and structure of their *installed bases*. The IS perspective, while recognizing the various II views, is particularly inspired by a *relational perspective*, in which distinction is made between the *demand-side* of installed base, which is composed of the user preferences, practices and investments, and the *supply-side*, which is related to the design, implementation and diffusion of technologies of e-government.

Integrating the IS and the PA perspectives in developing countries teases out the importance of focusing on the *supply-side* of e-government implementation in developing countries. From a PA perspective, what emerges is that e-government is part of the NPM reform package exported to African countries to improve governance. Therefore, what is received is of necessity a supply-side view from a developing country's perspective. The IS perspective on the other hand also captures the supply-side view by recognizing not only the nascent nature of e-government in African countries, but also to emphasize that technologies of e-government have their origins outside the continent.

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2.5 TRANSFER OF ICT INNOVATIONS

An innovation is referred to as something totally new in society or an invention (Bijker & Law, 1997) or something within a particular setting, but not new *per se* (Vidgen & McMaster, 1996). This research is concerned with the concept of e-government from the latter perspective in which

it is recognized that while the metaphor of e-government may be typically less than 10 years in Africa, the technologies upon which it is based are not new (Heeks, 2002). In addition, it may have existed as a concept in developed countries before being exported to African countries.

Technology transfer is taken to be a goal-oriented process intended to enhance the technological capabilities of the recipient organizations or countries (Autio & Laamanen, 1995). E-Government is also expected to achieve certain goals, which if realized, results in certain impacts in adopter countries. Kumar et al (2007) posits that large-scale state sponsored technology transfer projects are aimed at developing indigenous *technological capabilities* and meeting broader *socio-economic objectives*. E-Government, conceptualized at various levels of government can be considered as a large-scale initiative intended to achieve certain goals (impacts) that are envisioned in various policy documents. The basis of the proposition, that e-government impacts influence its conceptualization in developing countries finds justification from the technology transfer literature. The goal-oriented nature of the technology transfer process is captured in figure 2.4.

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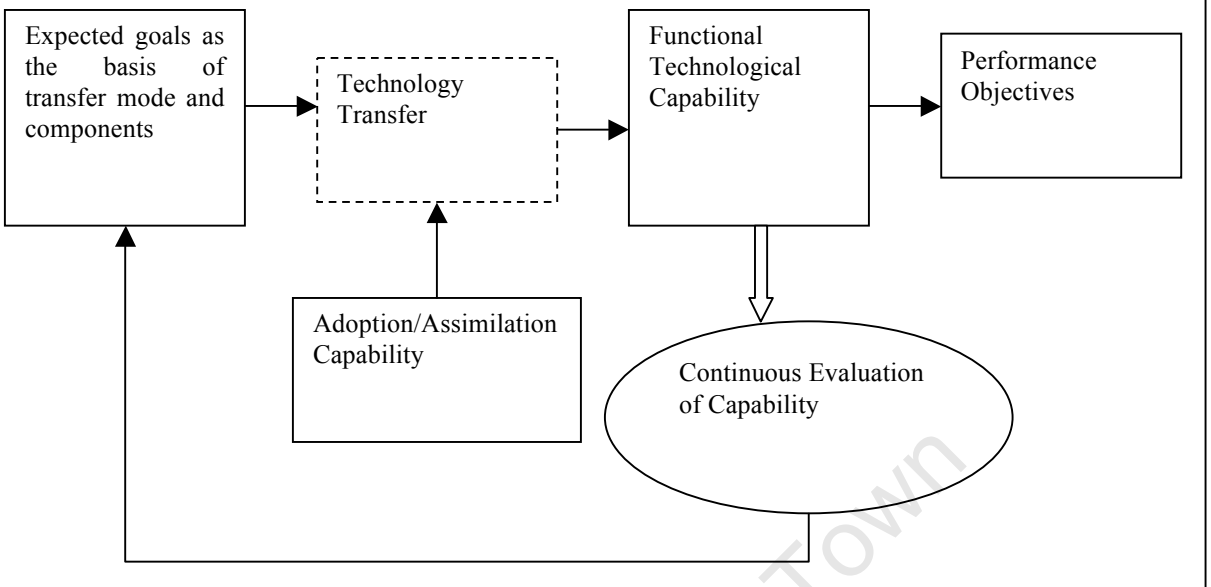

Figure 2.4: E-Government Technology Transfer Model (Adapted from Kumar et al, 2007)

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The packaging of e-government assumes certain expected impacts before it is negotiated and transferred to recipient countries. The expected impacts determine which physical and informational technological components are transferred (Kumar et al, 2007). For instance, under the guise of NPM, the expectation is that African governments would become better governed. This impact is therefore assumed prior to its assimilation/adoption in the local conditions of African countries. Thus, better governance is an envisaged impact as the innovation is transferred, in order to achieve certain functional capabilities emanating from the direct deployment of the technologies of e-government (such as the use of the Internet, advanced website functionalities, intranet, extranets, etc). Successful[2] adoption of e-government results in certain performance objectives being met, in the short-, medium and long'-term. The basis of the claim is therefore that the expected impacts of e-government are known *a priori* to the transfer and assimilation of its technologies in developing countries. E-Government qualifies as a large-

[2] E-Government literature links this notion to that of maturity. For instance, West (2005) considers e-government maturity as the extent to which a government has established an online presence. The online presence of governments can be assessed using the features implemented in e-government Web sites. West (2006) further clarifies that "e-government maturity" implies a continuum of developmental stages, with some countries having progressed further than others.

scale technology project since it features the components that characterize what scholars refer to as technologies (various ICTs).

For instance, Kumar, Kumar and Persaud (1999) identified the physical components of technology comprising products, tooling, equipment, blueprints, techniques and processes; and informational components which consists of know-how in management, marketing, production, quality control, reliability, skilled labor and functional areas. Ramanathan (1994) provided a more detailed view of what comprises technology into four main components of *technowar*e, *humanware, orgaware* and *inforware*. Technoware is the object-embodied form of technology that includes machinery, various tools, structures and computing machines. The human-embodied form or humanware represents the intervention required to achieve the desired goal of the technoware. Orgaware or the institution-embodied form refers to the support network of principles, practices, and arrangements that govern the effective use of technoware by the humanware. This is expressed in the form of work conventions, work organization, work facilitation, work evaluation, and work modification (Kumar et al, 2007). The accumulated knowledge that is required to realize the full potential of the above three components is the inforware of the information-embodied form.

All four components characterize e-government. The *technoware* consists of all the physical technological components required for the realization of e-government. For instance, the computers, printers, various communications components, communications networks and national physical infrastructure, switching equipment (e.g. PBX and Centrex systems)and various other physical accessories required (such as modems, fax machines), government process, blueprints and techniques. The *humanware* are the various stakeholders involved in the assimilation of the technoware to achieve certain desired outputs. Notable are the civil servants (government employees), civil society (citizens, and non-governmental organizations) as well as businesses and their systems and processes that interact with the technoware. The *orgaware* would therefore refer to the various governmental agencies at various levels such as government ministries at the national level, quasi-governmental institutions such as parastatals, local government agencies, provincial government agencies, district government agencies, civil society organizations, business organizations, as well as other arms of government such as the legislature and the judiciary. The *inforware*, considered to be a central element in an increasingly globalized economy (Udo & Edoho, 2000), especially with the emergence of IT, is premised on

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the need to enhance communication amongst the various stakeholders of e-government. E-Government is hinged on the realization of certain goals dependent on the efficient production and utilization of the knowledge available in various disparate databases, either in manual or computerized format. The deployment of IT, essential for the coupling of computers to telecommunications networks, enables the realization of the full potential of the technoware, orgaware and the humanware.

Thus the transfer of e-government, as a goal-oriented process, envisages that developing nations can achieve better governance and other socio-economic impacts from its adoption. As developing countries 'receive' e-government from developed nations, the expected impacts are already known, and its assimilation in local conditions is conceptualized with the full knowledge of its expected impacts. The claim in this thesis is that *conceptualization* (section 2.6 below and analysis in chapter six) of e-government in developing countries can be explained by the *expected impacts* envisaged by the various supra-national organizations, other developed nations and developing nations viewed by the recipient country as being more developed. E-Government, as an artifact of human conception, is premised on the relationship that developing countries 'know' the expected impacts of e-government before its technologies are patterned in a particular way to realize these impacts.

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2.6 E-GOVERNMENT CONCEPTUALIZATION AND IMPACTS

A number of IS researchers (Alter, 2003; Benbasat & Zmud, 2003; Guthrie, 2003; Holand, 2003; Whinston & Geng, 2004; Wu, 2003; Faraj, Kwon & Watts, 2004, Sein & Harindranath, 2004; Myers, 2003) have drawn attention to the concept of the Information Technology (IT) artifact. Of notable acknowledgement is the debate which was stirred by the article written by Benbasat & Zmud (2003), in which they polemically pointed out that the core of IS as a discipline, should be the IT artifact. While their assertion raised a lively debate on the core of IS as a discipline, its relevance to this thesis is their conceptualization of the IT artifact. They conceptualize the IT artifact to be:

> The application of IT to enable or support some task(s) embedded within a structure(s) that itself is embedded within a context(s). Here, the hardware/ software design of the IT artifact

> encapsulates the structures, routines, norms, and values implicit in the rich contexts within which the artifact is embedded (Benbasat & Zmud, 2003, p. 186).

They specifically endeavor to show that the intent of IS should be to increase the collective understanding of:

(1) How IT artifacts are *conceived, constructed*, and *implemented*,

(2) How IT artifacts are used, supported, and evolved, and

(3) How IT artifacts *impact* (and are impacted by) the contexts in which they are embedded.

In aligning this concept of the IT artifact within the e-government domain, the nomological net espoused by Benbasat & Zmud (2003) aided in grounding part of this study. Given the nascent nature of e-government in developing countries in Africa, a study of its *conceptualization* (number 1 above) and *impacts* (number 3 above) were considered apt, especially if recourse to the concept of the IT artifact acts as a guide.

Kenya, just like many other developing countries, has joined the race of adopting e-government, but largely depends on designs of ITs from the industrialized nations (Kirlidog, 1996). Depending on technology designed and produced in developed countries is claimed to bring a cultural bias in favor of those developed countries' social and cultural systems which may create obstacles to obtaining certain envisaged impacts in practice. Capturing the views of local implementers of e-government would bring to the fore how e-government conceptualization in a developing country is linked to the expected impacts (already inherent in the design of the various technologies of e-government). This section presents e-government conceptualization from the IT artifact concept by putting forth the argumentation that it is important to understand how what is transferred is conceptualized. In other words, as the technology is being transferred, the impacts are already engineered into the transferred artifact.

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2.6.1 E-GOVERNMENT CONCEPTUALIZATION

In reviewing the literature, five constructs were identified which were used as a basis for e-government conceptualization. The five constructs were based on a summary of the predominant IT artifact conceptualizations (or views) proposed by Orlikowski & Iacono (2001); Sein & Harindranath (2004) as well as Sawyer and Chen (2002). These five conceptualizations are *the tool view, proxy view, ensemble view, computational view* and *nominal view*. Orlikowski and Iacono (2001), while emphasizing the need for the centrality of the IT artifact in IS, pointed out that academics in the field have not deeply pursued the IT artifact as the core subject matter. They define the IT artifact as bundles of material and cultural properties that are packaged in some socially recognizable form, which could be in the form of hardware or software (Orlikowski and Iacono, 2001). While chiding researchers of the need to refocus on this under theorized domain, Orlikowski & Iacono (2001) as well as Sein & Harindranath (2004) clearly point out that any IT-based artifact is contextual, thus suggesting that this socially and humanly recognizable IT 'form' differs, not only in essence but also in its effects. Their description and adaptation to the e-government artifact concept are summarized in table 2.3.

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Table 2.3. E-Government Conceptualizations (Adapted from Orlikowski & Iacono, 2001)

IT Conceptualization	Representation	Adapted to E-Government Conceptualization
Tool or feature view	Social Relations Tool	E-Government Technology provides opportunities for the government to convey social presence which enables it to alter its effectiveness and its communications behavior
	Labor Substitution Tool	E-Government Technology is a tool that enables the government to serve the public more cheaply and efficiently
	Productivity Tool	Performance capabilities of any E-Government system is designed in the technical features of the technology used during implementation
	Information Processing Tool	E-Government Technology alters and enhances the way that civil servants and government employees process information
Proxy View	Technology as perception	E-Government Technology is largely represented by measures of users' perceptions of the technologies that have been adopted.

	Technology as Diffusion	Measures of diffusion and penetration of technologies such as e-mail, Internet, Intranets, Extranets, Mobile computing and Mobile telephony are indicative of E-Government Technology
	Technology as Capital	The impact that E-Government technology on the productivity of government staff is dependent on the monetary resources allocated to E-Government projects
Ensemble or functional View	Technology as Development Project	E-Government Technology is a social process that is largely determined by the roles of various stakeholders during its design, development and implementation
	Technology as Production Network	E-Government Technology is focused on building of systems of alliances which tie together various stakeholders who work together to develop new technologies for maintaining governments' public service delivery
	Technology as Embedded Systems	Conditions of use of the E-Government Technology within a particular social context determines its Technology as a continuously evolving system embedded in a complex and dynamic social context.
	Technology as Structure	E-Government Technology embodies social structures built into it by its designers during development which are then appropriated by the users as they interact with the technology
Computational or Proof of Concept View	Technology as Algorithm	E-Government Technology is a set of rules and procedures that is used by Governments to build new or enhance systems that enhance their service delivery
	Technology as Model	E-Government Technology is regarded as technology used for representing government's processes, structures, events, knowledge as accessible database through the use of data modeling or simulation
Nominal View	Technology as Absent	E-Government Technology is absent and cannot be described, conceptualized or theorized

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Thus the IT artifact conceptualization was used as a basis since e-government relies on a cluster of various information technologies.

Sawyer and Chen (2002) provides at least two reasons why the study of an IT artifact is also the study of the *resulting IS*. This argument is especially critical when there are proposals to look at the study of e-government Information Systems as opposed to an e-government technology oriented approach. Kling and Scachchi, (1982) point out that, while an IS can be developed that have no ICT, it is practically impossible currently to develop an IS without ICT. In fact, as Orlikowski and Iacono (2001) have argued, this inseparableness of IS and ICT is evident even in research, thus their call for a re-focus on the IT artifact as a research domain. Sawyer (2004) further theorizes that the growth in the use and value of IS can be attributed to the increased

power of the underlying ICT. These authors thus seem to point out that in terms of the *impact* of a particular IS application (section 2.7.2 below); the ICT component may actually be what could be regarded as the panacea. This thesis partly responds to the suggestion that the so-called technology component is increasingly under-researched, while its influence on an IS performance is not in doubt. In arguing for a focus on e-government conceptualization, the theoretical arguments resorted to the use of generalized IT conceptualizations.

2.6.2 INTENDED E-GOVERNMENT IMPACTS

Part of the conceptual development and assessment of the e-government artifact relied on Orlikowski and Iacono (2001) views of the IT artifact. Their characterizations provided a theoretical lens for undertaking part of this inquiry. E-Government, as a technology-based artifact for the transformation of public service delivery, needed to be addressed from a specific perspective to assess the influence of expected impacts on its conceptualization. To aid in this, the framework proposed by Malone & Rockart (1991) and later adopted by Sein & Ahmad (2001) was analyzed. The model postulates that new technologies impact social systems through three change-effects.

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The *first-order* or *primary effects* are considered as a simple substitution of old technology with new technology (Sein, 2004). In this case, any technological artifact is modified to take into account incremental changes in operations. The intention of adopters is not to radically alter their way of operating, but rather to improve operations. *Second-Order* changes, or *secondary effects*, result in the phenomenon enabled by the technology (Sein et al, 2004). In this case, there is a discontinuous change resulting in a technology artifact that replaces the status quo with a new way of doing things. The *third-order* or *tertiary effects* culminate in the generation of new technology-related service options and eventually social change (Sein et al., 2004). Third-order effects result in technology artifacts that allow actors to be reflective about the design and use of technology (Orlikowski & Baroudi, 1991).

While the above classifications were considered important for technology impacts research, their operationalization was found to be difficult within the context of a developing country where the

technology is still nascent, and they are heavily reliant on technology transfer. In fact, the predominant assumption is that most developing countries, such as Kenya, may still be experiencing first order effects. The challenge was therefore to operationalize relevant components of the e-government impacts construct to guide the research. However, the state of e-government development of the country under study needs to be considered: that the Government of Kenya only developed its E-Government strategy in 2004 (GOK-EGS, 2004). Thus whilst it may have been desirable to uncover the actual impacts of the e-government initiatives, this was impractical since implementation of this broad based strategy is still at a very nascent stage in the period 2005-2008. The appropriate respite was to consider the perceptions of the *intended impacts* of the stakeholders of these e-government initiatives. This called for a consideration of frameworks that aid in understanding or studying the intended actions and expected impacts of the e-government artifact.

One of the most recent and relevant e-government impact measurement models was that developed by Chrissafis (2005) used in the analysis of the efforts OECD e-government initiatives. Their argument is that any e-government initiative has both a primary and a secondary impact. Primary impacts results in a direct influence on socio-economic cohesion, improved democratic processes and GDP growth (Chrissafis, 2005). The secondary impact is however touted to have a positive impact on foreign direct investment, and to a certain extent GDP growth. While these may be regarded as general in nature, their operationalization requires a search for the *value drivers* or *objectives* for these impacts to be realized.

Chrissafis (2005) postulates that key objectives that lead to the attainment of GDP growth are those of a desire for better connected public service delivery system (*connectivity*) and a better functioning public functioning system (*efficiency*). The connectivity objective is conclusively achieved when there are cost savings in infrastructure investments; ICT industry output growth and better opportunity outcomes for citizens. On the other hand, efficiency is attained when there are overall cost savings, optimization of government revenues and the achievement of organizational efficiencies. Socio-economic cohesion, as a general construct, is driven by the desire of governments to attain *effectiveness* through better services and opportunities for its citizenry (Chrissafis, 2005). This can be operationalized through the outcomes of increased user value and satisfaction; better opportunities outcomes for citizens; improved business environment and improved business opportunities. Another expected outcome of e-government

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initiatives is the improvement of democratic processes within a country, with its overriding objective being the attainment of *openness* through good governance. Openness in governance is attainable via the constructs of transparency and accountability; openness and participation as well as a better cooperating public administration system (Chrissafis, 2005).

A secondary impact of the above model is the increased foreign direct investments (FDI), mainly achievable through a better connected public delivery system. As a secondary objective, its operationalization is intertwined with certain primary objectives. For instance, Chrissafis (2005) captures the following constructs as underlying the outcome of FDI: transparency and accountability, improved business environment, better opportunity outcomes for citizens and improved business opportunities. Overall, the four value drivers which provide indications of the impacts of e-government can therefore be grouped under the constructs of *Efficiency*; *Effectiveness*; *Connectivity* and *Openness* as summarized in Table 2.4.

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Table 2.4 E-Government Impacts

Value-Drivers (Objectives)	**End-Outcomes**
Efficiency	Overall Cost Savings; Optimization of Government Revenues; Organizational Efficiency
Effectiveness	Increased User Value and Satisfaction; Improved Business Environment; Improved Business Opportunities
Connectivity	Infrastructure Investments Cost Savings; ICT Output Growth; Inter-Connectiveness
Openness	Transparency and Accountability; Enhanced Rule of Law Awareness; Enhanced Co-operation; Openness and Participation

While there are perhaps a number of ways that can be used for investigating impacts of a particular technological innovation; of critical importance is to assess the suitability of a particular approach. For instance, Sein et al's (2004) model looks at impacts in terms of first-order, second-order and third-order impacts with their connotations of evolutionary attainment of these impacts. Thus, whilst their approach appears attractive, it was considered inadequate given the nascent nature of e-government initiatives in Kenya. Another alternative was to consider the logic model by Chrissafis (2005). Its attractiveness was discernible from its detailed operationalization of e-government initiatives, thus making it possible to capture outcomes

regardless of the stage of implementation. It was especially useful as a model of measurement since its approach espouses the themes of socio-economic cohesion, GDP growth and improved democratic processes; themes that are critical in the current human-centered perspective according to the millennium development goals.

In summary, the study partly draws on the technology artifact perspectives outlined, since it provides a peek into the essence (conceptual form of e-government) and the impacts associated with the artifact. For developing countries that rely on technological transfer, the choices are limited since the influence may be from benchmarks that are already established by organizations such as the UN, or other countries that have leverage in one way or another. For instance, in the e-government Strategy of Kenya, there is explicit mention of benchmarking with countries such as South Africa, Singapore, Britain and Canada (GOK-EGS, 2004). Thus the conceptualization of e-government programs does not take place in a vacuum in which expected impacts are not known. Conceptualization is therefore theorized to be dependent on impacts, with diffusion factors possibly mediating or moderating this relationship. The next section provides a summary of the chapter by providing a synopsis of the need for a supply-side notion for the study of e-government artifact as a socio-technical hybrid, by elevating the notion of the *maturity* concept, gleaned from the various perspectives presented above.

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2.7 SUMMARY - THE COMPELINGNESS OF THE NOTION OF E-GOVERNMENT MATURITY

The concept of e-government maturity is adopted from the discourses presented under the organizing vision of e-government, while the Public Administration and the Information Systems perspectives form the foundation for the supply-side notion for the study of the e-government artifact in this thesis. The evolutionary approaches to e-government that were introduced in the earlier sections are considered as denoting various levels of successful e-government adoption (Layne and Lee 2001; Chen 2002; Moon 2002; Davison, Wagner, and Ma 2005; West 2005; Andersen & Henriksen 2006). In these evolutionary models, there is a move from e-government deployment focusing on individual agency applications towards designing the front-end customers' experience to the integration of back-office databases and support services on a standardized infrastructure (Hodgkinson, 2002; Singh and Das, 2007). Thus successful

deployments at various levels denote some form of maturity. E-Government maturity is considered as demonstrated behavior by a country for realizing progress towards a certain level of e-government as opposed to readiness whose focus is on a country's potential(Singh et al, 2007).

So, overall is the organizing vision for e-government compelling? The answer is more positive now in the context of developing countries that continue to shape and re-shape their governance systems based on NPM. Certainly e-government has gained greater visibility now, particularly through the policy process (identified through the interpretation activities) and as well, the legitimization and mobilization activities have intensified.

In order to show how compelling an organizing vision is, Swanson & Ramiller (1997) list certain attributes: distinctiveness, intelligibility and informativeness.[3] As was highlighted, the OV of e-government has managed to convey a compelling and distinctive message by pointing out that transformation of governance is possible through improved service delivery. The various interest groups that participate in the formation of its meaning over the years demonstrates that e-government has been persistent in attracting and holding the attention of its community members, while the richness and coherence with which its message has been spelt out is evident in the various evolutionary approaches that have been proposed and concretized. The e-government message has fitted pretty well in the discourses touching on public sector reforms, presently framed within the broader NPM movement. Its packaging and transfers to African countries recognizes its broader framing within this broader societal discourse on how to improve public sector governance.

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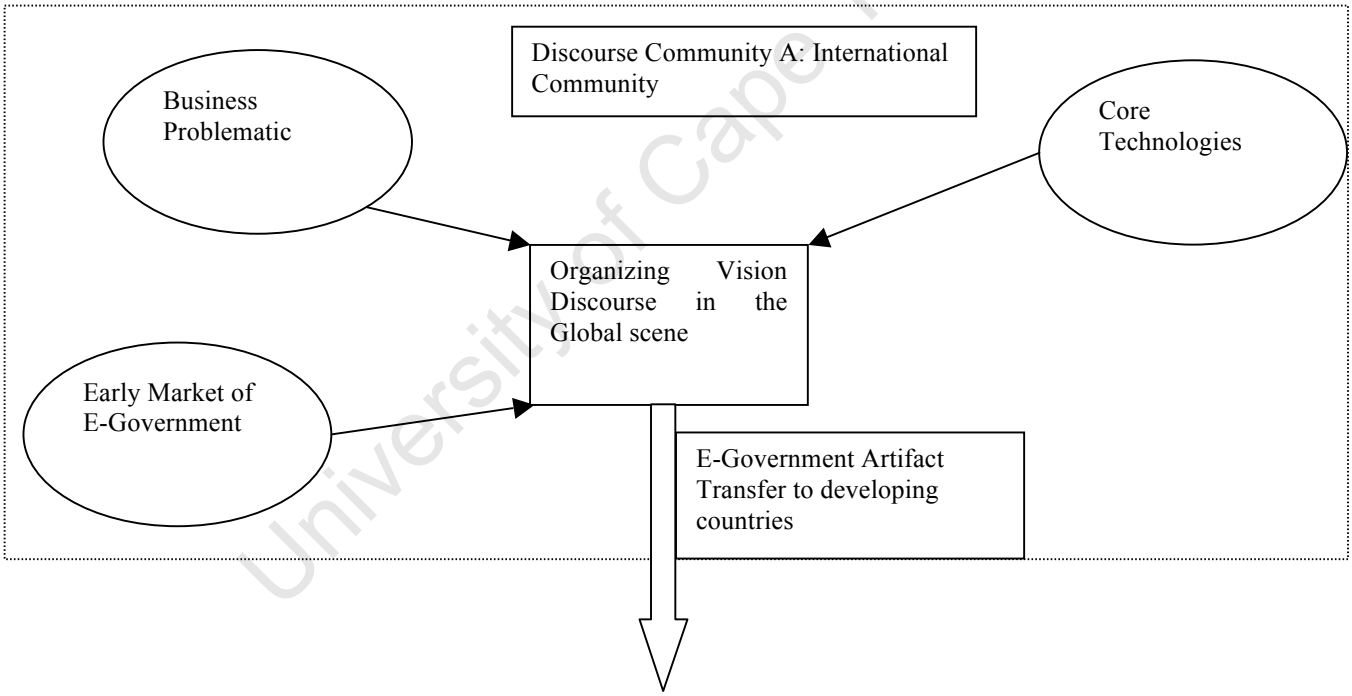
[3] Swanson &Ramiller (1997) " […] speculate that the organizing vision's compellingness is a function of several things, including: its distinctiveness, which is key to its ability to attract and hold people's attention; its basic intelligibility and informativeness, which are determined by the richness and coherence with which it is spelled out; its plausibility, or fit to broader, pre-existing frames for thinking in the relevant domain of application; and of course its perceived practical value, which is determined relative to social and material contexts and in the light of mobilization activities. All these factors may vary over time, and as they do so, the overall compellingness of an organizing vision rises and falls. (p 469)

Figure 2.5 summarizes the emerging conceptualization of the e-government artifact using the organizing vision (OV) language is employed to sum up the various sections. The discourse community A represents the international community, with the dominant voices coming from Western donors, supra-national organizations, large technology vendors and scholars. The discourse community B represents developing countries who are recipients of the transferred e-government artifact in form of (its technologies, management approaches and practices). In both discourse communities, the business problematic is reflected. According to the OV vision theory (Swanson & Ramiller 1997), the *business problematic* at the international level was shaped by drivers linked to the growth of the Internet and e-commerce, the Y2K problem as well as a continual search for public sector governance alternatives. These became the drivers of the OV of the international community, largely framed from the perspective of the Western world.



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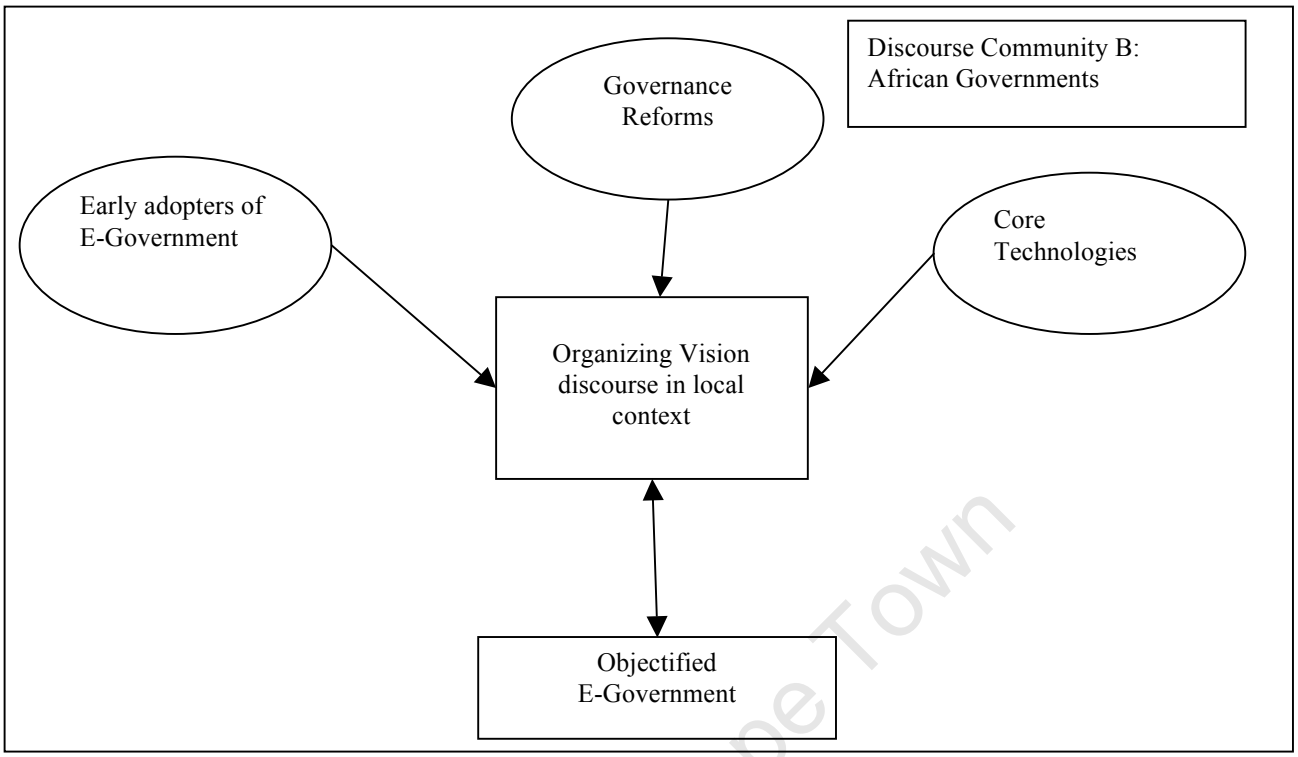

Figure 2.5. E-Government Conceptualization

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Swanson & Ramiller (1997) contend that the trading in an *early market* of an IS innovations applications among community members gives particular impetus to the development of the OV, thus reflecting shared knowledge and belief systems gained through commercial exchanges (Wang, 2001). The OV theory, similarly to management fashion theory, also state that the adoption of a management technique prompts management-knowledge suppliers to produce more discourses promoting this technique (Abrahamson, 1991). If this approach is brought to bear on the discourses that have been taking place in the international community, the later perspective is evident in the development of various evolutionary models and applications of e-government as was outlined in the interpretative activities.

Figure 2.4 portrays a snapshot of a hypothetical problem domain, hosting the emergence of the OV in community discourse A, which is then transferred to community discourse B. The objectification of e-government in community discourse A is then transferred in community discourse B in the form of NPM recommendations for resolving bad governance. Resolution of

bad governance therefore informs the OV discourse in community B, which influences the core technologies required for the organizing vision of e-government.

From an OV perspective, the emerging meanings of the e-government artifact in the African context must address notions of technology transfer (given that e-government relies on ICTs). In addition, the drive for realization of the goal of e-government of achieving agency collaboration must be supported by creating a national information infrastructure, leveraging the infrastructure through integration and pursuing service innovation through transformation (UN, 2008). The urgency for developing countries is even more poignant given the inadequate state of their infrastructure for e-government (Heeks, 2002). This thesis provides a further exploration of the infrastructure perspective, as the basis for grounding e-government within the IS discipline.

The IS perspective elevated the role of the II perspective and if this is intertwined with the concept of technology transfer, then the facilitating role of ICT infrastructure for e-government cannot be ignored in developing countries. The maturity of e-government in a country is therefore reasonably assumed to be dependent on the state of the ICT infrastructure since such infrastructure limits the extent to which the citizenry can be served by e-government services (see Singh et al, 2007).

In the search for the meaning of the e-government artifact in a developing country, it is helpful to distinguish between factors that facilitate the supply of e-government and those that stimulate the demand for e-government in a country. The physical ICT infrastructure and the imperative for governance are therefore linked to the supply-side of e-government. Singh et al (2007) undertook a study which suggests that the main pathway through which per-capita GDP enhances e-government maturity is ICT infrastructure. This study therefore builds its argumentation by linking the state of ICT infrastructure to the conceptualization of the e-government artifact. In this research, e-government maturity, as demonstrated behavior towards attainment of e-government success becomes the basis upon which an understanding of the e-government artifact is developed.

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One could also suggest that e-government, as a research object, is compelling given the research interest it has stirred over the years (see Heeks and Bailur, 2007). Its maturity, as a research domain, or probably as a discipline may no longer be in doubt and therefore this thesis is timely. The remainder of this thesis therefore takes further the investigation of e-government as an emerging phenomenon initiated in this chapter and in Chapter One. It explores what meanings e-government acquires in policy and practice. Drawing on these emergent meanings, the thesis considers the implications of the social exclusiveness of the e-government artifact, and considers a possible way out. In conducting the analyses, the thesis relies on Critical Realism and multi-methodological research approaches. These philosophical and methodological concerns are addressed in the next chapter.

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CHAPTER THREE

RESEARCH PHILOSOPHY, FRAMEWORK AND METHODS

3.1 INTRODUCTION

This chapter presents argumentation to support Critical Realism (CR) as a philosophical approach underpinning the study of the e-government artifact in the context of a developing country. By acknowledging the social character of the research and the phenomenon under study, the chapter further elaborates on the research framework and also provides a description of the research strategies.

3.2 OVERVIEW OF RESEARCH PARADIGMS

The study recognizes that there are other sets of philosophical assumptions that have been dominant in IS research and the debate regarding which is preferable over the other was regarded as less beneficial in this thesis. In order to position this research within the critical realist research paradigm, table 3.1 provides a summary of the key ontological, epistemological and methodological concerns of some the dominant research assumptions in relation to CR.

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Table 3.1 Research Paradigms

	POSITIVISTIC	INTERPRETIVE	CRITICAL REALISM
Ontology	A **realist** ontology asserts that there exists a single reality that is independent of any observer's interest in it and which operates according to immutable natural laws, many of which take cause-effect form. Truth is defined as that set of statements that is isomorphic to reality.	A **relativist** ontology asserts that there exist multiple socially constructed realities ungoverned by laws, causal or otherwise. "Truth" is defined as the best informed (amount and quality of information) and most sophisticated (power with which the information is understood and used) construction on which there is consensus (although there may be several constructions extant that simultaneously meet that criterion).	A *stratified reality* independent of human consciousness, and at the same time a dimension which includes our socially determined knowledge about reality. Thus reality has an objective existence but that our knowledge of it is conceptually mediated. It is true that facts are theory-dependent, but this is not to say that they are theory-determined. Three levels of reality: the empirical, the actual and the real.
Epistemology	A **dualist objectivist** epistemology asserts	A **monistic subjectivist** epistemology asserts	Science has two dimensions: an

	that it is possible (indeed, mandatory) for an observer to exteriorize the phenomenon studied, remaining detached and distant from it (a state often called "subject-object dualism") and excluding any value consideration from influencing it.	that an inquirer and the inquired into are interlocked in such a way that the findings of an investigation are the *literal creation* of the inquiry process. Note that this posture effectively destroys the classical ontological-epistemological distinction.	intransitive and transitive dimension. Theories are the transitive objects of science and they constitute the dimension that connects science with reality. However, there is no relation between science and the intransitive object; an ontological gap always exists.
Methodology	An interventionist methodology strips context of its contaminating (confounding) influences (variables) so that the inquiry can converge on truth and explain nature as it really is and really works, leading to the capability to predict and to control.	A hermeneutic methodology involves a continuing dialectic of iteration, analysis, critique, reiteration, reanalysis and so on, leading to the emergence of a joint (among all the inquirers and respondents, or among etic and emic views) construction of a case.	A structural analysis approach that relies on the nature of the object to determine the possibilities we have for gaining knowledge of it. Methods must suit the object of study and the purpose of the study.

Adopted from Guba & Lincoln (1989) and Danermark et al (2002)

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The table shows that there are three main concerns of philosophers when they are trying to understand what they know: ontological, epistemological and methodological questions (Guba & Lincoln, 1989). The *ontological issue* concerns a questioning of the nature of reality and truth. Ontological beliefs bring to light the *essence of phenomena* under investigation, by emphasizing beliefs about *human rationality* and beliefs about *social relations* (Orlikowski & Baroudi 1991). The view as to whether the empirical world and its phenomena is objective and independent of human conception as opposed to a more subjective view which only exists by humans creating and recreating reality have been dominant. Typical questions that philosophers grapple with at this level include the following (Niljand, 2004; p.32):

- Are the empirical world and its phenomena assumed to be objective and therefore independent of humans, or inherently subjective and hence existing only through the actions of humans in creating and recreating it?

- What intentions are ascribed to the humans studied?
- How do people socially interact in organizations, groups and society?

The *epistemological issue* is concerned with an examination of the conditions, possibilities, nature and limits of human knowledge and therefore which criteria need to be met to construct and evaluate knowledge (Danermark et al, 2002). A positivist research perspective is dominant in Western and in IS research and regards scientific knowledge as consisting of regularities, causal laws and explanations of an objective world (Ivari, 1991; Orlikowski & Baroudi, 1991). Two main reasons advanced for this state of affairs emphasize the historical prevalence of positivism, especially in the reference disciplines of Computer Science and Management Science (Trauth, 2001; Stahl, 2008) and the continued lack of coherence amongst the non – positivists IS researchers (Weber, 2003). Positivist or quantitative research is generally characterized by the formulation and testing of hypotheses and includes the use of methods such as surveys, laboratory experiments, formal methods and numerical methods (Myers, 1997). Critics of positivistic research pinpoint its inadequacy and inappropriateness in explaining the human, group, organizational and societal matters which surround information systems (Lee & Liebenau 1997) and that its emphasis is on universal laws disregard historical and contextual conditions as potentially triggering events or influencing human action (Niljand, 2004).

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The interpretive and critical perspectives underscore the importance of human interpretation and understanding as constitutive of scientific knowledge which cannot be obtained by recourse to natural and social laws but through social discourse (Ivari, 1991). The adherents to this perspective point out that the positivists ignore the fact that people think and act, and that people are active makers of their physical and social reality (Orlikowski & Baroudi 1991). The interpretive stance puts forth the claim that knowledge and human interests are interwoven and the researcher, being human, cannot be claimed to be value-free or unbiased (Klein & Meyers 1999). A critical view, when considered from an interpretive stance, stresses the importance of being aware of how common understandings and interpretations are taken for granted and therefore promotes having a conscious awareness about what interests' assumptions taken for granted serve.

The *methodological question* seeks to find ways of generating knowledge and how scientists go about obtaining it. Methodology is concerned with the research methods, approaches and techniques appropriate for gathering valid empirical evidence. It deals with the systems, rules and conduct of inquiry (Guba & Lincoln 1989). There is no single choice regarding these ontological, epistemological and methodological issues. The set of choices people make is the basic belief system or paradigm which is defined as "the most fundamental set of assumptions adopted by a professional community which allow them to share similar perceptions and engage in common practices" (Hirschheim & Klein 1989, p. 1201). By being explicit about the underlying assumptions of the paradigm being used, the researcher can become more aware of the assumptions and beliefs he or she brings to bear in his research. Each paradigm, while it helps to generate understanding, still has its own strengths and weaknesses. Applying different paradigms can also bring new and creative solutions and insights (Benbasat & Weber 1996). This research employed CR and the motivations for its adoption are discussed next.

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3.3 CRITICAL REALISM RESEARCH PARADIGM

Critical realism is widely recognized as the hallmark of the Bhaskarian version of scientific realism in the social sciences which recognizes the existence of reality independent of human consciousness and causal powers are ascribed to human reasons and social structures (Sayer, 2002). As a philosophy, it rejects relativism in social and scientific discourses and re-orientates social sciences towards emancipatory goals. Table 3.2 presents a summary of the ideas embedded in two versions of scientific realism proposed by Roy Bhaskar: transcendental realism (for natural science) and critical realism (for social science). The social science version of critical realism was adopted in this research.

Table 3.2 Versions of Critical Realism Paradigm

	Transcendental Realism	**Critical Realism**
Discipline	Natural Science	Social Science
Origin	1. Rejection of Humean empiricism and	1. Rejection of positivist account of

	Comtean positivism 2. A synthesis of Copernican revolution	science: methodological individualism 2. Rejection of empiricism, positivism, structuralism and hermeneutics 3. Search for the possibility of naturalism
Ontology	1. Things and materials posses causal powers independent of human agency: their realization is contingent 2. Intransitive dimension of the science: stratification of the world into different levels of ontological depth 3. The existence of natural necessity: secretion of causal powers through generative mechanisms and enduring tendencies 4. Open systems: no regular conjunctions of events and outcomes	1. Pre-existence of social structures: transformed and reproduced by social actors 2. Human agency with intentions: reasons as real causes 3. Continuous process of Structuration between structures and agency. 4. Open systems: no regular conjunctions of social events and outcomes
Epistemology	1. Science is an ongoing process 2. Transitive dimension of science: social reproduction of knowledge 3. Search for causal laws in science: explanation but not prediction	1. The possibility of naturalism 2. Subject-matter: internal (necessary) and external (contingent) relations between objects and events. 3. A material perspective of knowledge 4. Practice: immanent critique and emancipation of actors
Methodology	1. Process of retroduction: aposteriori reasoning. 2. Possibility of experimentation. 3. Use of postulated entities and analogies 4. Practice: theoretical and empirical research	1. Process of abstraction and retroduction. 2. Impossibility of experimentation 3. Possibility of direct awareness of structures and mechanisms 4. Theoretical (abstract) and empirical (concrete) research

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3.3.1 CRITICAL REALISM AND ONTOLOGY

From an ontological viewpoint, reality is either observer – independent (realists or positivist) or observer – dependent (anti – realists or interpretivists). Critical Realism (CR), just like post – modernism, pragmatism, post positivism and others, is one of the attempts to reconcile the ontological dichotomy of positivism and interpretive paradigms (Stahl, 2008). Achieving reconciliation is complex and consequently, CR has opened up a relatively new Meta - theoretical approach to reality, which is partially dependent on the observer. Thus completely

relying on either positivist or interpretivists ontological assumptions was untenable in this thesis. This is because some aspects of the inquiry required recognizing observer – independence (reported in sections of Chapter Five and Chapter Six) while others required observer-dependent (Chapters Four, Seven, parts of Chapter Five and Eight) view towards the artifact of e-government. A motivation for the need for CR realism is further given under methodological considerations in section

Critical realists develop a stratified model of reality, and distinguish between three domains. The domain of the *empirical* concerns experienced events. Actors have immediate access to this level and events are experienced as sensations, impressions, and perceptions of reality. The domain of *actual* includes events, whether observed or not. Such things can happen independently of the experience and perception that actors may have of them. Events can happen, and yet not be transferred into the domain of empirical until human agency has identified correctly those events and transformed them into experience (Bhaskar, 1978). Researchers will be able to identify events that might have escaped actors' perceptions, because of their particular focus and training. However, the domain of actual is the surface of reality and the events that happen are due to the causal powers of the objects and structures when they are activated. One of the key features of critical realism is that explanation involves penetrating behind the surface of reality to access the domain of *real*, identify those structures and causal powers, and the ways they act (Sayer, 1992).

The domain of the real consists of the structures and causal powers that generate events. The world exists independently of the idea that we have of it and structures have specific causal capabilities. Causal powers are transfactual—i.e. they exist whether or not they operate in the specific context under study. From a realist perspective, causal explanation is not about the deterministic or stochastic associations of patterns of events, nor experiences, but the ascription of causal powers to structures (Tsoukas, 1989). Thus causal powers can exist independently of empirical results and the laws governing these powers are seen as transfactual. This stance is informed by the fact that the social world is an open system in which different causal powers may coexist (Archer, 1995; Sayer, 1992). These three levels provide a stratified view of reality and thus give critical realism a specific ontological depth (Table 3.3 and Figure 3.1).

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The empirical domain consists of what is experienced, directly or indirectly, and is separated from the domain of the actual where events happen whether we experience them or not. The basic premise is that what happens in the world is not necessarily what is observed or observable (Danermark et al, 2002). The empirical domain is the level that contains 'data' or 'facts' which are theory-laden with the assumption that all data arise in connection with some theory. The events that characterize this level are therefore not experienced in a direct way but are always mediated by theoretical conceptions. The domain of the real is that which can produce events in the world and is metaphorically referred to as mechanisms (Danermark et al, 2002).

Table 3.3 Ontological Assumptions of the Critical Realist View (Adopted from Bhaskar, 1978)

	Domain of the Real	Domain of Actual	Domain of Empirical
Structures	V		
Events	V	V	
Experiences	V	V	V

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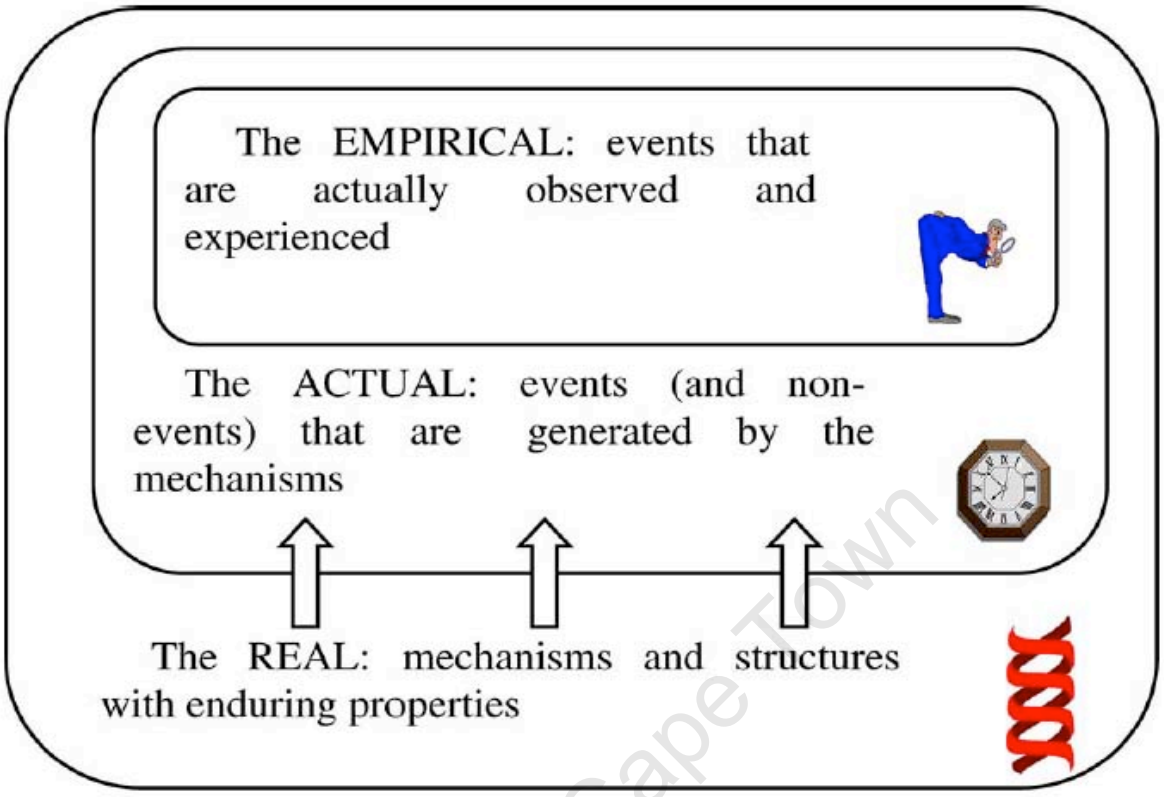

Figure 3.1: The three domains of the real (Source: Mingers, 2004)

Thus Bhaskar's ontological map provides the basis for the philosophical assumptions that were made with regard to this inquiry. While advocating for causality within the critical realist assumptions, Smith (2006) considers that the fundamental question in research is an *ontological one*, with an implication that research is of necessity *theory-driven*. The critical realist stance appears attractive for this inquiry, due to its 'soft-line' approach to determinism. Other authors (Wilson & Greenhill, A; 2004) point out that while there have been increasing calls for a pluralistic approach to research inquiry, there has been a weak philosophical base upon which these studies are premised. They thus advocate critical realism as an attempt to transcend the bi-polar opposition between positivism and interpretivism, thereby providing the philosophical base for carrying out pluralistic research approaches depending on a particular object of inquiry.

The three ontological levels of reality lead to the assertion that critical realism has both a transitive dimension and an intransitive dimension. The transitive dimension includes the knowledge and the theories we have of the world, and the intransitive dimension is the world

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itself. These are enumerated in the next section to provide traction to the epistemological stance of critical realism.

3.3.2 CRITICAL REALISM AND EPISTEMOLOGY

The overriding epistemological assumptions of CR are that science deals with something independent of science itself and has two dimensions: the *transitive* and the *intransitive*. Critical Realists acknowledge that knowledge about reality stems from a knowledge derivation process and which cannot be understood from the social actors involved (Dobson, 2002). However, Critical Realism is in opposition to the prevalent view of post modernism that attempts to equate reality with this knowledge derivation process. CR asserts that real objects are subject to value laden observations; the *reality* and the value-laden *observation of reality* operating in two different dimensions, one intransitive and relatively enduring; the other transitive and changing (Dobson, 2002). Bhaskar argues that a failure to make a distinction between the transitive and the intransitive dimension results in epistemic fallacy which assumes that statements about being (ontological statements) can be analyzed in terms of statements about knowledge of that being (epistemological statements).

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The epistemological statements refer to the value-laden theories that scientist use to understand the world around them (Danermark et al, 2002). The theories are thus transitive objects of science that constitute the dimension that indirectly connects science with reality. The intransitive object of science is therefore the target of researchers-an attempt to discover the generative mechanisms that produce the events that are experienced and understood using theories (Danermark et al, 2002).Given this stratification, the implication is that there is always an ontological gap that exists since there is no direct relation between science and its intransitive object, but that this relationship is mediated by theories (transitive objects of science). That in effect, the theories that researchers use to understand the world point to *something* external to the theory, pointing to a reality which is independent of the researcher. In conclusion, it is reasonable to ascribe to this something 'reality' or the 'world' as the intransitive object of science. Bhaskar refers to the existence of these two dimensions as the 'central paradox of science' and Collier (1994) concurs in his formulation by stating that:

> Rival scientific theories necessarily have different transitive objects, or they would not be different; but they are not about different worlds – otherwise how could they be rival? They would not be scientific theories at all if they were not aimed at deepening our knowledge of the intransitive object of science (p.51)

Thus for the realist, the most important driver for decisions on methodological approach will always be the intransitive dimension, the target being to unearth the real mechanisms and structures underlying perceived events. The next section presents CR methodological perspective on the conduct of research.

3.3.3 CRITICAL REALISM AND METHODOLOGY

Methodologically, the position of Critical Realism is that science is centrally concerned with *explanation, understanding* and *interpretation*, as opposed to an argument that science is about discovering universal laws, purely predictive ability, or the simple description of meanings and beliefs (Mingers, 2006). The methodological approach adopted in CR therefore moves from some phenomena (or its absence) that has been observed or experienced, to the postulation of some underlying mechanism(s) or structure(s) which, if they existed, would causally generate the phenomena. This approach is known as *abduction or retroduction*. The consequences for methodological implications of a stratified view of reality can be drawn from the following quotation by Roy Bhaskar:

> Methodological distinction between the social sciences [...] and the social psychological sciences […]. If the object of the former is *social structure*, that of the latter is *social interaction*. They may be linked by the study of society as such, identified as the system of *relations* between the positions and practices agents reproduce and transform (Bhaskar, 1989b, p.93).

The ontological presuppositions of critical realism results in a number of methodological and theoretical consequences highlighted below.

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3.3.3.1 Methodological Realism

The first methodological consequence CR is a conception of causality and causal explanation that is fundamentally different from that advanced by positivism (Lewis, 2000) and which may be linked to the concepts of social structure and relations elicited in the above quote. In realist research, structure is considered as a set of internally related objects or to the inner composition making each object what it is and not something else (Danermark et al, 2002). Thus structure refers not only to macro conditions, but also conditions at the meso and micro levels of a society. Causality refers to the inherent powers or capacities of mechanisms or structures, which, if they are activated in particular circumstances, then they may generate corresponding empirical events and outcomes (Sayer, 2000). There are four major conceptualizations of the term structure discussed by Archer (1995, p. 104):

> (a) Structure as "patterns of aggregate behavior that are stable over time" (from Methodological Individualism).
>
> (b) Structure as "law like regularities that govern the behavior of social facts" (from Methodological Holism).
>
> (c) Structure as "rules and resources which are implicated in social practices and have no existence independent of them" (Giddens' Structuration Theory)
>
> (d) Structure as "systems of human relations among social positions" (Methodological Realism).

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The realist interpretation of structure conforms to that of *methodological realism* that is seeing structures as referring to actual forms of social organization or systems depicting real entities with their own powers, tendencies and potentials (Archer, 1995). Dobson (2001) reiterates that such structures cannot be perceived and thus cannot be identified except through an examination of *their effects*. He states that:

> Social systems depend on the relations between and within a plurality of structures, such relations having their own independent causal properties. The resulting system founded on the various relations has emergent properties which may affect agents acting within the system (Dobson, 2001, p. 206).

Bhaskar (1989) outlines a transformational model of social activity in which the underlying assumption is that society pre-exists the individual. Social forms and structures are seen as necessary conditions for any intentional human act, in that social action and human agency presuppose a social context. This means that pre-existing social forms that may inhibit or promote certain actions or practices affect human activity. At the same time social structures cannot exist without human activity, they exist only by virtue of the activities they govern. Concrete human practice and activity can modify society, and the totality of such acts can sustain or change it. This potential for transformation makes social structures relatively enduring.

3.3.3.2 Retroductive Approach

A second methodological consequence of a stratified ontology is the recommendation of a 'retroductive' research strategy and design that contrasts with the 'deductive' form characteristic of positivism and the 'abductive' form typical of constructionism and postmodernism (Danermark et al., 2002). Retroduction is regarded as a mode of inference that aims at discovering the underlying structures or mechanisms that produce tendencies or regularities under certain conditions through a process of model building, testing and evaluation. Retroduction seeks to clarify, through argumentation, the basic prerequisites or *conditions* for social relationships, people's actions, reasoning and knowledge (Danermark et al, 2002). Conditions denote circumstances without which something cannot exist.

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In order to understand and explain the social world within a CR program, researchers interpret and understand the meaning of actions and events to people, as well as *produce concepts* that allow them to go beyond common-sense and reach a deeper understanding of more abstract character (Danermark et al., 2002). The process starts from the concrete phenomena one wants to explain, and then moves to a more abstract and theoretical form of research to understand the structures causing these events to happen. Such abstract conceptualization and research must then be related back to the complexity of the concrete phenomenon or object of interest. The process therefore involves a continuous move from abstraction to concrete research.

Abstraction in CR is linked to the main goal of finding the structures and mechanisms that generate the events. In order to attain knowledge of the social structures and the deep level of reality, realists have to engage in abstract and theoretical research in which they use thought to reduce the complicated empirical reality by taking an object of study out of its context and drawing out the internal relations involved in producing it. By using abstract theorizing and concepts, one tries to isolate one or more aspects of a phenomenon to find the necessary relations at work. The abstract research thus moves beyond the empirical observations of social phenomena, and tries to explain what is causing them by use of theories and conceptual abstraction. This thesis in the coming chapters uses theoretical abstraction to delineate various aspects of the object under study to enhance explanation.

The thesis also relies on concrete research by collecting data and information which are determined, analyzed and mediated by concepts, values and various theories. This recognizes that the knowledge that is produced in this thesis is transitive, fallible and open to correction, but more or less true to reality. The implication of a move from abstract to concrete research is that the best choice of methods for the concrete and more practical part of social research cannot be determined a priori, but is directed by what is known and can be obtained using different methods. This often leads to the need for combining different methods, based on research questions posed, the object of interest and the power of explanation of different methods. These issues are addressed in the subsequent sections.

The retroductive mode of inference, as the focus of CR, implies a causal-explanatory methodology in which the objective is to explain, rather than to predict, describe or deconstruct social behavior, in terms of the causal mechanisms that constrain and enable different forms of collective human action. The adopted explanation need to identify and account for highly complex 'compound effects' of the interactions between, often contradictory and conflicting, powers and influences operating at *different levels of analysis* and drawn from a wide range of structures and mechanisms operating in dynamic situations and contexts (Danermark et al., 2002; Lawson, 1997). From a realist perspective, this calls for an adoption of a research approach which is both intensive as well as extensive. According to Dobson (2002), intensive research using case studies for unearthing of underlying structures and mechanisms. Extensive research aids in understanding the nature of events which are pointers to the generative mechanisms and structures. In the context of the realist program, it is the events which are normally observed or

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experienced, while the mechanisms and structures may or may not be observable, necessitating the use of inferences from observable events. Sayer (1992) captures this realist perspective in the figure 3.2:

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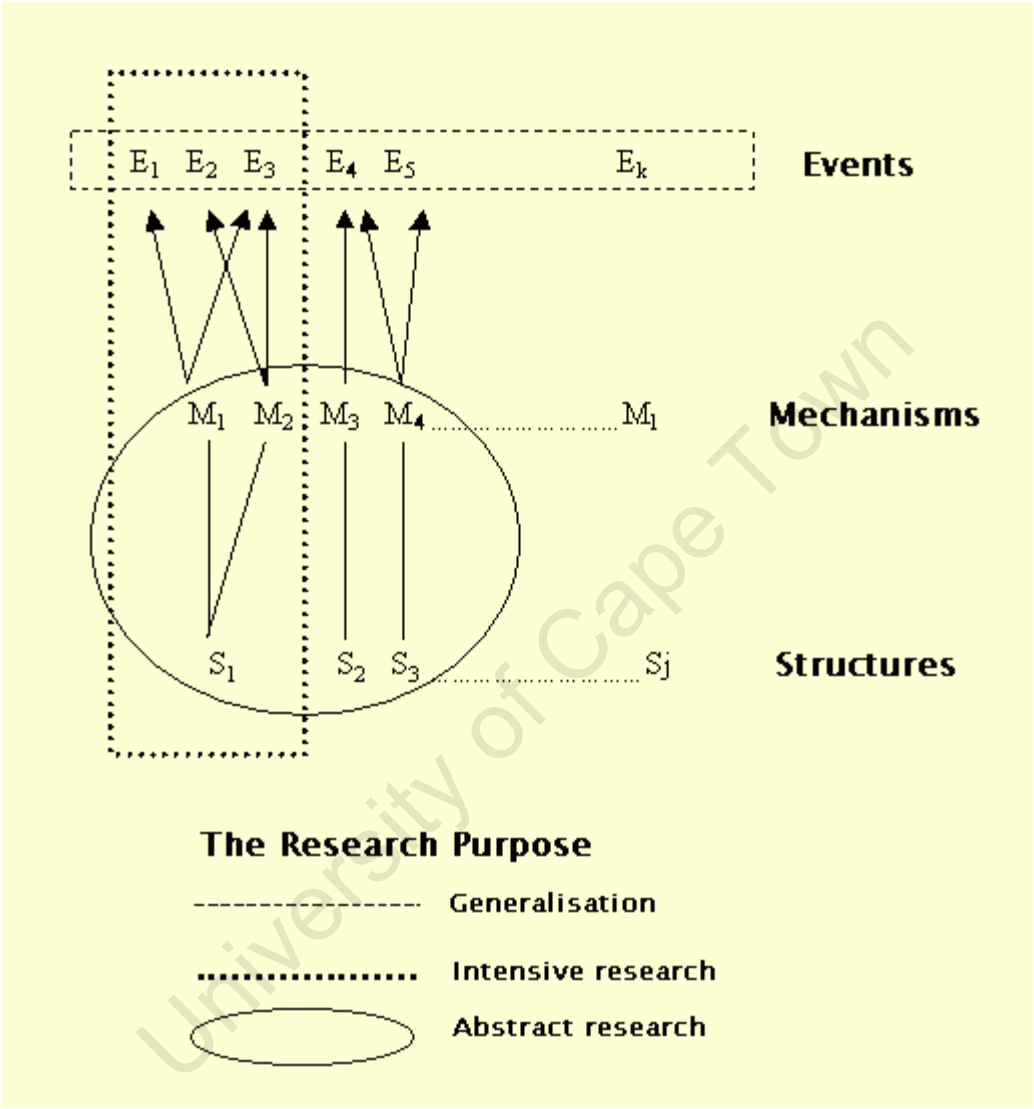

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Figure 3.2: Structures, mechanisms and events (based on Sayer, 1992: 11)

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Within this Critical Realist program, this study takes a stance characterized as an 'explanatory critique' by Bhaskar (1986) which proceeded as follows:

(i). The study focuses on a *social problem*, typical of the critical intent of CR, which can lead to the production of knowledge that can result in *emancipatory change*. In Chapter One and Two, a background to the study was presented as well as the organizing vision of the e-government artifact. The critical social problem that is driving the adoption of e-government in African countries is governance. Due to many years of bad governance, e-government presents an opportunity for radical transformation towards better governance (Heeks, 2002).

(ii). Identification of obstacles to the social problem identified in stage one. The objective is to understand how the problem arises and how it is rooted in the way social life is organized, by focusing on the obstacles to its resolution (Fairclough, 2005). This requires a multi-level analysis of the network of practices[4] (and behind these, stable structures) that makes the social problem intractable. The analyses presented in Chapters Four, Five, Six and Seven presents this stage.

[4] According to Fairclough (2005) coherent accounts of the relationship between social structures and social events depend upon mediating categories, known as 'social practices', meaning more or less stable and durable forms of social activity, which are articulated together to constitute social fields, institutions, and organizations. In critical realist terms (Fairclough, Jessop & Sayer 2004), social events are constituted through the intersection of **two causal powers** – those of **social practices** and those of **social agents**. Social agents produce events in occasioned and situated ways, but they depend on social structures and social practices do so – the causal powers of social agents are mediated by those of social structures and practices, and vice-versa.

Table 3.4 presents the research map adopted in the study and elaborates on the locus of each level of analysis.

Table 3.4: Research Map (Adapted from Layder, 1993: 72)

	Research Element	***Research Focus***	**Chapters**
HISTORY	CONTEXT	*Macro Social Organization* , e.g. national culture, national economic situation, traditions and power relations, ICT Infrastructure	Chapter 4: Analysis of various policy documents Chapter 5: Assessment of the ICT Infrastructure
	SETTING	*Immediate Social Organization*, e.g. State bureaucracies, departments, teams	Chapter 6: e-government conceptualization and impacts in state bureaucracies
	SITUATED ACTIVITY	*Social Activity*-these involves Dynamics of "face-to-face" interaction involving intentional participants implicated in the above contexts and settings e.g. local implementations of e-government projects and the constraints	Chapter 7: Assessment of local ICT implementations for e-government realization
	SELF	*Self-identity and individual's social experience*-as these are affected by the above sectors and as they interact with the unique psycho-biography of the individual.	

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The self and situated activities are enjoined with their concern being the way individuals respond to particular features of their social environment and the typical situations associated with this environment (Layder, 1993). The element of *situated activity* emphasizes the dynamics of social interaction by recognizing that interactions and processes have features that are the result of how the participating individuals' behaviors intermesh and coalesce (Carlsson, 2003). These features being the intermediate forms of the organization that the individual interacts with and is characterized by aspects such as culture of the organization, artifacts like ICT-based IS that are used in situated activities, power and authority structures, etc. The two macro elements of setting and context provide the more remote environment of social activity where context largely refers to large-scale and society wide features while setting focuses on the social works forms than in aggregate describe context. Examples of these features are provided in the research map above.

(iii). In this stage, the study considers whether the social order or network of practices, needs the problem by assessing whether those who benefit from the way social life is organized have an interest being resolved. In this thesis, this was considered as a reflexive approach in each of the analysis chapters and the Synthesis and Conclusions Chapters.

(iv). Identification of possible ways past the obstacles identified as constraining resolution of the social problem. This stage considers the possibilities of unrealized possibilities as well as reflecting critically on the various analyses. These options are presented in the Synthesis Chapter and the Conclusion and Evaluation Chapter.

The remaining parts of the chapter, lays out how the CR research program was operationalized, through a discussion of the research framework and methodology.

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3.4 RESEARCH FRAMEWORK OF THE E-GOVERNMENT ARTIFACT

The conceptual framework and the research procedures are presented and described in the next two sub-sections.

3.4.1 OVERALL CONCEPTUAL FRAMEWORK

The research framework conceptualized in figure 3.3 seeks to encourage a deeper understanding by also pointing out the alienating features of e-government artifact as well as provide alternative conceptualizations that seek to redress the alienating features.

Figure 3.3: Overall Research Framework

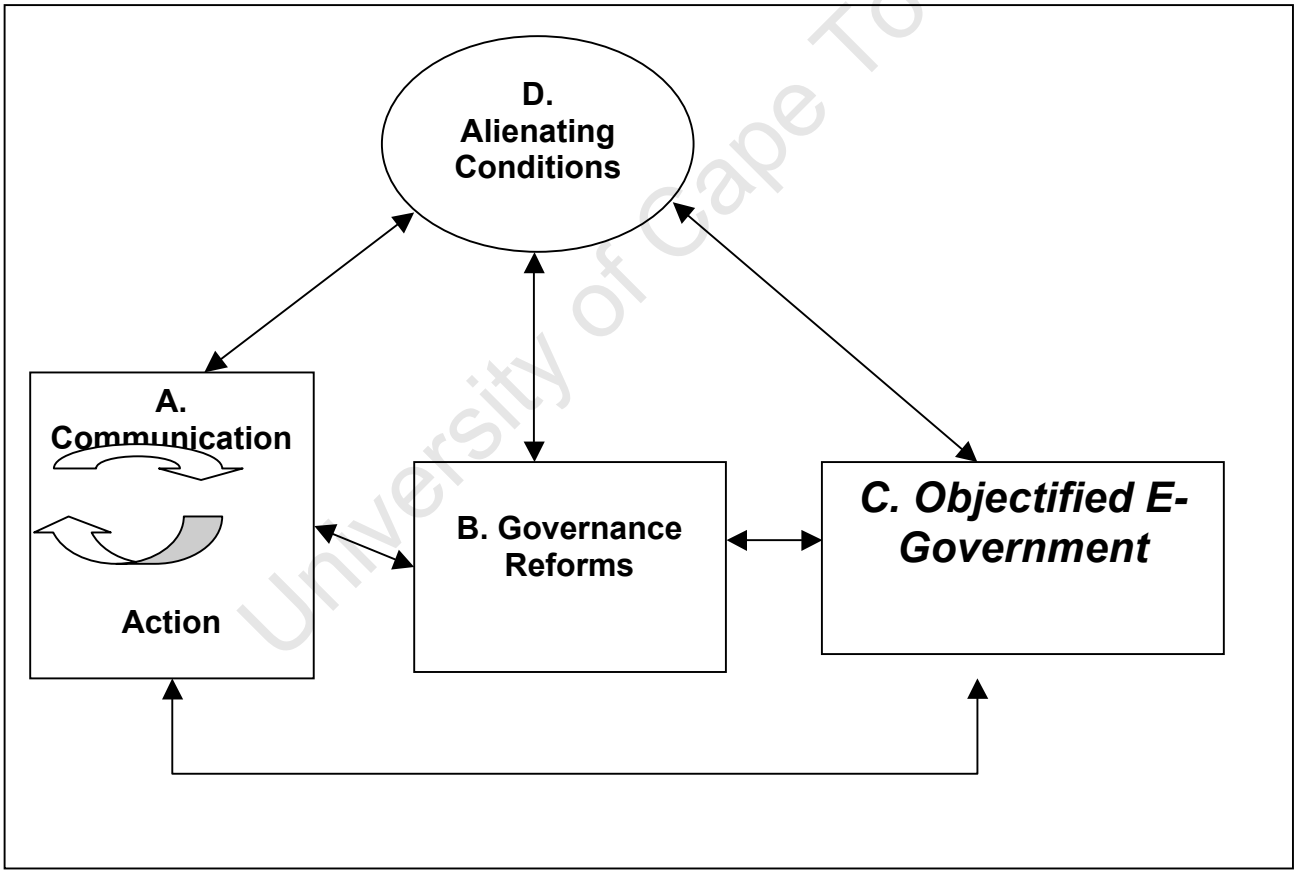

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Figure 3.3: Overall Research Framework

From figure 3.3, the research conceptualized actors as always in a constant state of sense making, forming interpretations of their reality and acting in tandem. The repetitive, continuous and recursive behavior of the actors (of various categories) involve 'rituals' of communication and action (A). The process of sense making involves a continuous enlisting of actors, wrought with diverse frames of reference. Due to the enlistment of different actors, a negotiated or consensus on appropriate technological deployment is objectified in the form of an E-Government Strategy or ICT related policies that impact on governance. Thus sense making takes place in a context of actors engaging in communicative action. Analysis of the policy documents emanating from this process is undertaken in Chapter Four.

It is argued in this conceptual analytical frame, that the objectified E-Government Strategy, or any other policy document for that matter, emerges bearing in mind actors' interactions with their contingent problem domain (B) and the 'speech acts' of the actors (communication and action). The rationale and the motivation for engaging in the process of e-government adoption is triggered by the quest for better governance (Chapter One and Two). Therefore in looking at the problem domain revealed in the diagram, focus is on the emergent governance model evident in the adoption of e-government. The enactment of the objectified e-government within the context of the predominant governance form (assessed in Chapter Four) and the recommended institutional structures provide a 'snap shot' identify of the e-government artifact (C).

The emergent artifact is continuously in flux and changes form based on changing constraining conditions. Masimo & Zamarian (2003) concept of the Information Technology artifact captured the bounded frame of reference notion (linked to alienating conditions in D) by indicating that a particular artifact is the outcome of at least three decision processes: design choices, adoption choices and use choices. Masimo and Zamarian (2003) consider that design decisions are characterized by an explicit or implicit consideration of the artifacts core and the artifact's interface. The artifact's core consists of those elements of the artifact that are *not* directly connected to the users' choices because they do not have access to technical, operational and physical elements of the artifact. In the context of the e-government artifact, then consideration focuses on those aspects that are entrenched in, not only the technical architecture, but also institutional and governance structures defining its operational logic as well as applications considered as the core of the e-government agenda.

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The artifacts interface (assessed in terms of web access choices) on the other hand consists of those elements that are *directly* connected to *use choices*. The thesis considered these two (design and use choices) aspects in delineating the e-government artifact's core. The argument from a Critical Realist perspective is that *design* and *use choices* may lead to some alienating conditions (D), as some actors' interests become more dominant compared to others. For instance, the *design* of the e-government programs (visible in the policy papers) may not take into consideration existing realities, which may eventually affect the use of e-government services. This design-reality inconsistency (Heeks, 2002) may lead to the alienating conditions.

Overall, the objectified e-government was addressed from various perspectives. An analysis of various policy documents in Chapter Four reveals the design choices that characterize meanings associated with the concept of e-government in Kenya. A survey of respondents involved in e-government implementation in government institutions, ministries and agencies in Chapter Six shows how implementers conceptualize e-government and what impacts influence their views. A qualitative assessment of the state of the Internet, as a cluster of ICTs antecedent to e-government adoption establishes alienating situation of current conditions (Chapter Five). A local case study (described in Chapter Three, with findings in Chapter Seven) is also used to show how the design and use choices influence the emerging e-government artifact in a local context.

Thus the research framework presented in figure 3.3 is operationalized from the explanatory critique presented in section 3.3.3.2, and formed the basis for answering the primary research question:

"How is the e-government artifact conceptualized in the context of a developing country"?

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The present study underscores context as an important factor for understanding how the meanings attached to the e-government artifact takes form. In the next section, a description of the research procedures that were followed in this study is presented.

3.4.2 RESEARCH PROCEDURES

Figure 3.4 shows a simplified outline of the major activities of the research process. The starting point was to prepare a guide, with logical steps that were followed during the research process. However, this guide had the flexibility to adapt to changes that became necessary as insight was gained during the course of the study. Henning (2004) suggests that an emergent plan with a strong logic is a better option to carrying out a qualitative research study.

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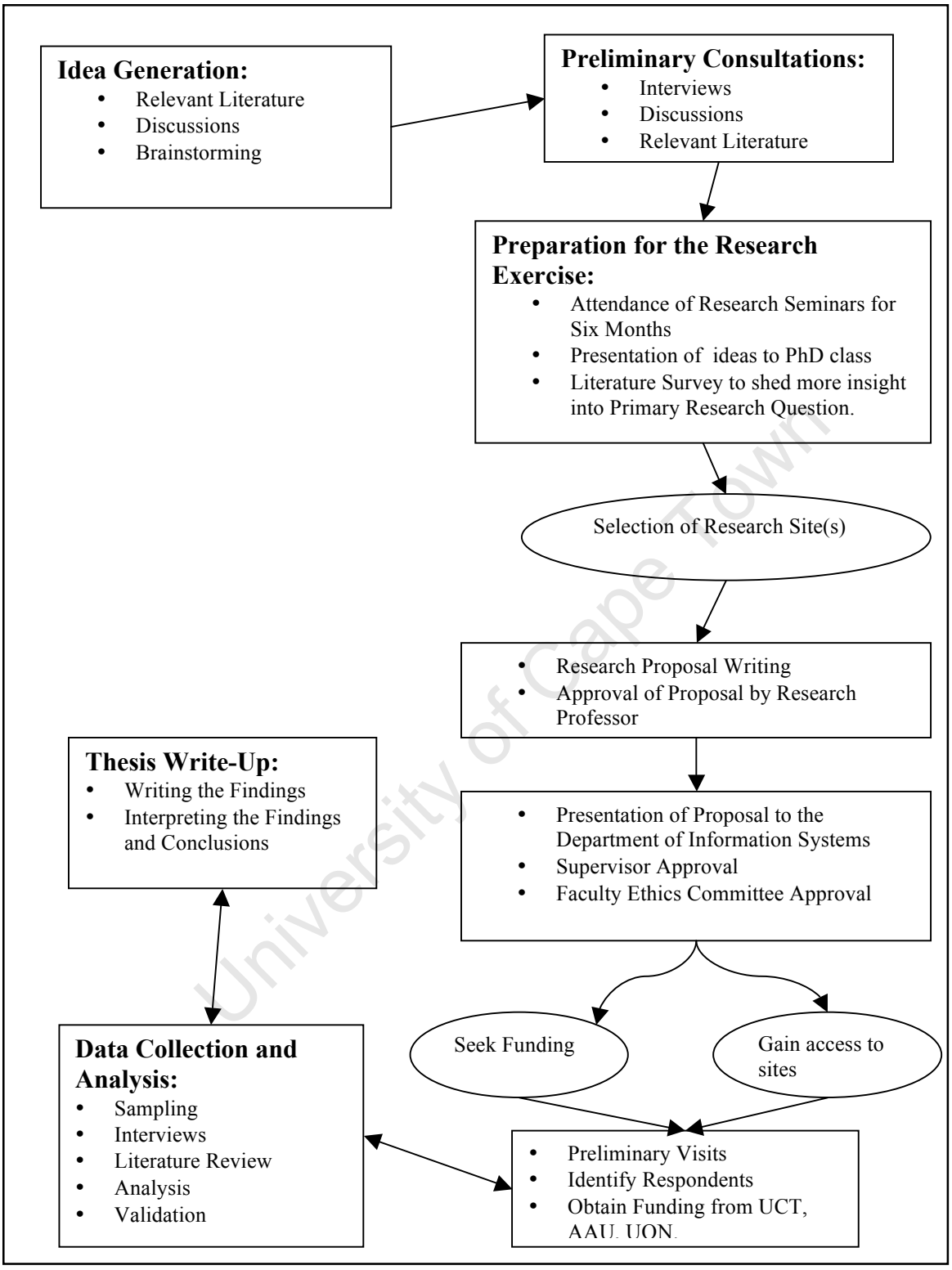

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Figure 3.5 Research Process

Figure 3.5 shows the various stages of the research that emerged from the time the research idea was generated through to the final research product. The procedures emerged during the course of the research as decisions and approaches were continuously reviewed in the light of new insights gained. The components of the plan include the generation of the research idea, preliminary consultation to determine feasibility as well as focusing of the study.

Preparations for the study involved building the researchers competencies and skills in research. The researcher attended research seminars that were conducted by the University of Cape Town Research Professor Dewald Roode between February and July 2005. Continuous review of literature and consultations with staff in the Department of Information Systems helped in gaining insight into possible secondary questions that can be developed from the primary research question. As a result of these efforts, the following secondary research questions were developed that were used to for delineating the primary research question:

- *How is the e-government artifact taking form in Kenya?*
- *What meanings e-government acquires in National E-Government Strategies and ICT Policies, as well as in meso-and micro-level local strategies and projects?*
- *Considering those meanings, what are the potential national social and administrative implications of e-government, particularly in terms of social exclusion?*

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The articulation of these research questions provided insight into possible theoretical bases for data collection and analysis (addressed in Section 3.5 of this chapter).

Following these preliminary activities, a research proposal was prepared and approved by the research professor. The proposal was then presented to the Department of Information System, where it was discussed and approval was given to proceed to the next stage. Prof. Jean-Paul Van Belle was appointed as the researcher's supervisor by the University of Cape Town. The researcher made corrections to the proposal that were suggested by the Department of Information Systems and the supervisor. The final proposal was presented to the supervisor in April 2006 and subsequent approval from the Faculty ethics committee was obtained in June 2006 (see appendix for Ethics Committee approval). The proposal was the basis for application

for permissions to interview the respondents and obtain funding from the sponsors. The University of Nairobi (Deans Grant) and German Academic Exchange (DAAD) funded the study.

The subsequent phase of data collection and analysis was undertaken after gaining access to the research sites (discussed in Chapter Two) and pilot testing. Finally, the results of the study were presented, leading to the completion of the thesis. A discussion of the research methodology adopted during data collection and analysis is provided in section 3.6. However, to provide a foundation for the description of the research methodology components, a summary of the literature upon which the major constructs of the study are based are presented in the next sections.

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3.5 THEORETICAL BASES FOR ANALYSIS

Walsham (1995), as well as Eisenhardt (1989), propose that theory maybe involved in research in three ways:

i) As an *initial guide to research design and data collection*: This stems from a need to start the research process from an informed position, even though there is caution that this may lead to a "blinkering effect" where analysis and conclusions are dominated by the guiding theory. The conceptualization of this study employed a number of theories, especially given the view of CR viewing theories as mirrors of reality (Danermark et al, 2002). The Organizing Vision framework was employed as a structuring device to theorize the nature of the e-government artifact through a synthesis of various literature sources (Transfer of Innovations; IT Artifact; Information Infrastructure and Public Administration perspectives).

ii) As part of an *iterative process of data collection and analysis*: The iterative approach allows the theoretical position to be developed as data collection and analysis proceed. The research proposes to use two theories. Actor-Network Theory (ANT) of Latour (1987; Ciborra, 2004), which Klecun (2005) asserts can be considered not

only as a theory, but also as a methodology. The variant of ANT used is introduced in this section and further operationalized in Chapter Seven. Concepts emanating from Social Exclusion literature are also used to ground the theoretical position adopted in Chapter Four, Five and Eight. In addition, the Global Diffusion of the Internet (GDI) and Diffusion of Innovations (DOI) theories, as variants of the National Systems of Innovation (NSI) theory is used for collecting and analyzing the infrastructure of e-government in Chapter Five and preliminary analysis of the local case study (section on the case study in this chapter).

iii) As a *final product of the research inquiry*: Given that the study's premise on CR, the explanatory critique approach proceeds from delineating the social problem of concern to the possible resolution of the problem or an aspect of the problem. Chapter Eight presents a possible theoretical grounding for conceptualizing the e-government artifact by borrowing from nomadic computing, information infrastructure, public administration and social exclusion theories.

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The multi-level approach to the study of the e-government artifact required various theoretical lenses. At the macro level focus, the Global Diffusion of the Internet (GDI) framework, with its theoretical base from the national systems of innovation and diffusion of innovations theories was dominant. At the meso level, the artifact concept of technology as well as the consequences of technology adoption informed the approach to data gathering. The micro level data and analysis relied on DOI theory and ANT. Synthesis of the findings borrowed from concepts of nomadicity, social exclusion, II and public administration.

Given the theoretical diversity used in this thesis, discussions of the various theories used are presented in various chapters where their use is directly linked to the above functionalities. However in the sub sections below, the theoretical bases for data analysis are introduced since they are linked to the research methods in this chapter. Specifically, the Global Diffusion of the Internet; Actor-Network Theory and the debate on Social Exclusion. However, the presentation in this section is deliberately brief, since the relevant theories or concepts are discussed in the various sections they are employed in. This was considered a prudent approach given that the study is structured to be 'holistic' and the nature of e-government is 'unpacked' from different theoretical perspectives in different parts of the thesis. This section therefore presents the broad theoretical perspectives that underpinned the various theories.

3.5.1 NATIONAL SYSTEMS OF INNOVATION AND RELATED THEORIES

There are three main bodies of research that can be referred to. The first is specifically about the national systems of innovation (NSI) literature whose primary emphasis is on how in-country or in-region institutions support the spread of innovations. This stream of research has largely relied on multiple, complex measures such as dollar volume of research and development (R&D) activity by firms and by research and educational institutions; patents; published papers and citations to them; and census-based data on the population (Wolcott et al, 2001). These measures incorporate both inputs and output measures of innovations. The Global Diffusion of the Internet (GDI) has six dimensions, three of which correspond to this first stream of research. These are *organizational infrastructure, connectivity infrastructure* and *geographic dispersion*[5] (Detailed discussions in Chapter Five on Internet diffusion). This is because they similarly have measures that assess inputs and outputs as well as interactions. Therefore by incorporating an institutional focus, these three dimensions represent three broad ways to characterize the Internet-related NSI of a country, and give a sense of how the NSI is shaping Internet diffusion (Wolcott et al, 2001).

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The first stream of NSI research is also linked to the diffusion of innovations (DOI) as a 'learning economy' (Lundvall, 1999), especially with regard to the ability of users to increasingly learn the use of a particular technology in a country. It is therefore geared towards assessing the absorptive capacity of the users to increasingly adopt sophisticated technological applications. Given the emphasis of this stream of research to user abilities, it can be linked to the *Sophistication of Use*[6] dimension of the GDI framework. Wolcott et al (2001) suggests that this stream of research emphasizing sophistication of use also reflects the NSI since it is concerned with aspects of education and training, and also influences the climate of innovation that can make innovations available to sophisticated users.

[5] Wolcott et al (2001). *Organization Infrastructure*: captures the number and robustness of the organizations that provide Internet services; *Connectivity Infrastructure*: captures the state of the telecommunications infrastructure; *Geographic Dispersion*: reflects the extent to which these organizations, along with the supporting telecommunications infrastructure, are distributed across the entire territory of a country.

[6] *Sophistication of Use*: recognizes that the adoption of the leading edge applications depends not only on what the users want, but also on what the Internet services infrastructure is able and willing to provide (Wolcott et al, 2001).

A second body of NSI research is the evolutionary theory that predicts that innovations generally show characteristics such as *path dependence,* whereby variations in technologies and routines will largely be dependent on what has existed previously; *irreversibility,* whereby countries are unlikely to revert to previous states; and *multistability,* whereby more than one stable state may arise from the existence of similar outcomes (Saviotti, 1997; Wolcott et al, 2001). These principles generally support increasing complexity and sophistication in measurement scales of NSI as is evident in the scales of the GDI dimensions (presented in Chapter Five, Wolcott et al, 2001).

The third body of NSI research is principally linked to the diffusion of innovations (DOI), whose most fervent proponent is Everett Rogers (1995; 2003). A discussion of this theory shall be presented below. The rate of adoption depends on the attributes of the innovation; type of the innovation decision, communication channels, nature of the social system and promotional efforts (Rogers, 2003). Linking DOI theory to GDI, adoption decisions are normally made by individuals (optional), within organizations (collective), or by some authority such as the state (authority). The GDI framework captures these through the dimensions of *Pervasiveness* and *Sectoral absorption* [7]measures at these levels.

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Therefore, at the macro level, the use of the GDI framework is used to analyze Internet diffusion as an antecedent to e-government adoption borrows from these three streams of research. This was considered necessary to illuminate on the constraining conditions within which meanings of e-government are formed.

The choice of the Global Diffusion of the Internet framework was selected as the explanatory model due to its robustness in making country level assessments of the Internet as a cluster of technologies [Wolcott et al, 2001]. This may be attributed to its relationship to a diverse but related body of theories that have been grouped under the national systems of innovation (NSI) research streams which reflect on innovation studies at individual, organizational and country

[7] *Pervasiveness* is a measure of the number of individual Internet users in a country relative to the total population while *Sectoral Absorption* considers Internet use from the viewpoint of adoption at an organizational level (Wolcott et al, 2001).

levels [Wolcott et al, 2001]. The first stream of NSI research literature is orientated towards an institutional locus and is reflected in the *organizational infrastructure*, *connectivity infrastructure* and *geographic dispersion* dimensions of the GDI framework. These three dimensions provide a sense of how the NSI is shaping Internet diffusion of a country.

The second stream of NSI research concerns the diffusion of innovations as a 'learning economy' [Lundvall, 1999] especially with regard to users ability to the use a particular technology in a country. Wolcott et al [2001] incorporates this research stream by means of the *Sophistication of Use* dimension of the GDI framework. A third body of research is that of diffusion of innovations, largely attributed to Rogers [1995] and is largely concerned with explaining adoption rate decisions. The GDI framework captures these through the dimensions of *Pervasiveness* and *Sectoral Absorption* measures at these levels. The GDI framework also adhere to the principles of path dependence, irreversibility and multistability which generally support increasing complexity and sophistication in measurement scales of NSI as is evident in the scales of the GDI dimensions [Saviotti, 1997; Wolcott et al, 2001].

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3.5.2 ACTOR-NETWORK THEORY

Actor-Network Theory (ANT) was deemed appropriate for this study since it offers concepts and a language that is apt in describing how actor-networks (people and things) are created, strengthened and weakened (Niljand, 2004). ANT or the 'sociology of translations' (Callon 1986), is concerned with studying the construction and transformation of heterogeneous networks (Law 1992) that are made up of people, organizations, agents, machines and many other objects; studying the networks that constitute the world, existing of both humans and non-humans. It explores the ways that the networks of relations are composed, how they emerge and come into being, how they are constructed and maintained, how they compete with other networks and how they are made more durable over time (Tatnall & Gilding, 1999). ANT's interest is in examining how actors enlist other actors into their world and how they bestow qualities, desires, visions and motivations on these actors (Latour, 1999).

Actors refer to elements in a context that shape action while pursuing their interests and can imply anything provided it is granted to be the source of an action (Latour, 1999). But as Law argues, actors are also an effect generated by a network of heterogeneous, interacting, materials (Law, 1992). For instance, he demonstrates this with an example that for a researcher to be a researcher, he has to be aligned with surrounding actors such as books, a computer, an office, colleagues, etc. Thus social agents are never humans alone, but rather are patterned networks of heterogeneous relations (Niljand, 2004). Each actor is therefore made up out of actors and at the same time is part of other actors. In the vocabulary of actor-network, each actor is itself a (simplified) actor-network and is at the same time part of other actor networks.

The argument by Latour (1999) is that an actor and a network designate two faces of the same phenomenon – the social phenomenon called actor-network; that is "a certain type of circulation that travels endlessly without ever encountering either the micro level or the macro-level". Law states that all attributes are normally associated with human beings, such as thinking, acting, writing, loving and earning, are generated in networks that exist beyond the body. An actor is also always a network (Law 1992).

When actors are aligned with each other, they form an actor-network. The process of alignment in an actor-network is achieved through the process of *translation* of interests and the *enrolment* of actors into the network. Translating involves showing how an actor's non-aligned interests may become aligned. Alignment is established in *inscriptions* that give a particular precedence in terms of a viewpoint. Inscriptions refer to the way technical artifacts embody patterns of use (Monteiro, 2000), or how certain viewpoints, values, opinions and rhetoric are converted into devices or materials (such as reports, documents and scientific papers - Callon 1986), or frozen into codes or computer applications (Bowker and Star, 1994).

Latour uses the term 'immutable mobile' to describe such network elements that when they are moved around in time and space, they remain stable and unchanged (Tatnall and Gilding 1999; Latour 1999). It displays properties of *irreversibility* (Walsham 1997). To Law (1992) the core of the actor-network approach is a concern with how actors and organizations mobilize, juxtapose and hold together the bits and pieces out of which they are composed; how they are sometimes

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able to prevent those bits and pieces from following their own inclinations and making off; and how they manage, as a result, to conceal for a time the process of translation itself and so turn a network from a heterogeneous set of bits and pieces each with its own inclinations, into something that passes as a *punctualized* actor. In this sentence, he talks about 'for a time' because once a network is formed; it is not formed once and for all. It can always become unstable since new actors, the desertion of existing actors or changes in alliances can cause the *'black-boxes'* (Callon, 1986) of networked actors to be opened and their contents reconsidered. A black-box is 'a way of talking of the simplified points that are linked together in an actor-network' (Callon 1986), which is also a network in its own right. Latour (1987, p. 108-121; Hepso 2001) describes five alternative strategies for enrolling others in the *punctualization* or creation of a black-box:

> to appeal to the other's explicit interests ("I want what you want"); to get the others to follow our interests ("You want what I want"); to suggest a short detour ("I will take care of your interests, if you follow me"); to reshuffle interests and goals by tactics such as inventing new goals and inventing new groups ("We all want this"); by becoming indispensable to the others ("You need me to get what you want").

A network recursively generates and reproduces itself and relies on the active maintenance of its simplifications or *punctualization* for its continued existence. Networks, contrary to other uses of the term, do not imply some fixed thing, but a dynamic, actively shifting alliance of actors. A network becomes durable partly due to a structure where each point is at the intersection of two networks: "one that it simplifies and another that simplifies it" (Callon 1987, p. 97).

It is perhaps worthwhile mentioning that while there are several criticisms of ANT, it has contributed tremendously to knowledge generation (Niljand, 2004; Iyamu, 2007) especially within the IS field. This research therefore, is not 'breaking' new ground in using ANT and the hope is that its themes (summarized in the table 3.5) that have been used in several IS studies will be adequate for description and explanation, within the context of the case study.

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Table 3.5 Some Actor-Network Themes

Actor	Any element which bends space around itself makes other elements dependent upon itself and translate their will into the language of its own. Common examples of actors include humans, collectivities of humans, texts, graphical representations, and technical artifacts. Actors, all of which have interests, try to convince other actors so as to create an alignment of the other actors' interests with their own interests. When this persuasive process becomes effective, it results in the creation of an actor-network. Callon, M. and B. Latour(1981)
Actor Network	A heterogeneous network of aligned interests. Callon, M. and B. 7(1981)
Translation	The creation of an actor-network. This process consists of three major stages: problematization, interessement, and enrolment. Numerous actors within an organization may be involved in a different process of translation, each with its own unique characteristics and outcomes.. Callon, M (1986)
Problematization	The first moment of translation during which a focal actor defines identities and interests of other actors that are consistent with its own interests, and establishes itself as an obligatory passage point (OPP), thus "rendering itself indispensable" Callon, M (1986).
OPP	The obligatory passage point, broadly referring to a situation that has to occur in order for all the actors to satisfy the interests that have been attributed to them by the focal actor. The focal actor defines the OPP through which the other actors must pass through and by which the focal actor becomes indispensable. Callon, M (1986)

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Interessement	The second moment of translation which involves a process of convincing other actors to accept definition of the focal actor Callon, M (1986)
Enrollment	The moment that another actor accepts the interests defined by the focal actor. Callon, M (1986)

Key Themes of Actor-Network Theory (Sidorova, 2000)

How ANT was employed in this study, is also linked to a 'New Management' agenda that was proposed by Ciborra (2004) used for assessing the alignment of an actor-network. Two themes from this approach consider the use of the themes of drifting and hospitality. Ciborra uses the themes of *Drifting* and *Hospitality* debunk myths about more 'command and control' in Information Infrastructure development. Thus to unearth the phenomenon of these complex information infrastructure, Ciborra (2004), in the book *The Social Study of Information Technology* by Avgerou, C., Ciborra, C., and Land, F., (2004); comments on the need to leave:

> The realm of method, procedure, and systematic ways of organizing and executing work according to rational study, planning, and control....and enter into the murky world of informal, worldly, and everyday modes of operation and practice (Ciborra, 2004; Pp. 20).

And in its wake, he proposes, in attunement with the themes of Heidegger, a focus on:

> The realm of hacking; practical intelligence; the artistic embroidery of the prescribed procedure; the shortcut; the transgression of the established organizational order as embedded in systems and formalized routines. Bricolage, improvisation, and hacking are terms that are often used to describe such modes of operation in various modes of activity. Since these approaches diverge from the formalized, preplanned ways of operating, their outcomes can well lead to serendipity and to the possibility of finding something valuable.... Pp. 20-21

The aspect of complexity captured by Ciborra as characteristic of inter-organizational and intra-organizational information systems aptly captures e-government as a system of heterogeneous applications. The dynamism inherent in complex information systems abhors situations where strategy takes a static 'moral high ground', characterized by stability in systems implementation from plans. It is worth noting that technology rarely works according to plan and with respect to

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the E-Government strategy, the evaluation of the implementation framework is replete with goals, targets and milestones off-target (Chapter Four).

Therefore, plans, procedures, methodologies and strategies, developed from a rationalistic perspective, considered as ad old management approach which rarely captures the 'here and now' of e-government implementation. It is in this light that, Ciborra (2004), talks of concepts such as bricolage, improvisation, drifting, hospitality and moods to capture the 'unstable' nature of complex information systems in implementation.

Thus in a new management approach for assessing alignment, the stability of plans, prescriptions, methodologies and strategies is in question, and the concealed nature of technologies can only be possible through acts of bricolage and improvisation, while taking into account the actors moods. There is the expectation, given this situation, which technological innovations keep on changing: in a manner characterized as from 'procedure-to-drift'. Procedure, where strategies are considered to occupy a moral high ground, to drift, characterized as life in a 'swamp' evident through acts of sabotage, passive resistance, learning by doing, micro-discoveries, radical shifts and serendipity (Ciborra, 2004). He defines hospitality as:

> Hospitality describes the phenomenon of dealing with new technology as an ambiguous stranger. Hospitality is a human institution. It is about being receptive and adopting, and about managing boundaries between what or whom is known, and what or whom is unknown. Hospitality is the first step in accepting the Other (Pp. 26).

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The analysis in a section of Chapter Seven relies on these concepts of bricolage, improvisation, hospitality, moods and drift to gauge the preparedness of the actor-network within a micro level project to embrace 'new thinking'.

3.5.3 SOCIAL EXCLUSION

The concept of social exclusion is used as theoretical metaphor that can be used for explaining the constraining conditions that conceptualization of e-government takes place. Warschauer

(2004) regards social exclusion as a concept that can be adequately applied for rethinking the digital divide problem, which is inexorably linked to wider debates of developing countries. Thus when social exclusion is looked at within the context of e-government, the design interfaces provided by the Internet becomes a concern since the target of e-government is to enable access and also ensure participation of citizens. The relevant concepts of social inclusions elevate the need for societies to invest in social, physical, digital and human resources (Warschauer, 2004). Therefore, an e-government program that achieves the goal of social inclusiveness is desirable, while the opposite is a promotion of social exclusiveness (a social problem). These concepts relating to social exclusion are discussed further in Chapter Five and are also used as a basis for proposing a framework in Chapter Nine.

3.5.4 THEORETICAL BASES SUMMARY

This section presented a multi-theoretical approach to data collection and analysis based on discussions that were presented in Chapter Two, this chapter and other chapters. The rationale stems from the multi-level approach proposed emanating from the complex object of inquiry of e-government. Thus discussions on the various theoretical concepts are in a number of chapters. The next sections present the research methodology, specifically, the dominant intensive case study methodology and the extensive survey methodology.

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3.6 INTENSIVE CASE STUDY RESEARCH METHODS

From the intensive case study perspective, two broad constructs were considered: the nature of e-government conceptualization as well as the nature of stakeholder interactions. The case study element focused on identification of the elements (human or nonhuman stakeholders), as well as decipher the nature of interactions of this various elements. Interactions are expected to be characterized as practices of deliberate actions in accordance with negotiated intentions by actors. Accordingly, significations are presumed created through discourse, in which various stakeholders participate. In addition, since there are normally a number of stakeholders involved in e-government initiatives, there are no assumed objectives (intentions); and that the evolving state is an evolving negotiation between the various stakeholders.

Context may be at the macro-level such as the country and also at the agency/department/organizational level. The above claim has support from a large body of accepted theory such as Kling & Scacchi's (1982) web models; Markus's (1984) interaction perspective as well as DeSanctis & Poole's (1994) adaptive structuration theory. Overall, the emphasis in the intensive study was to attempt to understand the nature of processes that lead to formation of the e-government artifact.

3.6.1 CASE STUDY RESEARCH METHODOLOGY

The case study (presented in Chapter One) included the collection and analysis of qualitative and quantitative data relating to an e-government initiatives being undertaken by the Directorate of E-Government as the policy wing, and implemented through the various ministries and agencies. There are currently several initiatives underway since the ratification of the GOK E-Government Strategy in March 2004 (GOK, 2004). The case study is therefore considered to be *e-government initiatives in Kenya* that have been underway.

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Yin (1989) considered a case study as an inquiry analyzing a particular object of inquiry within its real-life context, even when the boundaries between the phenomenon and the context are not clearly evident, and that multiple sources of evidence are used. As a result, the case study methodology did not only rely on primary data from the particular case itself, but also secondary data emanating from the survey component of study as well as other secondary sources of data highlighting the historical, social, political and economic context within which the case resides. In this study, the choice of the case study was the whole country (to understand some aspects of the e-government artifact) as well as an e-government initiative in a line ministry (Ministry of Local Government).

3.6.2 DESIGN OF THE CASE STUDY

Yin (2003) contends that the case study research is appropriate for "how" and "why" research questions since these largely deal with operational links which require to be traced over time. In line with these broad directions, and in light of the three major constructs of this study, the case

study considered the how and why aspects. To aid in the design of the case study, a rationale of the research questions as well as a priori determination of the unit(s) of analysis and the number of cases that were part of the research were defined. Pare (2004) opines that a priori definition of at least one or more related research questions are of great significance especially for the building of theories. Some broad-based research questions used as a guide were:

- Why e-government is conceptualized the way it is and what are the dynamics that underlie the conceptualizations?
- How do contextual conditions and adoption tactics interact and work together to ensure the attainment of particular impacts of the e-government?
- How do the conceptualizations and interactions influence the 'negotiated' impacts of the e-government?

Borrowing from Pare & Elam's (1998) approach of adopting a conceptual model from prior theory to guide case study research, this inquiry adopted the three questions to form the basis of a high level conceptual model. This view, referred to as teleological view by Pare (2004), considers that process explanations become more meaningful when situated within a broader meta-theory. For instance, it is presumed in this study that conceptualization, interactions and impacts have certain linkages (Chapter Two).

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3.6.3. DATA COLLECTION METHODS

There are a number of data collection methods that have been identified when conducting case research. Yin (2003) for instance considers the following sources of evidence: documentation, archival records, interviews, direct observation, participant observation as well as an examination of available physical artifacts. These methods were adopted when collecting data relating to the research questions.

While a number of these methods were employed, a common technique employed is the use of interviews. Common questions that arise in interviews are who to interview and how many interviews to conduct. Pare (2004) advises that the choice of unit of analysis and the overall

purpose of the case study should guide sampling decisions. A number of sampling strategies have been suggested in the literature to guide interviewee selection. Table 3.6 gives some of the common sampling strategies for case research according to Patton (2002):

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Table 3.6 Common Sampling Strategies for Case Study Research (Source: Patton, 2002).

Informant Sampling Strategy	Purpose
Maximum Variation	Documents diverse variations and identifies important common patterns
Homogenous	Focuses, reduces, simplifies; facilitates group interviews
Snowball or chain	Identifies cases of interest from people who know people who know what cases are information-rich
Purposeful	Select information-rich cases strategically and purposefully; selected type and number of cases selected depends on study purpose and resources
Opportunistic or emergent	Following new leads during fieldwork; taking advantage of the unexpected flexibility.

Given the nature of this study, a prudent sampling strategy which can lead to a richer understanding was required since evidence was needed from a number of interviewees, some of who were not known in advance. The study therefore adopted snowball or chain sampling, which requires a preliminary identification of members of a group (such as IT manager, systems users or systems developers) to be studied first. These initial members are used to identify others, and they in turn others. Lincoln and Guba (1985) indicate that this process is continued until a point

of redundancy is reached when it is apparent that no more convincing evidence can be attained. This sampling approach appeared appropriate for interviewee selection for this study.

Another core issue is a decision on the type of interview(s) to be conducted in case research. Yin (2003) suggests that most case research interviews are semi-structured in which the investigator knows most of the questions to be asked but cannot predict the answers. This technique is considered to be useful since it ensures that the researcher obtains all the information that is required, while at the same time, it gives the participant freedom to respond and illustrate concepts which are unclear to the researcher. This study also used semi-structured interview technique and an interview protocol is provided in the appendix. The sub-sections below detail the processes of data collection:

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3.6.3.1 Interviews

Although the primary focus of the study was on an e-government initiative within the Ministry of Local Government, it was necessary to interview knowledgeable individuals in other ministries since staffs from various ministries are frequently transferred from one ministry to another or from one agency to another. Therefore, the snow balling sampling strategy was instrumental in this process. All the informants interviewed in this study were chosen on the basis of their willingness to participate in the study and their proximity to facilitate data collection efforts and minimize costs. An introductory letter was first sent to identify informants, after which a phone call or an e-mail was used as a follow-up method to arrange an interview. A total of 10 people were interviewed from various ministries. A summary of their characteristics is provided in table 3.7.

Table 3.7: Summary - Informant Characteristics

No.	Agency	Title
1	Ministry of Local Government	IT Manager
2	Ministry of Local Government	IT Officer
3	Ministry of Local Government	IT Consultant
4	Ministry of Local Government	M & E Officer
5	Ministry of Local Government	Local Authority Accountant
6	Directorate of E-Government	Director
7	Ministry of Local Government	Systems Analyst
8	Ministry of Local Government	Project Coordinator

9	Ministry of Local Government	Systems Administrator
10	Ministry of Information and Communications Technology	IT Manager

3.6.3.2 The Interviewing Process

All the interviews were conducted in person, with the length of the interview ranging from 30 minutes to 1.5 hours. At the beginning of each interview, the interviewee was asked for his/her permission to tape-record the interview. 3 interviewees declined citing job security as the reason despite written and verbal assurance provided. In the case of the three interviews, notes were taken during the process. In the case of taped interviewees, one of the respondents requested the tape to be turned off when they considered their responses to be politically sensitive. This happened on two occasions when they were discussion the role of the president of the country in the e-government adoption process.

3.6.3.3 Interview Instruments

The instruments were prepared based on the theory bases that were described in Chapter 2 and Chapter 3. These included open-ended questions to solicit the opinions of the informants about the study objectives. Prior to the interviews the instruments were e-mailed or posted to the respondents to encourage them to be prepared. During the interviews, the instruments were presented in order to remind the interviewer to cover all the factors. Due to the varying perspectives of the informants the interviews followed a semi-structured fashion. Because data analysis and data collection overlap when utilizing this form of study, the content of the interviews changed slightly as new factors were discovered. The original interview instrument that acted as a guide is provided in the appendix 3.3.

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3.6.4 ANALYSIS OF CASE STUDY EVIDENCE

Case research data analysis is regarded as one of the most difficult approaches since there are not many developed strategies or techniques for this purpose (Eisenhardt 1989, Yin 1994). Kaplan and Maxwell (1994) consider that the basic goal of qualitative data analysis used in case research is a *search for coherence and order geared towards understanding*. This thesis primarily relied

on thematic analysis[8], primarily as a tool that can be employed across different methods. There are two versions of thematic analysis: inductive and theoretical thematic analysis (Braun & Clarke, 2006). In an inductive approach, the themes identified are strongly linked to the data themselves (Patton, 1990), which in the end may bear little to the specific questions that were asked of the participants (Braun & Clarke, 2006). The themes identified in the inductive approach would also not be driven by the researcher's theoretical interest in the area or topic.

Theoretical thematic analysis on the other hand is driven by the researcher's theoretical or analytic interest in the area, and is thus more explicitly analyst-driven (Braun & Clarke, 2006). This thesis employed theoretical thematic analysis (Chapter Four, Chapter Seven) even though it is recognized to provide a less rich description of the data overall but and more a detailed analysis of some aspect of the data. Theoretical thematic analysis, where employed, was selected because the data was coded for a specific research question (section 3.4) of the study and because the approach is in line with realist assumptions. For instance, CR makes the assumption that theories are pointers to reality that already exists (repeated from 3.3.2), thus the various analyses chapters that uses theoretical thematic analysis is driven by certain theoretical assumptions for detecting patterns in the data.

The analysis approach was divided into two stages. The first, considered as a preliminary analysis, involved presentation of relevant background information regarding the case study (Chapter One) and an analysis (based on the Knowledge phase of DOI) of an e-government initiative within the Ministry of Local Government (MoLG). The sub sections below present preliminary analyses of the micro-level implementation of e-government in the Ministry of Local Government in order to 'tease' out ambiguities where DOI is used, which are then taken up in Chapter 7. The second level of case analyses focus on the macro-level and are presented in Chapters Four and Five.

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[8] Thematic analysis is a method for identifying, analyzing and reporting patterns (themes) within data. It minimally organizes and describes your data set in (rich) detail. Themes or patterns within data can be identified in one of two primary ways in thematic analysis: in an inductive or 'bottom up' way (Frith and Gleeson, 2004), or in a theoretical or deductive or 'top down' way (Boyatzis, 1998; Hayes, 1997).

In this study, early steps in data analysis focused on familiarization with the case (Appendix 3.2). This preliminary assessment was also considered critical given that the initiative had been ongoing for a number of years before the enactment of the e-government strategy. It was necessary to use secondary data to build background information about the country in general (Chapter One).

3.7 EXTENSIVE SURVEY RESEARCH METHODOLOGY

The survey component focused on the meso-level of government employees involved in implementation of e-government projects. The objective was to establish their perceptions on e-government conceptualization and impacts. A synthesis of the theoretical foundations and the preliminary literature search formed the background to the research framework (Table 3.8). The framework has as its basis, the socio-technical perspective which posits that technological phenomena should be examined within the contexts in which they are embedded (Orlikowski and Iacono, 2001). It was considered adequate to focus on the high level constructs of conceptualization and impacts of the e-government artifact given the literature support from IT conceptualization and impacts research (Chapter Two). These provided the conceptual domain necessary for the development of an accurate and valid instrument (Churchill, 1979; Molla, 2002). Clarity of the domain of the study, in terms of the adopted constructs, was considered an essential procedure in ensuring the content validity of the instrument (Molla, 2002). Table 3.8 below depicts the constructs, their components, and the suggested literature sources.

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Table 3.8: Summary of Survey Research Framework			
Construct	**Components**	**Measurement Variables (survey)**	**Literature Sources**
Conceptualization	Tool View	Labor Substitution tool, Productivity Tool, Information Processing Tool, Social Relations Tool	Sein, M.K. & Harindranath, G., 2004; Orlikowski, W.J., & Iacono, C.S., 2001
	Proxy View	Technology as Perception, Technology as Diffusion, Technology as Capital	
	Ensemble View	Technology as Development Project, Technology as Production Network, Technology as Embedded System	
	Computational View	Technology as Algorithm, Technology as Model	
	Nominal View	Technology as Absent	
Impacts	GDP growth	Cost Savings, ICT output growth, General Productivity, Optimized revenues	Chrissafis, T., 2005
	Socio-economic cohesion	Better Opportunities outcomes for citizens, organizational efficiency	
	Improved Democratic processes	Better cooperating public administration, openness	

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		and participation, Transparency & accountability	
	Improved FDI	ICT industry output growth and Better opportunities outcomes for Businesses	

This part of the study included the collection and analysis of survey data from government agencies, government parastatals and e-government consultants with the objective of understanding the conceptualization and intended impacts of E-Government.

3.7.1 DATA SOURCES AND SAMPLING PROCEDURE

Relevant categories of experts were identified at various levels of government who have important and valuable knowledge about e-government activity in Kenya. The relevant groups of experts have been identified by the United Nations Economic Commission for Africa (UNECA, 1999) as stakeholders in African Telecommunications such as practitioners (private sector and ICT experts), government officials (government, parastatals and regulatory bodies), officials of non-governmental organizations (NGOs) involved in e-government initiatives in the region and academics (academia and research centers). These experts need to be involved in some form of e-government activity for responses to be solicited from them.

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Since there are various databases of experts involved in e-government (and more generally IT infrastructure development) in Africa and Kenya in particular, this research used a judgmental sampling procedure to sieve through the databases in order to develop a sampling frame for the survey. For instance, the Computer Society of Kenya (CSK) has a database of over 4000 ICT consultants and some may not be involved in e-government activity. The total number of University academics in Kenya is approximately 3,500 (MOE, 2005), of which only a handful may have expert knowledge of e-government. The Government of Kenya also has over 142 agencies, departments and parastatals that already have some form of online presence. The NGO Council of Kenya also has thousands of NGO involved in various initiatives. In addition, there are other databases of experts provided by organizations such as the African Information Society Initiative (AISI, 2003), which have consultants with expert knowledge of e-government

initiatives in Kenya. Thus given the diversity of probable respondents, the judgmental sampling technique appeared adequate for the development of a sampling frame. Therefore, the relevant categories of the sampling frame consisted of experts from:

- Computer Society of Kenya (CSK) database
- Government of Kenya (GOK) government parastatals, agencies, and departments involved in some form of e-government activity (implementation, consultation)
- University academics

The respondents were IT/IS Directors, Computer Managers, Information Systems Managers, Departmental Heads, academics, consultants and other e-government experts identified in the sampling frame. The appendix 3.1 shows the sampling frame of all the Government agencies which were involved in the survey component. The consultants were not included for privacy reasons.

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3.7.2 DATA COLLECTION PROCEDURES

After construction of a mailing list of the respondents, a paper-based and a web-based questionnaire were administered to aid in gathering data. In order to ensure the highest achievable response rate, Dillman's (2000) "Tailored Design Method" (TDM) was adopted in the design and implementation of the questionnaire. TDM is a set of procedures for conducting high-quality surveys with a greatly improved response rate potential and consists of elements such as: reduction of costs to the respondent, provision of rewards for completing a survey, creating respondent trust and tailoring the survey to specific populations. For instance to reduce postage costs, the research sent self addressed questionnaires to respondents who could not be interviewed. To further increase the response rate, a web-based survey was provided in order for the respondents to have another option depending on their preference.

3.7.3 INSTRUMENT DEVELOPMENT

There are three main components of the E-Government artifact that were considered relevant in this study. These are (1) Technology Artifact conceptualizations 2) Human and Nonhuman Interactions and (2) E-Government Impacts. This study identified a number of conceptual variables under the constructs of conceptualization and impacts that are relevant for the survey component of this research. Given the philosophical orientation of this research, only some of the variables were amenable to survey methodology while some were considered under the case study approach. The variable items were mainly derived from literature sources. The constructs of conceptualization and impacts were therefore operationalized from reference sources of information technology conceptualization as well as E-Government impacts research outside Africa. Thus the relevance of the items were constructed based on the literature review, which is a common approach followed by researchers when previous instruments are not available. Moreover, each construct was measured by using multiple indicators to capture the underlying theoretical dimensions effectively (Premkumar and Ramamurthy 1995). Table 3.9 provides a summary of the operationalization of the constructs along with their corresponding references.

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Table 3.9 Constructs, Variables and References		
Conceptualization Constructs	**Variables**	**References**
Tool View	10 (Q1.1-Q1.10)	Sein, M.K., & Harindranath, G., 2004; Orlikowski, W.J., & Iacono, C.S., 2001
Proxy View	11 (Q1.11-Q1.21)	
Ensemble View	5 (Q1.22-Q1.26)	
Computational View	3 (Q1.27-Q1.29)	
Nominal View	3 (Q1.30-Q1.32)	
Impact Constructs	**No. of Variables**	**Reference**
Connectivity	8 (Q2.1-Q2.8)	Chrissafis, T., 2005
Openness	10 (2.29-2.38)	
Efficiency	14(Q2.9-2.14; Q2.21-2.28)	
Effectiveness	9(Q2.15-2.20; Q2.39-2.41)	

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Content validity is meant to capture whether all the instrument measures are "drawn from all possible measures of the properties under investigation" (Straub 1989, p. 150). The expectation is therefore that the variables in the instrument must be drawn from a universal pool of the items, which represent that construct's entire domain (Straub 1989). The recommendation is that, experts who are familiar with the phenomena should review the instruments to ensure content validity (Straub, 1989).

A pre-test of the survey instrument was carried out by domain experts both in academia, Government, NGOs and in practice before survey data is collected. Ten experts reviewed the questions, scales, instructions and the appropriateness of the questions and language for the target population. Their recommendations were incorporated which resulted in the final instrument provided in appendix 3.2.

3.7.4 DATA ANALYSIS STRATEGY

The quantitative data collected via the survey was analyzed by performing statistical tests in order to determine underlying dynamics at play in the meso-environment of e-government implementation. Basic descriptive statistics were calculated to describe the characteristics of the organizational and environmental characteristics. Factor Analysis was also used in order to 'discover' the underlying constructs. In addition, a canonical analysis was undertaken to establish the relationship between conceptualization and impacts of e-government.

3.8 CHAPTER SUMMARY

In this chapter, the theoretical and philosophical underpinnings of the research were reviewed and presented. A summary of these discussions is presented in table 3.10.

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Table 3.10 Summary of Theoretical Foundations

Decision	**Choice**
Epistemological and ontological assumptions	Critical Realism
Domain	E-Government adoption as part of governance reforms
Theoretical Bases for Data Gathering	Technology Impacts and Artifact Conceptualization (meso level), Diffusion Theory (micro level) and Global Diffusion of the Internet (Macro level)
Theoretical Bases for Data Analysis	Actor-Network Theory (micro level) and various concepts from a number of theories.
Constructs	Conceptualizations; Interactions; Impacts

Critical Realist research does not prescribe any specific research methods with no precise guidelines or steps to follow. However, CR has been proposed as a philosophy that can be used to underpin research that utilizes multi-methodologies. This research adopted a multi-methodological approach, by employing a case study (at macro- and micro-levels) as well as survey (at the meso-level). CR was therefore attractive as an underpinning meta-theory.

Additionally, the inherent complexity of the concept of e-government calls for its illumination through various theoretical lenses. CR provided this basis, especially due to how it treats theories as pointers to some form of reality (Danermark et al, 2002). To aid in capturing some of these complexities of e-government, the research adopted a qualitative and quantitative approaches to capture various aspects. These approaches are further illuminated in the next four chapters. The choice of approaches was also driven by the cause of the researcher-to understand and establish the nature of the e-government, which was considered to be possible when an *integrative perspective*[9], with its central notion of 'realism'.

The research framework envisages the situatedness of e-government at various levels visible through the articulation of e-government strategies and national ICT policies, implementers' perspectives and local e-government initiatives within ministries. The study simply aims to erode ignorance and misapprehension by questioning the taken for granted assumptions on the nature of e-government in a developing country's context and considers the potential consequences. Taking into account the research approaches (table 3.11), the subsequent chapters report on the research conducted and deliver a critical analysis of the findings.

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Table 3.11 Summary of Research Approaches	
Level of Decision	**Choice**
Research Strategy	Qualitative involving case studies; Quantitative involving field survey
Research Techniques	Semi-structured interviews, documentation analysis, questionnaires
Units	Country-level, Ministry, Ministry level initiative
Sub-Units of Analysis	Directorate of E-Government; LAIFOMS; Internet Diffusion; Perceptions of Government employees
Timeline	July, 2006-July, 2007
Subject	E-Government Adoption in Kenya

[9] Central to this integrative school of thought is the concept of 'realism', advocating for some form of 'soft-line' determinism, arguing that technology has structures on its own right albeit social practices moderating technology's effects. For instance, the sociotechnical systems theory which falls within this school of thought contend that the impacts of Information Technologies is dependent on how well social and technological structures are optimized and that technology adoption should be interpreted as a process of organizational change.

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CHAPTER FOUR

OBJECTIFYING E-GOVERNMENT IN POLICY TEXTS

4.1 INTRODUCTION - POLICY PAPERS IN CONTEXT

This chapter seeks meanings of e-government conceptualization and its technologies in the policy and strategy context. In doing so, the chapter relies on the following principal policy papers: *E-Government Strategy* (GOK-EGS, 2004); *Kenya National ICT Policy Bill* (GOK-KNICT, 2006); and *National Implementation Strategies for E-Government and ICTs in Government* (2006). In addition, reference is made to other official news items that were deemed relevant within the domain of policy discourse.

Appendix 4.1 gives a background of the key events leading to the formulation and subsequent adoption of the e-government strategy. The adoption of e-government strategy presumably occurred in an environment in which the government failed to take into account the *state* of the stakeholder by failing to ask a number of critical questions: what e-government use interfaces are available for the actors' to access the services provided? Is there an appropriate infrastructure upon which e-government services will be provided? What policy directives are appropriate in such an environment? Thus the dominant mood characterizing the articulation and adoption of the e-government strategy is revealed as that of *panic*, which is considered by Ciborra (2004) considered as a hostile mood when any type of an information system is being deployed. The state of the actors, as part of the context in which the e-government vision is emerging, forms the background for an exploration of how the e-government artifact is taking form in Kenya.

The chapter[10], through the various sections, 'teases' out the emerging e-government meanings from various policy texts. This chapter has a number of sections. Section 4.2, titled *Analyzing the*

[10] This chapter was originally published as Muganda-Ochara, N. (2008). "Emergence of the E-Government Artifact in an Environment of Social Exclusion in Kenya" *African Journal of Information Systems*. Volume 1(1).

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E-Government Artifact, is a description of the analytical framework, based on thematic analysis, adopted in the analysis of the policy documents. The remaining sections comprise a report of various readings of the policy texts to unearth the meaning of e-government. Section 4.3(*E-Government Related Policies*) reports the first reading of the e-government policies with the intent of unearthing the underpinning *focus* and *logic* of e-government vision. The outcome of the first reading provides motivation for the second reading in section 4.4 (*Nature of Interactions in Governance*), with the intent of establishing the existing *nature of governance structure* in which this emerging vision is implemented. The rationale is that any e-government strategy is likely to be affected by how government has structured interactions amongst the various stakeholders. Section 4.5 (*Images of Design Strategies*), the third reading, is premised on the assumption that implementation strategies of e-government are affected by the existing public administration structure analyzed in section 4.4. Thus the section explores the possible design strategies envisaged in the policy texts. The last section (4.6), titled Em*erging Insights from the Analyses*), is a synthesis of the various analyses undertaken through a retroductory perspective in order to unearth the overall defining logic of e-government. Some of the conflictual issues in the emerging meaning of e-government are also brought out in this section. The last section (4.7) is a concluding critique of the findings of the chapter, which is in line with the Critical Realist aims of the thesis.

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4.2 ANALYSING THE E-GOVERNMENT ARTIFACT

From analytical diagram 4.1 (repeated from Chapter Three), actors involved in meaning formation are always in a constant state of sense making, forming interpretations of their reality and acting in tandem. The repetitive, continuous and recursive behavior of the actors (of various categories) thus involve 'rituals' of communication and action (A). The process of sense making involves a continuous enlisting of actors, wrought with diverse frames of reference. Due to the enlistment of different actors, a negotiated or consensus on appropriate technological deployment is objectified in the form of an E-Government Strategy or ICT Policy or references made in various documents such as the ICT Policy framework, Freedom of Information Policy and the Freedom of Information Act. Thus sense making takes place in a context of actors engaging in communicative action.

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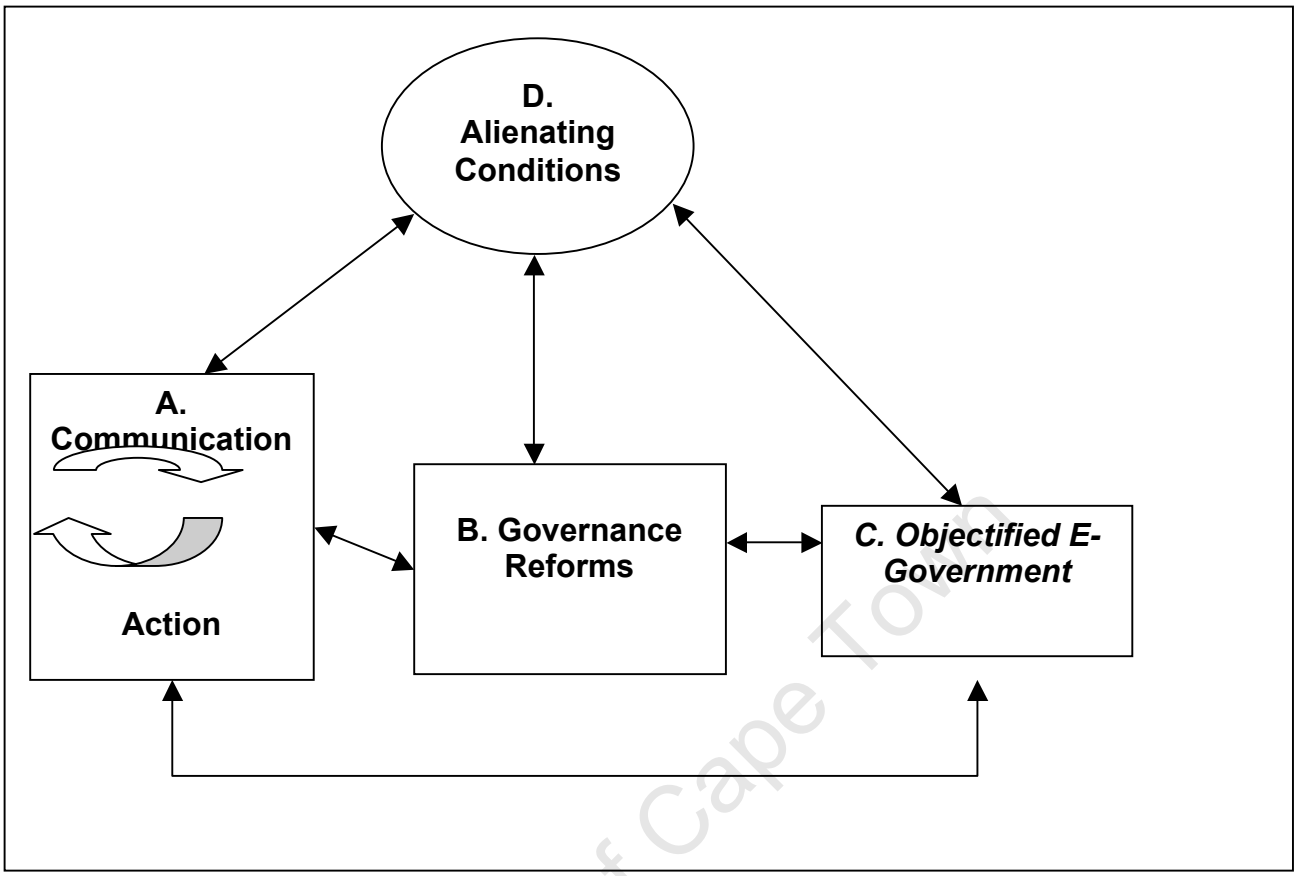

Diagram 4.1 Overall Research Framework

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The rationale and the motivation for engaging in the process of e-government adoption are rooted in the quest for better governance (B). Therefore in looking at the problem domain revealed in the diagram, focus is on the emergent Governance model evident in the adoption of e-government. The enactment of the objectified e-government within the context of the predominant governance form and the recommended institutional structures provide a 'snap shot' identify of the E-Government Artifact (C).

The emergent artifact is continuously in flux and changes form based on changing constraining conditions (D). These are evident when the context is assessed in terms of the social exclusion since the national information infrastructure (NII) provides the interface required for E-Government access. The argument is that policy choices expressed in the policy documents may lead to some alienating conditions (D), as some actors' interests become more dominant

compared to others. For instance, the design of the e-government programs may not take into consideration existing realities, which may eventually affect the use of e-government services. This 'design-reality' inconsistency (Heeks, 2002) may lead to the alienating conditions.

The formation of meanings emerges within particular problem domains. In this study, the meanings of e-government that are being considered from a governance perspective, especially as advocated for in the literature by NPM pundits [B].Both [A] and [B] influence and are influenced by the context in which e-government is taking form [D]. D] Could have been referred to as context, however, the agenda of the research was to point out the unfavorable context in developing countries into which e-government is being imported. The alienating conditions of the emerging e-government form were therefore illustrated through recourse to the metaphor of social exclusion as a retroductive[11] lens for illuminating the generative mechanisms. This was considered relevant to a critical realist research agenda so as to expose the taken for granted transformative impacts from the context of a developing country.

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The theoretical analytical framework shall be used as a guide in:

- An analysis of what promises and commitments have been objectified in the E-Government Strategy and other policy documents and 'speech acts'.
- From the Objectified E-Government, the emergent governance frame shall be assessed from the analytical lens of Chadwick and May (2003) and extended by Navarra (2007). The emergent institutional form shall be analyzed in the form of propositions in the E-Government Strategy as well as 'speech acts' in other media such as Government websites, media releases, presidential speeches, speeches by policy makers, etc.
- Lastly, the inclusiveness of actors in the process of E-Government sense making in the country is critically analyzed.

Theoretical thematic analysis (Chapter Three) was employed as the dominant mode of teasing out the E-Government artifact from the documents and some interviews transcripts. Thematic

[11] Retroduction is about advancing from one thing (empirical observation of events) and arriving at something different (a conceptualization of the transfactual conditions) (Danermark et al, 2002).

analysis is largely recognized as a method for identifying, analyzing and reporting patterns (themes) within data (Braun and Clarke, 2006). The thematic constructs used to 'tease' out the meanings were the *focus* and *logic* that characterize e-government. E-Government must have a specific *locus*, that is, the specific governance aspects it is intended to transform or improve. The locus of E-Government revolves around organizational processes being transformed using ICT (organization); government policy processes being undertaken using ICT (policy); how political actors use ICT (politics) and which relationships between citizens and government become digitalized (citizens) (Zouridis and Thaens, 2003).

The *focus* of e-government on the other hand is regarded as the dominant orientation that characterizes the thinking of the various stakeholders involved in meaning formation. The four rationalities of public institutions that underscore the focus of e-government are political, legal, economic and professional rationalities (Snellen, 2002). The locus and the focus are regarded as the Discursive Types (DT) or themes used for abductive interpretation to unlock the meaning of e-government from the policy documents. Table 4.1 summarizes these themes or Discursive Types (DT) that were employed in the interpretation process.

The remaining sections of the chapter are based on various readings of the texts that were undertaken.

Table 4.1 Discursive Type for Thematic Analysis

E-Government Focus	E-Government Locus
Economic Rationality	Organizational Locus
Political Rationality	Policy Locus
Professional Rationality	Political Locus
Legal Rationality	Citizens Locus

4.3 E-GOVERNMENT RELATED POLICIES

The 2004 E-Government strategy policy document titled *E-Government Strategy: The Strategic Framework, Administrative Structure, Training Requirements and Standardization Framework*

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(GOK-EGS, 2004) detailed a number of initiatives aimed at improving communication within government agencies, between government and business, and between government and citizens. The reforms proposed in the strategy focused on short, medium and long term initiatives geared towards meeting the goals of the policy document. While the reforms proposed in the document are fundamental, the emerging first reading of this policy document is that of an attempt by the Government of Kenya to harmonize, not only ICT initiatives which are already underway, but also newly proposed initiatives. This attempt to 'unify' ICT operations may have been recognized due to a realization that with the advent of the Internet and its related technologies, this feat would be possible (GOK-EGS, 2004).

What emerged was the need for a visible Government-wide management framework to oversee the process and the identification of specific activities, not only in the short run, but also in the medium and long' term. In addition, the E-Government Strategy paper also formally recognizes the contribution and the potential contribution of e-government to the attainment of the Government service delivery objectives:

> The E-Government Strategy presented in this document is designed to achieve pre-determined set of goals and objectives, which are: better and efficient delivery of Government information and services to the citizens, promote productivity among public servants, encourage participation of citizens in Government and empower all Kenyans in line with development priorities outlined in the Economic Recovery Strategy for Wealth and Employment Creation (2003-2007) (GOK-EGS, 2004, p. 1)

The link of e-government's contribution to development priorities is especially poignant from a historical perspective since the coming to power of the Kibaki Government (2002-2012) whose main campaign was based on a *reform* agenda. The Kibaki government developed an economic blueprint dubbed *Economic Recovery Strategy for Wealth and Employment Creation.* This blueprint and its successor, *Kenya Vision 2030* (Gakuru, 2007), have given prominence to the role of ICT in transformation of national development. Thus within a historical context, the coming to power of a new government in 2002 gave impetus for a refocus on ongoing ICT initiatives in Government (Appendix 4.1).

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The 2004 *E-Government Strategy* document also specified specific actions to be undertaken as well as indicators for their achievement. The actions largely drew from best practices from Singapore, Malaysia, New Zealand, Australia, South Africa and United Kingdom. For instance while focusing on communication within Government agencies, the policy document prioritized prerequisites for *improved communication* such as instituting structural and operational reforms. Under this, the specific reforms included introduction of change through training and awareness creation; organizational re-structuring for enhancement of service delivery; review Government operational and business processes in line with new tools and technologies as well as facilitate and enforce inter-agency cooperation, messaging and collaboration. Other reform activities targeted the enactment of regulation and legal framework, development of a Government secure and reliable infrastructure, communication with businesses as well as citizens.

Thus the document, apart from harmonizing the management of ICT in Government and the recognition of its contribution to service delivery, spurred interest in e-government activities within Government ministries resulting in the creation of committees to focus on achieving certain goals. The effect has been to create awareness within Government, especially given the institutional setup of the e-government function under the direct influence of the Head of Public Service (who reports to the Cabinet, which is presided over by the President).

The other policy document is the 2006 *National Information and Communications Technology Policy* (GOK-NICT, 2006). The vision of this policy document is to enable Kenya be a prosperous ICT-driven society by facilitating:

> Sustained economic growth and poverty reduction; promote social justice and equity; mainstream gender in national development; empower the youth and disadvantaged groups; stimulate investment and innovation in ICT; and achieve universal access (GOK-NICT, 2006, Pp. 2).

The policy aims to achieve this by focusing on the four guiding principles of infrastructure development, human resource development, stakeholder participation and appropriate policy and regulatory framework. The document highlights the importance of ICTs in achieving significant social and economic development. Further, that those countries that have adopted ICT in their

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national agendas are rapidly transforming into information and knowledge-based economies. The policy broadly accepts that the current society is both information and knowledge-based.

However, in order to achieve a prosperous Kenyan society through ICT, the policy document specifically mentions a number of challenges. Those relevant to the current research theme being a lack of a comprehensive policy and regulatory framework; inadequate infrastructure; insufficient skilled human resources; electronic learning; universal access; public-private partnerships (PPP); e-government, e-commerce; content development; electronic security and ICT leadership. The policy then proposes various strategies for addressing each of these specific challenges. Under the challenge of e-government, the ICT policy suggests that the focus should be on *redefining the relationship between government and citizens with the objective of empowering them through increased and better access to government services*. That this will have the effect of making the government more result oriented, efficient and citizen centered.

The identification of these challenges as barriers to a prosperous country has resulted in an increase in the number of institutions set up to handle them. Foremost was the establishment of a new, independent ministry, the Ministry of Information and Communications in 2004. Other institutional structures that have emerged over the years since the 2002 elections are the E-Government Secretariat (2003); Kenya ICT Board (2007); Kenya ICT Authority (2007). It is also expected that the Freedom of Information Authority will be setup as outlined in the provisions of the bill (GOK-FIA, 2007). Others that have been in existence prior to 2002 are the National Communications Secretariat; Government Information Technology Services; and the Communications Commission of Kenya. A host of other institutions are expected to be set up with the passing into legislation, the Kenya Communications Amendment Act, 2008.

The emerging vision emanating from the policy documents is a vision of *a renewed governance system from a previously inept public administration system which was inefficient, ineffective and less focused in service delivery*. This is a vision of re-focused governance based on a public administrative system meant to serve stakeholders who need or have the requisite technological resources to more actively participate in governance (*empowerment*). This overall emerging vision portrayed in these documents is set against broader societal requirements of poverty

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eradication, economic growth and socio-political cohesion as the quest for the Government of Kenya (GOK-ERS, 2004). All the papers link adoption of e-government's technologies to the achievement of governance objectives.

In all the policy papers reviewed, the prominence of ICTs in public service delivery is recognized especially in their contribution to improved quality of services. This is viewed in terms of making the Government more result-oriented, efficient and citizen-centered by *improving* collaboration in government agencies and improving collaboration with other stakeholders. At a broad level, these *improvements* are visible in statements in the policy documents highlighting need for adoption of management techniques which can result in re-design of processes, *improvements* in quality and *improvements* in information/knowledge accessible by stakeholders. Thus the emerging vision with regard to the role of ICT in government is its *contribution in improving service delivery.*

The policy extracts and interpretations in table 4.2 show an e-government ideology and focus that is underpinned by economic rationality (R1, R4, and R5). The economic rationality underpinning e-government in Kenya stems from both a macro and micro perspective. At the macro-level, the intent of e-government is closely linked with larger globalization concerns of citizen empowerment, gender empowerment, gender equity (R1), achievement of universal access goals and more participatory governance (R5). The macro-level economic rationality imperative identifies organizational and citizen loci. The organizational dimension is at the strategic top in which the government has set out strategic targets to meet certain universal access goals to enhance access to telecommunications services (GOK-NICT, 2006). This strategic top aspect is noticeable from a proliferation of institutional structures being setup to handle the macro-level targets for the realization of the e-government mandate.

The micro-level intent of the predominant Economic Rationality ideology is geared towards improvement of the individual experience with government agencies through the enhancement of communication electronically (R1 and R4). It points to enactment of actions by the government aimed at electronic service delivery (e-services), intended to augment manual service delivery.

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Ref	**Table 4.2. Extracts of Documents** Text	Description (Text Analysis)	Interpretation (Discursive Practice) and Explanation
R1	The E-Government Strategy [...] is designed to achieve [...]: better and efficient delivery of Government information and services to the citizens, promote productivity among public servants, encourage participation of citizens in Government and empower all Kenyans in line with development priorities outlined in the Economic Recovery Strategy for Wealth and Employment Creation (2003-2007) (GOK-EGS, 2004, p. 1) Sustained economic growth and poverty reduction; promote social justice and equity; mainstream gender in national development; empower the youth and disadvantaged groups; stimulate investment and innovation in ICT; and achieve universal access (GOK-NICT, 2006, p. 2).	Potential contribution of E-Government to development priorities. Service delivery is linked to this More areas in which E-Government plays a role in national development given	E-Government is being linked to a broad based government initiative of achieving economic progress ***Economic Rationality; Organizational Locus***
R2	Maximum access by all Kenyans to information held by public authorities to enable the country to transition to a knowledge-based (GOK-FIP, 2007, p. 1) Facilitates their communication with the public authorities and increases their participation in the democratic process and nation building. Public sector information is a key resource for economic activity and proper functioning of the economy (GOK-FIP, 2007, p. 20).	Linking E-Government to wider societal trends of knowledge society of focus on universal access	Rationalizes E-Government policy as a way of aiding transition to a knowledge-based economy, thus providing its scientific basis. ***Professional Rationality***
R3	A key component of the strategy is the electronic dissemination of information to the public. As a result, all ministries are in the process of enhancing their intranets and extranets to meet this challenge (GOK-FIP, 2007, p. 15).	Legitimization of the information flow format and action steps	Top-Bottom informational flow augmented through E-Government; reinforces an information ideology logic ***Managerial Control; Technostructure; Professional Rationality***
R4	The major challenge facing Government is to provide services in an efficient and effective way. E-Government provides a framework for improved service delivery and enhanced communication and information provision within Government, with the citizenry and the business community. There will be need to develop adequate capacity within Government to implement e- Government and realize the benefits of e-service	Legitimization of E-Government as an alternative to service delivery	Challenge of governance is provide efficient and effective services

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	delivery. (GOK-NICT, 2006; Pp. 6-7) Using e-Government as a tool to improve internal efficiency and quality of public service delivery and help in the fight against corruption ;(p.10).		***Economic Rationality*** Internal efficiency focus, while external quality focus: ***Operating Core***
R5	The overall goal of e-Government is to make the Government more result oriented, efficient and citizen centered. The e-Government strategy will focus on redefining the relationship between Government and citizens with the objective of empowering them through increased and better access to government services. The broad objectives of e-Government will be to: a) Improve collaboration between Government agencies and enhance efficiency and effectiveness of resource utilization; b) Improve Kenya's competitiveness by providing timely information and delivery of Government services; c) Reduce transaction costs for the Government, citizens and the private sector through the provision of products and services electronically; and d) Provide a forum for citizens' participation in Government activities (GOK-EGS, 2004; GOK-NICT, 2006).	Reinforcing E-Governments mandate of having an internal and external focus. Role of the government to stabilize the nature of interactions using E-Government.	Citizens are recognized as consumers, as well as replication of the logic of augmenting government mandate through E-Government. ***Economic Rationality; Political Rationality; Operating Core; Citizen Locus;***

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The specific locus underpinning micro-level Economic Rationality emphasizes the operating core of the organizational locus (to achieve internal efficiency) and citizen locus (service quality improvement).

A second ideology underpinning the 'spirit' of the e-government vision can also be explained from the *Professional Rationality* focus captured by R2 and R3. Snellen (2002) explains that realization of policies by governments needs to be based on appropriate policy theories derived not only from practical experience but also from scientific knowledge. This is the basis of professional rationality. The organizing vision of e-government in Kenya is based on information

and knowledge society ideas of participating in a knowledge-based society. This is evident from the policy proposals of the E-Government Strategy as well as the National ICT Policy (GOK-EGS, 2004; GOK-NICT, 2006) captured in R2. Therefore, crafting the E-Government Strategy premised on the dominant tenets of greater societal concerns of the knowledge society gives pointers to an ideology with some form of Professional Rationality. The bounds of this focus is characterized by an *Organizational locus* emphasizing changing the organizing core of public administration through various initiatives aimed at transforming the business processes, based on a *technostructure* built around ICT. For instance, e-services is structured around a managerialist model of interactions (analysis below) in which information provision is largely top-down, which requires the redesign of the back office processes such as personnel systems, revenue and expense systems (GOK-EGS, 2004).

In all the policy papers reviewed, the prominence of ICTs in public service delivery is recognized especially in their contribution to improved quality of services. This is viewed in terms of making the Government more result-oriented, efficient and citizen-centered by improving collaboration in government agencies and improving collaboration with other stakeholders. At a broad level, these improvements are visible in statements in the policy documents highlighting need for adoption of management techniques which can result in re-design of processes, improvements in quality and improvements in information/knowledge accessibility by stakeholders. Thus the emerging vision elevates the role of ICT in government by pointing outs its contribution in improving service delivery.

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4.4 NATURE OF INTERACTIONS IN GOVERNANCE

Some of the principal mechanisms of interaction and mode of information flow that point to a managerial focus of the E-Government Strategy are captured in the table 4.3 according to the model by Chadwick and May (2003). Recasting of the governance system in Kenya against this model shows that the dominant mode of interactions is that of the managerial model. As was pointed out in the earlier sections, a key objective of the e-government strategy is achieving a more result-oriented and efficient public service. This resonates well with the managerial focus which is geared towards achieving efficiency and transparency. The strategy documents capture the spirit of the reforms efforts geared towards achieving efficiency and effectiveness in

governance. It is in this 'spirit' that the managerial model seems to fit the governance model in Kenya.

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Table 4.3. Dominant Interaction Model and Information Flow

Period	Priority Areas of	Interaction Model	Information Flow/Interaction mechanism
Short Term	Talking to Citizens	Managerial	Provide information on government websites
	Improving Public Services	Managerial	Focus is on revenue for government
	E-Policing	Managerial	Provide security and traffic alerts from the government
	Employment	Managerial	Transfer employment process online
	Education	Managerial	Provide information online
	Family	Managerial	Provide family entertainment information
	Elections	Consultative	Verification of voter information
Medium Term	Listening to citizens	Consultative	Source citizens opinions on specific issue, but non touching on policy
	Property Search	Managerial	Facilitate transactions (geared towards capturing transactions for government revenue)
	Law	Managerial	Provide legal services
Long term	Utilities	Managerial	Linking to payment systems

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The short-term, medium term and long term priorities lean towards the managerial focus in terms of the defining logic, usage, interaction mechanism, actors, and the role of government. From Table 4.3, all the priorities depicted as managerial are to be provided under a 'one-stop' shop approach. In addition, the mode of information flow is largely from the government to the public by making information available online. There is minimal information flow from the public

except in cases where the government is interested in enhancing revenue collection or getting information for its own internal operations.

The emerging tone is that of a Government geared towards providing information to the citizens and other stakeholders with minimal input from the citizens. In addition, evaluations of the websites of ministries show that their intent is on providing information to the public and the government also uses the websites as a form of 'showcasing' the achievements of the Government. This may be interpreted as an attempt to achieve legitimacy from the eyes of the public.

Again, part of the emerging view is that the government sees itself as becoming more open to the public by speeding up delivery of information to the citizens. This is because receiving results through short message service (SMS) as well as being able to lodge documents online is viewed as becoming more open. Chadwick and May (2003) summarize the principle features of this Managerialist governance model as having:

> A concern with efficient delivery of government information to citizens and other groups of users; the use of ICTs to improve flows of information within and around government; a recognition of the importance of service delivery to customers; the view that speeding up information provision is, by itself, "opening up" government […] and presentational professionalism (often termed "spin" as the defining logics (p. 272).

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The aspect of spin is evident since the setting up of the Office of Government Spokesman for the first time in the history of the country in 2003. The Government hired a professional communications expert whose role is provision of information to the public. The office 'churns' out pro-government correspondence through the various media as well as their website (www.communication.go.ke). The website is inundated with archived information from the Government, but very little from the other stakeholders. The theme of a more 'open government' is also linked to the concept of a more empowered citizenry. Dr. Alfred Mutua (Government Spokesman, 2003 to date) states this on their website:

> President Mwai Kibaki formed a government of national unity to take care of the different political interests, and to safeguard against the marginalization of any ethnic communities on the basis of their political stand. The government of national unity also incorporated all political party

> leaders into the government. Today, we can confidently assert that our country's democratic space is open enough for people to exercise and enjoy their freedoms and liberties without fear of victimization. The government embraces the principles of good governance, supported by a citizenry that is increasingly aware of its rights under the law. (www.communication.go.ke).

Therefore, from the various policy papers as well as discourses emerging in other channels, e-government enactment is strongly influenced by a managerialist governance model of interactions. As per this model, adoption of e-government is viewed as an *improvement of any extant technologies, whilst the logic of public service remains unaltered*. Chadwick and May (2003, p. 278) characterize this as a push model of information dissemination in which:

> The state will place information in accessible forums and the onus is on the user to access it. The audience members are seen as passive recipients, rather than interlocutors. State produced information is a passive resource to be transferred between nodes in the information network. And while citizens are inescapably part of the e-government networks, their role is not important as that of the state, which manages the activity.

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Thus in time, e-government technologies becomes embedded in the routines of public administration in what Margolis & Resnick (2000) characterize as 'politics as usual'. The next section relies on the above analyses and other insights to explore how the policy drafters envisaged the approach to design strategy. The purpose of a particular design theory is to support the achievement of goals (Walls et al, 1992). The interest is to determine which predominant design strategy has been articulated in the policy papers and is likely to impact on how the adoption process tackles common dilemmas inherent in building an infrastructure for e-government in developing countries such as Kenya.

4.5 IMAGES OF DESIGN STRATEGIES

The E-Government Strategy was explicit in its quest for implementing Information and Communications Technologies to *support communication* within Government, between Government agencies, with business and citizens. What is communicated can be characterized as knowledge, without falling into the trap of differentiating data from information, as well as knowledge and wisdom. It may therefore be difficult to overlook the concept of *knowledge* and

how it ties in with the intentionality inherent in the policy papers. The various policy papers also uncovered the national intent of making Kenya a prosperous as a knowledge-based society.

Given the dominance of the knowledge concept, the notion of knowledge infrastructure (Hanseth, 2004) and relevant Design Strategies (Hanseth and Lyytinen, 2004) can be used to unlock the predominant implementation strategies. Juxtaposing Ole Hanseth's (2004) ideas of knowledge and infrastructure, then the intent of the policy papers is a quest to *transform or improve the knowledge infrastructure* in order for the country to move towards a *knowledge society*. Given this intention, Hanseth (2004) reckons that the knowledge infrastructure change process may be categorized as (p. 108):

> (a) *Extensions*: where the existing infrastructure may be extended while maintaining full backward compatibility, which can happen by either adding new nodes to the network or new functionalities.
>
> (b) *Moderate*: replacing one standard with another by means of gateways translating between the standards.
>
> (c) *Radical*: replacing the old standard with a radically new and incompatible one.

Evidence suggests that the predominant transformation strategy largely leans towards the *extensions strategy*, as is inferred from the plethora of standards that are proposed in the E-Government strategy (GOK-EGS, 2004; pp. 26-30). The attempt in the strategy document is not to radically change all the standards, but to provide guidelines for improving the knowledge infrastructure for e-government. For instance, while specifically addressing the issue of network standards, the strategy document lists no less than twenty four standards specific to IEEE. The language adopted in the policy document can be read to mean providing specific options and not change. For instance, the GOK-EGS (2004; p. 26), the government agencies are urged to consider use of the said standards:

> In the process of benchmarking, the following standards will also need to be considered for use in Government:
>
> - IEEE802.1: Standards related to network management
> - IEEE802.2: General standard for the data link layer in the OSI reference model....etc.

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In addition, there is explicit mention of older applications, some of which are legacy systems, forming the back office for other applications:

> The various projects include those already active and underway and those that are planned. These include.....implementation of the Integrated Financial Management Information System (IFMIS)...intended to ultimately improve the overall operational efficiency of the Government. It is at the testing stage (GOK-EGS, 2004; p. 4).

For instance, the implementation of Integrated Financial Management Information System (IFMIS) and the Integrated Payroll and Personnel Database system (IPPD) have been underway since the late 1990s. Considering these applications that have been underway as part of the transformative E-Government Strategy does not give a connotation of radicalism, but that of a focus on extension: extending the capabilities of existing systems (by additions or scaling up new ones) to attain improvements. Extensions, through scaling up of existing capabilities as well as new additions, call for providing a range of other standards to accommodate depth in the knowledge infrastructure of e-government. It does not however point to a moderate approach, since the emphasis is not on replacements, but on *augmentation of existing systems as well as the addition of new modules.*

Further in-depth reading explored how the envisaged extensions strategy is geared towards handling two dilemmas commonly encountered in building information infrastructures (II). These are referred to as *Initial Growth* and *Lock-In* challenges (Hanseth and Lyytinen, 2004). The initial growth or bootstrapping dilemma is when the proposed infrastructure may never take off because the expected user community is not hospitable. This is referred to as a dilemma of initial growth, where the initial users are unable to see the *value* of the II and therefore growth conditions are not self-reinforcing. In such conditions, the installed base of technological capability never starts to grow. Lock-ins occurs when the installed base starts to grow and, as more and more users find value in the II, self-reinforcing conditions may result in a user-base 'lock-in' or a technological capability 'lock-in' (Hanseth and Lyytinen, 2004). A user base lock-in results when users adopt their own standards and as II build-up gains momentum, the standards might become incompatible. Technology lock-in occurs when users are persuaded to agree to a particular technological standard initially, which may become inadequate in the future.

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Normative design principles need to be considered during design to forestall these challenges during adoption. These principles revolve around strategies that are geared towards addressing these dilemmas. For instance, Hanseth and Lyytinen (2004) proposed three design principles seeking to address the first dilemma (initial growth problem or bootstrapping); and two design principle for addressing the dilemma of lock-in. The proposed principles and the challenges they address are shown in the table 4.4:

Table 4.4 Design Principles for II	
Key Challenge	**Design Principle**
Enable Bootstrapping (or cultivating an installed base)	• 1. Design Initially for Usefulness
	2. Draw Upon Existing Installed Bases
	3. Expand Installed Base by Persuasive Tactics to gain Momentum
Avoiding Technology Lock-Ins	4. Make it Simple
	• 5. Modularize by Building Separately Key Functions of Each Infrastructure, Use, Layering and Gateways.

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An application of these principles and how they address the two dilemmas in the context of e-government policy texts in Kenya are discussed in the two sub-sections below:

4.5.1 CULTIVATION OF THE INSTALLED BASE

The installed base refers to the notion of an always pre-existing infrastructure. Cultivation of the installed base therefore assumes that there is always a pre-existing installed base which can form the basis for the take-off of a 'new' infrastructure. The concept of installed base has been underscored by a number of authors (Hanseth, 2004; Hanseth and Lyytinen; 2004; Ciborra; 2004; Nielsen; 2006). Building of 'new' infrastructures must therefore always be integrated into and extended from existing ones (Ciborra, 2004).

In order to address the problem of bootstrapping, Hanseth and Lyytinen (2004) propose the principles of designing for usefulness; drawing on installed bases and expanding the installed base through persuasion. Drawing on these design principles to address this dilemma, the following insights are evident from the policy texts as well as other interviews sources:

Cumulatively in the policy texts, the sophistication of the e-government infrastructure is noticeable in terms of the applications, services and transport services envisaged. For instance, some of the activities for improved communication within government are summarized in table 4.5 below:

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Table 4.5: Activity Design for Usefulness	
Period	**Activity**
Short Term	Develop Information Websites
	Capacity Building creating leadership for E-Government implementation; awareness creation and training
	Enforce standards and control processes in human resources management, expenditure management, monitoring and control
Medium-Term	Integration of Government information and records;
	Develop web-enabled databases
	Integration of government databases with quasi-governmental institutions

The short-term activities have an individual or single agency emphasis while the mid-term activities lean towards involving more than one agency. This shows increasing complexity of design towards the long-term.

The policy texts also recognize that there are a number of infrastructure initiatives that are already underway. For instance, the E-Government Strategy recognizes the need to continue expanding the transport and service information infrastructure to (GOK-EGS, 2004, pp.5):

- Complete the implementation of secure Government information infrastructure
- Continue installation of local area networks in Government [...] and extension of the infrastructure to district and [...].
- Improve and enhance the databases and systems to support Internet Protocol (IP) standards to enable access through the Internet by remote sites, etc.

The existence of applications such as IFMIS and IPPD has also been pointed out. However, the reference to the installed base largely refers to what exists within government, yet the strategy envisages three categories of stakeholders: government (public administration), citizens and businesses. In spite of this, the design strategy recognizes the importance of cultivating the installed base (of resources, people, applications, services, etc).

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4.5.2 AVOIDING TECHNOLOGY LOCK-INS

The two design principles intended to address the dilemma of technology lock-ins emphasize *simplicity* and *modularization*. These principles are relevant if an evolutionary strategy is adopted (Hanseth and Lyytinen, 2004). The prior discussions point out similarities between the extensions and evolutionary strategy since they target incremental building of information (knowledge) infrastructures. The e-government adoption process in Kenya is evolutionary. Accordingly, Hanseth and Lyytinen (2004) propose that:

> Simplicity suggests that it is easier to change something small and simple than something large and complex as one will have to change the II anyway. The second principle recommends strong and clean decomposition of the II into several independent sub-infrastructures. [...]. Any II should therefore be decomposed into several sub-infrastructures during design where each infrastructure offers "clean" interfaces to others so that they can evolve independently of each other. Infrastructures need to be accordingly decomposed horizontally into application and support infrastructures, and vertically into several independent neighboring infrastructures (p. 225).

It is difficult to analyze technology lock-in from a policy text. However, what is evident is the recognition that a number of government agency systems have been underway or are proposed in the strategy. As the systems evolve over time, changing the standards upon which they are based could become problematic as these systems stabilize at each stage of implementation. Thus, attempting to integrate the various systems that have been underway may prove to be difficult,

which would defeat the purpose of avoiding technology lock-ins. For instance, several application and support infrastructures are mentioned such as:

- Integrated Population Registration Systems-integrates with Department of Civil Registration, Immigration Department; Road Transport; Kenya Revenue Authority; Embassies; Electoral Commission of Kenya.
- Security and Law Enforcement Systems to address the needs of the departments such as Kenya Police; Criminal Investigations Department and General Service Unit.
- The Agricultural Based Information Systems that will allow easy access to information on agriculture, trade and business opportunities
- The Education Information Systems that will support the Ministry of Education; Science and Technology, etc.

In addition, several transport infrastructure projects are being undertaken in various ministries and also outside the mainstream of government. Overall, the design principles evident in the policy texts point to an extensions/evolutionary strategy to building of the E-Government Information Infrastructure.

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4.6 EMERGING INSIGHTS FROM THE ANALYSIS

The Critical Realist leanings of this research calls for a retroductive approach to provide pointers to possible generative mechanisms that could be influencing the organizing vision of e-government to emerge the way it is unfolding. Given the explanatory emphasis of the thesis in the earlier chapters, various theoretical concepts are used to unearth these generative mechanisms. A summary of the analyses above is provided in table 4.6.

Table 4.6. Summary of Findings

Main Theme	Finding
Target Social Problem for E-Government	Quest to improve governance for the prosperity of Kenyans.
Purpose of the organizing vision of e-government	Geared towards making Kenya a knowledge-based society by enhancing communication between government, citizens and businesses.
Nature of e-government conceptualizations	• The Managerial Model of governance was dominant • An Economic instrumentalist/tool/rationalistic view of E-Government conceptualization was evident in

	the policy texts.

Retroduction is structured around three central ideological critiques, that of articulating the e-government vision with the intent of *increasing control*, *power centralization* and *managerial domination*. The emerging meaning of e-government is largely premised on a ***managerialist ideology***, defined as a technocratic ideology which views tools as ends in themselves, with the hope that their solutions will help resolve complex conflictual problems (Kantz, James and Gilmore, 1990). The above analyses point to an increasing perception that e-government can act as a *means* (or a tool or instrument) to achieve good governance, largely focused on achieving efficiency, effectiveness and productivity of the civil service. Hallmark characteristics of the managerialist ideology could be gleaned from the purpose of the Kenya E-Government strategy which elevated the *economic value* of efficiency, effectiveness and productivity of the civil service.

This economic rationality of the ideology of managerialism is reminiscent of a *functionalist paradigm*[12] which enthusiastically embraces best practices and standard approaches for solving problems. The strategy papers revealed various best practices that inform the meaning being attached to the e-government vision in Kenya, as well as the functional basis on which the vision is hinged. E-Government is touted as a means to achieve results, through the improvement of processes to be more efficient and citizen-centered. Managerialism and its values and assumptions may therefore be characterized as shaping the emergence of the e-government artifact from an analysis of the policy documents. Its concern is to elevate efficiency, top-down authority structure (as revealed by the centralization of monitoring and control) and enhancing the expertise of the civil service. These are considered as defining characteristic of a *highly bureaucratic organization of government*, which was again seen from the analysis using Chadwick and May's (2003) framework. The dominant design strategy further gives credence to this fact since the analysis revealed that the evolutionary or extensions strategy is preferred. This may be read as an attempt to maintain the status quo of the public administrative system, underpinned by a *bureaucratic tenet*.

[12]The fundamental assumption of the functionalist paradigm is that all the groups or individuals involved in a project share common, objective and well-defined goals for the project and despite differing on the means of achieving the goals the ends are the same. One consequence of this paradigm is that it makes the issues of power, conflict and resistance outside the domain of the developer, enabling the focus on rationally defined objectives.(De, 2005).

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The implications arising from such a managerialist conception of e-government may point to the propagation of certain interests in its conceptualization. For instance, one poignant consequence of the evolving meaning of e-government may point to a *thinly veiled control agenda* couched in the language of a desire for efficiency in governance. There are positive initiatives that on the surface may appear as lofty and therefore mask the intent of adoption of e-government. For instance, the e-government strategy spells out the need for integration of disparate government systems to reduce instances of information redundancy; an attempt to homogenize various functional systems and various subunits of planning, budgeting, monitoring, evaluation and training through standardization; and a focus on a "one-stop-shop" approach to service provision through the web interface. These approaches, while lofty, may eventually lead to enhancing control of the central government over employees and citizens via routinization of tasks, considered as a strategy of gaining control (Vickers & Kouzmin, 2001). Homogenization of government operations may lead to increased control being exercised by the government representatives as well as reduced diversity of options.

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Thus a key inference arising from the dominant managerialist ideology of the organizing vision of e-government in Kenya is an intended/unintended consequence of increasing control through the centralization of power albeit couched in rhetoric of achieving better governance. In a preliminary sense, the emerging e-government artifact therefore appears as a front for regaining centralized control, even in an era of devolution of control and power. The analysis undertaken in this chapter, considered at a macro-perspective, critically brings to the *fore images of instrumental rationality for e-government adoption premised on managerialist ideology, with consequences of increased control over citizens and government employees by the ruling polity*.

While the analysis in this chapter was important in pointing out the above, a number of tensions were also noticeable. These are subjects of subsequent chapters.

The first one is about the need to seek further clarity to the social problems that adoption of e-government is meant to solve. Reading through the policy texts may presume that the proposed

solutions will result in the achievement of the goals in an inclusive manner to the satisfaction of the stakeholders identified as government, citizens and businesses. It needs to be recognized that design (as evident in the policies) and reality (reminiscent of the actual situations of stakeholders) may be inconsistent (Heeks, 2002). Given that building infrastructures is expensive and takes long periods of time, an assessment of the technological situation to assess the state and diffusion of the 'installed base' may point to the (possible) inclusiveness of the e-government solution. The study of the technological installed base is critical since policies per se can just act to produce, sustain and reproduce (maintain) the status quo. Thus any conclusions based on a policy analysis alone are inadequate. Therefore, the chapter on Technology Diffusion shall address this tension by seeking clarity to the state of the installed base.

The second tension arises from the nature of interactions that are revealed, premised on managerialism. The inherent tension is that the policy drafters in most instances are different from those that implement infrastructure solutions in government. For instance, the predominant instrumental view may be expressed in the policy texts but may not be the dominant view during implementation. It is therefore also important to understand how the various actors involved in the implementation across various government ministries conceptualize e-government and how these conceptualizations are shaped by the expected impacts. This becomes the subject matter of Chapter 6.

The third tension arises from the nature of interactions (the managerial model) and the design strategies. The managerial model may be linked to certain internal practices that make this the dominant mode of interactions. Also, the design strategy of avoiding technology lock-ins was not explicit in the policy analysis. One of the principles was building of an existing installed base by using persuasion tactics. Given the need to clearly uncover the social problems as argued above; Chapter Seven shall attempt to address these concerns through a case study.

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4.7 CONCLUDING CRITIQUE

The synthesis of the findings revealed that overall defining logic of E-Government adoption is primarily geared towards having *e-services* by *improving service delivery*; *improving managerial*

control of policy implementation as well as encouraging some form of *democratic supervision*. To achieve this defining logic, the focus or ideology for addressing the social problem is that of economic rationality and some form of political rationality. Thus it may be concluded that the emerging e-g*overnment artifact is based on an ideology of improving governance through managerial control*. Under the alienating conditions, characterized as socially exclusive to large segments of the population, the emergent e-government artifact is codified in the policy papers *with strong' managerialist orientations of augmenting and reinforcing central governments control over its polity.*

The literature on the ideals of NPM envisages revolutionizing public sector management in African countries. However, the reality as expressed in the policy papers, is that e-government is primarily being employed to attain greater *internal automation of government processes (old model of computing)*, as opposed to a new model which envisages transforming and supporting the external workings of government. While the policy texts analyzed recognize the latter transformative potential, the dominant meaning is more evolutionary and managerialist in orientation. Conflicts in meanings are therefore arising at two interwoven levels of international vis-à-vis national. While the visions expressed in the policy papers (by national policy makers) as well as international edicts (by NPM pundits) envisage a more transformative consequence of e-government, the inscribed meanings in the policy papers are more evolutionary (by policy designers) with a greater internal focus. This may enable a claim be made: that E-Government is merely becoming a *vocable for galvanizing and rallying more ICT investments* by the national government, which will possibly contribute to achieving governance goals. This claim is based on the recognition of the transformative role of e-government; yet the strategy for its realization is evolutionary.

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Despite the emancipatory claims of the e-government vision, and the probable laudable goals of its adoption within the managerialist discourse of changing governance, there are some counter veiling consequences. The overall managerialist discourse unveiled in this article, seem to reflect a quest for focusing on efficiency and effectiveness in government service delivery. However, this discourses, when coupled with the acute lack of resources in Kenya as a developing country, may also be playing a role in influencing the meanings that e-government is acquiring. A likely scenario that may emerge is a re-legitimization of central government authority over other stakeholders through the use of ICT. This is possible especially if the African governments are

perceived by the NPM pundits and donors to be enthusiastic in embracing e-government as the governance mantra. The resources that are marshaled are therefore likely to be used to inculcate a *paternalistic relationship* in which various agencies become dependent on the central government. This possible implication is in tandem with the managerialist intentions 'teased out' in E-Government policy. The resulting paternalistic relationship between central government and other stakeholders (such as semi-autonomous local government agencies and citizens) is likely to enhance the trend towards *managerialization* in which ICTs are perceived as means for achieving organizational changes and for enforcing controls (Doolin, 2002).

In line with the 'gaps' that have been revealed in the analyses undertaken in this chapter, the next chapter presents the state of the technological infrastructure as an antecedent to e-government adoption.

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CHAPTER FIVE

NATIONAL INTERNET INFRASTRUCTURE AND E-GOVERNMENT INCLUSIVENESS

5.1 INTRODUCTION

This chapter[13] assesses the status of the infrastructure for e-government by focusing on the Internet as the representative 'cluster of technologies' (Wolcott et al, 2001). The Internet is considered as a cluster of technologies that is antecedent to the successful realization of the goals of e-government, especially given its prominence since its commercialization in the 1990s and it still continues to play a key role in the current society (UN, 2008). Castells (2004) refers to this society as the network society in which the Internet is the crucial technology dominant in a new technological paradigm of informationalism[14]. A specific focus on Internet diffusion is motivated by the fact that the Internet infrastructure is integral to e-commerce and e-government activities (Singh & Das, 2007). The emerging artifact of e-government is incomplete without an assessment of the state of the Internet in a country.

However, it has also been recognized that the conceptualization of e-government relies on a Western-type telecommunications infrastructure that remain largely unrealized in many African countries (Heeks, 2002). The Western model presumes a widespread adoption of various technologies by various population groups, yet several studies on Internet diffusion in Africa document low levels of technology adoption (Bagchi et al., 2007; Brown et al., 2007; Bernstein et al, 2005; Foster et al, 2004; Oyelaran-Oyeyinka & Adeya, 2002).

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[13] Part of this chapter was published as: Muganda-Ochara, N., Van Belle, J.P., & Brown, I. (2008). Internet Diffusion and its Determinants: A Longitudinal Analysis. *Communications of AIS*, 23 (7).

[14] Castells (2004): Informationalism is a technological paradigm based on the augmentation of the human capacity of information processing and communication made possible by the revolutions in microelectronics, software, and genetic engineering. Computers and digital communications are the most direct expressions of this revolution. Microelectronics, software, computation, telecommunications, and digital communications at large, are all components of one same and integrated system.

As a result of the inadequacy of the Western-type physical computing model in the African context, meanings that policy drafters embrace may have unexpected consequences. Of relevance to the research agenda is whether the adoption of e-government is an inclusive governance instrument in Kenya, yet the wider societal debate is characterized by the duality of inclusion and exclusion in which there is selective diffusion of the various Information and Communications Technologies (ICTs) which impacts on peoples local experiences (Castells, 2004). This chapter elevates the role of Internet diffusion as the foundational core of a national information infrastructure (NII) for e-government.

Figure 5.1 presents the logic of how the issue of concern for this chapter is addressed. By linking the underlying structures of Chapter Four (quest for centralized control, managerialism, economic rationality of policy drafters), the chapter brings to the fore that this has resulted in rationalization of telecommunications investments over the years that favor certain segments of the population. The resulting unexpected consequence is that of social exclusion. Warschauer (2004) defines social inclusion as the extent that:

> Individuals, families, and communities are able to participate fully in society and control their own destinies, taking into account a variety of factors related to economic resources, employment, health, education, housing, recreation, culture and civic engagement (p. 8).

Social inclusion captures the ethos of better governance, and when it is considered within the context of e-government, then Internet diffusion becomes a concern since the target of e-government is to enable access and also ensure participation of citizens. The contribution in this chapter recognizes that the Internet diffusion trajectory in a country is partly dependent on the role the government plays in formulating policies that ensure that activities that are dependent on the infrastructure become inclusive or exclusive.

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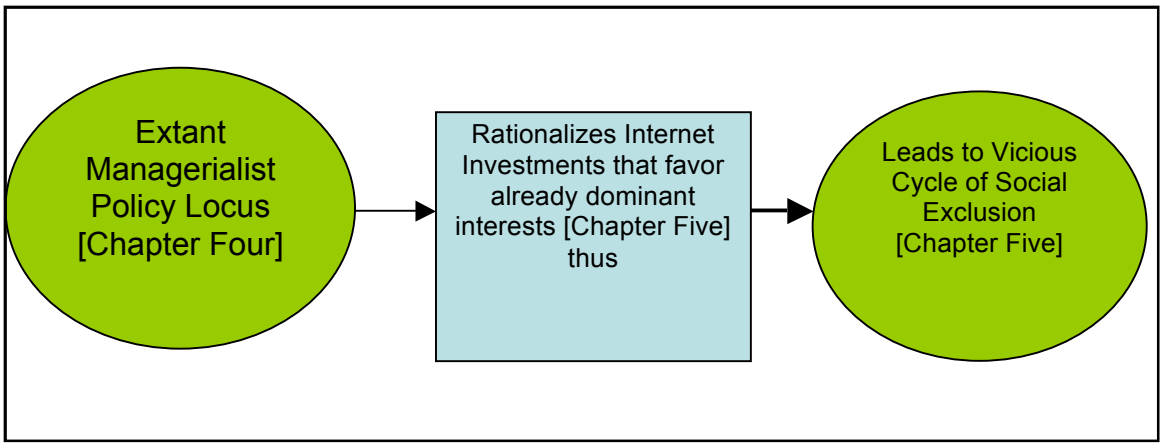

Figure 5.1. Linking Policy intentions to Social Exclusion

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The Chapter is laid out in three main sections. In the first section, the rationale for the explanatory framework adopted in this chapter is presented. The second section presents the analysis using the framework. The third section is intended as a retroductory section that reviews the implications of Internet diffusion pattern to the concept of Social Inclusiveness/Exclusiveness of e-government. This is then followed by a summary of the findings.

5.2: GLOBAL DIFFUSION OF THE INTERNET FRAMEWORK AND RELATED THEORIES

The Global Diffusion of the Internet (GDI) framework was selected as the explanatory model due to its robustness in making country level assessments of the Internet as a cluster of technologies (Wolcott et al, 2001). This may be attributed to its relationship to a diverse but related body of theories that have been employed to study innovations either at individual, organizational or country levels. The ensuing sections describe the two main sections of the GDI framework.

5.2.1 GDI DIMENSIONS AND THEIR INTERRELATIONSHIPS

The choice of the Global Diffusion of the Internet (GDI) framework as the explanatory lens for mapping Internet diffusion and its determinants is based on its robustness when utilized in making country level assessments of the Internet as a cluster of technologies (Wolcott et al, 2001). The GDI framework consists of six *dimensions,* each of which describes a somewhat intuitive and measurable feature of the presence of the Internet in a country (Wolcott et al, 2001). Figure 2 captures the GDI dimensions and their interrelationships.

The *Telecommunications Infrastructure* provides the base, without which there would be no Internet. Between the Telecommunications Infrastructure and the Users (Individuals and Organizations) are a host of proxies (depicted as ISP, but can also be application service providers). The dimension that captures the state of the telecommunications infrastructure is *Connectivity Infrastructure*. The Users at the top level require certain technologies for accessing the Internet. The dimensions that capture these aspects are *Sectoral Absorption* and *Pervasiveness*. *Pervasiveness* is a measure of the number of individual Internet users in a country relative to the total population. *Sectoral Absorption* considers Internet use from the viewpoint of adoption at an organizational level.

Sophistication of Use, on the other hand, recognizes that the adoption of the leading edge applications depends not only on what the users want, but also on what the Internet services infrastructure is able and willing to provide. The Internet services infrastructure has two dimensions-*Organizational Infrastructure* and *Geographic Dispersion*. Organizational infrastructure captures the number and robustness of the organizations that provide Internet services. *Geographic Dispersion* reflects the extent to which these organizations, along with the supporting telecommunications infrastructure, are distributed across the entire territory of a country.

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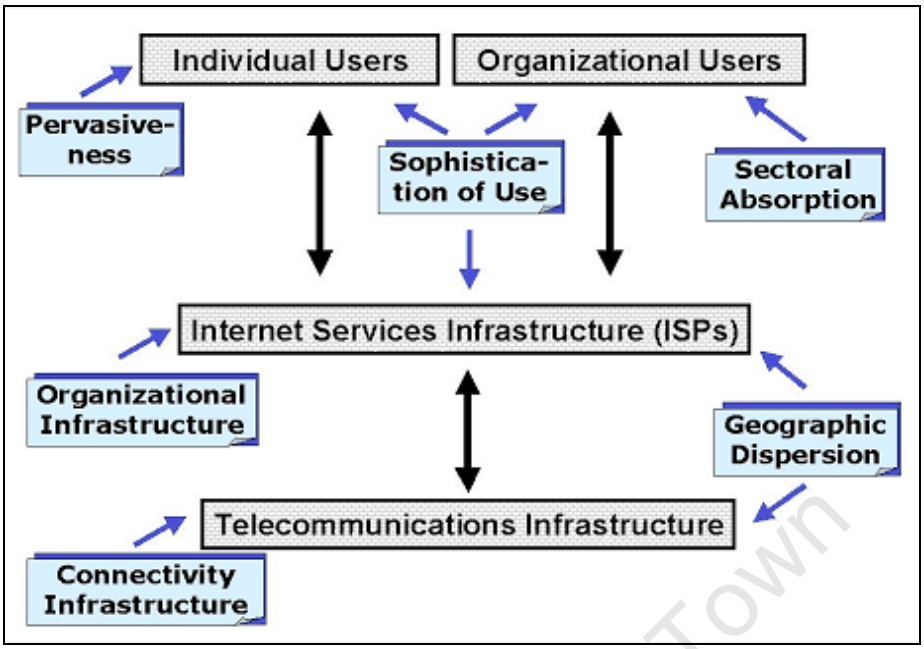

Figure 5.2. Constituents of the Internet Technology Cluster (Source: Wolcott et al, 2001)

Arguably, the six dimensions cover all aspects that may be of interest when measuring Internet use. Each dimension may be assigned one of five ordinal values ranging from zero (non-existent) to four (highly developed). These levels (Table 5.1) indicate the state of the Internet in a particular country at a given point in time. The GDI framework has been used to analyse Internet diffusion in over 40 countries (Wolcott et al, 2001).

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Table 5.1: levels of the six Internet dimensions

The Pervasiveness of the Internet	
Level 0	***Non-existent***: The Internet does not exist in a viable form in this country. No computers with international IP connections are available. There may be some Internet users in the country; however, they obtain a connection via an international telephone call to a foreign ISP.
Level 1	***Embryonic***: The ratio of users to total population is on the order of magnitude of less than one in a thousand (less than 0.1%).
Level 2	***Established***: The ratio of Internet users to total population is on the order of magnitude of at least one in a thousand (0.1% or greater).
Level 3	***Common***: The ratio of Internet users to total population is on the order of magnitude of at least one in a hundred (1% or greater).
Level 4	***Pervasive***: The Internet is pervasive. The ratio of Internet users to total population is on

	the order of magnitude of at least one in 10 (10% or greater).
Geographic Dispersion of the internet	
Level 0	***Non-existent***: The Internet does not exist in a viable form in this country. No computers with international IP connections are located within the country. A country may be using UUCP connections for e-mail and USENET.
Level 1	***Single location:*** Internet points-of-presence are confined to one major population centre.
Level 2	***Moderately dispersed***: Internet points-of-presence are located in multiple first-tier political subdivisions of the country
Level 3	***Highly dispersed***: Internet points-of-presence are located in at least 50% of the first-tier political subdivisions of the country.
Level 4	***Nationwide***: Internet points-of-presence are located in essentially all first-tier political sub-divisions of the country. Rural access is publicly and commonly available.
Organisational Infrastructure of the Internet	
Level 0	***None***: The Internet is not present in this country
Level 1	***Single***: A single ISP has a monopoly in the Internet service provision market. This ISP is generally owned or significantly controlled by government
Level 2	***Controlled***: There are only a few ISPs and the market is closely controlled through high barriers to entry. All ISPs connect to the international Internet through a monopoly telecommunications service provider. The provision of domestic infrastructure is also a monopoly
Level 3	***Competitive***: The Internet market is competitive. There are many ISPs and low barriers to market entry. The provision of international links is a monopoly, but the provision of domestic infrastructure is open to competition, or vice versa.
Level 4	***Robust***: There is a rich service provision infrastructure. There are many ISPs and low barriers to market entry. International links and domestic infrastructure are open to competition. There are collaborative organizations and arrangements such as public exchanges, industry associations, and emergency response teams.
Sophistication of Use of the Internet	
Level 0	***None***: The Internet is not used, except by a very small fraction of the population that logs into foreign services
Level 1	***Minimal***: The user community struggles to employ the Internet in conventional, mainstream applications
Level 2	***Conventional***: The user community changes established practices somewhat in response to or in order to accommodate the technology, but few established processes are changed dramatically. The Internet is used as a substitute or straightforward enhancement for an existing process (e.g. email vs. post). This is the first level at which we can say that the Internet has "taken hold" in a country.
Level 3	***Transforming***: The use of the Internet by certain segments of users results in new applications, or significant changes in existing processes and practices, although these innovations may not necessarily stretch the boundaries of the technology's capabilities.
Level 4	***Innovating***: Segments of the user community are discriminating and highly demanding.

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	These segments are regularly applying or seeking to apply, the Internet in innovative ways that push the capabilities of the technology. They play a significant role in driving the state-of the-art and have a mutually beneficial and synergistic relationship with developers.

Connectivity Infrastructure of the Internet

		Domestic Backbone	International Links	Internet Exchanges	Access Methods
Level 0	Nonexistent	**None**	**None**	**None**	**None**
Level 1	Thin	**<= 2 Mbps**	**<= 128 Kbps**	**None**	**Modem**
Level 2	Expanded	**> 2Mbps -200 Mbps**	**> 128 Kbps - 45 Mbps**	1	**Modem 64 Kbps leased lines**
Level 3	Broad	**> 200 Mbps - 100 Gbps**	**> 45 Mbps - 10 Gbps**	**More than 1; Bilateral or Open**	**Modem > 64 Kbps leased lines**
Level 4	Extensive	**> 100 Gbps**	**> 10 Gbps**	**Many; both Bilateral and Open**	**< 90% modem > 64 Kbps leased lines**

Sectoral Absorption of the Internet

Sector	**Minimal (1 point)**	**Medium (2 points)**	**Great Majority (3 points)**
Academic	0% -10% have leased line Internet connectivity	10% -90% have leased line Internet connectivity	90% have leased line Internet connectivity
Commercial	0% - 10% have leased line Internet connectivity	10% - 90% have leased-line Internet connectivity	90% have leased line Internet connectivity
Health	0% - 10% have leased line Internet connectivity	10% - 90% have leased-line Internet connectivity	90% have leased line Internet connectivity

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Public	0%-10% Have Internet Servers	10% - 90% have Internet Servers	90% have Internet Servers

Sectoral Absorption of the Internet Scale

Sectoral Point Total	Sectoral Absorption	Dimension Rating
0	Level 0	Non-existent
1-3	Level 1	Rare
4-6	Level 2	Moderate
7-9	Level 3	Common
10-12	Level 4	Widely Used

These dimensions reflect the full cluster of constituent technologies from the telecommunications infrastructure to the various user applications available directly over the telecommunications infrastructure or through the various 'proxies' such as Internet Service Providers, Applications Service Providers, etc. While the robustness of the GDI framework is evident in the clustering of various technologies, the framework is also parsimonious given the relatively few number of dimensions for mapping the diffusion of the Internet. This feature however does not make it inadequate as a framework for assessing complexity of underlying conditions of diffusion as is reflected in the discrete values from less to more ordered values along' the dimensions. The succinctness of the dimension values, and their breath should enable some form of replication with minimal variance in the findings.

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5.2.2 GENERIC GDI DETERMINANTS OF INTERNET DIFFUSION

The GDI also relies on determinants as proximate causes of how the Internet is diffusing (Table 5.2). However, there is no specific theory that can be linked to these determinants except that there are studies that have been undertaken to highlight their subtle link to NSI (Nelson, 1999; Porter, 1998). This has been attributed to a lack of a fully developed theory of NSI (Edquist, 1997). An understanding of the determinants of Internet diffusion is used to provide reasons why Internet diffusion is the way it is.

The GDI determinants pinpoint certain central elements of Rogers' diffusion of innovation model: the innovation/technology cluster's characteristics, adopters and adoption decisions, and the surrounding social/economic/regulatory system. These are reminiscent of innovations

characteristics such as relative advantage, compatibility, trialability and observability (Rogers; 2003)

The next section presents the results of the data analysis. The starting point is to provide a summary of the Internet diffusion on a Kiviat diagram and a summary of the possible determinants responsible for the dimension levels. A discussion on how these determinants have influenced the magnitude of the GDI dimensions follows.

Table 5.2: Determinants of Internet Diffusion (Wolcott et al., 2001)

Qualities of the technology itself	
1. Perceived value	Value the Internet provides.
2. Ease of use of the Internet	looking at literacy and availability of local-language content
3. Cost of Internet access	Entails looking at Internet costs (dial-up, ISP, etc.) relative to income levels
Inter-relationships within the technology cluster	
4. Access to constituent technologies	Looks at the balance between all the technologies that must be present for various levels of use
5. Demand for capacity, multiplicity of ISPs, services provided	How demand at various levels of the cluster is driving the connectivity infrastructure development
External/surrounding forces	
6. Geography	How physical geography influences Internet development
7. Adequacy and fluidity of resources	A broad category considering financial, informational, human, technological or capital, and material resources and the ease with which they can flow from where they are to where they are needed
8. Ability to execute	The ability to develop a sound strategy and a suitable design given opportunities and constraints, and the ability to manage plans through to completion
9. Culture of entrepreneurship	How entrepreneurship is rewarded
10. Regulatory/legal framework	Specific laws and regulations influencing Internet diffusion
11. Forces for change	Include competitive environment, presence of demanding domestic customers, rate of creation of new organisations, presence of champions

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12. Enablers of change	Conditions that allow a community to accept and incorporate change, including institutional, historical, cultural, and educational factors

5.3 ANALYSIS OF INTERNET DIFFUSION IN KENYA

The GDI framework advocates a qualitative approach since it recognizes that adoption of innovations is a multifaceted phenomenon that takes place in a variety of ways over time (Wolcott et al, 2001). The qualitative approach does not constrain the analysis to any predetermined variables. The researcher can gather data from many diverse sources. Below are some of the sources, recommended by Wolcott et al (2001), which this study relied on:

- Collecting any available data from existing sources, including other studies, press reports, net-based collections methods, etc.
- Collecting primary data from the Internet/WWW itself. For example, surfing web pages of ISPs can be quite helpful
- Opinions from stakeholders in the industry
- Information from ISP's and communications providers
- Interviews with various stakeholders of the telecommunications sector.

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The category of interviewees included Internet cybercafé users to understand their use characteristics; interviews with ISP representatives on their perspectives on the liberalization process and an interview with a representative of the Kenya Education Network on academic sector Internet connectivity.

The Kiviat diagram (Figure 5.3) summarizes the analysis of Internet diffusion in Kenya for 2008 and is discussed in more detail below.

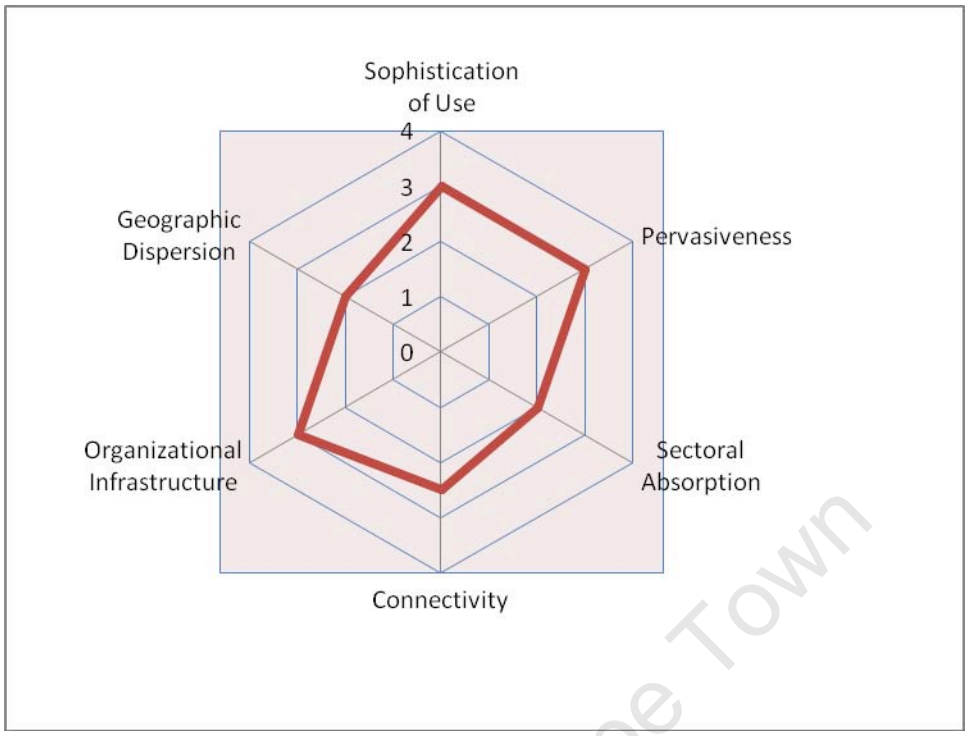

Figure 5.3. Kenya-Internet Diffusion (2008).

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The possible determinants relevant to Kenya that have had the greatest impact by June 2008 are presented in Table 5.3 and are used to explain the various GDI levels of the Kiviat diagram. The analysis and discussions are structured around the six dimensions in the following order: pervasiveness; geography; sectoral absorption; connectivity infrastructure; organizational infrastructure and sophistication of use.

Table 5.3. Determinants of Internet Diffusion in Kenya

Determinant	Sources	References
Forces of Change (*"change"*)	ISP knowledge transfer from Diaspora since 1990s and demand for services from the commercial sector organizations	Interviews[a] with ISPs; [Muiruri, 2004]
	Appointment of competent Minister and Permanent Secretary in charge of ICT since 2004; Establishment of the Ministry of ICT	Personal observations and interviews
	Civil Society campaigns against monopoly in the Telecommunications Sector since the early 1990s and broader push for political democratization impacting on competition	[Muiruri, 2004]

	Changing Market Structure (supply-side and demand-side); Pervasiveness of Mobile Telephony with mobile connections surpassing fixed lines;	[CCK, 2008a]
Regulatory/Legal Framework (*"regulations"*)	Kenya Communications Act No. 2 (1998), which liberalized the telecommunications sector. Results in Multi-Operator structure since 1999.	[Mudavadi, 2001]
	A weak consumer protection regime that is not practically enforceable by Communication Commission of Kenya (CCK). For instance CCK balked on implementing their recommendation for a maximum ceiling rate for interconnection charges between networks.	[Kui, 2007]
Ability to Execute (AE) (*"execution"*)	By April, 2008, there was still no Second National Operator even though exclusivity for Telkom ended in 2004. Players decry poor services from Telkom	[CCK, 2008a]
	Accelerated Private-Public Sector Partnerships	[CCK, 2007]
	Withdrawal of the Kenya Communications Amendment Act, 2007 indicates an inability to speedily execute policy mandate	[Kenya Law Reports, 2007]
	Long' delays in implementation of communications infrastructure projects that can positively impact on Internet diffusion. For instance, East African Submarine Cable System (EASSy) project was to start in 2002 and managed to take off after five years. Delays were largely based on project design and ownership.	[CCK, 2008]
Culture of Entrepreneurship (CE) (*"entrepreneur-ship"*)	There were 72 Kenyan owned ISPs in 1999 only 15,000 users. To date there are 51 ISPs. Africa Online was first Pan African ISP started by Kenyans	[CCK, 2008]
	Changing Market Characteristics	[Okuttah, 2008]
	Large ISPs have remained able to attract capital while small ISPs remain less profitable; mobile companies are profitable	Observations
	As at 2002, there were over 200 cyber cafes even though leased line costs were prohibitive.	www.mulonga.net; analysis
	Kenyan-based innovations such as M-Pesa, using the Telecommunications infrastructure for E-Cash;	www.safaricom.co.ke
Adequacy and Fluidity of Resources (AFR) (*"resource"*)	Setting up of the Ministry of ICT has improved mobilization of resources towards telecommunications, other bodies National Communications Secretariat, ICTPark.com, ICTVillage.com, Kenya ICT parastatal, are all geared towards development of ICT in Kenya.	Observations and interviews
	Increased Foreign Direct Investments	[CCK, 2008a]
	Private sector resource mobilization for Infrastructure development such as national fiber optic backbone for free Broadband Internet by Kenya Data Networks and Siemens; others are the TEAMS project	[Kola, 2007]
Cost of Internet Access (CIA) (*"costs"*)	Costs are falling, but are still prohibitively high for many; additionally, unemployment is over 40% thus Internet is not priority	Observations

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	Uncontrolled software piracy has initially provided some buffer to 'real' Internet usage costs	Observations, press reports
Perceived Value of the Internet (PVI) ("*value*")	*Organizational Value*-Public Sector and SME firms slow uptake; commercial sector pioneers	[Mureithi, 2005]; [USAID,2006]
	Applications: Also, e-commerce use may still be low due to factors such as low credit card penetration, lack of awareness as well as infrastructural problems	[Kinyanjui and McCormick,2002, Muganda, N. & Van Belle, J., 2007].
	Individuals: E-Mail (59%); lifestyle (12%); Career Planning (6%); Religion (5%); Business (5%); other lifestyle interests: pornography; chatting. There is some increased use of the Internet for investments such as Safaricom IPO. Thus going beyond entertainment.	[Mulonga,2003]; Interviews
Ease of Use of Internet (EUI) ("*Ease of Use*")	Based on new tests, adult literacy (62%); Literacy in Nairobi (87%); Literacy in North Eastern (8%); Rural (55%); Urban (80%); Desired Mastery Level (30%)	[Kilele,2007]
	Low Computer Literacy (10-15%)	[Håndværksrådet, 2006].
	Digital Content language is predominantly English; Sites now emerging which use local languages	Observations
Access to Constituent Technologies (ACT) ("*Constituent Technologies*")	ICT Costs prohibitive, but initiatives such as Madaraka Computer expected to impact positively	Various sources
	Wireless to wire line technologies such as CDMA are increasing; Wireless technologies becoming more accessible.	Various sources
	Low Electricity Penetration (15%) overall; Rural (4%)	Kestrel Capital; [KPLC, 2007]
Demand for Capacity; Multiplicity of ISPs and Services (DCMS) ("*demand*")	Poor service from the national telecommunications operator has higher costs for ISPs leading to formation of Internet exchange; poor services from ISPs lead to the formation of several consumer groups and CCK complaint resolution; mushrooming of end-user organizations for quality service demands	Interviews, CCK.
Enablers of Change ("*Enablers*")	Quest for democratization fuels the need for liberalization of telecommunications	[Muiruri,2004]

a: Appendix 5.1 gives an extract of some interview sources.

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5.3.1. INTERNET PERVASIVENESS

Kenya's Internet population accesses the Internet at cyber cafes, at work, in academic institutions, at home and much more recently through mobile phones. Table 5.4 summarizes the

source data that was used to calculate the required percentage for measuring pervasiveness. These statistics reflect three data sets: prior to 1998, the CIDCM Report; between 1998 and 2004 data from the CIA (1999 to 2005) Fact Books were used; for the years 2005-2006, the research relied on data from the Government of Kenya (CCK, 2008). There are some differences in assumptions between the different datasets. Data must be treated as approximate and year-on-year growth rates when changing data sources are somewhat suspect. The 2008 population estimate assumes a natural rate of growth of 2.85% based on statistics provided by the Central Bank of Kenya [www.cbk.go.ke] and the United Nations World Population Prospects (UN-WPP, 2008).

Table 5.4. Internet Penetration Estimates (1995-2008)

Year	Approx Users	Growth Rate	Approx Population	% of Population
1995[a]	100		24,000,000	<0.01%
1996[a]	10,000	9900%	25,000,000	0.04%
1997[a]	25,000	150%	26,000,000	0.10%
1998[a]	50,000	100%	27,000,000	0.19%
1999[b]	70,000	40%	28,686,607	0.24%
2000[b]	100,000	43%	30,202,564	0.33%
2001[b]	200,000	100%	30,849,933	0.65%
2002[b]	400,000	100%	31,491,130	1.27%
2003[b]	1,000,000	150%	32,125,315	3.11%
2004[b]	1,054,920	5%	32,751,523	3.22%
2005[b]	1,111,000	5%	33,368,802	3.33%
2006[c]	2,770,296	149%	33,947,066	8.16%
2007[d]	3,300,000	19%	37,538,000	8.79%
2008	3,500,000[e]	6%	38,550,000[e]	9.08%

(Sources: (a) CIDCM Report, August 1998; (b) Telkom; (c) CCK(2007); (d) Projection; (e) UN(2008).

The forecast for 2008 assumes that initiatives by the government, the private sector, and other stakeholders since the start of the year will lead to increases in mobile and non-mobile Internet use. Thus, the proportion of the total population with Internet access by mid 2008 is estimated at 9.1%. This shows that Kenya is at level three of pervasiveness (Table 5.5). This may partly be attributed to the regulatory and legal (*regulations*) reforms that have been undertaken since 1999. Key triggers were the unbundling of KP & TC as a monopoly through the enactment of the Kenya Communications Act in 1998 as well as better enforcement of license regulations

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(*execution*) and operational independence of CCK since the 2004 that led to the high increase in number of users in 2006. The reforms that have been undertaken resulted in a 2006 growth rate of 149%. The key driver for the reform efforts may be the sustained pressure from the civil society and political opposition to monopoly of government parastatals over the years (*change*).

Table 5.5. Pervasiveness of the Internet in 2008

Level 0	Non-existent. The Internet does not exist in a viable form in this country. No computers with international IP connections are located within the country. There may be some Internet users in the country; however, they obtain a connection via an international telephone call to a foreign ISP.
Level 1	Embryonic. The ratio of Internet users per capita is on the order of magnitude less than one in a thousand (less than 0.1%).
Level 2	Nascent. The ratio of Internet users per capita is on the order of magnitude of at least one in a thousand (0.1% or greater).
Level 3	Established. The ratio of Internet users per capita is on the order of magnitude of at least one in a hundred (1% or greater).
Level 4	Common. The ratio of Internet users per capita is on the order of magnitude of at least one in ten (10% or greater).

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In addition, the introduction of the Internet in Kenya has mostly been spurred by initiatives from the commercial sector rather than the Government or education sector. This was noticeable by the large number of ISPs (78) setup with the intention of taking advantage of the Internet boom, a fact which maybe attributed to a strong entrepreneurial culture amongst Kenyans (*entrepreneurship*). For instance, Africa Online (initially Karisi Communications) was setup in 1994 and boasts a presence in 8 countries in Africa were setup by three Kenyans (Ayisi Makatiani, Amolo Ng'weno and Karanja). Nairobinet Ltd was also setup in 1997 by Sammy Buruchara, former employee of a local computer firm and is has been the third largest ISPs for many years. The ownership of the ISPs can therefore be used as an indicator of entrepreneurship.

Despite the positive trends of Internet growth depicted, the Internet is still among the least accessible telecommunications services because only 35 out 78 licensed ISPs are operational (CCK, 2008a). According to an Internet Market study by CCK in 2006/2007, this state is largely attributed to low literacy levels, lack of infrastructure and lack of relevant local content (CCK, 2007; Eldon, 2005). The total costs (connectivity, equipment costs, maintenance) of Internet access (*costs*) also remain high, despite continued drop in both bandwidth costs and connections costs to end users arising government efforts of zero rating duty on the personal computers and

creating an enabling environment for industry competitiveness (PCs) (Eldon, 2005). When the dropping costs are considered in light of a more than 50% poverty incidence in Kenya, lower costs may not have contributed significantly to this growth, except to infer that many Kenyans have been realizing the *value* of the Internet in relation to more costly and less efficient substitutes such as postal services.

Therefore, the key determinants that played a role in enhancing the pervasiveness of the Internet in Kenya in its nascent years (1999-2008) are primarily those related to *regulation, execution,* increasing perception of *value and entrepreneurship*. Determinants related to *costs* and *execution* has slowed down the pervasiveness of the Internet over this period.

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5.3.2 INTERNET GEOGRAPHIC DISPERSION

Geographic dispersion measures the physical dispersion of the Internet within a country. The dimension looks at the number of Internet points of presence (POPs) in the first-tier political subdivisions (Wolcott et al, 2001). An Internet point of presence is taken to mean the physical presence of an ISP or a public data network operator (PDNO) in the first-tier political unit (Wolcott et al, 2001). The PDNO re-sells bandwidth to the ISPs or directly to large organizations. The presence of PDNOs allows Internet access using local calls to the telephone exchanges.

Kenya's first-tier political subdivision is the province. However for the sake of this analysis, there was need to consider other factors in determining the unit to be used for analyzing this dimension. For instance, Kenya has 72 administrative districts (considered as the third tier), each serving an average of 550,000 people. The telephone exchanges for dial-up access are district-based, not based per province. By contrast, there are only eight provinces translating into an average of 4.8 million citizens per province. Thus an Internet user has to dial a district exchange for access. In addition, Kenyans mostly rely on administrative districts and rarely on provincial districts. This analysis therefore considered the district as the first-tier political sub-division. Table 5.6 provides the statistics on the status of Internet POPs in Kenya.

Table 5.6. Presence of the Internet in Provinces & Districts

Licensee Category	Districts	Provinces	% of districts
ISP (Internet Service Providers)	20	8	28.57%
LLO (Local Loop Operators)	2	2	2.86%
PDNO (Public Data Network Operator)	33	7	47.14%
VSAT	57	8	81.43%

(Source: CCK, 2008b)

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Despite Internet presence in all the eight provinces, only 50% of the districts have an Internet presence. Based on the GDI framework, Kenya therefore is at level 2 since there are multiple Internet points of presence (Table 5.7). Given that fixed telephony has traditionally considered as a critical infrastructure for Internet access, the spread of the infrastructure was regarded as also critical in giving an indication of the geographic spread of the Internet.

Table 5.7. Geographic Dispersion of the Internet in 2008

Level 0	***Non-existent.*** The Internet does not exist in a viable form in such a country. No computers with international IP connections are located within the country. A country may be using unix-to-unix copy protocol (UUCP) connections for e-mail and USENET (this is a widely distributed online bulletin board which consists of thousands of online forums on any topic its users could dream up).
Level 1	Single location. The Internet points-of-presence (POPs) are confined to one major population centre.
Level 2	Moderately dispersed. Internet points-of-presence are located in multiple first-tier political subdivisions of the country.
Level 3	Highly dispersed. Internet points-of-presence are located in at least 50% of the first-tier political subdivisions of the country.
Level 4	Nationwide. Internet points-of-presence are located in essentially all first-tier political subdivisions of the country. Rural access is publicly and commonly available.

According to available statistics for 2007, urban areas have a total of 243875 fixed lines compared to 26668 available in the rural areas (CCK, 2008). 81% of the urban fixed lines are in the four major towns of Nairobi, Mombasa, Nakuru and Kisumu. Considering that more than 80% of the population lives in the rural areas, and even for those who are in the urban areas, 71% are poor slum dwellers (PRB, 2008) who may not prioritize Internet use.

To speed up the installation of fixed line connectivity, CCK licensed 10 local loop operators (LLOs) in 2002 to aid in installation of last mile telephone infrastructures to the national operators' exchanges (CCK, 2008). However, out of those licensed 10 LLOs, only two are operational in two districts. Out of the 78 ISPs licensed, only 35 are currently operational, which limits the national Internet coverage.

CCK's continuous execution of its mandate by licensing more operators (*regulation*) and enforcing licensing conditions has increased the level of competitiveness and forced some of the operators to be based in the rural areas (*execution*). However despite notable positive trends, the lack of a developed venture capital system for entrepreneurs interested in investing in the underserved rural and urban areas be hampering rapid development of the physical infrastructure of the Internet by the licensed operators (*resources*). There are also low levels of electricity penetration with only 15% of the population having access to electricity (KPLC, 2007). The physical infrastructure condition, when linked to the low level of electricity penetration, is thus unfavorable to dispersion since power is a requirement for the constituent technologies of the Internet (*constituent technologies*). This further works to discourage investments by licensed operators and may partly point to an inability of the government (through CCK) to craft a strategy for overcoming this bottleneck (*execution*).

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5.3.3 INTERNET SECTORAL ABSORPTION

The dimension of sectoral absorption assesses the extent of Internet diffusion in the academic, commercial, health and public sectors (Wolcott et al, 2001). It assesses the proportion of all organizations in each sector that has leased lines. The GDI framework uses IP connectivity as the base measure of the dimension as described in Table 5.8. Leased line connectivity or the

presence of hosted/co-hosted Internet servers are used as its metrics; because buy-in to these technologies indicates a high level of use of, and serious commitment to, the Internet by an organisation.

Table 5.8. Base Measures - Sectoral Absorption of the Internet in 2008

Sector	Minimal (1 point)	Medium (2 points)	Majority (3 points)
Academic	0%-10% have leased line Internet connectivity	10%-90% have leased line Internet connectivity	90% have leased line Internet connectivity
Commercial	0%-10% have Internet servers	10%-90% have Internet servers	90% have Internet servers
Health	0%-10% have leased line Internet connectivity	10%-90% have leased line Internet connectivity	90% have leased line Internet connectivity
Public	0%-10% have Internet servers	10%-90% have Internet servers	90% have Internet servers

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The summarized statistics used in this section are based on a market analysis study which was undertaken in 2006/2007 by the Communications Commission of Kenya (CCK, 2008b). According to this study, the Government sector has the highest number of leased lines: 29 % of the total leased lines in the country. The education sector has 1% of the total number of leased lines. The health sector has 17%, the commercial sector accounts for 23%, and other sectors account for 20%. However, these percentages need to be tempered since the overall absorption in learning institution is 12% of all the institutions. The report also highlights that the dial-up status follows a similar pattern to the leased line pattern as captured in Figure 3.4.

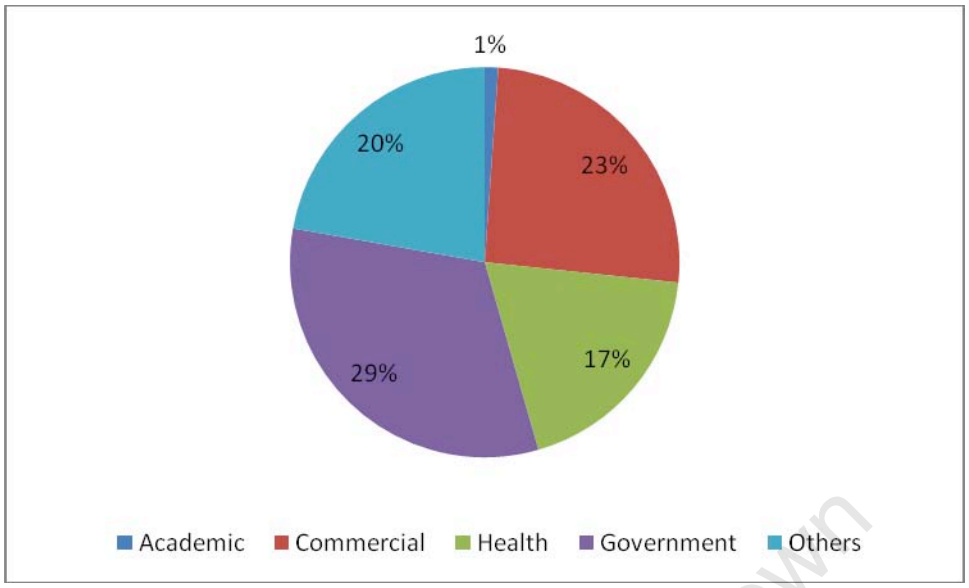

Figure 5.4: Leased Lines Sectoral Absorption

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Based on the CCK [2008b] report, the sectoral absorption is depicted in Table 8. Only CCK [2008b] report was considered because no other comprehensive research has been undertaken, and alternative information proved difficult to obtain or estimate.

The education sector is at a different GDI sectoral absorption level from the other sectors. In contrast to other sectors, the institutions under the Ministry of Education are more widespread since primary and secondary schools are located in all regions of the country. The schools and colleges would require a network infrastructure to support over 10 million students at various levels. The scope of required infrastructure for Internet is much wider than other sectors given the extent of its geographical mandate. The required infrastructure is largely absent, given that many areas lack electricity. The country has 19,890 primary schools and 4000 secondary schools (CFSK, 2007), but very few have Internet access. The public and commercial sectors are largely in the urban centers where electricity and telecommunications infrastructures exist. Public and commercial organizations in rural areas locate in regions that are served with electricity or have affordable alternative energy sources. The health sector, as with education, also has a wide geographical mandate. However, its use of the Internet is mostly for administrative purposes (Kamar and Ongondo, 2007), so it is assumed to have a lower absorption rate than education.

The CCK (2008b) report relied on data from the ISPs and other backbone providers. However, some educational institutions may not have been included. For instance KENET (backbone provider for learning institutions) provides Internet connectivity higher learning institutions in the country; although some like the University of Nairobi have an ISP license with their own independent leased lines. KENET had a network of only 50 institutions linked to its network in 2007, even though there are over 23000 secondary and primary schools in Kenya, most of which do not have leased line Internet connectivity (Kashorda et al, 2007; MOEST, 2005). The proportion of leased line connectivity available through KENET and the total number of institutions in Kenya is below 1% which means Kenya affords only minimal points in terms of sectoral absorption i.e. 0-10% have leased line Internet connectivity (Table 5.8).

The perceived value of the Internet (*value*) and the availability and fluidity of resources (*resources*) seem to be the likely determinants that have had a positive influence on sectoral absorption status for the commercial, public and health sectors. Internet adoption in Kenya has been driven more by the commercial sector than the other sectors. The introduction and use of the Internet has been commercial-sector driven since 1994. As of 2007, there were a total of 7637 leased line connections, a majority of which were leased to commercial sector organizations (CCK, 2008b). The commercial sector uses 81% of the total bandwidth compared to 1% of the education sector. They have had greater awareness of technological innovations than non-commercial ones. The public sector organizations were the early targets of ISPs when Internet was introduced. Interviews with representatives from the ISP sector indicated that a majority of the ISPs used to offer free Internet to public sector organizations in order to educate officials and encourage them to use the Internet.

A lack of resources (*resources*) and perceived value (*value*) of the Internet inhibited Internet diffusion in the academic and health sectors. The geographic scope of operations of these two sectors is country-wide; providing Internet infrastructure to all their institutions would require great financial, human, technological, and capital resources. To marshal adequate resources, these sectors have had to involve various stakeholders. For instance they have involved multinational corporations (such as Microsoft and Oracle), supra-national organizations (such as the World Bank and UN) and even the commercial sector in Kenya. These partnerships have had

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an impact in creating awareness on the value of the Internet amongst target institutions, but have had minimal impact in extending the reach of Internet connectivity.

Taking into account the results of CCK's (2008a) Internet market study, the estimate of the overall sectoral absorption is moderate, as shown in Table 5.9.

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Table 5.9. Sectoral Absorption of the Internet in 2008

Sectoral Point Total	Sectoral Absorption	Dimension Rating
0	Level 0	Non-existent
1-3	Level 1	Rare
4-6	Level 2	Moderate
7-9	Level 3	Common
10-12	Level 4	Widely Used

5.3.4 INTERNET CONNECTIVITY INFRASTRUCTURE

Connectivity infrastructure refers to the extent and robustness of the physical structure of the network and is measured by the aggregate bandwidth of the domestic and international backbones, the number and type of inter-connection exchanges, and the type and sophistication of local access methods being used (Wolcott et al., 2001). Kenya is at level 3 in 2008 as indicated by the shaded portion of Table 5.10 based upon the analysis that follows. The growth of total international bandwidth over the years is shown in Table 5.10.

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Table 5.10. Connectivity Infrastructure of the Internet as of 2008

Level		Domestic Backbone	International Links	Internet Exchanges	Access Methods
Level 0	Non-existent	None	None	None	None
Level 1	Thin	<=2 Mbps	<=128 Mbps	None	Modem
Level 2	Expanded	2 Mbps-200 Mbps	128 Kbps- 45 Mbps	1	Modem 64 Kbps leased line
Level 3	Broad	200 Mbps-100 Gbps	45 Mbps-10 Gbps	More than 1; bilateral or open	Modem 64 Kbps leased line
Level 4	Extensive	100 Gbps	10 Gbps	Many; both bilateral and open	<90% modem or 64 Kbps leased line

5.3.4.1 International Links

CCK has licensed 22 data carrier network operators who have licenses to operate commercial very small aperture terminal services (VSAT) and Internet backbone gateway services. Table 5.11 shows a remarkable increase in aggregate bandwidth between 2005 and end of 2007. Kenya's aggregate bandwidth is approximately 485 megabits (CCK, 2008a). This places Kenya at level 3 of the GDI framework since 485 falls between 45 megabits per second and 10 gigabytes per second. CCK links the increase in bandwidth usage to increased investments in the sector (*resources*) due to greater demand for innovative provision of data services by ISPS (*demand*) (CCK, 2008) and also due to a modest increase in the perception in the value of the Internet by consumers (*value*) (Kui, 2008).

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Table 5.11. International gateway bandwidth

Gateway Options	2003/2004	2004/2005	2005/2006	2007/2008
International gateway downlink bandwidth (Mbps)	84.91	89.89	100.96	337.18
International gateway uplink bandwidth (Mbps)	26.20	70.28	73.47	147.14
International gateway total bandwidth (Mbps)	111.10	223.38	174.43	485.14

Source: Internet Market Study (CCK, 2008a)

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5.3.4.2 Internet Exchanges

Prior to 2002, no Internet exchange point existed in Kenya, and all traffic, local or international, would be routed by network providers outside the country. The state monopoly, Telkom, handled all traffic through its subsidiary Jambonet. Due to pressure from the Telecommunications Service Providers Association of Kenya (TESPOK), the regulator (CCK) granted a license to the Kenya Internet Exchange Point (KIXP) in 2001 (GIPI, 2004). KIXP started operations in February 2002.

As of September, 2007, 23 out of the 51 active ISPS were members of KIXP. A second IXP, Alma Limited, was licensed in 2006 but was not operational at the time of this writing. When KIXP began services in 2002, six ISPs were interconnected while eight were on the waiting list (KIXP, 2007). KIXP's members actively exchange domestic traffic and, improving internal traffic. TESPOK estimates that 30% of upstream traffic (229 Mbps) is to a local destination. The impact of allowing local peering through the Internet exchanges has seen reduced bandwidth costs for ISPS (table 5.12)

Table 5.12. Bandwidth Charges to ISPs (Source: CCK, 2008a)

Bandwidth	2005 (US$)	2006 (US$)	2007 (US$)
32K Leased Line	262	227	192
64 K Leased Line	536	460	384
128 K Leased Line	968	878	768

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The pressure for Internet exchanges stemmed from prohibitive bandwidth costs that ISPs were charged by international satellite providers. This result was the licensing of the Internet exchange point and a restructuring of the licensing regime to provide more options for ISPs in providing connectivity to consumers (*regulatory*). Despite the positive changes, 80% of Kenya's Internet traffic is still routed via expensive satellite connections (*costs*) (Kui, 2008). The positive improvements on this GDI dimension can therefore be linked to pressure from for better services (*demand*) by ISPs, even as costs of Internet service provision remain prohibitive (costs) due to over-reliance on satellite links.

5.3.4.3 Domestic Backbone

Despite having a liberalized telecommunications market, the domestic backbone Internet infrastructure in Kenya has been dominated by Telkom Kenya, the national landline operator. In 2004, the Government regulator licensed three more firms to offer domestic backbone service, which have been operational since: Kenya Data Networks, UUNET and Jamii Telecom. By 2008, eight firms had received a license to offer Internet backbone services.

Data on domestic traffic is difficult to come, however given that 80% of Internet is routed internationally, the remaining 20% translates to roughly about 97 Mbs being transferred through

local peering as at 2007 (table 5.11). This places Kenya in level 2 of the GDI framework. While it was expected that the setup of an Internet exchange in Kenya would result in higher local traffic switching, lack of trust amongst service providers and costs of network infrastructure required to link to the IXP are disincentives for collaboration [ISOC, 2007]. The necessary conditions for encouraging domestic peering are still inadequate to optimize the value from keeping domestic traffic local (*enablers*). However, the continued licensing of more industry players is acting as a catalyst for changes in how the market is structured in Kenya for the benefit of the industry players (*regulation* and *demand*).

5.3.4.4 Access Methods

The access methods measure reflects the percentage of users that use modems to access the Internet and the proportion of 64k Leased Lines in use. Kenyans have the option of accessing the Internet using either modems with dial-up connections or the leased lines. Dial-up connections are available through both fixed telephone lines as well as Code Division Multiple Access (CDMA) technology introduced in Kenya in late 2005.

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Three operators provide CDMA wireless access technology: Telkom Kenya, Popote Wireless and Flashcom. Other operators plan to offer a wireless option as a business strategy to remain competitive in the increasingly liberalized telecommunications market. By some estimates 400,000 new Internet users will rely on the wireless option in the first half of the year 2008 (Kinyanjui, 2008). Many Kenyans opt for CDMA as equipment costs drop and coverage extends throughout the country. Currently, the coverage by Telkom is limited to 50 Kilometres of the major urban centres of Nairobi, Kisumu, Nakuru, Eldoret, Mombasa, and Nyeri.

By some analyses, the four major ISPs combined have over 400,000 dial-up connections. According to Telkom Kenya, Internet access is available through either the 64/128/256 Kbps leased lines or through the 64 Kbps dial-up accounts. Home users in Kenya mainly choose the option of the dial-up accounts or the wireless option because they are less expensive than leased lines. The leased line market is dominated by four Internet Gateway and Backbone Operators (IBGOs). Data collected from the IBGOs indicate that they have 7637 customers on leased lines

while 17,737 customers are on dial-up accounts (CCK, 2008a). This proportion of users on dial-up accounts, as an indicator of customers using modems, is approximately 70% of the total Internet user population. While there are a number of corporate customers on more than 64Kbs bandwidth, the bigger proportion of customers have connections of 32Kbs and 64Kbs. Kenya can be placed at level 2 (table 5.13) since more than 70% of ISP customers use dial-up modems and those on leased lines purchase bandwidth capacity of less than 64Kbs.

Table 5.13. Connectivity Infrastructure (2008)

Connectivity Option	Level
Domestic Backbone	Level 2
International Links	Level 3
Internet Exchanges	Level 3
Access Methods	Level 2
Overall	Level 2.5

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In summary, the determinants that have played a role in positively influencing the connectivity infrastructure dimensions of the GDI framework are grouped under *value*, *demand*, *regulations* and *resources*. As the Internet sector becomes more competitive due to the licensing of operators by CCK (regulations), ISPs look for efficient ways fulfilling demand for Internet services. For instance, the prohibitive costs of Internet access for ISPs influenced the 'struggle' to have a local Internet exchange point (*demand* at the operator level), while continued modest increases in perception of *value* by users fuels consumer *demand*. The result is increased investments in the Internet sector (*resources*).

Despite the positive influencers above, the CCK as the regulator has failed to create the necessary conditions for the operators (*enablers*). The struggle to have an Internet exchange point in the year 2000 and its subsequent shutdown by CCK illustrated that the regulator failed to recognize that having a peering mechanism can only lead to development of the Internet. The *costs* of Internet access as still high, even though there is a general trend that shows they have been reducing over the years (CCK, 2008a). The connectivity infrastructure as shown above is

still relatively underdeveloped in terms of domestic backbone, international links, access methods and Internet exchange points.

5.3.5 INTERNET ORGANIZATIONAL INFRASTRUCTURE

The Organisational Infrastructure dimension provides a measure of the competitiveness of the market for Internet and telecommunications services (Wolcott et al, 2001). Table 5.14 provides an overview of the Organisational Infrastructure dimension and the characteristics of the different levels. Kenya is at level 3 in 2008.

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Table 5.14. Organizational Infrastructure of the Internet in 2008

Level 0	None. The Internet is not present in this country.
Level 1	Single. A single ISP has the monopoly in the Internet service provision market. The ISP is generally owned or significantly controlled by the government.
Level 2	Controlled. There are a few ISPs and the market is closely controlled through high barriers to entry. All ISPs connect to the international Internet through a monopoly telecommunications service provider. The provision of domestic infrastructure is also a monopoly.
Level 3	Competitive. The Internet market is competitive. There are many ISPs and low barriers to market entry. The provision of international links is a monopoly, but the provision of domestic infrastructure is open to competition or vice versa.
Level 4	Robust. There is a rich service provision infrastructure. There are many ISPs and low barriers to market entry. International links and domestic infrastructure are open to competition. There are collaborative organizations and arrangements such as public exchanges, industry associations, and emergency response teams.

The development of a competitive market sector can be traced to the early 1990s when Kenya was a one party state under President Moi whose government was faced with a lot of international and local pressure to open up democratic space in the country (Muiruri, 2004). The pressure was in the form of aid cuts for budgetary support as well as increasing agitation for reinstatement of democracy. Government agencies, such as the former Kenya Posts and Telecommunications (KP& TC), were under pressure from the government to rationalise their existence by generating revenue for the government. Thus beginning of the restructuring process in 1999 can be traced to the larger democratic processes that were underway since the early 1990s.

Another trigger to the development of a competitive market sector can also be traced to the influence of early Internet entrepreneurs who came with the knowledge from the developed world (*entrepreneurship*). Kenyans who were returning from their studies in the US and UK established the first three ISPs. Dr. Shem Ochuodho started African Regional Center for Computing (ARCC) with support from the British Overseas Development Fund. Africa Online was started by two former MIT graduates and a Princeton graduate. Form-net Africa was started by Nazim Njani who returned from United Kingdom. Africa Online obtained funding from Prodigy Inc while Form-net Africa had financial backing from a politician who was pro-government at that time (Muiruri, 2004). The regulations that have been instrumental (Table 5.15) in influencing the development of organizational infrastructure should therefore be seen from these two triggers: larger democratization processes since early 1990s (*change*) as well as the influence of commercial sector entrepreneurs in the introduction of the Internet (*entrepreneurship*). Some of the highlights of the regulations are discussed below.

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Table 5.15. Critical Regulations influencing organizational infrastructure

Government Regulation	Year	Reference
Restructuring of the telecommunications sector	1998	[Mudavadi, 2001]
Adoption of universal service provision as a strategy for achieving infrastructure goals	2004	[www.cck.go.ke]
Licensing of Local Loop Operators at the end of Telkom's exclusivity period	2004	[CCK, 2008a]
Consolidation of general international data licenses into one	2005	[CCK, 2007]

The restructuring of the telecommunications through the crafting and adoption of the Kenya Communications Act 1998 created a multi-operator market structure formally under the monopoly of KP & TC. The act provided Telkom exclusivity in the provision of national fixed telephony as well as international gateway services up to 2004. The move has since been instrumental in revitalization of the telecommunications sector through the continued licensing of more sector players, development of a competition policy sector and liberalization policy for the sector (Mudavadi, 2001). The number of registered ISPs increased from 3 in 1996 to peak at 40 by mid July of 1999 due to activities that followed the restructuring of the sector in 1998.

CCK has continued to focus its regulation of the telecommunications hinged on the need to achieve universal service goals for the Kenyan population. The regulator recognized in 2004 that despite the liberalization of the sector since 1998, access to ICT services is limited to residents of major towns, leaving out the rural areas where 80% of the population live without these services (www.cck.go.ke). The result of a policy focus on universal service provision has resulted in various infrastructure initiatives such as EASSY and TEAMS that has seen increased resource inflows and more participants in the sector. Prospects of profitability of the sector are high as many ISPs continue to extend their services into the rural underserved areas. There are a total of 78 registered ISPs, 35 of which are operational (CCK, 2008a).

The end of Telkom's exclusivity in the provision of Internet backbone services ended in 2004 and efforts to engage a second national operator (SNO) have since failed. However, CCK has ensured there is competition in the provision of Internet backbone services nationally and internationally by licensing of local loop operators as well as allowing ISPs to provide voice over Internet protocol (VOIP) services (CCK,2008a). The licensing of local loop operators resulted in the introduction of code division multi-access (CDMA) as a connection option for those requiring Internet services. Latest reports indicate that fixed wireless/wired CDMA connections account for 193064 users, while mobile connections accounting for close to 12 million users (CCK, 2007). This installed capacity gives an indicator as to the likely influencer of this dimension: that as a result of a high critical mass of potential users requiring Internet services, a requisite number of organizational (ISPs and consumer interest groups) bodies are needed to represent their interests (*demand*).

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CCK has also enhanced its licensing procedures by consolidating international data licenses under a category known as Data Carrier Network Operator (DCNO). Under this category, ISPs were allowed to operate as network backbone service providers as well as provide Internet services under a single licence. However, the requirement is that the ISP cannot compete in the two market segments under a single company name. This move resulted in the registration of 22 DCNOs which resulted in reduced cost of provision of data services due to more competition in the sector (*costs*). Bandwidth costs are on the decline for ISPs who pass on the benefits to the consumers (Table 5.12).

5.3.5.1 ISP Size and Barriers to Entry

Following the 2004 removal of the Telkom Kenya's monopoly clause in both domestic and international telecommunications services many new players in the Internet services market emerged. However, CCK introduced stringent obligations which required ISPs to file returns on an annual basis on whether the ISPs were meeting their service obligations. The subsequent enforcement of this licensing requirement resulted in deregistration of 51 out 72 ISPs that were registered in 2004. Stringent enforcement of licensing obligations by CCK resulted in deregistration of a certain ISPs in 2004. The high number of ISPs (72 in early 2004) point to few entry barriers and perception of high return on investments by entrepreneurs (*entrepreneurship*) but may also point to start-up ISPs' difficulty in attracting resources (*resources*) and increased enforcement of rules by CCK (*regulations*) aimed at ensuring consumer protection contributed to a drop in the number of ISPs. The government realized that growth of the Internet driven by the commercial-sector without the subvention of the government fails to meet public policy goals such as universal service. CCK enforced licensing requirements more stringently, leading to increased operational costs for ISPs (*costs*).

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5.3.5.2 Organizational Bodies

Another measure of competitiveness in the industry is the existence of organizational bodies that lobby for the interests of their members (Wolcott et al., 2001). In Kenya, ISPs collaborate in an association called Telecommunications Services Providers of Kenya (TESPOK). The mission of TESPOK is to be the telecommunications industry's voice by providing policy and direction within the Industry and Government (Southwood, 2007). Since its inception in 1999, TESPOK has been a stakeholder in Government ICT policy making and successfully negotiated for the establishment of KIXP.

In 2002 Kenya formed the Kenya Network Information Centre (KENIC) to manage the registration of domain names. Initially Telkom Kenya and the ISPs handled this task without consulting a central body. Prior to the formation of KENIC, the country level domain (.ke) was administered by an individual based in the USA. This issue was not addressed until the formation

of KENIC. The inference may be that Telkom did not see value in managing the registration of country level domains (*value*).

The Cyber Café owners Association of Kenya was formed to lobby for the interests of its members, particularly for a reduction of the costs charged to them by ISPs and Network Operators. The association works to increase the options of type-approved equipment that cyber café owners can use and to lobby the regulator for lower licence fees. There is evidence that the various organizational bodies are in collaboration to enhance the effectiveness of their lobbying. For instance Southwood (2007) indicates that these organizations have been using media resources and mass persuasion, forcing a policy changes to the betterment of internet users country-wide.

Consumer-oriented organizations also have sprung up since 2006. The Kenya ICT Action Network [www.kictanet.or.ke] was formed as a multi-stakeholder network to help reform the ICT sector in Kenya. The group was instrumental in forming the ICT Consumer Association of Kenya, which aims at institutionalizing consumer protection. Its annual meeting held in May 2007 was inundated with consumer concerns revolving around slow Internet connections as well as high costs of Internet access. CCK is also focused on institutionalizing consumer protection and has set up structures for addressing consumer complaints regarding service quality and costs of access.

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Given that all these bodies enhance the competitiveness of the industry, it might initially be argued that Kenya is at level 4 of the organizational infrastructure of the GDI framework. However, most of the industry associations are still nascent and the regulator still holds power in the sector. There are currently no visible emergency response teams. Kenya can therefore be placed at level 3.

Overall, the positive influences that have been at play on organizational infrastructure are a mix of the entrepreneurial culture (*entrepreneurship*), forces of change (*change*), regulatory and legal processes (*regulations*), *value* as well as reducing *costs* for service provision. However,

resources are still a limiting factor in ensuring more organizations registered to offer services realize their growth goals.

5.3.6 SOPHISTICATION OF USE

The Sophistication of Use dimension evaluates the level of innovation associated with the Internet (Wolcott et al., 2001). Table 5.16 provides an overview of the dimension with the highlighted portion indicating the 2008 level based on the analysis that follows. The analysis on sophistication of use shall focus on individual as well as business use of the Internet.

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Table 5.16. Sophistication of Use as of 2008

Level 0	**None.** The Internet is not used, except by a very small fraction of the population that logs into foreign services.
Level 1	Minimal. The user community struggles to employ the Internet in conventional, mainstream applications.
Level 2	**Conventional.** The user community changes established practices somewhat in response to or in order to accommodate the technology, but few established processes are changed dramatically. The Internet is used as a substitute or straightforward enhancement for an existing process (e.g. e-mail vs. post). This is the first level at which we can say that the Internet has taken hold in a country.
Level 3	**Transforming.** The use of the Internet by certain segments of users results in new applications, or significant changes in existing processes and practices, although these innovations may not necessarily stretch the boundaries of the technology's capabilities.
Level 4	**Innovating.** Segments of the user community are discriminating and highly demanding. These segments are regularly applying, or seeking to apply, the Internet in innovative ways that push the capabilities of the technology. They play a significant role in driving the state-of-the-art and have a mutually beneficial and synergistic relationship with developers.

As early as May 1999, there was e-commerce activity in various sectors. A study conducted by Mureithi (2005) showed that the proportion by sector engaged in e-commerce was: tours and travel (58%), hotel and restaurant services (20%), arts and handicraft (16%), with the rest in sectors such as agriculture, shipping and manufacturing (Mureithi, 2005).Definite figures are difficult to obtain as to the overall level of e-commerce activity in Kenya. Another study by Muganda and Van Belle (2007) examined e-commerce activity in Kenya for the period 2001 to

2005. The results indicated that firms were using the Internet for business in various ways. Some used it for organizational improvement, transformation or even the redesign of their businesses. Using the Internet as a strategy for achieving transformation implies it is being employed by organizations to re-design their processes.

Apart from new enterprises emerging, there are also organizations such as E-sokoni found at www.symphony.in, a business-to-business trading hub, which is trying to use the Internet to integrate suppliers and consumers so that firms can cut down on operational costs. It had about 200 suppliers by 2002 (Kinjanjui and McCormick, 2002). Kinyanjui and McCormick (2002) also studied the use of the Internet in the garment sector, which has traditionally been considered to be slow in the uptake of technology. The 12 firms they focused on confirmed that the sector had been engaging in B2B ecommerce, resulting in either change of their suppliers, increased international suppliers and also increased revenues.

In 2004, Kenya initiated an ambitious 5-year e-government strategy. The E-Government Strategy (GOK-EGS, 2004) spells out short term, medium term and long term initiatives aimed at enhancing collaboration within government, with businesses and with citizens. As a result of this initiative, a total of 34 government departments now have their own websites, most already at a transactional level though some are currently still purely informational.

According to Wolcott et al (2001), 5% of all websites should be interactive to be at level 3. Analysis shows that most of the 33 government websites are interactive since they allow for provision of online feedback, online enquiries, and online applications for services such as licenses, national identity cards, etc. In tandem with these web initiatives, the government is also in the process of enhancing connectivity via CDMA technology up to the fourth tier (location) of political administration. Enhancing connectivity to this level of political administration expected to increase accessibility and use of government websites by citizenry in the rural areas.

These developments point to the use of the Internet by leading age groups for transformation purposes. For instance, Mobile Government in the Ministry of Education to transform delivery of

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examination results to the population, 80% of which lives in the rural areas (MOEST, 2007). Therefore, Kenya has achieved level 3 in sophistication of use. A determinant which has strongly driven this dimension to level 3 is the perceived value of the Internet (*value*). The Internet infrastructure has been used to exploit opportunities available as well as the adequacy and fluidity of resources (*resources*) given that most of the leading edge initiatives are private sector driven. Even some initiatives within government have private sector participation. The Ministry of Education has partnered with the private sector through the Kenya ICT Federation to help it realize its ICT Vision (MOEST, 2007). The private sector has the ability to marshal resources coupled with the ability to execute (*execution*) to realize their plans. However, the relevance of digital content on the Internet calls and the low levels of computer literacy (*enablers*) is still a challenge to the realization of higher levels of sophistication of use (CCK, 2008).

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5.3.7. SUMMARY OF INTERNET DIFFUSION DIMENSIONS

A summary of the values of the six dimensions is shown in Table 5.17. A minus indicates that the determinant has a negative influence, while a positive sign indicates a positive influence.

Table 5.17. Summary of Kenya's Internet Dimensions for 2008

Dimension	Level	Diffusion Determinants
Pervasiveness	Level 3: Established	*Entrepreneurship (+); Value (+); Execution (+, -); Regulations (+), Costs (-); Access [-]*
Geographic Dispersion	Level 2: Moderately dispersed	*Regulations (+); Resources (-); Execution (-); Constituent Technologies (-)*
Sectoral Absorption	Level 2: Moderate	*Value (+, -); Resources (+, -); Access [-]*
Connectivity Infrastructure	Level 2.5: Expanded	*Resources (+), Demand (+), Value (+); Regulation (+); Enablers (+,-); Costs (-);*
Organisational Infrastructure	Level 3: Competitive	*Entrepreneurship (+); Change (+);Costs (+); Regulation (+) Resources (-); Value (-)*
Sophistication of Use	Level 3: Transforming	*Value (+); Resources (+); Execution (+); Enablers (-); Access[-]*

In summary, Internet diffusion has been positively influenced primarily by a healthy culture of entrepreneurship in Kenya (*entrepreneurship*), witnessed in the lead role that commercial sector

organizations took in introducing it in the formative years. A strong impetus for change linked to the overall democratization process in Kenya (*change*) forced early liberalization of the telecommunications sector by the government (*execution, regulation*). With the e-government strategy and ICT strategy, the government has taken an active interest, mobilizing resources and increasing the perception of value (*value*; *resources*). Government interventions, as well as pressure from commercial interests and civil society provide an explanatory lens for explaining the positive state of the Internet infrastructure in Kenya.

Negative influences on Internet diffusion cluster around weaknesses in unclear licensing requirements, thus continued lack of a SNO (*execution*), lack of resources (*resources*) to extend connectivity to underserved areas, an unclear value-proposition of the Internet in the health and education (*value*) due to their prevalence in areas with no electricity (*constituent technologies*), persistent high bandwidth *costs* for ISPs due to expensive satellite connections and a continued inability for CCK and other sector players to create an enabling environment for realization of universal goals despite positive trends (*enablers*).

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5.4 ASSESSING THE ROLE OF GOVERNMENT

Shin (2007) provides several roles that may be played by the government during the process of building a national information infrastructure. The government can act as a ***direct intervener***, by setting goals and guidelines for industry to follow (*controller*); by providing the physical infrastructure for everyone to access information (*builder*); by creating a fair business competition ground (*regulator*) and by becoming a major producer and buyer of ICT (*investor*). The government can also act as an ***indirect facilitator***, in which it becomes the main body for developing a vision for the whole country (*strategist*); creates a proper environment for innovation and growth through channeling of resources to the ICT sector (*guider*); establishes ICT as a national priority (*leader*); and articulates the objectives of various programs into a single vision (*integrator*). The two major sub-categories (direct or indirect intervener) are used to point out possible roles that were not adequately played by the government in positively influencing the Internet diffusion trajectory. This is done by looking at the various determinants.

The skewed development of the Internet in favor of the urban populace, and more specifically within the two largest cities, Nairobi and Mombasa, can be linked to proximate causes arising from the *"value"*. For instance, the fact that the government was not instrumental in the commercialization of the Internet in the early years of its adoption, except in a regulatory role (*regulations*), may have forced the 78 ISPs that have been part of the Internet landscape since its inception, to focus only on locations where they would get a financial return on the basis that a physical infrastructure already exists (such as electricity and relevant ICTs) as well as requisite demand. A private entrepreneur may not be in a position to marshal the necessary resources to invest in areas that do not have adequate demand or the physical infrastructure. Therefore, what emerges is a situation where the government did not, in time, rightly conceptualize the value of the Internet (*value*) and marshal resources (*resources*) to build requisite infrastructure in areas that lacked them, or act as an enabler of change (*enabler*) by fostering favorable conditions for building the Internet infrastructure.

These determinants, or the lack thereof, can be linked to the inability of the government to play specific roles required for the building of a national technological infrastructure. For instance, the role of government as an ICT investor in Kenya is a recent phenomenon appearing post-2004 with the creation of the Ministry of ICT and the subsequent articulation of an ICT vision and strategy. Even the role of government as a regulator was mainly as a result of larger democratization processes in Kenya which culminated in the establishment of CCK in 1998 (Muiruri, 2004). In addition, the government's role as a builder is also questionable, especially given the skewed nature in which the physical infrastructure of the Internet has developed. While these roles may have improved since 2004, the inadequacies prior to that date played an important role in influencing Internet diffusion as it is.

The above analysis reveals that the government's role has been inadequate and contributes to the low GDI levels as they are. While the study recognizes that recent policy initiatives (Table 5.18) are likely to impact positively on the determinants of the Internet over the medium and long term, the diffusion of the Internet appear to be exacerbating the global concern of social exclusion (Warschauer, 2004). The study's (Table 5.19) recommendations attempt to re-dress the skewed Internet diffusion trajectory, as well as give pointers on how the recent government initiatives are likely to impact positively on the determinants of Internet diffusion.

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Table 5.18. Recent Policy Initiatives for Kenya

P1. Government Crackdown on Pirated Software *(piracy)*: Under the office of Attorney General, the Government, is cracking down on businesses using illegally acquired software. This initiative is being undertaken in conjunction with Microsoft and Kenya Copyright Board. Kenya has one of the highest piracy rates in the world in which 8 out of 10 computers have pirated software [Kenya ICT Board, 2008].
P2. Digital Villages Project (DV) *(digital inclusion):* The Ministry of ICT and the Kenya ICT Board have embarked on a connectivity and e-services delivery project. The goal of the project is to boos ICT Connectivity in the country, improve service delivery to citizens, improve type and quality of information to and from citizens and ensure government's ability to ensure transparency. [Kenya ICT Board, 2008].
P3. Rising Profile of ICT Sector within Government and Globally *(ICT Profile)*: The Government of Kenya has formally developed a national ICT Policy and Strategy, a Freedom of Information Policy, the Electronic Transactions Act and an E-Government Strategy which is in the medium-term review process. In addition, many multinational corporations consider Kenya to be Africa's major ICT-hub besides South Africa. [GOK-EGS, 2004; GOK-NICT, 2006; Kenya ICT Board, 2008]
P4. Strengthening of Public-Private Sector Partnerships *(partnerships):* The government and the private sector are collaborating on a number of ICT-related initiatives. These include collaborations with Kenya ICT Federation, ICT Village, banking institutions and multinational organizations. [MOICT, 2008]
P5. National and Regional Infrastructure Projects *(infrastructure):* The Kenya government is involved with a number of telecommunications and other physical infrastructure projects which are financed by the private sector, the World Bank, the government of Kenya and consortia of local and multi-national organizations. These infrastructure projects include the Eastern Africa marine cable system (TEAMS; EASSY) and the National Fiber Optic Backbone Infrastructure (NOFBI) [CCK, 2008a]. Promote Regional and International cooperation within the ICT sector. Other projects include the implementation of COMESA Telecommunications Project (COMTEL) that aims at improving connection between telecommunications network within the COMESA Region. The project will put to an end the rerouting of regional traffic through other countries outside COMESA thus reducing the regional communications costs. The other projects include East African Internet Exchange Point and East African Postal Automation Project among others [MOICT, 2008].
P6. Continuing liberalization of the Telecommunications Market *(Restructuring):* The licensing of a second national operator, the licensing of additional fixed-to-wireless CDMA service providers, the sale of Telkom to France Telecom and general industry mergers (various sources and observations)
P7. Improve Equity in the Provision of ICT *(Equity)*

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In order to promote social equity for the disadvantaged groups, targeted programs will be implemented to enhance their participation in development process. The Ministry will support development of multipurpose community centers and public libraries as public ICT access centers through provision of complimentary infrastructure like electricity and telecommunications. The project will target farmers, "Jua Kali" Artisans, Community Based Organizations, marginalized groups among others by providing internet Kiosks at proximity locations in both urban and rural areas. The Ministry will also provide physical incentives as a way of addressing inequitable access to ICT [MOICT, 2008].
P8. Financing *(financing)* The government will explore financing mechanism for development for the ICT industry including public private sector partnership establishment of universal access fund; digital solidarity fund; multilateral and bilateral funding; promotion of investment through liberalization and licensing of additional operators; and encouraging equity ownership [MOICT, 2006; Kenya ICT Board, 2008).

Table 5.19. Expected Impacts of Policy Initiatives for Kenya

Determinant	Policy recommendations and objectives	How Policy Initiatives impact
1. Perceived Value of the Internet	• Speed up implementation of E-Government	*ICT profile* and *Equity*. These are likely to impact positively, since as more resources are channeled to the ICT sector, questions of ROI will be paramount.
2. Ease of Use of the Internet	• Introduce information and computer literacy education at all levels • Develop content in local languages to encourage Internet use • Develop more mobile phone-based applications	*Digital Inclusion* may encourage this as the Internet is brought closer to populations; it becomes less of a myth. *Piracy* may have a negative influence initially, even though piracy is unethical.
3. Cost of Internet Access	• Remove impediments inhibiting Second National Operator (SNO) operations • License more fixed-to-wireless operators	*Partnerships, Infrastructure* and *Restructuring* may encourage this.
4. Access to Constituent Technologies	• Extend the accessibility of electricity • Encourage local assembly of technologies through incentives.	*Digital Inclusion, Equity* and *Financing* may encourage this. The government expects to assemble the *madaraka* computer using local capabilities.
5. Demand for Capacity, Multiplicity of ISPs, Services Provided	• Make Internet communications at lower administrative levels mandatory • Brand local tourism using Internet-	*Infrastructure* may be critical in the setting up of ISPs in all the districts, who can stimulate demand. *Digital Inclusion, ICT Profile, Partnerships,*

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	based commerce	*Infrastructure* and *Restructuring* may encourage this.
6. Geography	• Speed up implementation of infrastructure projects • Provide 'tax havens' for infrastructure projects in underserviced areas	*Digital Inclusion, Partnerships, Infrastructure, Equity* and *Financing* are likely to impact positively
7. Adequacy and Fluidity of Resources	• Encourage projects that enhance social resources of communities • Provide incentives to projects in under serviced areas	*Partnerships* and *Financing* are likely to encourage this.
8. Ability to Execute	• Define mandate of government as facilitator, intervener	*Restructuring* and *Partnerships* are likely to encourage this.
9. Culture of Entrepreneurship	• Re-orient education systems to reflect this	*Digital Inclusion* is likely to encourage this.
10. Regulatory/legal framework	• Innovate regulatory regimes relevant for local context	*Partnerships* is likely to impact positively
11. Forces of Change	• Encourage competition	*Restructuring* is likely to encourage this
12. Enablers of Change	• Explore applicability of mobile technologies as the basis of a National Information Infrastructure (NII)	Current *Infrastructure* may discourage this, but rising costs may force a re-look into other options.

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5.5 CHAPTER CONCLUSIONS

The analysis in this chapter has shown that Internet diffusion in Kenya is at level 3 of pervasiveness, connectivity infrastructure, organizational infrastructure and sophistication of use. Sectoral absorption and geographic dispersion were at level 2 each. The determinants that positively influenced the GDI dimensions were primarily clustered around the external/surrounding forces and specifically those related to "*change*", "*regulations*", "*enablers*" and "*entrepreneurship*". Overall, the surrounding social/economic and regulatory system in

Kenya elevates the role of champions returning from the diaspora as change agents; the quest for greater democratization and a more open government due to years of dictatorial rule, and generally a culture of entrepreneurship inculcated from a history of capitalism in Kenya. Determinants that negatively influenced the GDI dimensions significantly were found to be *execution*, *constituent technologies*, *value* and *resources*. More recently, *cost* has also played a role.

The Internet growth trajectory brings to the fore possible unintended consequences related to the exclusion of large segments of the population that can be linked to the geographic dispersion and sectoral absorption. The penetration of electricity is unacceptably low reaching only 4% of the population with the distribution primarily skewed in favour of urban populations. This has limited the geographic dispersion of the Internet to Kenya's urban centres. While the policy initiatives of the government are laudable, priority should be given to extending the physical infrastructure of electricity to under serviced areas. If the physical infrastructure of electricity is not built, then large segments of the population will not engage in those activities that rely on the Internet infrastructure such as e-government. Exclusion of large segments of the population from participating in activities that are reliant on the telecommunications infrastructure has been characterized as digital or social exclusion (Warschauer, 2003). This finding maybe masked by the good average performance as reflected on the dimensions of the GDI framework.

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Sectoral absorption analysis prominently elevated the dominance of the commercial sector over the public sector, yet public sector participation is critical in ensuring equitable growth. The policy initiatives envisage greater participation of the public sector especially with regard to universal service goals. This should be coupled with a confluence of other events such as increasing public awareness of the value of the Internet, as well as formalizing the provision of ICT education. This is necessary to make those applications that are dependent on the Internet acceptable to a large segment of the population, without exclusion. However, social exclusiveness of the Internet persists, evident from the remaining concluding remarks.

The analysis revealed that 80% of Kenyans live in the rural areas, with realistically only 29% of meaningful administrative points (districts) having possible access to ISPs in the country. Power

availability remains inadequate with an overall penetration rate of 15% nationally and 4% in the rural areas. The cost of access was also found to be prohibitive, despite laudable efforts on a number of fronts. The teledensity based on fixed telephone lines is very low (about 303,000 to 35 million Kenyans) and, again, these are mostly in the urban centers. The cost of computers required for Internet access is still prohibitive given that Kenya is a developing country and about half of the population lives in poverty. Warschauer (2004) classifies these inadequacies as affecting *Physical Resources (access)*; which emphasizes accessibility to computers and telecommunications by the users. It concerns affordability of computers, provision of public access options as well as extension and affordability of telecommunications. Results emerging from the GDI study paint a picture in which physical access is being denied to a large segment of the population.

Another aspect of the Social Inclusiveness/Exclusiveness perspective concerns *Digital Access or Digital Resources*. These are digital materials that are made available online (Warschauer, 2004) through a variety of media. Digital resources are assessed in terms of the content and their relevance to specific communities as well as the language used in creating the content. E-Government services are content-based, with information flow expected from/to citizens, businesses and the government. Useful content depends on the language used. An analysis of all Government websites in Kenya showed that the official language of the websites is English. This is the case, despite the fact that a majority of the rural populace communicate in local ethnic languages and occasionally in the national Swahili. Sustained use and standardization of content based on the English language would results in an e-government infrastructure enhancing social exclusion of a majority of Kenyans.

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Human resources, emphasizing mass literacy and education, is also an aspect that can be inferred from the foregoing analysis (Warschauer, 2004). Overall literacy is at 62% using recent psychometric testing literacy tools (Kilele, 2007). However, the average masks the huge disparities between Nairobi which has a literacy of 87% while one of the provinces (North Eastern) has a literacy rate of 8%. The computer literacy is much lower, given that English was not considered in administering the test, yet digital content of government services is disproportionately in the English language. It may be inferred that determinants such as the perceived value of the Internet can only be enhanced if there is mass literacy and education thus creating necessary conditions for the technologization of the Kenyan society. The low levels of

pervasiveness as well as sectoral absorption may point to information illiteracy of the population. The e-government programs are being implemented in an environment in which there is no comprehensive public access to ICT education to enhance their preparedness for utilizing governance resources. The urban areas have access to some ICT education in the form of various programs offered by commercial colleges and NGOs whereas; there is little or no access to ICT education in the rural areas. This divide is further exacerbated by the fact that in most rural areas, there is no electricity or telecommunications. The attempts by the Government to introduce computer education in schools, target those schools that already have electricity. This would enhance the divide between those who have the ability to access and those who do not. This environment calls to question the 'wisdom' of cultivating the installed base as is, without considering what should count as priorities.

Another key inference from the findings focuses on the concept of *Social Capital (Social Resources)* and the Government's lukewarm or lack of focus on it. Social Resources refer to the community, institutional, and social structures that support access to ICTs necessary for use of ICT-related applications (Warschauer, 2004) such as e-government services. The connection of the concept of social capital and cultivation of Internet as a base for e-government is its importance in helping community members in gaining access to the Internet. This is because entering the world of the Internet is complex and it involves making many decisions such as what computer to buy, how to set it up, how to install it, where to get Internet connection, etc. For an individual, these may be daunting decisions especially given the relatively low levels of computer literacy. Given the language barriers and poverty levels in developing countries, social institutions that community members are comfortable with can play an important role in introducing members to the Internet, and hence be hospitable to e-government. While there was no explicit indicator from the analysis above, an inference can be made generally focusing on poverty levels, language, and literacy rates.

Thus overall, the Internet infrastructure, as an antecedent to e-government is emerging in an environment of *social exclusion*. Despite images of inclusiveness of the vision of e-government (Chapter Four), the conditions of Internet adoption are not conducive to a large group of stakeholders-the rural population and the urban poor. Further, that the initiatives that are being put in place may result in increased exclusion of these groups from participating in governance.

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Given that cultivation of the installed base 'as is' may exacerbate the social problem of governance; the findings of this chapter shall form part of the basis for the rationale for an E-Government infrastructure model for developing countries. The model shall be proposed in the Synthesis chapter by drawing on and relying on backing from the grounds adduced in this chapter and the other chapters.

The next chapter builds on this chapter as well as on Chapter Four. Chapter Four, with its policy focus, may not have captured the perspectives of those who are actually involved in implementing e-government systems. This Chapter presented what currently exists at the national or macro level. The next Chapter moves a step down at the meso-level of government to capture perceptions of those who are charged with implementations of policy.

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CHAPTER SIX

ANALYSIS OF MESO-LEVEL PERCEPTIONS OF THE E-GOVERNMENT ARTIFACT

6.1 INTRODUCTION

Chapter Three provided a theoretical discussion of the research, statistical methodology and demographic data for this chapter. This chapter [15]focuses on the interpretation and discussion of the survey results, details of which were provided in Chapter Three. Reliability and item analysis, factor analysis, and canonical analysis are all reported and interpreted. This Chapter presents the analysis and findings of the survey component of the research capturing the perceptions of meso-level government employees and consultants involved in implementation of E-Government. The survey had two main constructs: *conceptualization* of e-government and the expected *impacts* of e-government. The overall goal of the Chapter is to reflect on the findings of an exploratory examination of the relationship between e-government conceptualization and its impacts. The schematic diagram below (Figure 6.1) captures the envisaged relationships of E-Government views and impacts.

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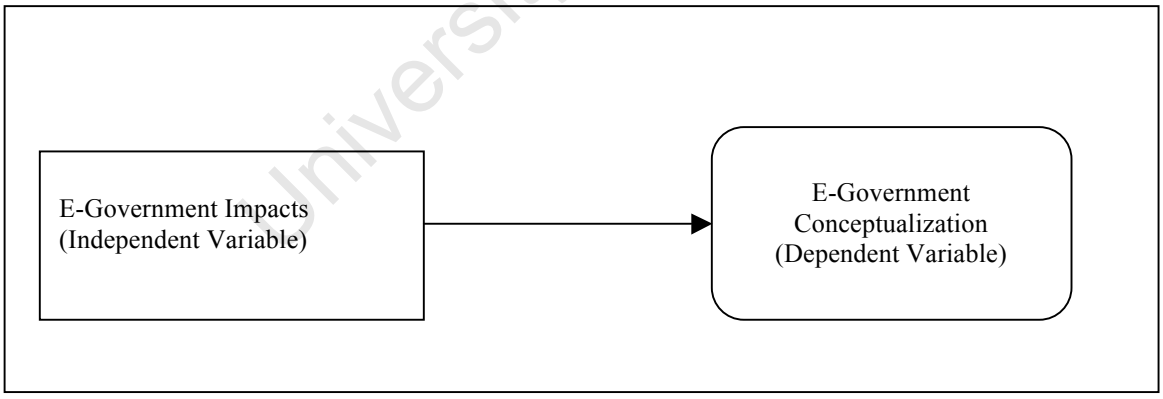

Figure 6.1: Hypothesized Relationship between Conceptualization and Impacts.

[15] Conference version of the chapter published as: Muganda-Ochara, N. (2008). Public Sector E-Government Conceptualization. In the *Proceedings of the 4th International Operations Research Society of East Africa (ORSEA) Conference*, 23rd-24th Oct 2008 Nairobi, Kenya.

E-Government impacts were hypothesized to influence conceptualization of e-government. The argument in the thesis is that e-government conceptualization is influenced by the expected impacts can be explained from the technology transfer literature that was presented in Chapter Two. Analysis was undertaken on the two constructs of conceptualization and impacts of e-government to achieve the following objectives:

1. Identification of latent factors that are not easily observable in the large sets of variables for conceptualizations and impacts
2. Identification of appropriate variables using factor loadings for subsequent canonical analysis to identify e-government impacts that explain e-government conceptualization in a developing country.

The contribution of this chapter is in providing an explanatory model that links expected impacts as a possible predictor to how e-government is conceptualized in developing countries. This is in line with the thesis agenda of understanding the emerging nature of the e-government artifact in developing countries. The implications may be critical in ensuring success of e-government projects in developing, especially given that e-government projects mostly fail in developing countries (Heeks, 2002). The success of e-government initiatives should be partly hinged on the nature of this relationship between expected impacts and conceptualization since the knowledge will help in illuminating the phenomenon of e-government, as a technology artifact. Thus the postulation of the expected impacts has implications in terms of how, as a concept, e-government is operationalized by the implementers.

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The Chapter has six main sections. The first section reflects on the development of the data collection items for the primary sections of the questionnaire; the second and third sections presents factor analysis results of conceptualizations, and impacts of E-Government respectively; the fourth section presents the results of a canonical correlation analysis while the last section provides a discussion and summary of the findings.

6.2 DEVELOPMENT OF DATA COLLECTION ITEMS

The approach to developing the factors associated with conceptualization and impacts followed a systematic procedure proposed by Churchill (1979), and have been used previously in developing IT constructs (Lederer and Sethi, 1992; Lewis, Synder and Rainer, 1995). The first stage describes the domain of the construct (covered in the review of the literature Chapter Two). The second stage operationalized the construct by developing a measurement instrument (Appendix 3.2). Stage three employs a statistical analysis on the data gathered from administering the questionnaire.

6.2.1 DOMAIN OF THE CONSTRUCTS

The E-Government Conceptualization and Impacts items were selected from literature on Information Technology conceptualization and technology impacts literature. The *conceptualization* items were placed in five main categories: *tool view; proxy view; ensemble view; computational view* and *nominal view*. There were a total of 32 items measuring conceptualization. The *E-Government Impacts* items were placed under four main systemic objectives of achieving *Effectiveness, Efficiency, Connectivity* or *Openness* in governance (Chrissafis, 2005). There were a total of 41 items measuring E-Government impacts.

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Each construct was measured using multiple indicators to capture the underlying theoretical dimensions effectively (Premkumar and Ramamurthy, 1995). Table 6.1 provides a summary of the operationalization of the constructs along with their corresponding references. The summary of the constructs are shown in Table 6.2. All the measures were based on a 5-point Likert scale with (1) "strongly agree" and (5) "strongly agree" as the anchors. An original pool of 32 items was used in the development of items for measuring e-government conceptualization which were distributed as shown. E-Government impacts were captured by an original pool of 41 items as indicators of the four objectives of e-government shown in Table 6.1.

Table 6.1 Constructs, Test Items and References		
Conceptualization Constructs	**No. of items**	**References**
Tool View	10	Sein, M.K., & Harindranath, G., 2004; Orlikowski, W.J., & Iacono, C.S., 2001
Proxy View	11	
Ensemble View	5	

Computational View	3	
Nominal View	3	
Impact Constructs	**No. of items**	**Reference**
Connectivity	8	Chrissafis, T., 2005
Openness	10	
Efficiency	14	
Effectiveness	9	

6.2.2 RELIABILITY ANALYSIS

Reliability analysis was used to assess internal consistency (degree of homogeneity among the items) to identify those items in the questionnaire that had low correlations in order to exclude them from further analysis. This was regarded as an important first step since the survey instrument had not been used before. Landis and Koch's (1977) benchmarks were employed to determine reliability, that is from (a) 0 to .20 as "slightly reliable"; (b) .21 to .40 as "fairly reliable"; (c) .41 to .60 as "moderately reliable"; (d) .61 to .80 as "substantially reliable"; and (e) .80 to 1.0 as "almost perfect" (Landis & Koch, 1977, p. 168). The overall sample size, discussed previously, was 77 respondents.

The conceptualization of e-government was theorized to be underpinned by five main views: tool view (*tool*); proxy view (*proxy*); ensemble view (*ensemble*); computational view (*computational*) and nominal view (*nominal*). Cronbach alpha coefficients were computed for *tool, proxy, ensemble, computational* and *nominal* items in order to identify items that contribute to low internal consistency. The interpretation that was adopted was that an inter-item correlation below 0.3 was considered low, meaning that the item is insufficiently correlated with the overall scale.

Overall, the original 32 items theorized as indicators of e-government conceptualization reduced to 23 after deletions, resulting in an overall Cronbach alpha coefficient of 0.89, which according to Landis and Koch (1977), is "almost perfect" (p.168). An examination of the 23-item scale revealed that one item linked to *computational* had a low item-correlation; however, the elimination of this item, or any other item, would not increase the reliability. The 23 items were therefore retained for further analyses since the above results indicated that the items were homogenous. The remaining 23-item scale was therefore factor analyzed to achieve data reduction.

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Cronbach alpha coefficients were also computed for the indicators of E-Government impacts (*connectivity, efficiency, effectiveness,* and *openness*) items in order to identify those that contribute to low internal consistency. Out of a 41-item scale, only two items were dropped due to low correlations. A reliability analysis of the remaining 40 items is shown in table 6.3, with an overall Cronbach's alpha coefficient of 0.95 and average inter-item correlations of 0.32. The remaining 40-item scale of the impacts was therefore subjected to an exploratory factor analysis reported in the next section.

6.3 FACTOR ANALYSIS RESULTS

A factor analysis based on a principal component analysis (PCA) of the two scales for conceptualizations and impacts was conducted to investigate the internal structure as well as to determine the smallest number of factors that could be used to best represent the interrelations among the sets of variables for the two constructs. In deciding on the number of factors to extract, a combination of the Kaiser-Guttmann Rule (K1 rule), the scree plot and practical considerations were utilized to determine the most appropriate component solution. The K1 rule advocates for retention of those factors with Eigen values of at least 1, while the scree plot considers only those factors that appear before the steep decline ends.

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An examination of the rotated component matrices was conducted to distinguish which factors, if any, made theoretical sense. The factors considered significant were based on a criteria proposed in the literature. Hair et al (2006) proposes as a rule of thumb that loadings greater than 0.3 are considered significant; loadings of at least 0.4 are considered more important and if loadings are at least 0.5, then they are very significant. If a variable loaded on more than one factor, then the factor with a higher loading of the variable was picked. Comrey and Lee (1992) suggests that the pattern/structures in excess of 0.71 loading are considered excellent, 0.63 as very good, 0.55 as good, 0.45 as fair, and 0.32 to be poor.

In addition, Hair et al (2006) suggests that there should be due consideration of the sample size when deciding on the threshold for the loadings. According to their guidelines, the ideal factor loading for a study with a sample size of 77 respondents would fall between 0.65 and 0.60. However, given the exploratory nature of this research as well as the use of factor analysis as a heuristic tool in this study, a cutoff of 0.55 was considered appropriate. This decision was reached based on the restrictions of the sample size as well as Comrey and Lee's (1992) criteria in which a weighting of 0.55 is considered to be good. The factor analysis results are presented for e-government conceptualization, followed by e-government impacts.

6.3.1 E-GOVERNMENT CONCEPTUALIZATION RESULTS

The 23-item scale was factor analyzed and the resulting optimal factor solution interpreted. A summated scale was then constructed to form the basis for subsequent canonical analysis. The following subsections present these results.

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6.3.1.1 Factor Extraction Process

The K1 rule (read from table 6.2) and the scree plot (Figure 6.2) results are shown. The right hand section of table 6.2 shows the variance explained by the initial solution. Seven factors in the initial solution have Eigen values greater than 1.Together, they account for 72% of the variability in the original variables. This suggests that seven latent influences are associated with E-Government conceptualization, but there remains some room for some unexplained variation (28%).

Table 6.2: E-Government Conceptualization Eigenvalues Extraction: Principal components

Component	Eigenvalue	% Total - variance	Cumulative - Eigenvalue	Cumulative - %
1	7.190716	31.26398	7.19072	31.26398
2	2.503368	10.88421	9.69408	42.14819
3	1.994937	8.67364	11.68902	50.82183
4	1.378498	5.99347	13.06752	56.81530
5	1.262261	5.48809	14.32978	62.30339
6	1.172980	5.09991	15.50276	67.40331

7	1.033706	4.49437	16.53647	71.89768

A scree test of the eigenvalues plotted against the factors was examined to confirm the 7 component solution (Figure 6.2). From a review of literature, factor extraction should be halted "at the point where there is an 'elbow' or leveling of the plot" (Thompson, 2004, p. 33), or at the point where there is a significant jump between any two Eigen values. Using this guideline, four factors should be retained. This would mean that only 57% of the explained variance would be utilized, yet as per Stevens (2000), there should be an aim of accounting for 70 percent of the total variance. The scree plot was considered inconclusive as a guide and therefore the K1 rule which yielded 7 factors with a 72% explained variance adopted.

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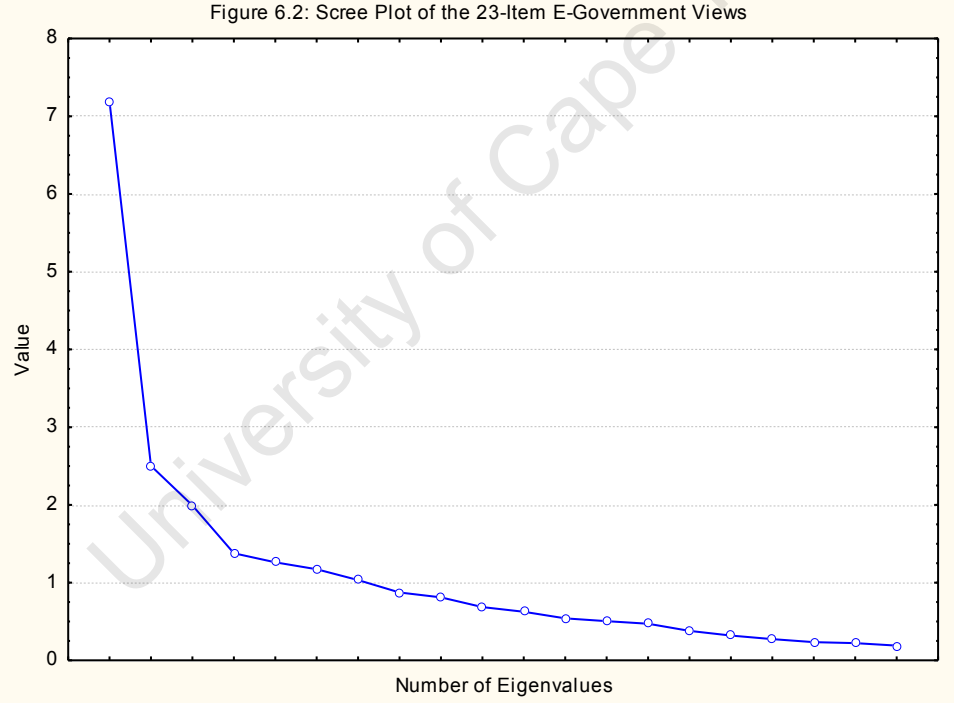
Figure 6.2: Scree Plot of the 23-Item E-Government Views



From the factor analysis, 20 items had sufficiently high factor coefficients for the 7 extracted factors at an absolute cutoff of 0.55. However, some factors failed to have a sufficient number of items for interpretation purposes. Factor 7, with an explained variance of 4.5%, was significantly loaded with only a single item while Factor 4, with an explained variance of 6% was significantly loaded with two items which were also inversely correlated to each other at 0.23

(Appendix 3.4). According to Tabachnick and Fidell (2001), "factors with a single variable can be described as poorly defined. Factors with two variables should be highly correlated with each other as in > .70" (p. 622). Accordingly, Factor 7 was considered to be poorly defined and therefore dropped. Factor 3 was also dropped due to its low inter-item correlation. Thus the five factors that were retained subsequently had an explained variance of 61%, which was considered acceptable.

6.3.1.2 Factor Interpretation

Table 6.3 presents the items, the factor loadings and the names that were given the factors. The naming of the factors took into account the significance of the loadings. Three items were therefore deleted from further analysis, while five factors, representing 61% of the explained variance were retained; resulting in a 19-item inventory as shown in Table 6.3.

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Table 6.3: Retained Rotated Factor Matrix-E-Government Conceptualization	
Variables	**Names**
Factor 1	**Network Diffusion View**
Proxy View: Experienced Barriers	(0.71)
Proxy View: Spread of Technology	0.63
Tool View: Cheap and Efficient Enabler	0.61
Proxy View: Critical Mass Required	0.60
Proxy View: Resource Availability	0.56
Computational View: Integrated Database Technology	0.56
Factor 2	**Service Delivery Tool**
Tool View: Technical Enable Performance	0.76
Computational View: Computational Power	0.75
Proxy View: Ease of Use	0.56
Factor 3	**Extensive Value Network**
Proxy View: Change in IT Spend	0.85
Proxy View: Numbers Using Technology	0.72
Proxy View: Financial Resources Spent	(0.77)
Factor 5	**Network Restructuring Device**
Tool View: Enhance Worker Capabilities	0.72
Tool View: Administrative Restructuring Tool	0.70
Factor 6	**Evolving Actor-Network**

Ensemble View: Complex Socio-Political Process	(0.77)
Ensemble View: Network of Stakeholders	0.71
Ensemble View: Social Influences	0.66
Ensemble View: Integration & Engagement of Users	0.51
Tool View: Repository of Information	0.50

In naming ***factor 1***, *Network Diffusion View (NDV),* cognizance of the four Proxy View items as opposed to one Tool View item is considered. Out of the four Proxy View items, three are orientated towards diffusion of technologies as surrogate to e-government conceptualization. *Network* connotation refers to the critical mass of actors, identified as human stakeholders in development projects as well as other alliances such as with various industries, technologies and other nations. The *Diffusion* metaphor relates to the surrogate perspective, where the success of a project conceived by the network of stakeholders, can only be visible from its spread in a particular context in various forms (as a technology, applications, perceptions, etc).

Factor 2 was named *Service Delivery View (SDV)* with a total explained variance of 11%. The tool view perspective is captured through the inscription of technical features in relevant technologies, while improved service delivery is possible through superior computational power of e-government technologies. While service delivery is possible based on the engineered artifact and superior computational capabilities, its realization is only possible when the artifact is used, as demonstrated from the proxy perspective. Naming of Factor 2 therefore derives from the tool view and the computational view perspectives due the high loadings of their items.

Factor 3 was named *Extensive Value Network* (EVN) with a total explained variance of 6% with all the loadings derived from various proxy perspectives. Two statements espoused the conceptualization of *Technology as Capital*. A third statement exposed the *Technology as Diffusion* perspective. Factor 3 is therefore a Proxy View of E-Government with a strong' leaning towards Technology as Capital and Diffusion. In naming the factor, the influential perspective was the Technology as Capital Perspective with recognition that a positive change in IT expenditure being critical in enhancing or extending the value accruing to the network of users.

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Factor 5, with an explained variance of 6% was named *Network Restructuring Device (NRD)* and was significantly loaded with two tool view items**.** The Tool View of Technology regards it as an engineered artifact, expected to do what its designers intended it to do. The tool view statements that were heavily loaded on the factor highlight E-Government as a device for augmenting labor productivity.

Factor 6, with an explained variance of 5% was named *Evolving Actor-Network (EAN)*. It depicts an ensemble perspective of E-Government where the role of stakeholders is critically elevated (as a development project and production network) in implementing technologies in a particular context (embedded system). As a development project, E-Government captures the roles of a multiplicity of actors, thus elevating stakeholder roles which continuously evolve.

6.3.1.3 Construction of Summated Scale

The five-factor interpretation above suggests that five summated scales can be constructed (Table 6.4) to form a basis for further analysis. The reliability of the summated scale is best measured by Cronbach's alpha, which in this case is 0.78 for scale 1, .68 for scale 2, .84 for scale 3, .57 for scale 4 and .74 for scale 5.

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Table 6.4. Replacement of Original Variables with Summated Scales	**Summated Scale Mean**	**Cronbach's Alpha**
Scale 1: Network Diffusion View (NDV)	3.9	0.782
Scale 2: Service Delivery View(SDV)	3.93	0.679
Scale 3: Extensive Value Network(EVN)	3.43	0.835
Scale 4: Network Restructuring Device(NRD)	4.23	0.567
Scale 5: Evolving Actor Network(EAN)	3.76	0.738

Out of the five summated scales, only one was substantially below the recommend cut-off level of 0.70 (Hair et la, 2006). Scale 5, representing the factor, *Network Restructuring Device* had an alpha of 0.567, was retained even though its reliability was below 0.70. It was retained with a caveat that its lower reliability provides a need for future development of additional measures to

represent this concept. The means of the individual factor items were retained as surrogates for further canonical analysis.

6.3.2 E-GOVERNMENT IMPACTS RESULTS

The 40-item scale was factor analyzed and the resulting optimal factor solution interpreted. A summated scale was then constructed to form the basis for subsequent canonical analysis. The following subsections present these results.

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6.3.2.1 Factor Extraction Process

A Principal Components extraction method was employed using a Varimax rotation with Kaiser Normalization with no limit placed upon the number of potential factors. This initial analysis resulted in 10 factors with an explained variance of 79%. The factor solution was not unique with no clear and significant clustering of the variables. In the 10-factor model, four factors had only two significant loadings with correlations ranging from 0.17 to 0.50. This is below the recommended correlation of 0.7 required when a factor has two items significantly loading on it. The 10-factor solution was therefore considered to be uninterpretable thus the factor extraction process was repeated using the same extraction and rotation methods, but with the solution successively reduced to 9, 8, 7, 6, 5 and 4 factors which accounted for 77%, 73%, 70%, 67%, 62%, and 57% of the variance respectively. The analysis did not go below four factors given that the literature from which the scale was developed assumes that the impacts of e-government can be structured around four constructs (*efficiency, effectiveness, connectivity, openness*). Each of these solutions accounted for greater than the 2% minimum increase in variance over the previous solution, as recommended by Cattell (1966).

The results of these factor analyses were examined for ease of interpretability as the basis for the appropriate factors solution (Hair et al, 2006). The 4-factor model appeared to be the optimal and had significant loadings of the items in each of the four factors, even after accounting for cross-loadings items. In addition, there were clear clusters of the items converging. Thus while only 57% of the variance could be explained, the 4-factor model was considered to provide an

interpretable solution (table 6.5). Thus, for the factor analysis of the 40-item scale of the impacts of E-Government, interpretability of the simulated factor solutions (Sweet, 2003) was given preference over the more mechanical Kaiser-Guttmann "K1" rule and scree plot approach since the latter would not provide meaningful interpretations.

Table 6.5: E-Government Impacts - Eigen Values and Total Variance Explained

Extraction: Principal components

	Eigenvalue	% Total - variance	Cumulative - Eigenvalue	Cumulative - %
1	13.20994	33.02485	13.20994	33.02485
2	4.23433	10.58583	17.44427	43.61068
3	3.00057	7.50142	20.44484	51.11210
4	2.44911	6.12277	22.89395	57.23487

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6.3.2.2. Factor Interpretation

Table 6.6 lists the items, the factor loadings and the names that were given the factors. The naming of the factors took into account how significant the loadings were. The discussion that follows concern interpretation of the factors based on their significant loadings.

Table 6.6: VARIMAX-Rotated Component Analysis Factor Matrix For E-Government Impacts	
Variables	
Factor 1: Enhanced Interactions and Accessibility	**Loadings**
OPENNESS: results in increased interaction due to the online forums available for public usage	0.79
EFFECTIVENESS: ensures an increase in the accessibility of public procurement opportunities to SMEs	0.72
EFFICIENCY: adoption leads to an increase of the productivity of public employees in terms of hours worked	0.69
EFFICIENCY: adoption leads to a decrease in the number of cross-agency managed files resulting in the decrease of internal costs of processes	0.69
EFFICIENCY: adoption leads to improved organizational and governmental efficiency due to a decrease of percentage of resources released for internal processes	0.68
EFFECTIVENESS: results in reduced administrative burden for businesses	0.67
EFFICIENCY: The level of demand aggregation increases from E-Government adoption	0.63
OPENNESS: adoption results in a general increase in online consultation	0.60

Factor 2: Enhanced Co-operation and Awareness	
OPENNESS: Enhanced cooperation from increased daily usage of cross-agency networks	0.81
OPENNESS: Regulatory agencies make information available online	0.74
OPENNESS: Enhanced quality and volume of interaction in various government levels	0.74
OPENNESS: Increased percentage of Legislation Online	0.67
CONNECTIVITY: adoption results in improved inter-administrative integration resulting in general cost savings	0.64
EFFICIENCY: results in better targeting of services to various sectors	0.61
EFFICIENCY: adoption is visible in the dollar increase of revenues due to collections from new premium services such as e-commerce/e-business	0.58
OPENNESS: adoption results in increased digitalization of data which enables organizational charts and contact information be available online	0.58
Factor 3: Better Connected Public Administration	
CONNECTIVITY: leads to ICT output growth due to increased human capital investments	0.78
CONNECTIVITY: adoption leads to improved communication between various administrative units resulting in reduced inter-connectiveness costs	0.71
EFFICIENCY: adoption leads to a percentage reduction in administrative costs of procurement of goods and services	0.71
CONNECTIVITY: leads to a single-approach to applications development within the government sector	0.67
EFFICIENCY: adoption leads to a reduced number of internal transactions in government	0.64
CONNECTIVITY: leads to a one stop-shop approach to handling within government departments/organization and country	0.61
CONNECTIVITY: adoption leads to ICT output growth due to increased software investments	0.60
CONNECTIVITY: adoption of E-Government leads to the reduction of costs as a result of integration of the diverse distributed databases	0.58
EFFICIENCY: adoption leads to a percentage reduction of data processing costs	0.57
Factor 4: Enhanced Citizen Opportunities	
EFFECTIVENESS: adoption leads to increased access to public e-learning resources	0.79
EFFECTIVENESS: adoption leads to an increased ease of access to job information for public institutions	0.70
EFFICIENCY: adoption results in a percentage increase in constituent coverage	0.62
OPENNESS: adoption results in increased clarity of taxation information	0.62
EFFECTIVENESS: adoption leads to considerable ease of enrolment at educational institutions	0.61

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Factor 1, with a high explained variance of 33% was named *Enhanced Interactions and Accessibility (EIA)*. The variables capture a number of themes: increased interaction with the public at large (OPENNESS); increased business opportunities (EFFECTIVENESS); back office effect of organizational efficiency (EFFICIENCY). OPENNESS is implicit in the word interaction, opportunities is captured by the effectiveness item, while organizational efficiency by the efficiency items. Therefore, an expected impact of E-Government is to enhance its

interactions through electronic means. This would result in organizational efficiencies and accessibility of the government by businesses (especially the SMEs).

Factor 2 was named *Enhanced Co-operation and Awareness (ECA)* and explained an additional 11% of the variance. The variables emphasize enhanced rule of law by making legislation available online and enhanced co-operation (OPENNESS). Enhanced rule of law and enhanced co-operation are considered as inter-mediate outcomes for good governance (Chrissafis, 2005), thus these three highly loading variables emphasize aspects of good governance by increasing accessibility to better information to enhance the rule of law. Given the high loadings of the first four factors, the influence of the remaining two variables was considered insignificant.

Factor 3, with an explained variance of 8%, was named *Better Connected Public Administration (CPA)* and had predominantly CONNECTIVITY items. The three variables that were considered critical in naming the factor due to their high loadings of over 70% captured the notion that a better connected public administration arises from increased outputs from the ICT industry in terms of better services, terms and innovations. This point to the need for a certain level of critical mass to be reached in terms of services and products accessible by the government from its ICT industry. Further, a better connected public administration is visible when there is a reduction in administrative inter-connection costs amongst agencies as well as reduced administrative costs of procurement.

Factor 4, named *Enhanced Citizen Opportunities (ECO)*, had an explained variance of 6% with two significant items loading (EFFECTIVENESS). The expected impact arises from better opportunities for citizens in terms of better life expectancies from improved health information, improved public schooling opportunities, access to better job information and increased accessibility to the citizens. The items therefore capture improved capabilities of the government and the citizens.

6.3.2.3 Construction of Summated Scale

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The four-factor interpretation above suggests that four summated scales be constructed. The reliability of the summated scale is best measured by Cronbach's alpha, which in this case is 0.89 for scale 1, 0.89 for scale 2, 0.88 for scale 3, and 0.76 for scale 4 as captured in the Table 6.7.

Table 6.7: Replacement of Original Variables with Summated Scales	Summated Scale Mean	Cronbach's Alpha
Scale 1: Enhanced Interactions and Accessibility (EIA)	4.125	0.89
Scale 2: Enhanced Co-operation and Awareness (ECA)	4.022	0.89
Scale 3: Better Connected Public Administration (CPA)	4.056	0.88
Scale 4: Enhanced Citizen Opportunities (ECO)	4.052	0.76

All the four scales obtained a Cronbach's alpha above the recommended cut-off of 0.7 (Hair et al, 2006). The means of the four summated scales were calculated to be employed subsequently in a canonical analysis in the next section. In the ensuing section, an analysis is undertaken to show the relation between E-Government impacts and its conceptualization based on the model presented in the introductory section.

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6.3.3 SUMMARY OF FACTOR ANALYSIS RESULTS

In summary, the construct validity of the scale that was used to assess perceptions regarding e-government conceptualization was established by internal consistency and content validity. To investigate the internal structure, a reliability analysis as well as a factor analysis yielded a seven-factor, 23-item inventory. However, through an assessment of whether the extracted factors met factor analysis assumptions, one factor was dropped and six remained for interpretation. The six factors were: Factor I: Network Diffusion View (NDV), Factor II: Service Delivery Tool (SDT), Factor III: Extensive Value Network (EVN), Factor IV: Productivity and Information Retrieval Tool (PIR), Factor V: Network Restructuring Device (NRD), Factor VI: Evolving Actor-Network (EAN). The Cronbach's alpha coefficient was established at .89 for the 23-item final scale, demonstrating convergent validity of the scale in its ability to theoretically explain e-government conceptualization. However, the fourth factor: *Productivity and Information Retrieval Tool* was subsequently dropped on construction of its summated scale since it had an unacceptably low reliability.

The construct validity of the scale that was used to assess perceptions regarding e-government impacts was established by internal consistency and content validity which resulted on a 40-item scale with a Cronbach's alpha coefficient established at 0.95, thus demonstrating convergent validity of the scale in its ability to theoretically explain impacts. To investigate the internal structure, an exploratory factor analysis (EFA) was undertaken with no limit to the number of factors. The initial 10-factor solution was uninterpretable. Subsequent iterations of the 9-, 8-, 7-, 6- and 5-factor solutions also violated factor analysis solutions. By assessing the interpretability of factor solutions for 9, 8, 7, 6, 5, and 4 factors solutions, the most optimal solution was the four factor model. The four factors were: Factor I: Enhanced Interactions and Accessibility (EIA), Factor II: Enhanced Rule of Law Awareness (RLA), Factor III: Better Connected Public Administration (CPA) and Factor IV: Enhanced Government and Citizen Capacities (GCC). In the next section, a canonical analysis is undertaken to show the relation between e-government impacts and its conceptualization.

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6.4. CANONICAL CORRELATION ANALYSIS RESULTS

The 4-item summated scale for impacts and the 5-item summated scale for conceptualizations were then used to analyze their association using canonical correlation analysis (CCA). The 4 impact factors (Enhanced Interactions and Accessibility (EIA); Enhanced Co-operation and Awareness (ECA); Better Connected Public Administration (CPA); Enhanced Citizen Opportunities (ECO) were designated as the set of multiple independent variables. The 5 conceptualization factors (Network Diffusion View (NDV); Service Delivery View (SDV); Extensive Value Network (EVN); Network Restructuring Device (NRD); Evolving Actor-Network (EAN) were considered as the multiple dependent variables. The statistical problem involves identifying any latent relationships between the respondents' perceptions about e-government impacts and the measures of e-government conceptualization. The analysis in this study provides evidence linking conceptualization and impacts. The CCA process is discussed in the sections below.

6.4.1. MULTIVARIATE SIGNIFICANCE TEST

A canonical correlation analysis (CCA) of the data (Table 6.8) shows 8 significant correlation coefficients level of significance of 0.05, widely accepted as an appropriate level of significance (Hair et al, 2006). The coefficients show some relationships between e-government conceptualization and the expected impacts. For instance, one may conclude that some 17% (0.41^2 coefficients of NDV and CPA) of the variance is the view that e-government, conceptualized from a Network Diffusion View (NDV), is influenced by the need to have a better Connected Public Administration (CPA).

Table 6.8: Canonical Correlations

	EIA	RLA	CPA	ECO
NDV	**0.34**	0.06	**0.41**	0.03
SDV	**0.31**	**0.26**	0.22	**0.25**
EVN	**0.44**	0.13	**0.31**	**0.23**
NRD	**0.31**	0.14	**0.30**	0.11
EAN	**0.60**	0.20	**0.52**	-0.08

Likewise, 36% (0.60^2 coefficient of EAN and EIA) of the variance is the view that conceptualizing e-government as an Evolving Actor-Network (EAN) is influenced by the expected impacts of Enhanced Interactions and Accessibility (EIA) of the civil service and citizens. From the table, there are 12 significant correlations out of a possible total of 20.

From the total of 12 significant correlations, it is expected that at least one is significant due to chance (5% level of significance multiplied by 20 possible correlations). There is also one negative correlation as well as 7 non significant correlations. Adopting an interpretation based solely on pair wise correlations may not be very persuasive, especially given the somewhat low but significant correlations (Hair et al, 2006). Thus a CCA analysis was undertaken in order to identify any latent relationships between the multiple dependent and multiple independent variables.

Table 6.9 presents relevant details of the canonical analysis extracted from the STATISTICA program showing the loadings of the variables, variance extracted, redundancy indices,

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significance levels, and canonical roots for the variables. The number of functions produced from a canonical analysis is equivalent to the lower of the two sets of dependent and independent variables. Four canonical functions were produced from the data. There were only four e-government conceptualization measures as opposed to five expected e-government impacts measures. Therefore, the four canonical functions extracted are assumed to capture all the correlation between the sets of the dependent and independent variables.

Table 6.9 : Relevant Results of Canonical Correlation Analysis

Row	Criterion Variables	L1	L2	L3	L4
1	Network Diffusion View	-0.599993	-0.021694	-0.572066	0.501559
2	Service Delivery View	-0.405483	0.653821	0.124453	0.589810
3	Extensive Value Network	-0.599143	0.597250	-0.439514	-0.231904
4	Network Restructuring Device	-0.482742	0.252583	-0.194311	0.474478
5	Evolving Actor-Network	-0.944446	-0.203310	0.150745	-0.155929
6					
7	**Variance Extracted (VEI)**	0.401680	0.177958	0.119280	0.180532
8	**Redundancy**	0.211018	0.024969	0.008385	0.003370
9	**Predictor Variables**				
10	Enhanced Interactions and Accessibility	-0.892517	0.271035	0.189789	-0.306487
11	Enhanced Rule of Law Awareness	-0.317441	0.410687	0.713341	0.470862
12	Better Connected Public Administration	-0.770092	-0.181605	-0.249686	0.558242
13	Enhanced Citizen Opportunities (ECO)	-0.002319	0.975493	-0.170178	0.139451
14					
15	**Variance Extracted (VEI)**	0.372601	0.306673	0.159045	0.161682
16	**Redundancy**	0.195742	0.043028	0.011180	0.003018
17					
18	**Canonical R**	0.724803	0.374576	0.265128	0.136635
19	**Canonical Root Square**	0.525339	0.140307	0.070293	0.018669
20	**Chi Square Value**	70.15266	17.24673	6.51293	1.33804
21	**Degrees of Freedom**	20	12	6	2
22	**Level of Significance**	0.000000	0.140619	0.368270	0.512218
23	**Lambda Prime**	0.372296	0.784341	0.912350	0.981331

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An evaluation of the 4 functions (components) that were extracted showed that only one function was statistically significant (Function 1) as shown in the table. Bartlett's Chi Square test of significance (row 22 in the table) showed that Function 1, 2, 3 and 4 had 0.000, 0.1406, 0.3682

and 0.5122 respectively. However, use of a single criterion for deciding on whether a canonical function should be interpreted or not is too restrictive. Redundancy analysis as well as practical considerations has been suggested in addition to using the level of significance (Hair et al, 2006; Stewart and Love, 1968).

Redundancy is the ability of a set of independent variables (the e-government impact measures), taken as a set, to explain variation in the dependent variables (the e-government conceptualization measures). The relevant redundancy index for interpretation purposes is normally the criterion variable redundancy index. The common practice is to interpret only those canonical functions that contribute most in explaining the variability in the dependent set since the interest is in knowing how much variability of the dependent set can be explained by the independent set.

From Table 6.9, analysis of the redundancy index for the dependent variable (i.e. e-government conceptualization) set indicates that the total redundancy is 24.8% (sum of row 8 in the table). While there are no generally accepted guidelines on the minimum acceptable redundancy, the 24.8% was considered significant especially due to the fact that there are possible several other factors which could be moderating and mediating the relationship. This needs to be taken into account since government agencies are complex and there are many possible influences. For instance, diffusion factors may be critical in mediating the strength of the relationship between the dependent and the independent variable set. Further, factors connected to the current status or the current level of e-government in a country may also intervene in such a relationship. In addition, this is an exploratory research and completely delineating all the possible influences is difficult.

In accepting the redundancy index of 24.8%, the study took into account the possible mediating and intervening effects of other factors as well as reference to other studies. Prior exploratory studies investigating information technology related phenomena have used lower levels before. For instance, Byrd and Turner (2001), undertook an exploratory study examining the relationship between IT infrastructure and competitive advantage. They found that the criterion variable redundancy index was 24% while the predictor was 18%. In this study, the criterion variable

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index is 24.8 % while the predictor variable redundancy index is 25.3%%. The redundancy index indicates that 24.8% of the variance in the criterion variables has been explained by the canonical variate in the predictor set, giving an indication that the canonical model reasonably captures the relationships postulated. Therefore, the canonical functions extracted may provide an indication of the nature of the relationships.

The other possible criterion that gives an indication of the canonical function is to evaluate the variance explained by the variable sets in each of the functions (row 19, which is the square of row 18). Only those functions with a reasonable amount of variance should be interpreted. Function 1 had 53% explained variance within the variable set; Function 2 had 14%; Function 3 had 7%, while Function 4 had 2%. On the basis of this criterion, Functions 1 and 2 had a combined explained variance within their functions of 67%; while Functions 3 and 4 each contributed less than 10% for the explained variance within their functions. Contributions to explained variance of less than 10% are sometimes considered to be sufficiently weak so as to not warrant interpretation (Sherry and Henson, 2005).

The contributions of the individual canonical functions are determined by dividing the product of row 7 (for the dependent variable) and row 19 by the total redundancy. From this procedure, the first canonical function accounts for 85%; the second accounts for 10%; the third accounts for 3.4% while the fourth explains 1.4%. The first canonical function was picked for further interpretation based on the significance test above as well as the practical considerations of the variances explained within the functions and the individual contribution of the function to shared variance. This was because of its statistical significance as well as a high redundancy index. Thus the restrictiveness of the statistical significance threshold was relaxed to allow for its inclusion due to practical considerations. The interpretation of Function 1 is undertaken in the next section.

6.4.2. INTERPRETATION OF THE FUNCTION LOADINGS

Table 6.9 above also presents canonical loadings (linear correlations between the dependent or independent set and the set's canonical function) between individual variables and their

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respective canonical function. The criteria adopted for selecting which variables to interpret were similar to that suggested for factor analysis sections given the sample size restrictions as well as reliability concerns. Therefore, 0.55 loading was considered the minimum.

The ranking of the selected variables (where importance is determined by the absolute value of the canonical loadings) for the expected impacts of e-government variables contributing to the first canonical function is enhanced interactions and accessibility (EIA), better connected public administration (CPA), and enhanced co-operation and awareness (ECA). Similarly, the rank order of importance for the e-government conceptualization variables contributing to the first canonical function is evolving actor network view (EAN), network diffusion view (NDV), extended value network (EVN) view, network restructuring device view (NRD), and service delivery view (SDV).

The first canonical function suggests that the expected impacts of e-government are significantly and positively correlated with e-government conceptualizations since all the loadings have the same signs. Under the dependent variable set of conceptualization, the first function (under L1) has three significant loadings of the *Evolving Actor-Network* (EAN), *Network Diffusion View* (NDV) and *Extended Value Network* (EVN) view at 94%, 60% and 60% respectively. The expected e-government impacts that influence these views are *Enhanced Interactions and Accessibility* (EIA) and a Better *Connected Public Administration* which had loadings of 89% and 77% respectively. These two predictors, as a set, can be used to explain the explained variance for the three criterion variables which load significantly. The variables in the predictor set are directly related to the relevant criterion variables as evidenced from the signs of the canonical loadings. This relationship is captured in Figure 6.3.

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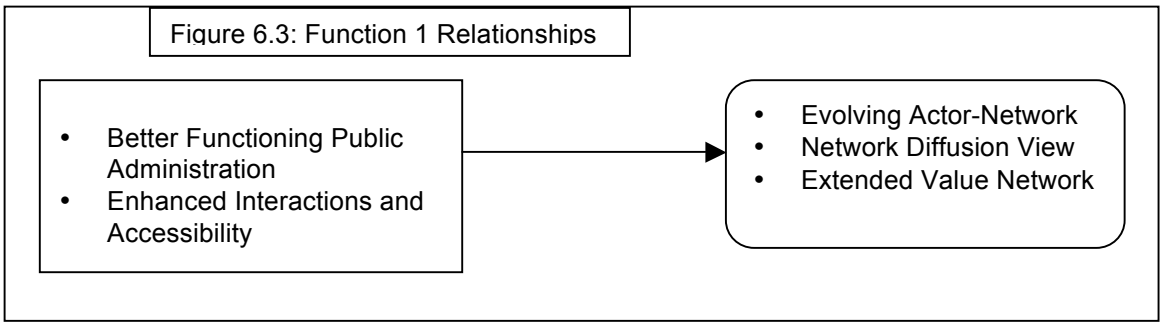

The rank order of importance of the expected impacts of e-government contributing to the second canonical function is the Enhanced Citizen and Government Capacity (CGC), Enhanced Co-operation and Awareness (ECA), Enhanced Interactions and Accessibility (EIA), and a Better Connected Public Administration (CPA) with loadings of 0.98, 0.41, 0.27 and 0.18 respectively. Similarly, the rank order of importance of e-government conceptualization contributing to the second canonical function are Service Delivery View (SDV), Extended Value Network (EVN), Network Restructuring Device (NRD), Evolving Actor-Network (EAN) and Network Diffusion View (NDV) with loadings of 0.65, 0.60, 0.25, 0.20 and 0.02 respectively.

For the first function, only those variables with loadings above 0.55 were interpreted. While this guideline is desirable based on the sample size restrictions, the benchmark for the interpretation of the second canonical function was reduced to a loading of 0.40 since the variability diminishes with subsequent functions (Hair et al, 2006). The dependent variables set based on this criterion were *Service Delivery View* (SDV) and *Extended Value Network* (EVN) with loadings of 65% and 60% respectively. The independent variable set of expected impacts that had significant loadings were those of *Enhanced Citizen Opportunities/Capabilities (*ECC) and *Enhanced Co-operation and Awareness* (ECA) at 98% and 41% respectively. The second canonical function suggests that e-government conceptualizations of SDV and EVN are individually correlated to the expected e-government impacts of ECO and ECA as a set. The overall relationship is summarized in figure 6.4.

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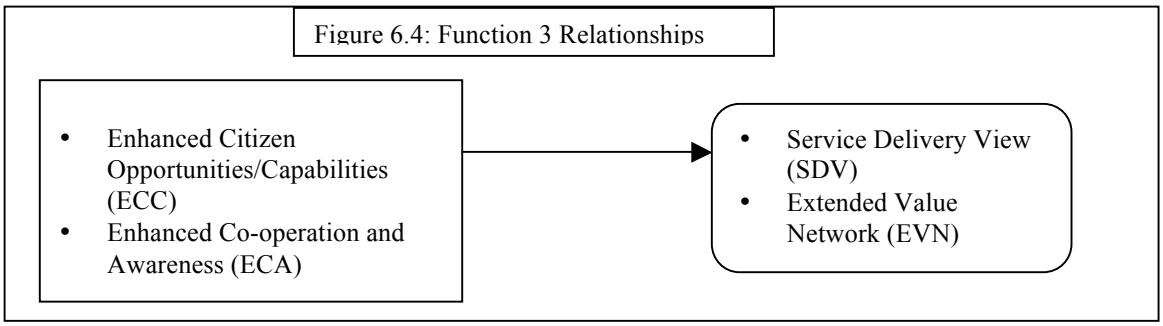

6.4.3. DISCUSSION OF CCA RESULTS

From an assessment of the individual correlations, the correlation analysis indicates that the individual e-government impact measures are significant, but weakly associated with the individual conceptualization factors. However from the canonical analysis which considered the combined effect of impacts on conceptualization measures, the prediction level was considerably increased. The results of the CCA point to a significant relationship between the expected impacts of e-government and its conceptualization. All of the indicators of the CCA, such as the canonical loadings and the redundancy index are strong and unambiguous. A discussion of the insights that emerged from the analyses is presented in the next two sub-sections.

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6.4.3.1. Connected Government and the Evolving Artifact

According to canonical function 1, the expected e-government impacts of enhanced interactions and accessibility (EIA) as well as the expectation of a better connected public administration (CPA) is directly and significantly related to e-government conceptualizations revolving around the evolving actor-network view (EAN), the network diffusion view (NDV) and the extended value network (EVN). The impact of CPA, which was significantly loaded with 8 items in the factor analysis, and a canonical loading of 89%, can be interpreted to be strongly linked to the quest for *good governance* by ensuring more openness and participation (thus facilitating interactions) through online forums and consultations (Chrissafis, 2005).

Canonical function 1 also had EIA with an explained variance of 33% from factor analysis and the highest canonical function loading of 89%; the other significant loading of CPA had an explained variance of 8% and a canonical loading of 77%. From the factor analysis, EIA highlighted the impact of e-government in terms of encouraging online interactions as well as enhancing accessibility to government services. Increased interactions with the public can also be linked to the objective of enhancing *good governance* (Chrissafis, 2005). This is achieved by creating an environment of more openness and participation in governmental affairs, through for instance online forums and consultations. However for interactions to be enhanced, whether based online or not, there are certain efficiencies that should be realized. The EIA factor captured a number of these, such as the need to optimize the flow of resources within and among' government agencies, reducing internal costs through efficient management of resources across government agencies; and aggregating demand to avoid redundant services. The *back office effect* of these efficiencies enables the government to be more effective in service delivery (for instance by becoming more accessible to its target constituents).

The other composite impact of e-government reflected through canonical function 1 is that of having a *Better Connected Public Administration* (CPA). The factor analysis showed that six out of eight of the items that loaded significantly emphasized the themes of improved communications, integrating diverse databases, one-stop-shop perspective to whole government applications development as well as a special focus on encouraging investments in human resources and software. Like EIA, which highlighted the need for achievement of certain efficiencies, CPA would help in realizing cost savings arising from a more *connected* and *integrated* public administration.

What emerges from the composite construct as reflected in canonical function 1 is that the EIA factor emphasizes the need for *good governance*. CPA on the other hand, captured the need for improving *connectivity and greater integration* among public agencies. These two (EIA, CPA) can be considered as formative constructs reflecting an internal orientation of expected impacts that can be captured by the theme of *connected government.* This is derived from an ICT-based approach to governance aimed at improved co-operation between government agencies and allows for active and effective consultation with various stakeholders (UN, 2008). This empirical study has therefore provided insight into the concept of *connected government* by linking it to

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the set of e-government conceptualizations of the Evolving Actor-Network (EAN), Network Diffusion (NDV) and Enhanced Value Network views (EVN).

The EAN had the highest loading of 94%, compared to 60% each for NDV and EVN loadings. The EAN primarily reflects an *ensemble view* of e-government, specifically characterized as a socio-political process influenced by the roles of a network of stakeholders in a particular context. Thus as a concept dependent on particular technologies, e-government conceptualization relies on stakeholder roles and interests and how they manage their relationships as well as the contextual conditions specific to a country or even an individual government agency in which it is appropriated. Significantly, the factor analysis captured the predominant view oriented towards its conceptualizations as an *artifact in formation* or as a *development project*, where the focus is on the roles of stakeholders and their influence in the social processes (Orlikowski and Iacono, 2001).

It was also highlighted in the factor analysis that the NDV, with the highest explained variance of 31%, was heavily orientated towards viewing the conceptualization of e-government as surrogate to a critical mass of people, industries, and nations adopting certain technologies. For instance, the extent of diffusion of Internet would be viewed as such a *proxy view*, where, based on numbers that have adopted it, the perception of large numbers of Internet users is viewed as evidence of its adoption. This perception of *critical mass of actors* (people, industries, nations, technologies) is indicative of e-government conceptualization.

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In summing up the insight emerging from the first canonical function, the dependent variable set reflects a view of the conceptualization of e-government from a *proxy* and an *ensemble* perspective by elevating the role of the critical mass of the network of actors involved in its development as an artifact that evolves over time. Both the EAN and the NDV, as a set, focus on e-government as an *evolving artifact* defined by *a critical mass* of a *network of actors*. This conceptualization is strongly associated with the perception that adopting e-government results in a *connected government*. Thus, at the very least, it can be said that *connected government*, significantly influence the conceptualization of e-government as an *evolving artifact*. This

conceptualization (or views) of is evidently geared towards achieving an internal impact (*back office effects*) (UN, 2008).

6.4.3.2 Value-Addition and the Technical Artifact

Canonical function 2 had two significant loadings of the predictors: the first being *Enhanced Citizen Capabilities* (ECC) with a canonical loading of 98% and five factor loadings; while the second was *Improved Co-operation and Awareness* (ICA) with a loading of 41% and nine significant factor loadings. As an expected impact of e-government, ECC features improved schooling prospects through e-learning alternatives; as well as access to more and better jobs opportunities. The expectation from the adoption of e-government is that the citizenry shall have better opportunity outcomes available, which if they take up, their capabilities are enhanced. While the focus seem to be on the opportunities for learning, the formative construct of ECC also implies that the impact can be extended to other opportunities such as improving the life expectancy of citizens for instance by providing medical information online (Chrissafis, 2005). Thus the overall orientation of ECC is the effectiveness of e-government in providing opportunities for its citizens.

ICA on the other hand is characterized by quality and amount of communication provided to enhance the daily usage of information from government agencies, as well as to improve the diffusion of information on rights and regulation. Both of these are considered as intermediate outcomes of the ultimate goal of achieving good governance, which was also reflected in the first canonical function. When ECC and ICA are considered as a set, the relative dominance of ECC with its focus on *opportunity outcomes* for citizens is noted based on the absolute canonical loading of 98%. The interpretation adopted is that providing alternatives to citizens, in terms of added opportunities cannot be divorced from the goal of a *citizen-centric* concept of good *governance*. The second canonical function shows that an expected impact of e-government focuses on adding value to citizens interaction with government agencies by availing more opportunities. *Value-Addition* can therefore be used as a formative construct representing the measures of ECC and ICA. *Value-Addition* captures the objectives of achieving effectiveness in service delivery to citizens as well as fostering more openness and participation of the citizens. *Value-Addition* was shown from the canonical analysis to strongly influence conceptualization

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orientated towards the *Service Delivery View* (SDV) as well as the *Extended Value Network* (EVN) perspective.

SDV, as one of the criterion variables of the second canonical function had a canonical loading of 65% and significantly loaded with three items in the factor analysis. The two critical loadings of the factor analysis were conceptualizations featuring performance capabilities arising from the technologies of e-government and the computational power of ICT engineered for public service delivery. The former is a *tool view* conceptualization where e-government is seen as a productivity tool for extending the reach of government in order to achieve certain performance benefits. The computational perspective was captured to be that geared towards enhancing existing computational capabilities of ICTs used in government (*computational view*). This view may elevate e-government conceptualization as an algorithm, where its technologies are represented through "algorithmic endeavors to build new or enhance existing computational systems that can support human activity" (Orlikowski and Iacono, 2001, p. 127). This makes sense especially when conceptualization of applications is visualized as different phases, where applications in later stages of e-government build on earlier phases as a result of adopting or adapting better technologies. Thus SDV captures two conceptualizations of technology relevant to the e-government artifact: E-Government as a *productivity tool* and as an *algorithm*. The highlight of the EVN perspective further builds on the proxy view. The critical items that informed the naming of the factor revolved around its perception as a *capital investment* with measures such as financial resources spent on e-government technologies as well as the return on investment of these technologies over time.

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Overall, canonical function 2, with EVN and SDV appear to elevate the role of technologies of e-government in terms of technical capabilities or being able to delineate the value arising from investments in these technologies. What may be implied in these conceptualizations, as a composite, is that the *technology artifact* of e-government is separable and therefore it is possible to focus on *specific capabilities*, *features* and *measures of value*. Thus overall, the composite theme of the criterion variables in canonical function two is that of a *technical artifact*, capable of enhancing service options, beyond the normally received view.

Thus from the second canonical function, the dependent variable set reflects a view of the conceptualization of e-government from a *tool* and *computational view* perspective by elevating the technical capabilities of ICTs and their role in creating added value to users (citizens) of government services. Both the EVN and SDV, as a set, focus on e-government as a *technical artifact* which is strongly influenced by the composite formative construct of *Value-Addition* to government service. This conceptualization (or views) of e-government is can be said to be orientated towards achieving an external impact or has a demand focus towards citizens.

6.5 CONCLUSIONS

In conclusion, this study is premised on the notion that developing countries are net importers of technology, they have minimal influence in the design of these technologies and the impacts expected from them. This is also the case with e-government, which is reliant on a number of ICTs imported into the developing countries. The starting point was therefore to theorize the relationship between the expected impacts of e-government and how they relate to e-government conceptualization by implementers at the meso-level government.

The canonical correlation analysis undertaken showed a significant and unambiguous association between the impact and conceptualization factors. Two canonical functions were interpretable. The first function of the predictor variables was christened *connected government* and was shown to be related to the conceptualizations of *Evolving Artifact.* The internal orientation of *connected government* implies a *supply-side* focus aimed at having a public administration system that is well integrated technologically.

The second set of the predictor variable highlighted the theme of public service delivery through *Value-Addition* as an expected outcome. This was associated with the formative construct of the *Technical Artifact* nature of e-government. The implication is that if the expected impact of e-government is *value-addition*, then the likely conceptualization by implementers is that of a *Technical Artifact* geared towards augmenting service delivery functions of government. The interpretation is that this is more of a *demand-side* orientation.

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The overall emergent meaning is captured in Figure 6.5, reflecting the formative constructs of connected government influencing evolving artifact, as well as value-addition influencing the technical artifact conceptualization. The four are considered as formative constructs, regarded as a composite of multiple measures which keep on changing as the underlying construct changes (MacCallum and Browne 1993; Jarvis et al. 2003). This is expected, since the underlying objectives of e-government are not assumed to be static, thus measures associated with these change over time. The changing objectives influence the conceptualizations associated with those objectives. In this study, the expectation of having a *connected government* and *value-addition* are not static and their underlying measures keep on changing too. Conceptualizations arising from these are also affected likewise.

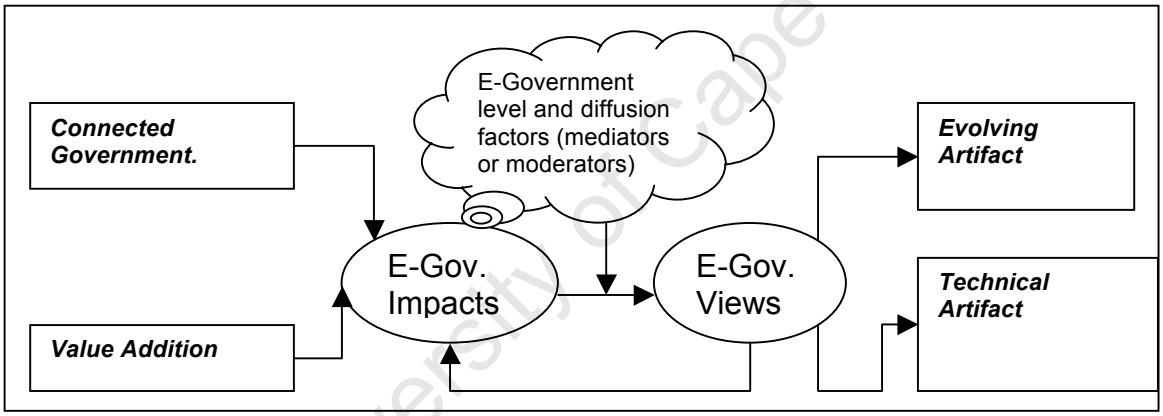

Figure 6.5: E-Government Impacts and Conceptualization

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Given that changes are inevitable, the expectation is that there needs to be a learning process, entailing improvements from previous objectives and conceptualizations of e-government. The feedback loop from views to impacts is based on the assumption that, as the expected impacts are realized, the policy makers and implementers reconsider and re-contextualize the measures underlying the expected impacts, which feed into the continuous conceptualization of e-government. These relationships are likely to be moderated and mediated by other factors such as the current status of e-government infrastructure in a country. The direction of the feedback

loop from conceptualization to expected impacts can be assumed to hold for as long as the developing countries remain net importers of technologies of e-government.

If learning takes place, then changing paradigms of e-government are unlikely since improvements would be emerging from those undertaking implementation instead of 'edicts' from Western nations whose focus are not necessarily in tandem with local realities. For instance, the e-government vision partly captures the need for Kenya to be part of the knowledge society (again a largely Western concept) with the assumption that the extant computing platform is adequate. This assumption is not tenable in the current African situation, and evidently, the ethos of a knowledge society is not captured from what emerges in this study. The concern of e-government implementers is predominantly a *supply-side focus*, evidently pointing to less priority on programs that can foster more inclusion of other stakeholders. The elevation of the supply-side (back office effects) finds traction from the canonical function 1 that was highly significant and unambiguous when interpreted.

Two consequences of a supply-side focus on e-government are offered: from an *ensemble view* as well as from a *proxy view* conceptualization of e-government. The ensemble view brings out the perception that e-government remains an *artifact-in-formation*, critically dependent on the roles of various stakeholders. The proxy view reveal that e-government is a *surrogate* for achieving *internal automation* of the internal systems in order to realize bureaucratic efficiency through greater access to information, automation of routine operations, and systems integration (Calista et al, 2007). The notion of *artifact-in-formation* discounts notions of a monolithic technological 'black box' since the nature of e-government is dependent on evolving stakeholder relationships. This is conflictual with dominant evolutionary approaches that 'back boxes' e-government maturity through various stages, yet its conceptualization appears to be linked to how to manage stakeholder dynamics.

The second consequence stems from the surrogate perspective which elevates e-government as a galvanizing metaphor for attaining *internal automation* for bureaucratic efficiency. This is again conflictual to ideas, practices and visions of e-government that appear to elevate greater inclusiveness of the e-government by the designers (Chapter Four, Calista et al, 2007). So while

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the e-government visions appear favorable to citizen participation and inclusiveness in government affairs, the meso-level perceptions of implementers has an emphatic internal focus of achieving automation of internal processes. The next chapter (Chapter Seven) presents how the issue of *stakeholder dynamics* and *internal focus* 'plays' out in the implementation of an e-government project at the micro-level to provide a complete explanatory insight into the emerging e-government artifact.

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CHAPTER SEVEN

ALIGNMENT AND IRREVERSIBILITY OF E-GOVERNMENT INFRASTRUCTURE PROJECTS

7.1 INTRODUCTION

Chapter Seven [16]presents a micro-level view of how e-government is unfolding in the context of the local authorities (LAs) under the Ministry of Local Government (MoLG). The analysis in Chapter Four revealed the managerialist intentions of the organizing vision of e-government policies which primarily adopt an extensions strategy. These policies provide scenarios on what the designers intended through various programs of action, yet the actual inscription of these can only be visible in their implementation. The inscriptions of scenarios envisaged by designers are played out in actual programs of action, definition of the roles of users and the technological infrastructure (Ciborra, 2004).

However, the design intentions are rarely realized especially in developing countries that are beset by what Heeks (2002) characterize as a *design-reality* inconsistencies. Meaning that designs based on plans, procedures, methodologies and strategies, developed from a rationalistic perspective (Chapter Four findings), rarely capture the 'here and now' of e-government implementation. Development of an e-government infrastructure needs to recognize the complexity in the environment and adopt a 'new' management agenda during its development.

The purpose of this chapter is to further illuminate how the e-government artifact is unfolding in actual implementation in local contexts. Ciborra proposed a possible Heideggerian agenda, with a minimalist Actor Network Theory (ANT) perspective for understanding the information infrastructure alignment (Ciborra, 2004; Hanseth, 1998). He recognized that development of information infrastructures rarely go according to plan and eventually acquires a life of its own during development as a result of the complexity of the environment.

[16] Published as: Muganda-Ochara, N. & Van Belle, J.P. (2008). Managing the E-Government Adoption Process in Kenya's Local Authorities. *Communications of the IBIMA*, 1(1): 98-109.

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The analysis in this chapter adopts a minimalist version (Hanseth, 1998; Ciborra, 2004) of Actor Network Theory (ANT) as a meta-theory for following the actors during the adoption process to assess *irreversibility* of e-government projects; while the concepts of Hospitality and Drifting are used to assess alignment to a 'new' managerial agenda proposed by Ciborra (Bijker and Law, 1992; Ciborra, 2004). Theoretical thematic [17]analysis (Braun and Clarke, 2006) was employed to assess the *alignment* of current local implementations of an e-government infrastructure project in Kenya under the Ministry of Local Government (MoLG) dubbed Local Authorities Information and Financial Operations Management (LAIFOMS). The LAIFOMS project has been underway since early 2000 and is still ongoing. The background to LAIFOMS was provided in Chapter Three and also in Appendix 3.2.

From the description provided in the LAIFOMS background, the process of adoption and use is studied through the lens of translation, inscription and irreversibility. The first level of the analysis uses the ANT perspective to understand the processes of building, growth and stabilization of the network around the development process of LAIFOMS. The purpose of the second level of analysis is to interpret the process of adoption by taking into consideration the *alignment* of the adoption process according to a Heideggerian ANT perspective proposed by Ciborra (2004). This is then followed by an analysis of the strength of *irreversibility* of the infrastructure project. The last section presents a summary of findings which shall partly form the basis of further analysis in the next chapter.

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7.2 *TRANSLATION* PHASES OF LAIFOMS

This section relies on the sociology of translation and inscription to identify the actors, their roles and interests. The notion of inscription refers to the way technological artifacts embody patterns of use during the adoption process (Ciborra, 2004). This is achieved when the developers of a technology artifact such as LAIFOMS work out scenarios or options on how the technological artifact will be used. These scenarios are visible in the form of features or modules that expected to achieve certain functionalities when used by the various role players or actors. These visible

[17]A 'theoretical' thematic analysis would tend to be driven by the researcher's theoretical or analytic interest in the area, and is thus more explicitly analyst driven (Braun & Clarke, 2006, p. 83).

modules represent certain interests of actors that have been inscribed in the technological artifact. Thus the actors[18] inscribe their interests in the technological artifact. The language of translation and inscription is used to understand the adoption of LAIFOMS as an e-government infrastructure for Local Authorities, referred henceforth as LAs. The focus is on how the actor-networks grow, change and stabilize during the process of adoption of LAIFOMS as an Information Infrastructure (II) for E-government. The case is analyzed on the basis of the four moments of translation: problematization, *interessement*, enrolment and mobilization

7.2.1 PROBLEMATIZATION

Problematization in ANT is the process of enlisting other actors by suggesting and convincing them that they share a common problem. This is possible if an actor convinces others that it has the skills, knowledge and resources to devise a solution to the common problem. If this feat is achieved, then the actor becomes indispensable or an obligatory point of passage (OPP) (Law and Callon, 1992). The original problem can be renegotiated or translated as allies join the network defined by their common ownership of the problem. The problematization process can be analyzed by identifying the actors and how the roles they played influenced how the network of alliances takes shape. Following the actors aids in identifying the agencies/actors and their roles (Latour, 1987).

Table 7.1 shows a general categorization of actors that have played the role of designer and/or user in LAIFOMS implementation. As a designer, an actor played the role of influencing the overall LAIFOMS design by providing certain requirements. The user group depends on information coming from the LAIFOMS system.

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[18] According to ANT, a technological innovation is developed and adopted through the building of a heterogeneous network of alliances comprising human and non-human actors, or actants (Callon, 1991).

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Table 7.1 - Classification by Function of the Key LAIFOMS Actors

Group	Organization	Department	Designer	User
Government of Kenya	Office of the President	Directorate of E-government	+	
	Ministry of Finance	Kenya National Budget Office	+	+
	Ministry of Local Government	KLGRP		
		IT	+	+
		Accounts	+	+
		Minister (1999)	+	+
		Inspectorate		
Supra-national / International Institutions	World Bank	KUTIP	+ (until 2001)	
	EU	DFID	+ (From 1999-2005)	
	World Bank	Country Office	+ (from 2006)	
	Duke University	DCID	+	
Other Government Arms	Anti-Corruption	KACC		+
	Auditor General	KNAO		+

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Suppliers	Local Audit Firm Local ICT Suppliers	National Practice International Practice Head Office	+ +	+
Consumers	Citizens Business	Accounts Clerk Accounts Clerk		+ +
Civil Society	ALGAK Media	Head Office	+	+ +
Local Authorities (LAs)	City Councils Municipal Councils Town Councils County Councils	IT Accounts Administration Users	+ +	 + +

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The non-human actors identified included the data items from LAs, existing ICT infrastructure, management procedures and processes, various strategy papers (Economic Recovery Strategy, E-government Strategy, Poverty Reduction Strategy, Vision 2030), and expectations of LAs customers (citizens, businesses and MoLG). The initiators of LAIFOMS in the LAs are the MoLG and the World Bank. The key role players of LAIFOMS within the LAs include Accounts Department, Consultants, Other Government arms (Kenya Anti-Corruption Commission, Auditor General) and clients of LAs.

7.2.1.1 Roles and Interests of each Actor

Ministry of Local Government (MoLG): The mandate of the MoLG is to manage LAs as service provision outlets for the government. The ongoing reform initiatives in the Kenya government since 1993 made it inevitable that the LAs would be considered under the reform effort. The realization resulted in the setting up of the Kenya Local Government Reform Program (KLGRP) as a secretariat under the MoLG taxed with spearheading reform initiatives in all the 175 LAs in Kenya. The main aim of the reforms within the LAs is to strengthen their capacity to deliver

services to its residents. Ensuring proper management of LAs is therefore part of the mandate of MoLG.

The interests of the MoLG can therefore be traced to the overall reforms to improve governance. LAIFOMS infrastructure's origins found expression in the requirements of the Local Authorities Service Delivery Action Plan (LASDAP) process required for LAs to access LATF (Chapter 3). Building LAIFOMS in all the 175 LAs would therefore ensure effectiveness in managing information from the LAs.

Local Authorities (LAs): Due to constitutional amendments that eroded the effectiveness of LAs as service provision units since the 1970s (Stamp, 1986), the LAs were either not feasible units of administration or were in indebt by the time of introduction of LAIFOMS. There were mandatory requirement to introduce Single Business Permits (SBO) and its information requirements; the introduction of LATF and the LASDAP information requirements made it obligatory for LAs to participate (discussed in Chapter Three). Therefore, the interest in participating was dictated by the dire governance circumstances the LAs found themselves in. The implicit motivation to participate is therefore driven by the funding accruing from their participation in the SBP, LASDAP and LATF processes.

Local Authorities' Clients: These are all the traders and business people within the jurisdiction of the 175 LAs in Kenya. For LAIFOMS to be made operational, the LAs require information from their clients which are fed into the system. In addition, reports from LAIFOMS need to show evidence that there is local participation in the use of LATF finances (LASDAP). Forms for capturing information from the clients were designed by the KLGRP designers. Therefore the role of LAs' clients is to provide information used as input into the LAIFOMS system. Their interests stem from their expectation of better services from LAs.

Development Partners and Consultants: There have been a number of consultants at various points of the LAIFOMS lifecycle. Consultants from World Bank, DFID, European Union and DCID provided policy analysis, capacity development and assistance to the design and

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implementation of strategic policy and administrative reform initiatives linked to LATF, SBP, LASDAP and LAIFOMS. The interests of the development partners have been on the need to improving financial governance of local authorities. This can be traced to their involvement since the 1990s in the MoLG where they have been involved in pushing for a SBP as well as strengthening Monitoring and Evaluation systems throughout the government. Thus what emerges is an infrastructure geared towards strengthening financial and operations management of the LAs as well as increased monitoring.

There are also *local consultants* such as the Local Audit firms. It is mandatory that LAs engage external audit firms to prepare their financial statements for the Office of the Controller and Auditor General, under the Kenya National Audit Office (KNAO). The audit firm staffs are involved in interpreting the requirements of the KNAO as well as ensuring that reports from LAIFOMS follow generally accepted accounting standards (GAAS). The World Bank also hired consultants to undertake design, training, programming and implementation of the LAIFOMS in LAs. In addition, there have been ICT consultants engaged to undertake various ICT projects such as web design for the LAs. The interest of the local consultants is to make a profit/return based on a successful delivery of various solutions supporting LAIFOMS.

Other Government Arms: Outside of MOLG, there are other independent constitutional offices such as the Kenya Anti-Corruption Commission (KACC) and the Kenya National Audit Office (KNAO). KACC's mandate is to act as an anti-corruption watchdog in Kenya. They have required that LAIFOMS' design also take into account their information requirements. Therefore KACC has been involved in that sense as designers and users of LAIGOMS. KNAO also requires audit reports from all government agencies or agencies that receive money from the central government such as LAs. Therefore, the reporting requirements of KNAO have been considered in the design of LAIFOMS.

Civil Society: A number of organizations have been involved in mobilizing support for reforms within LAs and ensuring that the public participate in the affairs of the council. They have played a role in ensuring that the system is acceptable within LAs as well as encourage some level of participation from the public. Public participation is crucial since LAIFOMS information

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input is partly from the public. In addition, the financial support from MoLG through the LATF funds using LASDAP is pegged on public participation. Thus the role of the civil society organizations such as the Association of Local Government Authorities of Kenya (ALGAK), Kenya Alliance of Resident Associations (KARA), and powerup.co.ke have been involved in the redesign LAIFOMS and empowerment of the LAs' staff and clients. Others include Action Aid (Kenya), "We Can Do It", KARA, Institute of Policy Analysis and Research (IPAR) as well as Kenya Private Sector Alliance (KPSA).

Non-Human Actors: Various policy interventions proposed to strengthen the management of the LAs also played a part in influencing the problematization of LAIFOMS. For instance, LAs' are required to adopt a more participatory approach to development projects in their locales. The LASDAP process was therefore initiated to aid in strengthening the process. The SBP as well as the LATF introduction also played a critical role in trying to strengthen the management of the LAs. Thus overall, LATF, SBP and LASDAP information requirements therefore qualify as non-human actor that influenced the problematization. Other policy texts that have providing an underlying vision for LAIFOMS at the national level were those that were analyzed in Chapter Four.

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7.2.1.2 Establishment of an Obligatory Point of Passage (OPP)

The reforms of LAs were being supported by a number of international development partners. This was in the form of technical support as well as direct equipment purchases for the LAIFOMS. The pilot LAs 'graduated' from using IFMIS as piloted in the other government ministries to LAIFOMS, with additional and unique capabilities. Therefore development partners were part of the process to ensure the piloting of these systems was successful. Financial support and technical assistance during this period came from a number of sources. DFID provided support from 2001 to 2005. However, their support continued to diminish due to a reduction in their thematic areas of focus as well as their perception that the government was not on target to meet the millennium development goals (DFID, 2006).

In addition, they cited deep seated problems of economic and political patronage which stood in stark contrast to the new NARC government's commitments on taking power in 2003 (DFID, 2006). Due to reduction in funding, the government negotiated for support from the European Union (EU) who commenced support from 2005. The Duke Center for International Development (DCID) also provided technical assistance from 2002 to 2006. Their main focus was on policy analysis, capacity development and assistance to the design and implementation of strategic policy and administrative reform initiatives linked to the LATF, the SBP, LASDAP and the LAIFOMS (DCID, 2007).

It was also realized on operationalization of LATF that a lot of LAs did not have the capacity to handle the requirements of LASDAP. This attracted the enrolment of mostly civil society stakeholders to aid LAs in interpretation of policy as well as implementation. Some of the civil society that have participated in this process are Action Aid (Kenya), "We Can Do It", KARA, Institute of Policy Analysis and Research (IPAR) as well as Kenya Private Sector Alliance (KPSA)(GOK-LASDAP, 2005). The role of these societies has been in mobilization of stakeholders to participate in the process to help realize the reform initiatives of KLGRP.

Therefore the development partners as well as the other stakeholders were more comfortable with an accountable entity separate from mainstream central government. The institutional entity which acted as a proxy to LAIFOMS as an OPP was therefore KLGRP. This maybe attributable to the fact that the local governance framework also extends beyond the LAs and also consists of provincial, district, location and sub-location administration with technical staff drawn from various ministries. The sheer size of the MoLG created a need for an additional secretariat focusing solely on reforms in LAs.

KLGRP has three areas of focus. The first is to ensure rationalization of central – local fiscal relationship. The second is enhancing local financial management and revenue mobilization. The third is improving local service delivery through greater citizen participation. LAIFOMS was therefore conceptualized to help in partly realizing the reform agenda of KLGRP. Since the inception of the system in a number of LAs in 1999, they and other stakeholders have been reliant on KLGRP for governance reforms to form the basis for e-government adoption in LAs.

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KLGRP has acted as the OPP. However, this situation changed in 2004, when maintenance of LAIFOMS was handed over to the Inspectorate Department in the MoLG. This change of status was explained thus:

> We have handed it over to the Inspectorate Department because they are the owners. We initiate the reforms, but they own it. These reforms are managed by us, but …It is a process, the owners of these projects have to be on board with us from inception (Officer in Charge, M & E, KLGRP).

KLGRP (with institutional support from Inspectorate Department) therefore became the OPP for the various stakeholders in various respects summarized in Figure 7.1 and discussed further.

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Figure 7.1: Translation in Action, Adapted from Callon (1986)

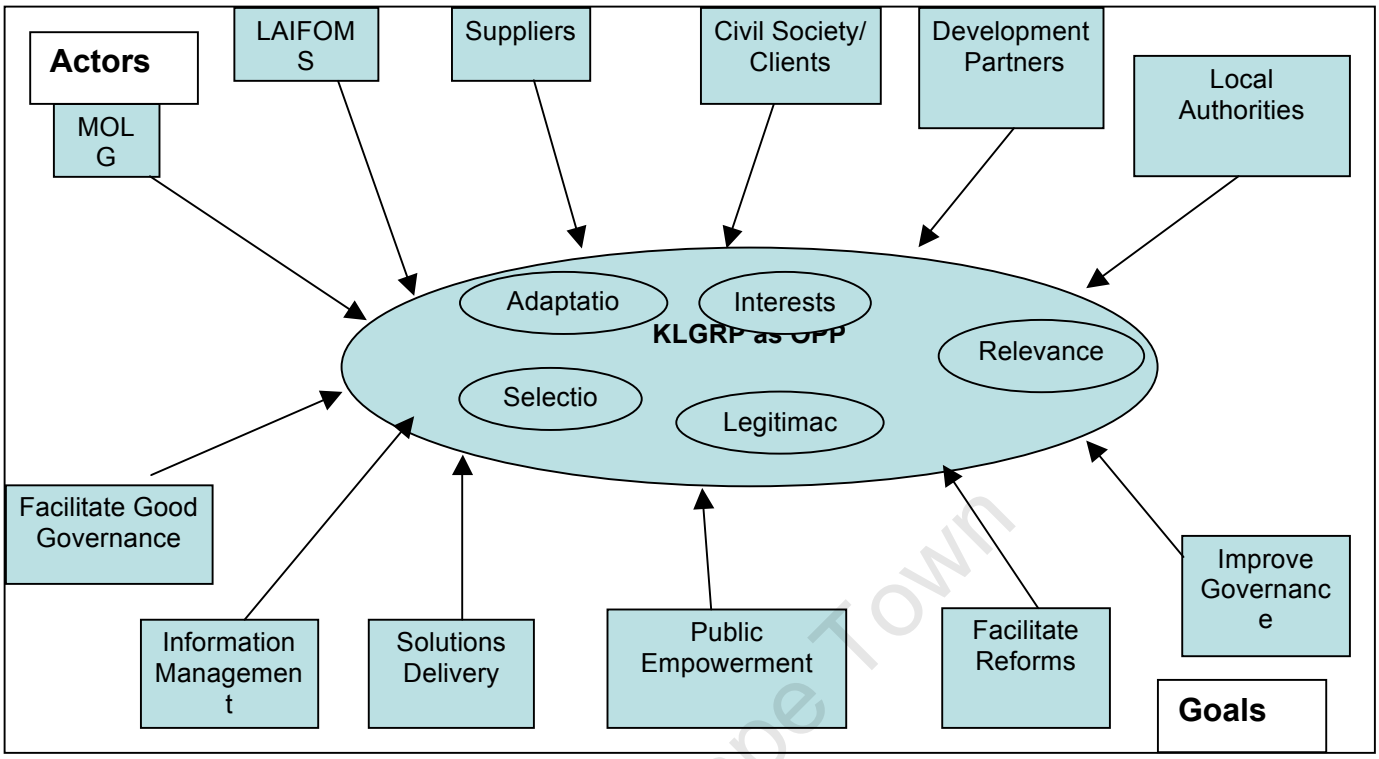

Figure 7.1 summarizes the relationship between the various human/nonhuman actors, the obstacles they face and their interests. LAIFOMS as an actor need to remain adaptable to these various interests in its quest to provide centralized information management for the achievement of governance objectives.

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• *MOLG*: Management information from LAs is much more accurate and is received on time since the ministry is able to access this information from a centralized database. This supports the objective of E-government Strategy in Kenya of improving governance through adoption of ICT. Achieving integration of back office systems in all ministries is one of the key milestones of the E-government strategy (GOK-ERS, 2004). This will enhance efficiency and effectiveness in service delivery. Therefore adoption LAIFOMS should be seen as an attempt towards meeting the goals of e-government Kenya. Specifically, LAIFOMS has been instrumental in gathering accurate information for the management of all the LAs:

> We were trying to get the budget summaries from local authorities. But even these summaries were not coming in the right format. We started by capturing some of the information that was coming from the local authorities. We started with cleaning some of the information

> which was coming from some of the councils. Even how the budgets are prepared, you are worried about how credible is the information you are getting. So we started asking ourselves, why don't we first assist them to prepare the information that we want, so that we minimize the difficulties of yet again having to clean the data which is coming from the local authorities countrywide (Officer- in- Charge, M& E, KLGRP).

The goal of MoLG in this process is to ensure that LAs are facilitated to provide good governance to the public. This they are attempting to achieve through KLGRP. Thus KLGRP becomes an obstacle to achieving good governance they do not perform their role in the translation process (Figure 7.1).

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- *Local Authorities*: The MoLG provides funds to LAs so that it can provide better services to the public. This is part of the central government's devolution strategy to help in providing better services (improved governance) to the citizens (private and institutional). Because there are finances involved, there was need for LAIFOMS to help in processing information from all the 175 LAs serving 37 million Kenyans (2008 estimate). Therefore, LAIFOMS is helping LAs in internal management matters, provision of services to the public as well as providing timely reports to other government agencies. These are aspects of enhancing efficiency and effectiveness, pillars upon which E-government implementation in Kenya revolves around.

> From the year 2000, they noticed that the changes we effected were starting to bear fruit; they then started coming to offer support and even refer other councils to consult us. And even the political wing' realized the improvements especially in revenue collection and has been providing support since then. So there has been an impact on revenue collection and things like that. This was after about six months. We were able to capture at least three quarters of the people in the market. So we then started polishing up the system. We then started adding modules. Like we added the water billing. You know that water has a direct impact on the people (**Accountant & ICT Officer, Mavoko Municipal Council**)

The goal of LAs is therefore to improve governance through the use of LAIFOMS. The obstacle towards this process is to ensure continued relevance of LAIFOMS to their governance needs. This challenge has been addressed before through modifications of the system.

- *Public*: Visibility of improved governance through LAIFOMS is in the form of ICT-based services which have been made possible since its adoption. For instance, clients are able to receive reports on a timely basis through e-mail; the public can also access the MoLG's website

(www.localgovernment.go.ke) to see results of LATF utilization based on the LASDAP participatory process. Therefore, there has been marked improvement in receiving responses from LAs that have adopted LAIFOMS. This has had the effect of improving the image of these LAs in the eyes of the public it serves. One of the direct benefits to the clients of Mavoko Municipal Council (one of the local authorities) was:

> But the interesting thing is that when harmonized, we even reduced the rates overall especially for those that were paying more. Overall we did not therefore find a lot of resistance because a majority benefited from lower rates (**ICT Officer & Accountant, Mavoko MC**).

- *Civil Society*: Most of the civil society organizations have used LAIFOMS as a tool for demanding more empowerment of LAs. For instance, through ALGAK, a number of LAs have visited LAs that have implemented LAIFOMS to learn about its implementation. Other civil society organizations have obtained funding to organize conferences and workshops to sensitize the public and other civil society groups. The themes revolve around improving governance in other LAs through the adoption of the LAIFOMS. Civil society has been involved as part of their role to involve mostly excluded stakeholders. They are involved in the reform process and enlighten these groups if and when there are positive changes. The setup of KLGRP within the MoLG signaled to the civil society a commitment from the government and other development partners that good governance in the LAs was now a priority. A number of civil society organizations started participating in awareness creation campaigns to help LAs embrace reforms that were being propagated through KLGRP.

> Initially it was a World Bank project within the local government (meaning KLGRP). Remember that since the early 70s, nobody really had a positive image of the local authorities. […] But, the World Bank group came around 1996, it is then when the ministry started thinking, how, and where do we start to change this image. The World Bank was ready to donate the equipment. Since then they started to initiate forums organized through various civil society organizations, where councils would send representatives so that councils can learn from each other. This was started by the reform initiative from the ministry (**Accountant & ICT Officer, Mavoko MC**)

Civil society organizations in the developing countries are mainly concerned about the empowerment of disadvantaged members of the community such as the poor, minority groups, inequity, etc. Thus, as the dynamics of the communities continually change, the challenge for the civil society is how to remain relevant to the target groups.

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- *Consultants*: The consultants benefit is the profit or the pay from getting involved in the LAIFOMS initiative. The goal of suppliers and consultants is to deliver a solution at a profit. Therefore involvement in the LAIFOMS initiative is that there is fairness in the selection of suppliers.
- *Other Arms of Government*: The interest by other arms of government in using KLGRP as an OPP for achieving good governance is the need for credible information from LAIFOMS.

> There are other stakeholders who are starting to influence the process. Even the controller and auditor general have become interested. He has noticed that there is information that is coming out from the councils that is more credible. He has therefore started becoming a key stakeholder, because we are started to get certain requirements from the office that needs to be incorporated in the systems. Even the Anti-corruption authority has come in now (**Officer in Charge, M&E, KLGRP**).

- *Development Partners*: Development partners are interested in ensuring that the social programs that they support are meeting their funding objectives. They get involved to facilitate reforms with particular interests. Given the diversity of development partners over the years, the challenge in the translation process is how to manage the various interests of stakeholders.

Overall, the scenario emerging on how the LAIFOMS infrastructure is expected to be used revolves around:

- Improving and facilitating good governance
- Improved information management by the LAs
- Empowerment of the public to participate in governance

In summary, the initiators of the LAIFOMS system problematized it by pointing out that the initial IFMIS that was being implemented in all ministries including MoLG (and by extension all LAs) was limiting. Further, the pace of implementing the IFMIS had been slow in the central government ministries. The policy for implementation of IFMIS had also been slow in coming yet the LAIFOMS group had already been involved in piloting the system for close to 10 years. The argument was that the LAs requirements were unique as opposed to the initial IFMIS. One of the respondents justified this problematization by saying that:

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> The most unfortunate thing is that the central government is behind. We have had a number of meetings with them. They are in charge of ICT Policy. You see they are coming up with a policy, even after we have piloted and implemented systems. Right now they are trying to integrate financial systems in all ministries. For us, we have had such a piloted system for more than ten years now. And our system is more comprehensive in such a way that local authorities do not just spend money like the government. They have only one side of the account. Local authorities have revenue authorization. So the database that we have for the systems captures both revenue and expenditure. They are a little bit behind in terms of systems development in other ministries. I know there is a difficulty in terms of policy and what is on the ground. It has always happened in Kenya. You find that implementation has been happing for some time and then policy follows later (**Officer in Charge, Monitoring & Evaluation, KLGRP**).

7.2.2 INTERESSEMENT

This is a process of persuading other potential allies by those who have the solution to the common problem. Winning the support of others requires that an actor makes itself indispensable (OPP) by translating their interests and enrolling them so that they can only solve their problem using the technology. How KLGRP became an OPP has been described above.

By 2008, LAIFOMS has been installed in 68 LAs and the user departments are already using the relevant modules (Limo, 2007). The user departments in the LAs are structured around the treasury and the town clerk. The treasury mainly presents interests of the political wing' while the town clerk has an administrative role. The various departments are already using the LAIFOMS system to generate various reports. The success of the system hinged on training which was handled by the various consultants at different times. The *Consultants* also organized workshops and conferences to interest the participants from LAs to encourage those who were not under the pilot scheme to visit those that had successfully implemented LAIFOMS. This created interest in other consultants (such as vendors).

> They engaged in the implementation as part of what was prescribed following a conference and a series of meetings that was meant to bring in e-government. It actually helped thankfully. Most of these councils don't really have the capacity to say what they want, other than Systems that help in day to day work like typing and accounting. Any system that is able to link to the headquarters to exchange information etc, these are basically backed with a couple of credits that are donor supported, etc so you may find that other councils are implementing due to these initiatives. Certain stakeholders, especially vendors of turnkey solutions have played a significant role, in fact even in organizing the conference, their banners are all over. I may also point out that even central government may just be reading a script from somewhere trying to get a system that would make them more accountable, more

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> transparent, etc. It may also be true that locally, there is some capacity that may be developing, especially in ICT (**ICT Consultant, MOLG**).

MoLG, as a focal actor in the process bought into the idea of reforms as a government wide initiative. However, there is a subtle link to the influence of donors and other development partners in the quote above and in the following:

> Essentially the influence of vendors let alone development partners who are coming in now to talk about good governance can only come through via these. This is what everyone else is doing; it is working here and there and maybe to bankroll the process. Either way, the end justifies the means, at the end of the day; we can't gainsay the efficiency that come from using ICT (ICT Consultant, MOLG)

Part of the concern for the MoLG was the bad image of the LAs over the years. Thus, the reforms that were being undertaken considered the need to improve the viability of all LAs through management reform.

Some insights were evident in the processes of interessement within LAs such as *Mavoko Municipal Council (MC)*. For instance, the KLGRP staff and the consultants would claim that LAIFOMS was a project from the government of Kenya, while it was actually being 'pushed' by external partners such as the World Bank. This misrepresentation of facts was intended to ensure faster acceptability of the project by the Las. This was necessary given that the politicians in the LAs would have offered resistance if they realized LAIFOMS was being pushed by 'outsiders'. The government was also pushing its own agenda to reclaim legitimacy before the semi-autonomous LAs and therefore the MoLG insisted that the project need to be seen to come from the government. Thus the acceptability of LAIFOMS was possible within Mavoko MC and other piloted sites because they assumed it is what is needed to get credible reports to the government.

The public who require services from LAs were further engaged in LAIFOMS implementation through sensitization:

> We started by first sensitizing *Mwananchi* [Swahili word meaning citizen]. We wrote to all our customers, we also went to anywhere there was in public gathering and in the

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> marketplace and distributed forms for capturing their details. We did all this before the implementation of the systems. Some of them were reluctant, but they eventually took the forms because they know they needed us. We went even to the police stations, post office, to the schools and provided these forms. We took all that information and keyed it. When we keyed it in, we started discovering the discrepancies (**ICT Officer & Accountant, Mavoko MC**).

The other stakeholders from other *arms of government*, such as the KACC as well as KNAO got interested in LAIFOMS post 2003 when a new administration came to power through an anti-corruption platform. The new government through the various constitutional offices such as KACC made corruption a 'common' agenda for all public institutions. Banners and other advertisements encourage participation in anti-corruption activities. A number of judicial commissions were also setup with an anti-corruption agenda. These activities had the effect of creating expectations from public institutions, self-reporting to the anti-corruption bodies. Thus the increase in the visibility of the anti-corruption reform agenda captured the interest of these bodies to widen their lenses for corruption investigation.

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7.2.3 ENROLMENT

Enrolment if the stage in the problematization process when actors are enrolled into alliances and consolidated through bargaining and concessions (Callon, 1991). The motivation of all actors is critical for the enrollment process. This requires that the initiators of LAIFOMS be able to convince and persuade others to enthusiastically join them.

A number of insights point to how the enrolment process was achieved. Commenting on how the public was enrolled to support the LAIFOMS implementation process in, one respondent had this to say:

> Overall we did not therefore find a lot of resistance because a majority of the traders benefited from lower rates. We gave out this notice in the year 2000 in November and gave them a grace period until January to comply. We also had to talk to the councilors to help in this process. Of course the town clerk had to convince the councilors to be part of the process. Also, there had been a revision of the local government act with some requirements, so to the councilors, it was also made to appear as mandatory to implement the system. Thus eventually they supported the process (**ICT Officer & Accountant, Mavoko MC**).

The public realized the benefits of the system when they are charged lower rates by the LAs. However, it needs to be recognized that their input in the process was as providers of information to the design process, not as users of the system. The expectation of LAs is to eventually provide the web interface for the public to access some of the reports from LAIFOMS. LAIFOMS design does not provide an interface for the public to use it. The public's 'experience' with the system evidently is in the form of lower rates (which Mavoko MC attributes to LAIFOMS) as well as the fast turnaround times when request for various reports are noticed.

Enrolment of individual LAs has mostly been through piloting, which is then replicated to other LAs. For instance, Mavoko Municipal Council (as an LA unit) enrolment was through the piloting process which required that over time, the Mavoko user departments become confident enough to use the system. This required that KLGRP staff develop guidelines for LAIFOMS as well as training for all user departments within Mavoko MC.

> We therefore decided to come up with a procedures manual so that all local authorities can present information in the same way. So I think that was one of the milestones. The other issue is capacity issue. You get to some local authorities where the managers do not have an idea of what computers are all about. So we go there and realize we have to train on ICT literacy and this takes time (**Officer in Charge, M & E, KLGRP**).

The impression given was that the staffs are confident to undertake even basic maintenance of LAIFOMS. This is not institutionalized yet, since this task can only be handled by the Accountant who doubles also as the ICT Officer out of necessity. The implementation of LAIFOMS in Mavoko MC did not recommend the need for an in-house ICT Officer or a reliable support mechanism from the Inspectorate Department (the current owners of LAIFOMS) within the MOLG. This needs to be considered as a crucial phase of the alignment of actors. KLGRP was the institution charged with LAIFOMS implementation within Mavoko MC (one of the Las) for over 8 years to 2004. In 2004, they handed over ownership to Inspectorate Department without informing the user (Mavoko MC). After trying to get support from KLGRP a number of times without success, Mavoko sensed that they were now on their own and started 'meddling' with system changes themselves or by contracting other consultants.

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There is thus a breakdown in the long established link with the OPP (KLGRP), while the Inspectorate Department, as the new OPP did not bother to assert their authority. This is still the case as at 2008. This can only be considered a crisis in the network, since it is no longer clear to the allies which institution is the OPP. Enrolment of the local actor (Mavoko MC and other local stakeholders) is therefore questionable. On one score, it may be claimed that Mavoko MC is now completely reliant on LAIFOMS as a solution based on ICT. However, on another score, the role of the new OPP for those that have installed LAIFOMS is now vague. It can only be interpreted to mean that Mavoko MC is not completely enrolled in the process, since the OPP is not indispensable. Mavoko MC constantly requests for support from other consultants even as the accountant learns how to support the system on his own.

In addition, the MoLG in some instances assumed or bypassed the role of the political wing in the LAs in which LAIFOMS was being implemented. Some politicians did not have a clue as to what was going on in the LAs. Management of LAs requires expenditure approvals from committees composed of councilors of the LAs with representation from MoLG employees, such as the Town Clerk (CEO). Failure to enroll a key part of the top management puts to question the irreversibility of the LAIFOMS project, especially if the current management structure is maintained where politicians chair expenditure committees.

Despite the above omission, the MoLG tried to overcome resistance through misrepresentation of LAIFOMS intention as well as coercion:

> The management there did not see the benefit of the system. People try to propagate their interest. There are so worried about any budgeting system. They were thinking that we want to manage their accounts. Initially they were resistant, but they later realized we were friends, because the system was to aid them in their work, especially when we convinced them that the computer does not know who is doing what, but would rather make their system better. They were worried and were imagining that the computer will be monitoring them. We also realized that where the ministry had discretion and someone was resisting, we would take him out so that the effort is not frustrated (**Officer in Charge, M &E, KLGRP**)

Another consultant pointed out that the predominant view of the political wing in the local authorities is that it is for anti-corruption activities. Therefore, many of the politicians were fearful of being monitored using computers because the reforms under the KLGRP are meant to also enhance accountability of the LAs. This fear by the political class is a mood which is not conducive for the acceptance of LAIFOMS, even though some key politicians such as the Mayor

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of the municipal council have accepted it. However, the mayor is political and depends on other councilors to be in that position. The failure to effectively enroll the political wing (as the 'purse holders') in the LAs makes enrollment process doubtful. The enrollment of the MoLG was achieved through the following:

> We have even organized a workshop for the whole ministry. One thing I know, I have been able to train all staff that are directly related to LAIFOMS. At least they know there is LAIFORS. The awareness has been created, because they know that the local councils are our mandate and we depend on the information coming from there. Thus, I believe everyone knows, to what extent they are interested, I have no idea (**Officer in Charge, M & E, KLGRP**).

> This is because the local government used to keep on creating codes for different services. Thus it was a headache for them. We were therefore influenced from the central government so that we can provide them information with standard codes (**ICT Officer & Accountant, Mavoko MC**).

Even though these initiatives were carried out ostensibly to enroll all the MoLG staff, an ICT Officer within the MoLG has a feeling that LAIFOMS belong to KLGRP.

> We are not involved with LAIFOMS. It is part of KLGRP and EU. My role is to maintain websites and also provide user support in the ministry. We were supposed to influence the design of Local Authority websites, but now we don't. The link between the Ministry and the LAs is not very good. When you talk about LAIFOMS, I know what you talk about, but we are not involved. That is 'honey' for the people of KLGRP and they are jittery when you inquire anything about it. KLGRP is everything regarding Local Authorities (**ICT Officer, MOLG**).

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The points above need to be looked at in the wider context of how E-government implementation is envisaged in Kenya. The institutional framework envisages ICT units within ministries as the 'front end' in realizing the E-government vision of the country. Given the governance reforms premised on the E-government Strategy, the ICT units within the MoLG need to realize e-government through the LAs. This should be in addition to realizing the e-government vision internally within the ministry. However, the comments above clearly point out that the ICT unit is not in charge of the computerization of the LAs as the service delivery points for the ministry. This task has been left to KLGRP which has passed on the mantle to the Inspectorate Department. The lack of involvement of ICT Unit in the MoLG further lends credence to the crisis of the OPP concept in this translation process.

The metaphor of 'honey' in the quote is in reference to extra income accruing to the staff of KLGRP involved with LAIFOMS. These are in the form of consultancy fees paid by the donors of the project such as the EU. Thus the insinuation of LAIFOMS staffs being wary of other ICT staff inquiring after the LAIFOMS project is because they do not want to lose control of the LAIFOMS mandate to others. The emerging scenario from the metaphor of 'honey' connotes a disaggregated MoLG team required to support LAIFOMS. This again puts to question the enrolment of the MOLG.

7.2.4: MOBILIZATION: ASSESSING LAIFOMS IRREVERSIBILITY

Mobilization addresses the issues of stability, which is attained when actors' investments in a network reach a point when withdrawal becomes unlikely (Papadopoulos and Merali, 2008). The network is then considered as a coherent entity in which the actions of the individual actors are no longer discernable, but rather confirm to what imposes collective interactions. Ciborra (2004) links the point when possible withdrawal becomes unlikely to the notion of irreversibility, which describes how translations between actor networks become durable and how they can resist assaults from competing translations. Therefore the degree of irreversibility is a good measure of the mobilization process.

In order to assess irreversibility of LAIFOMS, three interrelated processes were addressed:

(i) How the principal actors 'borrowed' the force of their 'passive agent allies' and inscribed their own interests in the LAIFOMS solution artifact.

(ii) how the end users of LAIFOMS have since reproduced and reaffirmed the importance, form and content (Bloomfield et al, 1994) of the solutions artifact and

(iii) Identify the chain of events and actions which identify the shifting focus, actors and how the trajectory influences the stability of the LAIFOMS infrastructure project over time. These issues are addressed in the sub-sections below.

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7.2.4.1: Inscribing Patterns of Action for Users

The strength of an inscription presupposes that the translation process was successful and that the Actor-Network is aligned (Hanseth, 1998). In terms of translation, the implementation process has resulted in a solution largely focused on ensuring financial information management between LAs and MoLG. This is unlikely to meet the E-government Strategy vision of a Knowledge-based society in Kenya (GOK-EGS, 2004). The resulting re-interpretation, re-contextualization and re-registering of various actors roles achieved through the mobilization process resulted in the following solutions artifact shown in Figure 7.2.

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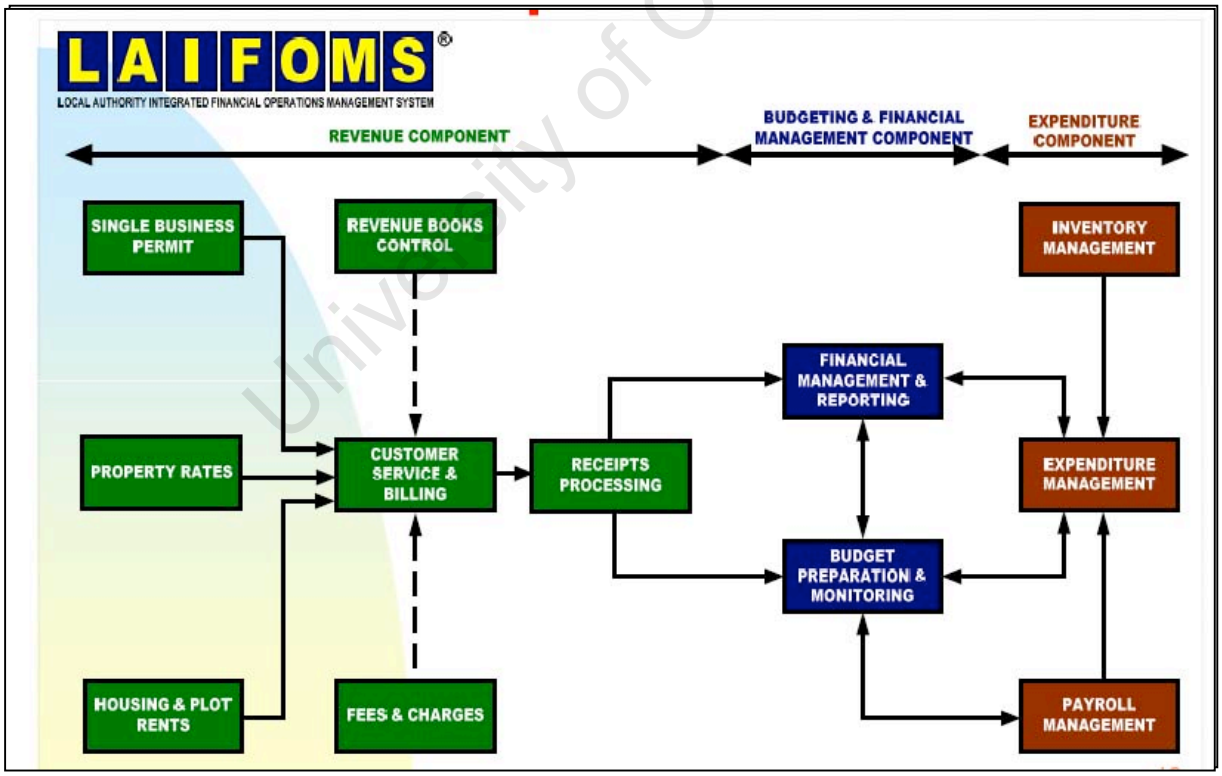

Figure 7.2: Material Inscription-LAIFOMS Modules **(Adopted from Waema, 2007)**

Structurally, the major components of LAIFOMS shown in the figure above are:

- The Revenue Management & Monitoring Component-This has business permits management, rates management, water-sewer-conservation management, periodic management and miscellaneous management subsystems.
- The Budget Preparation and Monitoring Component has the Budget Preparation and Statutory Accounts Modules while;
- Expenditure Management and Monitoring Component has Payroll Management and Creditors Modules
- The also are reporting capabilities offered by LAIFOMS under each of the three main sub-components.

The MoLG has a centralized database capturing information for all the LAs. LAIFOMS provides reports to the MoLG through e-mail. The MoLG can also link to the server of the LA to get the final reports.

In the structure of LAIFOMS, there is no interface for the public to get reports. Public requests are assessed individually and the reports printed or sent via e-mail. However, these are limited to progress reports of the LASDAP process. What therefore becomes clear is that the material inscription of the anticipations of the actors has focused on the MoLG, LAs and the development partners. MoLG is achieving centralization of information management by implementing LAIFOMS in the LAs; LAs are achieving better management, while the development partners are achieving better monitoring and evaluation of public expenditure by the government. This is in support of their funding goals. Thus improved information management and facilitation of good governance in LAs are strongly inscribed in the solutions artifact.

LAIFOMS is being implemented in all LAs in Kenya, with the MoLG as headquarters. Thus as a distributed technology artifact, the revealed task capabilities is being influenced by particular task contexts and structures which were gleaned from interview transcripts as well as a study

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conducted by Waema (2007). These are summarized in Table 7.2. The missing components are pointers to the weak inscriptions of certain actors' interests.

Table 7.2: Defining Element of LAIFOMS as an E-government Artifact		
Artifact	**Existing**	**Missing**
E-government Technology	• Internet Service connectivity (Dial-up and leased lines) • ISP hosting service • PCs connected to a LAN • System Modules emphasizing financial management • Website	• Web Interface • Intranet • Extranet
Tasks	• Management of Council priorities • Analysis of management alternatives that meet governance needs (revenues, expenditure) • Analysis of systems need that meet the needs of MOLG and other stakeholders	• Service Delivery Module interfacing to the website; Human resource needs (assessing capacity)
Task Structure	• Council governance policies, rules and practices such as existence of LASDAP, LATF, SBP, etc. • Formal and Informal Management processes exist	• No ICT units; • No formal IT adoption practices despite 4% budget
Task Context	• Administrative and Political values and norms are context specific to the Las • ICT championship is being driven by central government through MoLG • Personal agenda and relationships • External and internal jolts	• Addressing community values and norms • Addressing community inclusiveness agenda • No formal link to e-government strategy

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Assessing the context in which the artifact is embedded requires a look into the involvement of the actors, since this reveals the pattern of design and use of the representative artifact (LAIFOMS). A number of insights can be gleaned from the table, discussed under managerial practices, technological capability and operational practices that facilitate usage.

(i) Managerial Practices in developing LAIFOMS

Under the managerial dimension, the political commitment of the councilors at the local level as well as their agendas put to question the eventual stability of the system (Waema, 2007). This is because the political wing control how money is spent in the council and certain projects may be 'shot down' if certain interests are not met. For instance, one respondent said:

> So you find councilors do not value formal systems for churning out information and would rather have the funds being used for other things. There is a lot of resistance to IT projects especially at the point of awarding the contracts had it not been for the insistence of criteria by the accounts department (**ICT Consultant, MoLG**)

While the political process of development of IT systems is recognized, the interference by the political wing as these artifacts begin to emerge cannot be wished away. This interference stems partly from their need to benefit from any project in the council in the form of winning tenders. In addition, interference arises because IT projects are viewed as 'stranger' because a majority of councilors do not appreciate the strategic implications of ICT in council management.

The lack of managerial capability is evident in the structure of the council, since there is no clear-cut ICT organization. There is also no provision for an outsourced ICT function within the council. The ICT function is being managed under the Accounts Department, which is under the administrative unit of the council. This results in IT management approaches unlikely to aid in realizing the intended impacts of LAIFOMS as usage surges.

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(iii) Technological Capability

The technological capabilities of LAIFOMS revolve around efficient revenues and expenditure management of the council. The modules, as revealed in the diagram above give a snapshot of the anticipations of the designers-LAIFOMS as a financial and operations management system geared at meeting the interest of the local authority as well as the MoLG. Thus the technological capability of LAIFOMS is structured around PCs connected to a LAN as well as an ISP Internet service for sending reports to the MoLG.

Technological capability does not consider certain segments of stakeholders-clients (such as traders, businesses and individual). Overall, participation of residents in LAs affairs (for instance in Nyeri and Mavoko Municipal Councils) has increased from 3.2% to 43% while interactions with residents have increased from 1.1% to 48%. However, Waema (2007) attributes these increases to the introduction of LASDAP as a requirement for LATF rather than due to the implementation of LAIFOMS. LAIFOMS in its current form does not foster participation and inclusiveness of the public since a service delivery module capable of providing web-based service as envisaged in the country's e-government vision has not been incorporated. Thus notable absentees in the technological capability are an intranet, extranet and web-based interface.

(iii) Operational Practices that facilitate Usage

This insight focuses on those operational practices that *facilitate the usage* of an IT artifact such LAIFOMS. The deployment of LAIFOMS does not consider the need for human capacity to handle ICT issues. For instance, Waema (2007) reports that in two Las (Mavoko and Nyeri Municipal Councils), there was no formal ICT position, despite the two councils having a budget for ICT. This has severely affected the support required for the LAIFOMS in these two councils. The response time for provision of support is also long as there appears to be a lack of enthusiasm on the part of the new owners to provide support. The implication for lack of ICT staff in as well as slow response from MOLG hinders optimal usage of the LAIFOMS system.

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7.2.4.2: Assessing Irreversibility: Global and Local Network Trajectories

The global-local network framework (Figure 7.3) of Law and Callon (1992) is deployed to show how the chain of events and episodes influence the stability and hence the (possible) irreversibility of the network. The global network in the LAIFOMS infrastructure project is a set of interactions that enables the project to take place with the resources provided (money, expertise, executive and political support). The local network is the 'inside' of a project, representing interactions and associations of actors that actually implement and use the project for their benefit. The intermediaries are the various project documents and deliverables that pass from local to global network actors and vice versa. The changing strength of the global and local networks over time can be plotted on a two-dimensional graph, with the *x* axis showing the

degree of the local actors' mobilization, and the *y* axis showing extent to which global actors are attached. The intention in undertaking a network analysis is to establish the *stability* of the emergent LAIFOMS network, since the translation and enrollment processes assumes that the solutions artifact has subsequently been *inscribed*.

The network diagram (Figure 7.3) shows the progress of the project over the years based on the extent of mobilization of local actors (LoA) and the degree of attachment of global actors (GA). In the context of LAIFOMS, LoA would refer to the LAs and Public who depend on their services. The GA would be all the other actors involved in the implementation of LAIFOMS. The various episodes that provide a motivation for this state is shown in Table 7.3.

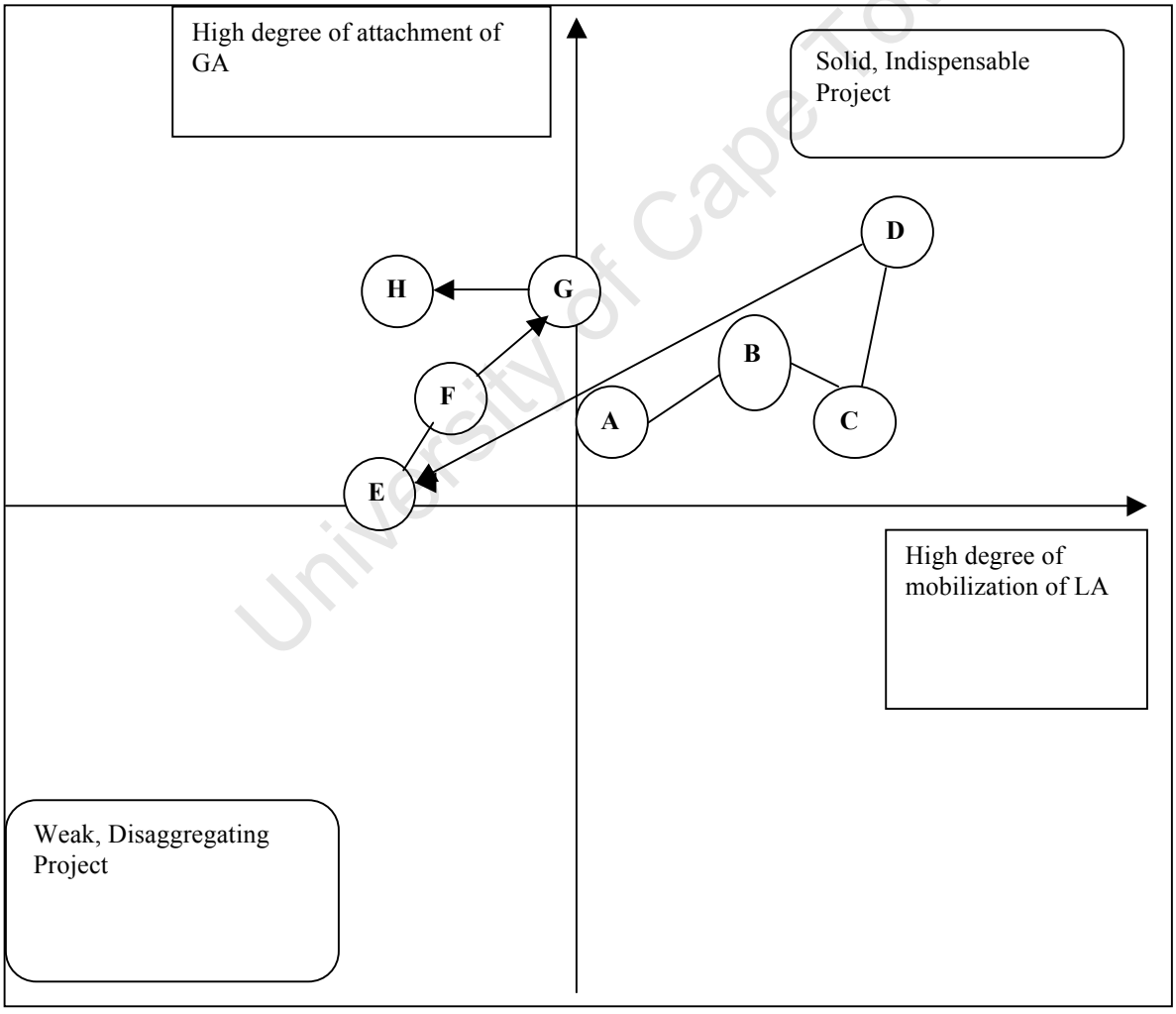

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Figure 7.3: Network Analysis Diagram

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Table 7.3: Choices and Consequences

Node	Description	Consequences
A	• 1970s-1990s-Erosion of service delivery capacity of Las • KLGRP (GA) Set-up under MoLG (GA) with World Bank (GA) Support, no recruitment yet of Local Authorities (LAs) • All LAs are in Debt, thus very weak. The starting point is zero	• GA goes up slightly
B	• 1999/2000 MoLG circular operationalizing Single Business Permit (SBP), Local Authorities Transfer Fund (LATF) and Local Authorities Service Delivery Action Planning (LASDAP) which results in mobilization of some LAs (LoA) for LAIFOMS. • Piloting process of Integrated Financial Management Information Systems (IFMIS) starts in Ministries • Involvement of Civil Society (LoA) in sensitization of Las regarding the LASDAP process	• LoAs increase • Slight increase in GA
C	• 2001: World Bank stops technical assistance; DFID takes over with reduced thematic focus thus reducing capacity of KLGRP • Strengthening of LASDAP, design of IFMIS sensitizes LAs to the benefits	• LoA increase • GA reduce
D	• 2001/2002: Piloting of IFMIS (changed to LAIFOMS) starts,	• GA increase

	with 8 LAs; benefits realized in 6 months. • More government agencies (GA) and LAs (LoA) become interested	• LoA increase
E	• 2003/2004, KLGRP withdraws support for LAIFOMS, hands over completed projects to Inspectorate Department • Internal resistance from parts of MoLG on program design results in lack of support • Central Government starts negotiating with EU for support, technical assistance is quite limited	• Sharp drop in LoA, and moderate drop in GA
F	• 2004-2006-Adoption of E-government Strategy, ICT Policy and Freedom of Information Policy results in mobilization of resources for ICT projects; increased number of private sector participants • No concrete pronouncements on how E-government policy on LAs, however public/businesses continue to get empowered as awareness of LASDAP/LATF requirements	• Increase in GA • Slight increase in LoA
G	• From 2006: More LAs are recruited as process of obtaining LATF funds becomes clearer; 38 LAs are using LAIFOMS; • EU extends funding for TA to 2009	• LoA increase • GA increase
H	• October: 2007-LAs dissolved affecting involvement of politicians till March 2008 • New committees constituted in Las to manage their affairs. This may reconstitute a new learning process in order to engage the newly elected politicians. Uncertainty as to	• Slight decrease in LoA

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Thus the resultant anticipations that are currently being met are represented by the MoLG (and by extension the Development partners) and the LAs interests. These two actor groups are continuing the accumulation of the 'strength of their anticipations' by continuing the implementation of LAIFOMS in all the LAs in Kenya, without expressly considering how the LAIFOMS can be an infrastructure of use by the public. This is revealed from the network diagram since there is a low local actor mobilization based on the motivations in table 7.3.

Overall, the mobilization process reveals a *weak, but indispensable project*. The project is indispensable because of its origins. The LAIFOMS project started on a 'clean slate', when there were no computerization projects within the LAs. Thus at the start of LAIFOMS infrastructure project, there were no viable and attractive alternatives to go back to. In this regard the project is indispensable. The internal positive impacts have also made impressions internally and externally with key officers supporting the project. In addition, the level of involvement of global actors is good, despite a weak OPP. This may be attributable to the foreign support providing technical assistance and financial support. The project is irreversible, but would largely remain confined to internal use by LAs unless a strong institutional OPP links the systems to e-

government ideals. The indispensability of LAIFOMS also links to the broader quest by the government of Kenya to achieve good governance goals. Thus through instruments such as LATF, LASDAP and SBP, the involvement of GA is assured in the long run. However, the LAIFOMS project remains weak due to the inability to engage a broad spectrum of local actors (LoAs).

The network perspective finds traction from the process viewpoint of the diffusion of innovations discussed in chapter three. The network perspective is particularly given prominence in the public sector reforms literature (Papadopoulos and Merali, 2008; Addicott et al, 2007; Tagliaventi and Matarelli, 2006). The network perspective, drawing from the process view of innovations, stresses the value of shared meanings, influence, professional solidarity, power and politics during the implementation of innovations and also highlighting the importance of coherence between global and local network agendas (Addicott *et al.*, 2007). The fact that there seems to be a relatively low level of mobilization of LoAs puts to question the coherence of the emerging LAIFOMS network, thus long term sustainability and alignment to the needs of the local actors is an open question.

The next section addresses the issue of how the emerging LAIFOMS network is aligned to a 'new' management agenda that questions development of infrastructures elevating the role of plans, methodologies, and procedures. The possible irreversibility of LAIFOMS as revealed through the translation processes of ANT may be weakened further if the implementers do not recognize the complexity of building information infrastructures.

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7.3: ALIGNMENT TO A 'NEW' MANAGEMENT AGENDA

This part of the chapter assesses the alignment of LAIFOMS infrastructure development by recourse to Ciborra's 'New management approach' (Chapter Three) that elevates the notion of hospitality as a new language that "offers an opportunity to explore the complexities of designing, developing and implementing systems" (Ciborra, 2004, p. 104). First, the pervasiveness of the new over the old management themes were 'teased' out. Secondly, specific

instances of how actors involved in the implementation of the LAIFOMS infrastructure project are presented to establish what their experiences portend for implementation.

7.3.1 ANALYSIS APPROACH

Theoretical thematic analysis was employed to unearth these experiences. The coding of the interview transcripts was undertaken for a specific analysis agenda: to establish whether, through the implementation process of LAIFOMS, the interactions of the actors highlighted the new management agenda opposed to rationalistic approaches that ignore the complexities of systems. Thus a somewhat deductive theoretical thematic analysis was used which encourages coding to map on specific research questions, as opposed to inductive thematic analysis which allows for coding to evolve themes from a detailed description of the data (Braun and Clarke, 2006).

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Latent themes relevant to a new management paradigm for building information infrastructures characterized by Hospitality and Drifting discussed in Chapter Three were derived using this approach. The metaphors for theorizing what is emergent from the data were therefore from these two concepts. These were regarded as the Discursive Practices (DP) used for interpretation purposes. Table 7.4 below summarizes these discursive practices and the management themes or Discursive Types (DT) discussed in Chapter Three:

Table 7.4: Management Agenda and Discursive Practices

'New' Management Agenda (DT-N)	**'Old' Management Agenda (DT-O)**	**Discursive Practices (DP)**
Care	Rationality	*Hospitality*
Share	Replication	
Reciprocal Cultivation	Strong' Identities	
Crossing Boundaries	Enforcing Boundaries	
'Negative' Capability	Positive Capability	
Service	Seek Consensus	
Flexible Co-Operation	Strong' Control	*Drifting*

Responses whose interpretation are aligned to the latent themes of DT-N point to alignment of the management processes of Hospitality, which would result in an infrastructure able to adapt to the dynamism in the environment due to Drifting (Ciborra, 2004).

7.3.2 DOMINANT THEMES: CONTROL, BOUNDARIES AND RATIONALITY

In Table 7.5, what becomes apparent from the responses is a dichotomy between a community, largely identified as ICT experts within Government and the 'Other' people or the non-ICT experts.

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Table 7.5: Dominant Themes: Positive Capability and Control			
Ref	**Text**	**Description (Text Analysis)**	**Interpretation (Discursive Practice)**
R1	There is Wareng' and Eldoret. There **was pressure** from ***upstairs*** **because *we* had picked** Kiambu and Mavoko due to their proximity to our central office. However, *someone* questioned why *we* were picking only councils within Central province, not knowing that Mavoko is in Eastern province. We were forced to go to Eldoret and Wareng' in the Rift Valley province. **(Officer-in-Charge, M&E, Central Government).**	-Identification of actors who exercise power	Control
R2	***They*** **were thinking that *we* want to manage their accounts**. **Initially they were resistant, but *they* later realized *we* were friends**, because the system was to aid *them* in their work, especially when *we* convinced them that the computer does not know who is doing it, but would rather make the system better. ***They*** **were worried and were imagining that the computer will be monitoring them**. **(Officer-in-Charge, M&E, Central Government).**	-IT Capability unclear to some actors -Evidence of fear of unexpected consequences	Positive Capability and Control
R3	**The Mayor is political. The Town Clerk is an employee of the central government**. Thus what is of priority is **what are the interests of the mayor given that he is voted in through the councillors**. So you find councillors do **not value formal systems for churning out information** and would rather have the funds being used for other things. There is a lot of resistance to **IT projects especially at the point of awarding the contracts had** it not been for the insistence of criteria by the accounts department (**ICT Consultant, MOLG**).	-Identification of protagonists with command power -Reasons for resistance	Control
R4	What there is, the **local authorities do not realize that these initiatives are being supported by these external partners**. They actually think **it is the Government** who are handling the issue. So they take it that way. Some of these local authorities you really need to hold their hands to handle these ICT initiatives, and the **government is best placed to marshal resources**, especially given that the government expects certain reports from the local authorities **(Officer-in-Charge, M&E).**	-Protecting Legitimacy before the weak actors -Positioning government as possessing power	Control

From R1, '*Upstairs*' as a concept is associated with power or those in decision making authority or those able to influence decisions. In addition, it has connotations of those in positions of authority who have the power to subvert processes by showing their ability to exercise power. This has an implication of *control* by certain segments of actors. There is the need to maintain control of the status quo, undisturbed by the implementation of LAIFOMS.

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In R2, there is an indication that 'they' are unclear about the capability of the new LAIFOMS thereby resulting in resistance. The lack of clarity of its capability results in fear of unexpected consequences. The discursive practices highlighted from these are Control (denoted by reluctance to accept LAIFOMS) and Positive Capability (due to unexpected consequences which may result from the adoption of LAIFOMS). '*They*' are the non-ICT group and conversely, '*We*', the ICT group.

The identification of the actors is captured in R3, where the political group is depicted as having power over ICT projects. The need for *Control* by this group arise from the ability to influence tendering procedures as well as their disdain for formal systems associated with ICT. The implementers (or the ICT group) express the *mood of frustration* with this state of affairs. Overall, the dominant discursive practice is Control (R2, R2, R3 and R4 below).

The illustrations emerging from R1, R2, and R3 show some levels of resistance to LAIFOMS as well as covert or even overt sabotage. The structure of Government places power at the behest of the political class (a section of non-ICT experts), even though the technocrats are responsible and accountable for implementation of sometimes inconsistent decisions made by the political elite.

This may be viewed as *sabotage* because sometimes the technocrats are made to change mid-stream, despite having devoted not only physical resources to the ICT agenda, but also 'psyched' themselves in an appropriate '*mood*' to undertake the initiative. The resultant *situation* is a technocrat, bereft of any autonomy, implementing technology without motivation. Sabotage runs counter to bricolage, which, if lacking, then the result is lack of ingenuity and creativity. Drifting, Improvisation and Bricolage are sometimes used interchangeably despite slight differences (Ciborra, 2004).

Sabotage goes both ways as is evident in the second quote (R2): the technocrats, who largely view themselves as experts, offer *passive resistance* to edicts which emerge from 'upstairs'. The

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quote captures the issue of resistance in the form of politicians propagating their interests, whilst technocrats respond by *misrepresenting* their 'true' intentions. For instance in R2, the ICT experts claim that the "computers do not know who is doing it"(refers to dishonest activities), this is misrepresenting the capability of the systems. It is also evident that people instinctively fear computers taking control (R2), which possibly lead to resistance.

These acts, by the political group and the technocrats implementing LAIFOMS show a quest to maintain control of their 'turf'. This indicates that the implementation of LAIFOMS is taking place in a hostile environment, where certain hosts (politicians and some non-ICT Technocrats) play the role of unwilling hosts to the technology by resorting to power play. Evidently, the implementation of LAIFOMS is replete with organizational and personal power and politics at play, with the politicians, especially the councillors at the LAs offering resistance in order to register their interests, while the technocrats use the vantage point of the MoLG as the source of executive support.

Trust and dishonesty issues also emerge from the quotes in R4. In R4 the MoLG is assuming credit for initiating LAIFOMS before the LAs yet it did not have the technical capacity or the political will to initiate it without the development partners. The misrepresentation can only be viewed as a way of gaining (or re-gaining) legitimacy. The end result is the view by the LAs and by extension, the public that the government is powerful since it is able to project itself through the resources it is able to marshal. The overriding Discursive Practice in this instance is that of a quest for Control.

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The predominant 'cultural mode' revealed is that of two broad 'clans'. The political clan has real power while the ICT experts are the technocrats with no real power, except systems implementation. It is also evident that there is mistrust between the two clans and this raises the risk of misunderstanding on the intent of e-government implementation in the LAs.

There are two more inferences that may be made from R6, and R7 in Table 7.6 that can further illuminate on the emergent dominant themes:

Table 7.6: Dominant Themes: Strong Identities			
Ref	**Text**	**Description (Text Analysis)**	**Interpretation (Discursive Practice)**
R6	**Yeah. In the rural areas, it is like a myth. In urban areas they understand.** We already know the setup that is there, like in telecommunications, we are actually fighting for it to be there, so we already know. **So when they say there is E-government undertaken by the Government we really appreciate it and understand it, but for the rural guy they don't understand it**. But they don't' even have electricity, so for them, they would rather have the electrical bulb first **(ICT Officer, Central Government).**	-Questioning the prioritization yet situation demands other priorities -Evidence that some actors are not valued	Strong Identities
R7	We may want to ask very fundamental question, are these **systems quite appropriate given our environment**. Look at the issue of local context, a local government authority should have the capacity to develop local content that would inform farmers that given that the rains have started, they are getting late, and this should even be in local languages. But I want to think that the local content we are likely to end up with if we go full throttle and say take systems that are from out there, maybe content that tells us what the weather will be like in another country, and **may not be very useful in changing our commodities locally** (**ICT Consultant, MOLG**).	-Timing and relevance of systems influence adoption	Strong' Identities

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The first concerns the issue of *moods* in the sense that reference is being made to the actors' situation. For instance the pointed remark that e-government may not really be a priority since stakeholders do not have electricity points to a lack of registering what exists in the environment in order to gauge its acceptability once implemented.

In this case, e-government is revealed as a stranger (as myth), to which the particular actors appear not ready to play host. This may be regarded as a case of *strong' identities* existing that disregard the priorities of various groups. The opposite of strong' identities is *reciprocal cultivation* which embraces the need to value guests. The guest in this case is e-government being introduced to the rural folk who view it as a myth. The urban group, as opposed to the rural group, appears to be comfortable in being able to register their needs and capabilities (R6).

The second inference is with regard to further categorization of actors. The ‘rural versus urban’ duality points to lack of prioritization on the part of the implementers to value what is important to the rural populace. The situation or 'moods' (Ciborra, 2004) of the rural populace has not been adequately valued, thus the perception of e-government as myth. This categorization further entrenches the view that e-government is exclusive to those who already have government services. A key insight from Chapter Five was the lack of access to telecommunications by the rural populations. This hinders access to services that can potentially be provided over the Internet. At the micro-level of implementation, it is also getting clearer that the evolving implementation is exacerbating this exclusion of the rural population as a result of the myth status of e-government.

The *'e-government as myth'* perspective is contrasted (by the researcher) with the acceptability of the Constituency Development Fund Policy (CDF) which was initiated at almost the same time as the e-government Strategy (R10 below). The CDF is a fund allocated to constituencies (i.e. an area under a Member of Parliament) for development projects. The interpretation is that ICT likewise need to be made as tangible as CDF projects. This point to a desire by actors to ensure that cultivation of the host-guest relationship should be visible (tangible). The non-acceptance or the invisibility of ICT projects may be due to bad timing (R8); which may again point to Strong Identities as some actors are not valuing the existential situation of actors.

From the above, a sense of frustration pervades all interviews in areas such as delays in funding, in tendering, in tender allocations, unjustified political priorities, etc. These frustrations may be influencing the nature of *'trust and friendliness'* exhibited by the actors. From the two groups (technocrats and politicians in the Las): the political wing do not seem to be fascinated by e-government technology as the professionals are, and the professionals do not practice 'full disclosure' for a number of reasons. For instance, the ICT technocrats *fear* that the ‘political wing' will balk at providing approvals if they understood the full consequences of adopting technologies in governance activities.

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Frustration is a form of *impatience*, especially when unable to control a situation. Impatience gives an inclination of *panic*, a mood which is important in assessing how actors' creativity can emerge in implementation projects. The lack of autonomy or the freedom to act may be hampering creativity. The mood of panic is further illustrated Table 7.7:

Table 7.7 : Dominant Themes: Rationality and Replications

Ref	Text: Hospitality and the Protagonists	Description (Text Analysis)	Interpretation (Discursive Practice)
R9	Remember that E-government is very dependent on ICT, so that from the technological front, **we have to contend with ever changing technological trends, yet sometimes our procurement process is not friendly**. The other issue we have to contend with is political, politicians determine Government policy and what direction we are headed, any change in policy may mean a great change in the E-government Strategy (**Director of E-government)**.	-Bureaucratic 'red tape' of government systems	Rationality Control
R10	In urban areas, **it is the business language people are more conversant with**, since it is the same language used elsewhere when talking about technology, **it is universal**. When it comes **to rural areas, I think it is good to use the local language**. If guys are kikuyu (a local ethnic community) use kikuyu, but that will be another challenge, because translating the terminologies from English to the local language is another problem. **But I think we should work towards that, because the common man out there**, take a farmer, he would be interested in what you are saying in his own language because they would understand it better.. **You see CDF is in their language (ICT Officer, Central Government).**	-English eliticism fostering exclusion -Localization fosters inclusion -Make ICT appear tangible	Rationality

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It may also be inferred that given the uncertainty in Government bureaucratic procurement processes, technocrats become frustrated at their inability to act. This arises from their inability to control procurement processes (R9) given that those who control the process do not understand the dynamism of ICTs. R10 also emphasizes the issue of rationality in the form of government 'sticking' to the use of the English language, while the realities in the rural areas

dictate otherwise. R10 also highlights that adopting local languages may foster inclusion of these groups in the process. Localization also emerges in the form of making ICT projects benefits tangible when the respondent refers to CDF. The reference to language is in the context of the relevance of digital content on government websites, LAs websites, or generally the language used for sending and receiving reports to/from the public.

Language is a *hospitalit*y issue. Using English indiscriminately (*Rationality*), fosters exclusion, even though it may be the convenient approach for creating awareness. This came up since the Government was involved in awareness activities not only within Government, but also targeting other stakeholders. What was evident in the awareness campaigns is the predominant use of English in brochures, posters, websites, print and electronic media. If there is no communication, then the capability of actors adequately playing host to the technology is in question. Some actors are therefore disadvantaged in this process. The opposite of rationality is Care. Indiscriminate use of the English to popularize e-government initiatives alienates the local populace who speak any one of the 43 languages in Kenya. Large sections of the population (rural) are therefore not ready or prepared to play host to e-government.

So far, it could be construed that the *mood* that pervades the relationship between the protagonists (e-government on one hand and the human actors) is not conducive to the concept of hospitality. The moods identified run counter to hospitality. For instance, lack of trust and honesty amongst human actors, frustration (as panic) in Government procedures, lack of autonomy and the inability to take into account the capabilities of human beings (in terms of language as well as resources). The implication of the 'negative' moods which are counter to improvisation is that the actors become *inhospitable to e-government*, as a phenomenon. Ciborra (2004) considers hospitality to be a phenomenon where the human host must be able to deal with the intrinsic ambiguity of the technology artifact. As is evident above, some actors are not able to play host to technology due to lack of language ability, resources, fear and inability to understand the capability afforded by e-government, thus reinforcing its myth status to certain actor groups.

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However, despite the negative characterizations, there were also moments when attempts were made to improve the actors hosting capability. This was evident in the attempt by certain categories of actors to 'bridge' boundaries in order to enhance the 'symmetry of human and non-human actors. This bridging concept is explored next.

7.3.2: THE 'BRIDGE' TO DRIFT: CHAMPIONING AND PILOTING

Two perspectives that emerged as bridges were *piloting* and *championing* (Table 7.8). The inferences that seemed relevant revolved around the theme of *Reciprocal Cultivation*. Reciprocal Cultivation emphasizes being able to accord technologies their rights in an Actor-Network, foster trust amongst actors, recognizes the importance of the existing base of the installed infrastructure and interests and the existing culture and practices. Thus its focus is on *valuing the existential guest-technology situation*. Therefore, in the implementation of LAIFOMS in the LAs, the practices that emerged as bridges to hospitality are explained under the theme of cultivation was piloting (R11, R12, and R13).

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The implementation of LAIFOMS started by selecting eight LAs at its inception in 2000 as pilot sites based on existing management structures. R11 shows that the basis for selection was on the candidate LAs having some form of information management in place. Using this criterion for piloting has been noticeable in other local councils as well as certain key ministries piloting e-government innovations. Piloting can be linked to the concept of hospitality as a bridge which can be used in minimizing the risk of misunderstanding that may arise in the host-guest relationship. This recognizes that there is already an existing 'installed base' of management practices which cannot be ignored during implementation of a new information infrastructure. This existing installed base embodies a certain culture and practice which need to be taken into account. Therefore, Piloting can be an important tactic in fostering trust and honesty during the e-government implementation.

Piloting can also been used *to minimize mistrust*, by enhancing acceptability of the initiatives to the clan that wields power. In all situations where piloting was being undertaken, the target of the pilot projects was the need to sensitize the political actor group. Apart from the role of

minimizing misunderstanding, piloting also emerges as a way of encouraging actors to accept the e-government application. When there is misunderstanding as to the role of actors or technology, then the result is non-engagement or non-use of the technology. This, using the terminology of Ciborra (2004), is a situation of *boredom*. Ciborra presents *boredom* as the opposite of *panic.* In boredom, time is of no essence and thus actors may fail to register any unexpected consequences stemming from the use or non-use of technology. This is at the root of the hosting process, since if the host becomes disinterested, the result would be hostility towards the guest or a lack of service, thus failure to humanize technology in the process. Piloting can therefore be regarded, as one way of e-government technocrats engaging other actors to action from their inaction.

In this sense, the twin roles of piloting (i.e. aiding in *minimization of misunderstanding* as well as *reducing boredom*) has the effect of enhancing the host-guest or human-technology relationship. The relationship becomes *hospitable* in the process. In another instance, piloting, by helping actors move from inaction to action promotes the ability to *get out of mere calculative and instrumental thought-or a*bility to "jump", or *Gestalt* switch. It thus acts as a bridge towards drift.

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	Table 7.8: The Bridge to Drift: Reciprocal Cultivation		
Ref	**Text: Reciprocal Cultivation**	**Description (Text Analysis)**	**Interpretation (Discursive Practice)**
R11	You know when you are **piloting**; you need to get it in an **environment which is conducive** to piloting. And then you look at which councils have been trying to capture adequate data or some form of data, so that as we pilot, then you are starting at some level. You also look at the authorities that already have an improved management [.....]**(Officer-in-Charge, M&E)**	-Choice of pilot sites depend on favorable base	-Reciprocal Cultivation
R12	**The model is that of identifying those who are pro ICT and working with them to push the ICT agenda** has worked in the ministry. This is a big ministry and people only start to associate with an initiative when they 'smell' success. Thus it is important to be able to identify those who are friendly. As a Department, we are regarded as a support department, thus those we support in a way are able to spread the word on what we do. **There's a core of champions for ICT in the Ministry, while resistance mostly comes from the middle ("old guard").** ICT contributes to the willing' users after which others become converted. We have noticed that resistance is mostly in middle management, yet the biggest impact is in this section on implementation, in terms of efficiency. In addition, it is also noticeable that in the long' term, the impact is in terms of the added services that ICT is able to bring' on board **(ICT Director, Central Government)**	-The mandate of ICT is not clear -ICT is recent, thus associated with those without effective power-must demonstrate impact	Reciprocal Cultivation
R13	**It took quite some time to even to communicate the need for an integrated system in the local authorities**. However, some of the local authorities they were starting at the lowest level, even in terms of capacities. Some are also in areas that are not well served by the electricity. So their priorities would be different. We want the local authorities to have data that can enhance their management as well as to ensure we are getting the right information from them (M & E, MOLG).	-Being able to prioritize is difficult for integration projects	Reciprocal Cultivation

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The championship process of e-government was also considered as a 'bridge' to drifting (R14 and R15) in Table 7.9. R14 shows that championship is difficult and requires commitment; while R15 emphasizes that rational approach characteristic of government projects are not necessarily the basis of success. The two quotes can be explained using the latent theme of *Service* as a new commitment of hospitality which is opposed to traditional approaches that emphasizing consensus building. Service is about 'being the server of' both technology and guest in the relationship. Championship emerges as the form of offering service in order to ensure acceptability. Its intent appears to be geared towards reducing the level of uncertainty, by

allowing unwilling actors to view the applications beforehand. The need for viewing these applications before hand is due to the perception that these initiatives mark *radical shifts* in normal day-to-day operations (Ciborra, 2004). Given their uncertainty, they mark radical shifts in the eyes of human stakeholders.

Table 7.9: The Bridge to Drift: Championship			
Ref	**Text:**	**Description (Text Analysis)**	**Interpretation (Discursive Practice)**
R14	I have **gone through hell to ensure that this works**. I was able to initiate contacts with key managers in the ministry who I knew really relied on the information from the local authorities. Remember, the information was coming from the local authorities, but we needed to interpret them or put them in the right format. **It was a headache**. Thus, we were doing donkey work, thus I talked to managers who used this information regularly and this formed the lobby group for this system. This was to ensure that it gets broad support **(Officer-in-Charge, M&E).**	-Commitment by champions -Championship is a difficult task	Service
R15	**The way it was started, it wasn't that deliberate. It was not conceived as a big project.** We realize that in order to provide advisory services to the local councils, we needed to **get some basic information from them**. Whenever we tried to get such information, it took a long' time and it proved very difficult to get information, especially on finances. We started as a small thing, to consolidate some of the financial information that we had. And actually we started with the licensing of business. **(M & E, MOLG)**.	-Procedures does not necessarily explain success of public sector projects	Service

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What is emerging is that there is an expectation in the public sector that once a project is structured around concrete plans, prescriptions, models and methodologies (rationalistic, instrumental thinking), then the outcome become obvious. This subtly downplays the role of human beings, yet championship is a human institution not given to the rationalistic approach. It may also be inferred that through the process piloting and championing, human-technology relationship is enhanced. These two concepts thus play a critical role in fostering hospitality in e-government initiatives as a new way of overcoming failure.

7.4 RETRODUCTION: STANDADIZATION, INFRASTRUCTURALIZATION AND CONTROL

In line with Critical Realism's retroductive[19] approach, the retroductive process in this section explores the conditions, structures and mechanism that exist. From the analyses in section 7.2 and 7.3, LAIFOMS translation processes reveal a weak but indispensable project which is primarily non-aligned to the 'new' management approach. In order to tease out the masked transfactual conditions, the summary relies on concepts heterogeneity and the dominance of control (Ciborra, 2004), infrastructuralization (Nielsen and Aanestad, 2005) and standardized packages (Fujimura, 1996) and the programmable artifact (Orlikowski, 2000). These concepts are used as 'lenses' to a reality that already exists (Chapter Three; Danermark et al, 2002). These concepts are used to get beyond the description and analysis that have been presented above.

7.4.1: DOMINANCE OF CONTROL

Control was revealed to be the dominant theme, typical of bureaucratic systems in highly politicized environment such as has characterized governance in Kenya. This may be linked to the *type of regime* that has been prevalent in Kenya, i.e., characterized by high centralization of power which is exercised by executive politicians, who over the years, have tended to influence how top civil servants work. However, the MoLG has been characterized as a weak ministry (JICA, 2007), which has not had sufficient resources to maintain effective control over the LAs. Thus LAs have been faced with minimal funding from government, with the result that they have been behaving as semi-autonomous units, with councilors politicizing processes within them. However, MoLG has been regaining effective control over the LAs since the introduction of LASDAP, LATF and SBP, with the result that the hierarchical relationship is being strengthened with the introduction of LAIFOMS. Councilors, as part of the political group are also fighting to maintain the control they have always had in the LAs, thus the resistance experienced by technocrats implementing LAIFOMS. This *dominance of control and the failure to nurture heterogeneity of relationships* in the LAIFOMS initiative can be explained from the changing regime system in Kenya since 2002.

[19] Retroduction is about advancing from one thing (empirical observation of events) and arriving at something different (a conceptualization of transfactual conditions) (Danermark et al, 2002).

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Reflecting on the structure of the bureaucratic system in Kenya, the period prior to 2002 general elections were highly centralized, with high politicization of the careers of tenured civil servants. This has the effect of limiting the effectiveness of these public service mandarins, since politicians always interfered with their work. However, with the coming to power of the National Rainbow Coalition Government (NARC) in 2002, there has been a trend towards less politicization of the operations of the civil servants, which has consequently empowered them to act independently. However, empowerment of the civil service has resulted in the introduction of performance measures, with top civil service mandarins having to sign performance contracts as a basis of evaluation on an annual basis. Further, there have been an increased number of top civil servants being hired from outside the public service in order to permeate it with greater professionalism. The result has been a more assertive civil service, acting independently from considerable influence of politicians.

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This trend may be argued to be similar to that of separating the *sphere of political choices* from the sphere of *administrative choices*, with the main intent of limiting what were considered pervasive micro-management practices by executive politicians (Ongaro and Valotti, 2008). The sphere of political choices is thus increasing becoming more distinct from the sphere of administrative choices, even though there is still a great influence of the ministers in both spheres. The pervasive role of ministerial cabinets, which have wide and influential roles on the functioning of ministries, is also a feature that has been recognized to be common in understanding the relationship of the public bureaucracy to politics in which political allegiance is influential (Page, 1997) in delineating the nature of control. Therefore, the inference that is being pointed out is that the ability of the technocrats to influence and control the trajectory of LAIFOMS implementation is partly being informed by a shift in the regime of governance within the public sector in Kenya.

Thus the scenario that emerges is a group of technocrats (specifically the ICT group) featuring the global actors and their power over LAIFOMS (with *discretionary administrative power and choice*) interacting with the political group (councilors as politicians) in the LAs who are intent on maintaining control. The councilors are intent to maintain control since LAs are quasi-independent of the MoLG. The various moods that were expressed characterized this interaction:

dishonesty, sabotage, boredom, mistrust as well as *panic*. The struggle for control results in a situation in which the "politicians-technocrats deal" evolves in a context which is not favorable to LAIFOMS implementation. However, given the power that the technocrats have (in terms of resources and executive authority), the expectation is that the control would have been nurtured in a way that recognizes the heterogeneity of various interests. This may have required the need to delegate, with intent to cultivate reciprocity.

7.4.2: INFRASTRUCTURALIZATION

Despite the dominance of control, Nielsen (2006) argues that centralized control does not imply inability to delegate partial, limited or even fragmented control. What is questionable, is not the dominance of control, rather it is the *inability to delegate control responsibly* to units that are able to support and nurture the relationship with other local actors to spur creativity at the local levels.

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This inability to cede control revealed some tensions. For instance, since 2004, a number of LAs have been left without effective support for LAIFOMS, despite their lack of capacity. Ostensibly, KLGRP had ceded the role of OPP to the Inspectorate Department as it continues the replication of LAIFOMS in other LAs. However, the new OPP has not been effective. This may reflect an inability to *exercise control responsibly*. This is because:

> Control must be balanced in a sensible way in order to gain the benefits of the creativity and energy which arises from autonomous activity on the part of the individuals and groups (Walsham, 1993, pp. 45).

The LAIFOMS project shows this was not done. The new OPP are the owners of "successfully" implemented LAIFOMS through the mediation efforts of KLGRP. Nielsen and Aanestad (2005) refer to this mode of ceding control, *infrastructuralization*, where operational control is delegated away to another actor once the OPP assumes the project has been successful in the local context. This infrastructuralization however, is not nurturing heterogeneity to invite innovativeness amongst the local actors. Inability to enroll local actors through *infrastructuralization* may further exacerbate the social problem of building an e-government

information infrastructure which is socially exclusive (Chapter Four and Five), yet citizens (as local actors) are the prime target of improving governance in the LAs.

7.4.3: STANDARDIZED PACKAGES

Another insight that emerges can be explained using Fujimura's concept of standardized packages (Fujimura, 1996). This emphasizes *standardization*, which are the central means by which actors influence relationships through control and autonomy. For instance, LAIFOMS was shown to revolve around financial and operations management (budgetary, revenue and expenditure as the major components). These revealed interests of dominant actors which structure relationships in the local context by:

- Controlling to what extent innovations can be undertaken in the local context. Thus any innovations are structured around the three main components of LAIFOMS. While the revealed inscriptions do not necessarily limit the technological capabilities, the fact that these formed the basis of the 'core' solution artifact influences the '*openness*' of the infrastructure. This arose due to what may be perceived as a narrow mandate of the KLGRP. Thus the 'openness' of LAIFOMS elicits a perception of being discriminative to local actors' possible innovations.
- LAIFOMS is also being developed to maintain and strengthen relationships between the MoLG and LAs. The grant funding system between the two groups is fuelling the nature of this relationship. Therefore, LAIFOMS is emerging as a *standardization* approach to manage LAs as outlets for achieving good governance on behalf of the MoLG. It is therefore being used to distribute responsibilities to the LAs.

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The concern that emerges regarding the standardized solutions artifact of LAIFOMS is that its use has a constraining effect due to its physical properties. This is based on the fact that its task mandate is limited to revenue, expenditure and budget management and monitoring. LAIFOMS is therefore being replicated in the other LAs as a programmable artifact (Orlikowski, 2000), since to a large extent, it has attained some form of closure in terms of how it is expected to be used. The concluding claim is that it is emerging as a less malleable e-government technology solution and is being constructed in a context in which the interests of local actors are not dominant. The general logic for adoption of the process of standardization revealed in LAIFOMS

is indicative of a need to maintain centralized control by the government, and not necessarily to have a more open governance structure (envisaged in ideal organizing visions of e-government).

7.5: CHAPTER SUMMARY

In sum, the three insights: *inability to nurture heterogeneity, unfavorable infrastructuralization* and *nature of standardization* appear to influencing the trajectory of LAIFOMS infrastructure projects in Kenya. The implication is that the local actors (the public, business, and some politicians) are peripheral to the LAIFOMS adoption process. There is an implicit assumption that the local actors are participating in the process through the LAs, yet the LAs are also minimally participating save for the coercion of the global actors (resources, technical expertise and power). The overall insight is that the LAIFOMS implementation trajectory has a weak local actor mobilization, which is a pointer to its social exclusiveness. If this is a similar trajectory being undertaken by other e-government initiatives, then the attendant social problems arising from social exclusion from governance can only become more pronounced.

The development process was marred by partial disclosure of the true intentions of the LAIFOMS. There were certain instances where the designers were forced to lie to move the agenda forward. There is also institutional vacuum in terms of the management structure. The initial OPP (KLGRP) is no longer playing the role and there is no OPP now. The role of donors in the provision of support is crucial given the financial handicap of developing countries. However, sometimes their management structures approaches may contribute to the demise of the projects. Lack of an OPP to manage the donors may also contribute to a slow process since each have their own agenda. Despite the project receiving support from both global as well as local actors, its progress was characterized by solo efforts of technocrats, without strong political support. These individual champions had to go to great lengths to ensure the agenda of the project is realized. However, the danger in over reliance in individual effort is that there may be internal and external jolts occasioned by these individuals if they are unavailable.

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The next chapter provides a synthesis of the findings emanating from the analyses chapters (Chapter Four, Five, Six and Seven). The possible framework that may guide the building of e-government information infrastructures is proposed.

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CHAPTER EIGHT

SYNTHESIS: TOWARDS A NOMADIC FRAMEWORK FOR BUILDING E-GOVERNMENT INFRASTRUCTURE

8.1 INTRODUCTION

The four prior analyses chapters and various literature review sources form the basis for this synthesis chapter. Chapter Four, as an analysis based on the *macro-level* of policy design, showed that the notion of e-government is one couched in instrumental rationality, premised on a managerialist ideology. Chapter Five, with its interest in assessing the status of the Internet infrastructure, exposed an inadequate national information infrastructure, fostering social exclusion of large segments of stakeholders currently unable to access government services. The *meso-level* perceptions analysis in Chapter Six captured the overriding notion of an evolving artifact for achieving connected government. Chapter Seven, undertaken at the *micro-level* of implementation, showed that context-free logic within which e-government is taking form is underpinned by weak local actor participation and a centralized political and administrative task structure. Table 8.1 captures a summary of the emerging e-government artifact at various levels.

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Table 8.1	**Emerging Artifact**	
Developing Country Context	***Level***	***Context-Free Logic***
	Macro-Level	Instrumental rationality, managerialism and inadequate NII (Chapter 4, 5)
	Meso-Level	Evolving Technical Artifact (Chapter 6)
	Micro-Level	Programmable artifact with weak malleability (Chapter 7)

By positioning this thesis as an 'explanatory critique'(Bhaskar, 1996) in Chapter Three, the Chapter Eight seeks to be true to the critical realist goal of offering an alternative redefinition/conceptualization of e-government after providing a synthesis of the prior analysis chapters. The intention (especially in a critical realist research agenda) is to identify a possible way towards resolving a social problem (Fairclough, 2003); which, in this thesis, is founded on

bad governance in developing countries of Africa (Chapter One, Two). Thus in a search for the unrealized possibilities for ensuring the success of e-government in a developing country, the proposed framework, which is not intended as a panacea, but as an alternative redefinition, considers the negative implications (discussed in section 8.3) of the predominant conceptualizations of e-government as the premise for a nomadic framework proposed in this chapter.

In order to respond to the above mandate, the chapter is structured as per Figure 8.1. In section 8.2, the social problem that the thesis sought to understand and address is restated in light of the various findings. Section 8.3 is devoted to a summary and a discussion of the findings with the intention of pointing out the inadequacies of the current e-government conceptualization in developing countries. In section 8.4, a model is presented, described and a critique offered. Section 8.5 then provides a summary of the chapter.

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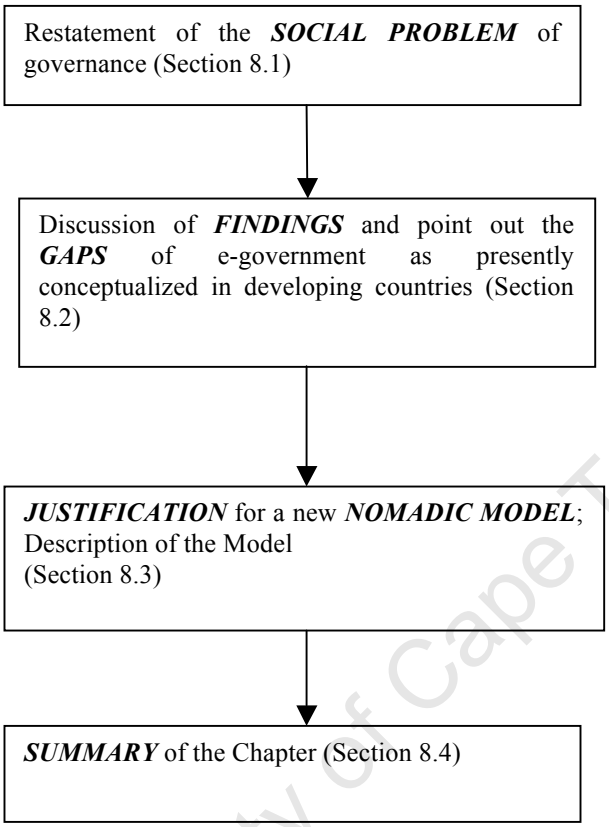
Figure 8.1: Structure of the Chapter



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8.2 E-GOVERNMENT AND GOVERNANCE PARADOX

There are three synthesis areas that are addressed in this section. The first is a re-statement of the social problem that e-government is attempting to address. The second synthesis is on the focus of e-government, while the third addresses the ideology behind e-government organizing visions.

8.2.1 RE-STATING THE SOCIAL PROBLEM OF E-GOVERNMENT

The social problem that e-government attempts to address was presented in Chapter 1 and was also intertwined in discussions in the various chapters. It was highlighted that its introduction is aimed at redressing bad governance practices that has become characteristic of government bureaucracies in Africa. Governance, especially in the context of developing countries, is normally reduced to a commitment to efficient and accountable government (Stoker, 1998). In the Kenyan context, the adoption of the E-Government Strategy in 2004 captured this perspective: a pursuit for better governance especially after years of bad governance prior to 2003 (Chapters 2, 4, 5). From a standpoint of prior bad governance, adoption of e-government is seen as one of the instruments for achieving better governance.

As one of the instruments for achieving better governance, e-government must therefore have a specific *locus.* From a public administration perspective, the locus of e-government revolves around organizational processes being transformed using ICT (organization); government policy processes being undertaken using ICT (policy); how political actors use ICT (politics) and which relationships between citizens and government become digitalized (citizens) (Zouridis and Thaens, 2003). Those that were relevant in the Kenyan context were the organizational locus, policy locus and to some extent the political locus (Chapter Four).

The *organizational locus* of e-government in Kenya emphasizes *improving service delivery* (Chapter 4, 6 and 7). The findings from Chapter 4 for instance envisaged using e-government to enhance communication both inside and outside government. To achieve this, the e-government vision proposes changing various administrative processes through the implementation of various systems over the short, medium and long term. The analysis that was reported in Chapter 6 on the expected impacts showed that the emphasis is on the theme of *connected government* with its internal efficiency focus. This was found to be largely an internal supply-side focus of e-government reforms. A further insight on the expected impacts revealed the demand-side focus in which these reforms are targeted at the external constituents, in which *value addition* becomes the primer in augmenting service delivery through various additional modes. Further, the LAIFOMS case study (Chapter 7) showed that the goal of building the information infrastructure is to ensure that there are service delivery improvements in the local authorities. Therefore the overall defining logic of the organizational locus is *service delivery improvement*.

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The *policy locus* for e-government is predominantly about how ICT can be used in the policy making and implementation process. The principal aim is to improve citizen-focused services by getting government authorities online. For this to be achieved, a secure and trustworthy infrastructure becomes part of the principal issue (Zouridis and Thaens, 2003). Chapter 7 on the LAIFOMS information infrastructure traced how the need for its adoption arose: as an information infrastructure to realize the implementation of various policies such as the Single Business Permit (SBP), Local Authorities Transfer Fund (LATF) and Local Authorities Service Delivery Action Plan (LASDAP). The E-Government Strategy (GOK-EGS, 2004; Chapter 4) also confirmed that the implementation of an Integrated Financial Management Information Systems (IFMIS) and the IPPD are meant to realize policies to ensure proper budgeting and expenses management and human resource management respectively. Thus overall, the policy locus of e-government is primarily about *improving managerial control* over policies that are being implemented by the government.

The political locus is one reason why e-government is claimed to be different from e-business or e-commerce. This is because e-government is linked to public administration which is not just another branch of industry, but a different type of institution. These institutions comprise citizens who:

> Are not just shareholders who want to make a profit, but constituents of a polity […]mdemocratically organized. Therefore, politics is part and parcel of public administration and e-government (Zouridis and Thaens, 2003, p. 169).

Politics generally comprise four activities: representation; selection and definition of social problems that qualify for policy-making; decision-making and deliberation and democratic supervision (Manin, 1997; Zouridis and Thaens, 2003). The e-government initiatives in Kenya are aimed at supporting some form of *democratic supervision*. For instance, all the government websites are providing information relating to their policies, strategic plans and activities (Chapter 4, 5). The government has also developed a Freedom of Information Policy and Bill aimed at making electronic information accessible to the public (GOK-FIB, 2007). Presenting policy information on websites and through other electronic means is one way of easing access to government information in order to increase the transparency of public administration to citizens and other interest groups. On one hand, this enables these groups to assess and possibly

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criticize actions and policies of the government; while on the other hand, it also helps the government to get feedback from these groups to enhance the government's managerial control.

Chapter 4 showed that the overall defining logic of the mode of interaction envisaged in the e-government vision is *managerialist*, and therefore does not deify democratic participation and deliberations. Chapter 5 showed that the way Internet is diffusing in the country is in fact increasing the *social exclusion* of certain groups from participating in governance. Thus overall defining logic of e-government in Kenya is deficient in the citizen locus given the limited role espoused in the in the political, organizational and policy loci illustrated above. The citizen locus is increasingly emphasizing the role of the citizen as a consumer of the products and services supplied by the government. Thus initiatives aimed at enhancing democratic participation and deliberations with citizens characterize a locus which is citizen-oriented. Thus there needs to be a shift of priorities in order to achieve citizen participation.

Overall, e-government adoption is primarily geared towards having *e-services* by *improving service delivery*; *improving managerial control of policy implementation* as well as encouraging some form of *democratic supervision*. The next section discusses the insights that emerged from various analyses that illuminate the focus of e-government, i.e. what is the ideological bias that predominate the thinking towards addressing the governance problem.

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8.2.2 INTERPRETING THE IDEOLOGY OF E-GOVERNMENT

Given the overall defining logic of e-government of improving service delivery, understanding its ideological bias can bring to the fore why certain implications such as social exclusion are becoming prominent. A starting point is to assess assumptions on what underpins governance systems in Africa.

For instance, it is generally taken as a given that systems of governance are in a crisis in developing countries in Africa, and that the crises are being addressed by recourse to Western models of governance such New Public Management or its extensions (Heeks, 2002). Drawing

on a number of sources, Heeks (2002, p. 97) crystallizes a functionalist perception of the problems facing the public sector in African countries as follows:

> – *Inputs.* In a number of countries, the public sector is seen to require unsustainably large and/or unsustainably increasing public expenditure; with a looming threat or reality of heavy public debt.
>
> – *Processes.* There is concern about examples of waste, delay, mismanagement and corruption within the public sector, all of which contribute to inefficiency in the conversion of public expenditure into public services.
>
> – *Outputs.* Concerns are widespread in a number of countries that the public sector is not delivering what it should, from adequate defense and policing through support for agriculture and industry to education, housing, health, social welfare and a hundred other responsibilities.

This, in turn, undermines the wider social outcomes of public sector activity. In tandem with this perception, Chapter Four also highlighted the functionalist-oriented paradigm that pervades the E-Government Strategy of Kenya. Thus the conceptualization of the governance problem adopts an *Input-Process-Output* approach. The imported model of e-government is therefore transferred to African countries as a panacea to bad governance by various carriers such as international donor agencies, consultants, IT vendors and Western-trained civil servants (Heeks, 2002; Chapter 7). Chapter 7 highlighted the role of interests of vendors and other supra national organizations. E-Government hence is part of a package of needed governance reforms in Africa (Chapter 2, 4). However, African governments have been using Information Technology for more than 40 years; first, for automating internal workings of government (old model), but also increasingly to support and transform the external workings by processing and communicating data(new model) (Heeks, 2002).

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It is the recasting of the *old model* and the introduction of the *new model* of applying IT that is 'clothed' under the banner of e-government, which is currently being used as a 'social bulldozer' meant to transform governance from bad to good, albeit in an evolutionary manner. Chapter Four pointed out that the concept of e-government is also being used as a ‘galvanizing metaphor’ to marshal investments in IT, which appear to link to the notion above. The significance of the Input-Process-Output approach to solving governance problems is evident in the various e-government initiatives currently underway. For instance, one of the governance problems concerns how to control public expenditure and debt. To improve the coordination and control of

public expenditure, a number of initiatives have been underway for improving fiscal discipline in the government. For instance, the implementation of IFMIS and IPPD in the Central Government ministries in Kenya is meant to aid in this. LAIFOMS is geared towards ensuring information management quality for the stakeholders (Chapter 7).

There are a number of propositions made in the E-Government Strategy meant to enhance public delivery of services (outputs) such as e-policing (providing security alerts), e-water (electronic billing of water) and e-voting (GOK-EGS, 2004; Chapter 4). The Input-Process-Output conceptualization therefore encourages e-government initiatives that result in various Information Infrastructures (such as LAIFOMS, IFMIS, IPPD, etc) that are meant for enhancing *information management*, either for the internal workings of the government or to transform and support external interactions with stakeholders.

Therefore, the e-government agenda in Kenya is underpinned by an ideology of *information collection, information processing, and information dissemination*. This is underscored by the emphasis in the E-Government Strategy, which aims at transforming communication between government and citizens and businesses (Chapter 4). Communication is primarily information oriented, and thus for e-government in Kenya; information is at the core of public administration. When information becomes core, the ideology of E-Government can thus be characterized as an *information ideology* or *information Taylorism* (Zouridis and Thaens, 2003). It is also characterized as "*infoprefixation*" (Brown and Duguid, 2000) whose dominance results in a tunnel vision that tends to obscure the richness of institutions being transformed by using ICT (Zouridis and Thaens, 2003) and that this perspective acts as a 'prison' from which it is difficult to escape (Lash, 2002). This ideology when applied to e-government is therefore considered to be a narrow world view, whose social consequences may sometimes be disastrous as is evident in the increasing social exclusiveness of the digital divide. In order to understand what *information Taylorism* 'ignores' in governance, the 'richness' or the complexity of public institutions need to be understood by bringing out the predominant rationality (or focus) in e-government and what transformations result in the process.

8.2.3: INTERPRETING THE FOCUS OF E-GOVERNMENT IN KENYA

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There are four rationalities that underscore public institutions: political, legal, economic and professional (Snellen, 2002). The vision of e-government in Kenya has a strong' *economic rationality orientation* and some form of *political rationality* envisaged in the future. Economic rationality's mantra is the need for efficiency. This perspective requires a rational organization of public administration (Zouridis and Thaens, 2003). Thus implicitly, the aim of e-government adoption is the creation of a rational organization of public administration by enhancing the economic rationality of public policy and the efficiency and effectiveness of government agencies.

The analysis in Chapter 4, 6 and 7 brought out this form of rationality of e-government conceptualization. Chapter 4 captured this aspect when it emerged that the vision is highly managerialist in orientation. The other policy papers, such as the National ICT Policy as well as the Freedom of Information Policy also underscore that the underlying rationality for e-government in Kenya is highly economic-oriented (Chapter 4). The quantitative analysis of Chapter 6 also brought out this orientation from the factor analysis of the expected impacts of e-government which were theorized to have various drivers such as the need for openness, efficiency, effectiveness and connectivity in government. The factor analysis divulged that one of the high loading factors was the need to achieve *Enhanced Interactions and Accessibility* as well as *Enhanced Co-operation and awareness*. The former is aimed at achieving efficiencies that eventually results in economic growth and social cohesion; the latter at external efficiencies through the improvement of democratic processes linking citizens and businesses to government (Chrissafis, 2005).

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The analysis of Chapter 7 also disclosed that the implementation of e-government information infrastructures such as LAIFOMS is also oriented towards the economic rationality. The ANT translation process uncovered that the intent is to *enhance financial information management in local authorities*. The emphasis is to make the process of handling information by the Ministry of Local Government more efficient through LAIFOMS. This also shows an economic rationality perspective, since the central government is intent on creating and sustaining local authorities based on their economic rationality.

The other three (political, legal, professional) rationalities are still largely ignored in the adoption of e-government in Kenya. Political rationality is based on the concepts of conflict, power, force and political decision-making. These are needed since disputes arise as a result of differences regarding government policies. The essence of settling disputes in political decision making is either through debate or force, especially in democratic governance. This type of rationality is still largely ignored in e-government adoption, even though there are long' term plans to involve the public in policy debates through online referenda (GOK-EGS, 2004; Chapter 4).

Legal rationality focuses attention on the actions of government: that every action of government needs to be legal. This means that government decisions and actions must necessarily have legal security and equality. These legal obligations must underpin all government actions and structures (Zouridis and Thaens, 2003). ICT can be used in joining up government by ensuring that the same information is available for decision making at different levels of the same organization and decreasing cleavages of public institutions. This may threaten separation of powers inherent in democratic societies where the police, judiciary and the attorney general's office are independent. Seamless joining of these legal entities may threaten the very essence of the principle of checks and balances and therefore legal rationality of public administration in light of the emergence of e-government need to be redesigned to forestall any unintended consequences. In the analysis of the vision of e-government in Kenya, there was no hint as to how legal rationality is being addressed.

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Professional rationality requires knowledge of the effects of government interventions through the implementation of various policies (Zouridis and Thaens, 2003). It therefore requires a sound policy theory background on how to manage the intended and unintended effects of various interventions. As far as professional rationality is concerned, e-government should enhance the internal consistency and harmony of public policy of government. Empirical results show that to some extent, the building of LAIFOMS information infrastructure is achieving the harmonization of the policy requirements for LASDAP, SBP and LATF (Chapter 7).

This has been achieved, for instance, through universal and consistent data definitions, in which the 68 local authorities that have implemented LAIFOMS are able to furnish the central

government with standardized reports which contributes to efficient management of the local authorities. While this effect of e-government is noticeable and is a consequence of a deliberate policy, the LAIFOMS project planners are not aware that its implementation is possibly having minimal positive effects with other stakeholders. As was reported in Chapter 7, 75% of consumers in two urban-local authority services do not have access to computers and over 54% of them are not aware that LAIFOMS exists. Therefore, the possible consequence of non-use may defeat the policy objective of encouraging participation of consumers in local authority activities. Thus overall, professional rationality is captured to some extent in the local implementations of e-government initiatives without due regard to the unintended consequences of these policy interventions. The result may exacerbate social exclusiveness of E-Government.

8.2.4: IMPLICATION OF THE IDEOLOGY, LOCUS AND FOCUS

The summary of the social problem that e-government address in Kenya, its predominant ideology, focus and locus are presented in Table 8.2. The discussion that follows highlights the implications of the locus, ideology and focus of these predominant e-government conceptualizations.

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Table 8.2: Summary of the Social Problem, Focus and Locus of E-Government

Feature	**Defining Logic**	**Emphasis**
Problem Domain	Structuring Public Administration	Improving Governance
Locus	Managerialist	Improving Service Delivery
Ideology	Information Taylorism	Information Management
Focus	Efficiency; Effectiveness	Economic Rationality
	Policy Effects	Professional Rationality
Possible Transformations	Economic and Professional Rationality	• Stabilization of power relationships • Rationalization of Public Policy
Unintended Effect	Locus, Ideology and Focus	• Checks and Balances • Social Exclusion • Citizens as Consumers

8.2.4.1 Solidification and Re-Distribution of Power Relationships

The bias of e-government adoption in Kenya towards a predominantly economic and to some extent professional rationality may result in a number of transformations as implementation continues. The first is that these e-government initiatives may *solidify certain relationships* in government as well as *power distribution*. This is achieved through stabilization of data definitions and the information architecture of public administration (Zuurmond, 1998). For instance, the analysis of the local LAIFOMS implementation showed that it is effectively strengthening the control relationship the central government has over local authorities. Therefore, in one aspect, the relationship between the LAs and the MoLG is strengthened, while on the other hand, the power of the central government over the LAs is also enhanced. The LAIFOMS information infrastructure, once stabilized, would become the architecture for solidifying the relationship between these two actors groups.

Solidification of power relationships is also likely to occur as the internal workings of central government continue to be integrated through the various back office applications currently being implemented such as the IFMIS, IPPD, etc (GOK-EGS, 2004; Chapter 4). In the process of implementation, bureaucratic conflicts are likely to arise during the process of standardizing data definitions as a result of entrenched interests. These are evident when resistance arises during the implementation of these government initiatives such as councilors in the LAs opposing LAIFOMS implementation for fear of prosecution from corruption activities (Chapter 7). However, once the information infrastructure of e-government has stabilized, that is, as the government realizes its managerialist interactions model (Chadwick and May, 2003; Chapter 4), then these bureaucratic conflicts dissipate as relationships and power distribution stabilize (Zouridis and Thaens, 2005).

This can be explained from an economic and professional rationality perspectives, where public policy effects are valued based on the tenets of efficiency and effectiveness (Zouridis and Thaens, 2005). An instance of this was provided where the LASDAP, LATF and SBP policies have been rationalized from the point of view of information management based on LAIFOMS. Given the universal data definitions arising from the three policy initiatives, LAIFOMS provides the information architecture required for the efficient and effective management of the three policy processes. Thus the expectation is that the various e-government initiatives currently

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underway in Kenya will form the bedrock for assessing government policy processes from a professional rationality perspective.

8.2.4.2 Consumerism and Counter Networks

There are two unintended transformations that may arise when e-government initiatives are based on an information ideology. The first is that even though an information Taylorism-based e-government initiative maybe efficient (managerialist), it fails to create counter power in the form of checks and balances of established stabilized relationships (Zouridis and Thaens, 2003). For instance, the implementation of LAIFOMS ignored the appropriate translation of the interests of local actors, and this has had the effect of having weak local actor mobilization (Chapter 7).

The interests that had strong translations effectively locked out the citizens to actively participate in the policy implementation process except as consumers of public services delivered through the local authorities. This is likely to alienate the citizens, yet citizens are expected to actively participate in policy formulation and implementation at the local level, which is a key goal of the policy interventions of LASDAP, LATF and SBP. Engagement of citizens in the process creates a *counter power*, as they voice their interests in the process of policy formulation and implementation. In the design of LAIFOMS so far, there is little in the form of an interface allowing for this possibility. This is not evident in the implementation of LAIFOMS.

This lack of counter power through checks and balances is also visible with the increased use of government websites for channeling information from various government ministries and agencies. Government and its agencies websites are inundated with lots of information on policy without necessarily engaging public input into the process. Traditional forms of governance normally filter through to the citizenry through various government notices and agents, who are in some instances available physically to engage. However, there are increasing instances where the government is providing policy information on websites, and the onus is on the individual citizen to interpret and 'consume' this information. The mantra, as e-government becomes more pervasive is for citizens to 'check the website' for any information. The fear is that the role of

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traditional forms of organizing in Kenya such as churches, schools, public market places, postal service centers or even informed individuals would diminish as centers of policy interpretation. The result would be a highly entrenched information ideology of e-government, fostering the use of government websites, e-mail, bulletin boards, podcasts, etc as avenues for information 'spin'.

A second unintended (even intended) transformation is increasingly regarding *citizens as consumers*. E-Government's view of citizens as consumers aims at providing services proactively (Lips, 1998). For instance, the government intends to create in the long term, a one-stop shop approach to providing government services online. Evidence points to initiatives such as the building of 'Digital Villages' (*Pasha*) in all constituencies of the country as one way of providing access to government services (Chapter 5). There are a number of problems associated with conceptualizing citizens as consumers (see Ryan, 2000). For the sake of providing a view relevant for the unintended consequence of transforming citizens to consumers, two problems shall be cited: consumers having *insufficient knowledge* and regarding the relationship as a *passive commercial transaction*.

Insufficient knowledge can be linked to illiteracy. Chapter 5 brought out issues related to computer illiteracy, language, relevance of content and the lack of computer education facilities in the rural areas to which 80% of the population live. The issue of the complexity of decisions regarding ICT was also highlighted. These are fundamental concerns that hinge on knowledge and capacity of the citizens as individual consumers to make informed decisions. The lack of capacity and knowledge impacts on citizens as consumers to, assimilate relevant information; assess decisions; and benchmark interpretations (Ryan, 2000). For example, while the Ministry of Education currently releases examination results both online and via mobile phones, the majority of individuals requiring these services rely on others for getting this information. Regarding citizens as consumers without taking into account the appropriate *associations* engaged in the interpretation of information assumes an ICT literacy of the total population.

The problem of regarding the relationship between the government and citizens as a passive commercial transaction may also exacerbate the notion of citizen as a consumer of government services. This notion negates the necessity for interactive political engagement of citizens with

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the government, with the consequent effect of separating government policy-making from service delivery. Ryan (2000) contends that the objective is to:

> Diffuse the extent to which politics might interfere with administration, allowing administrative decisions to be based on rational, objective criteria rather than democratic negotiation and bargaining. A consequence of this approach is that government is protected from the political demands of society (Ryan, 2000; p.105).

For example, implementation of LAIFOMS (Chapter 7) showed that the nature of relationships between the technocrats involved in design and implementation and the politicians was dishonest. This was partly because the technocrats were not interested in political engagement with the councilors for fear that the latter would impose their interests. The technocrats view political engagement as interference to their 'rational and objective criteria' of implementation which negates the need for democratic negotiation and bargaining. Thus the citizens as consumers wait for the service to be delivered without participating in the policy process. The likely effect of such an attitude is regarding e-government initiatives as a myth (Chapter 7), even as the experts in e-government continues implementing systems towards a technocracy. However, it is also recognized that regarding citizens as consumers is likely to have a positive effect. For instance, online surveys and discussion forums are alternative means for engaging the public in service delivery design hitherto used minimally by the government.

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Overall, the resultant positive and negative transformations also highlight the problem of social exclusion manifested in inadequate social resources, physical resources, human resources and digital resources (Chapter 4, Chapter 7, and Chapter 8). In addition to the highlighted problem of social exclusion, the e-government mandate in Kenya is probably missing out on certain possibilities achievable through the current mode of implementation.

The next section presents a framework for building e-government infrastructures in a developing country, employing literature drawn from a public administration perspective as well as information infrastructure perspective. The presentation of the framework is discussed in the context of Kenya by drawing on inferences from the past analyses (Chapters 2, 4, 5, 6, and 7) and other literature references.

8.3: TOWARDS A NOMADIC FRAMEWORK FOR E-GOVERMET

Increasing managerialization critically brought to the fore bureaucratic control intentions by the central government agencies while weak local actor participation espoused ineffective consumerism as a guiding metaphor for e-government service delivery. Further, notable lack of counter power of citizenry continues to exacerbate the social exclusion problem of e-government.

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The nomadic framework presented below is an attempt to offer an alternative redefinition which is a key agenda of the critical realist inquiry of the thesis. The goal in presenting the framework seeks to redress the negative implications of the predominant e-government conceptualizations as presented in this synthesis chapter. The three 'intuitive' themes that are used to ground the framework revolve around increasing managerialization, ineffective counter networks and perceiving citizens as consumers in an environment of high digital illiteracy in e-government efforts. The redress of the negative implications is approached from a nomadic perspective considered by Kleinrock (2001) as elevating the consumer or the community of users as being in charge of how, when and the extent of connectivity afforded by the immediacy that the Internet offers e-government applications. Elevating the concept of nomadicity in this framework is therefore expected to respond to the focus and locus of control of e-government (from the prior synthesis) as a socio-technical artifact dependent on IT.

Kleinrock (2001) describes the concept of nomadicity, which is the premise upon which is the premise of nomadic computing, as a:

> transparent virtual networking. The essence of these terms is that the end user should be able to access programs, computational and communication needs as they move from place to place in a way that is transparent, integrated, convenient and adaptive. (p.3).

In support of the nomadicity concept, Lyytinen and Yoo (2002) discuss a possible research agenda for what they refer to as a new wave of nomadic computing. Their emphasis is on the

current prevalent nomadic nature of information environments[20]. They present a framework for the design, use, adoption and impacts of the next wave of nomadic computing by giving prominence to the features of *mobility*, *convergence* and *mass scale* for the building of new information environments depicted in Figure 8.2. The argumentation developed relies on these features (*mobility, convergence, mass scale*) of nomadic information environments as well as a recourse to Warschauer's (2004) social, human, digital and physical resources as the basis for addressing the current inadequate conceptualization (fostering increasing control through *managerialization*, *ineffective consumer* focus and *weak actor mobilization*) of the e-government artifact in the Kenyan context.

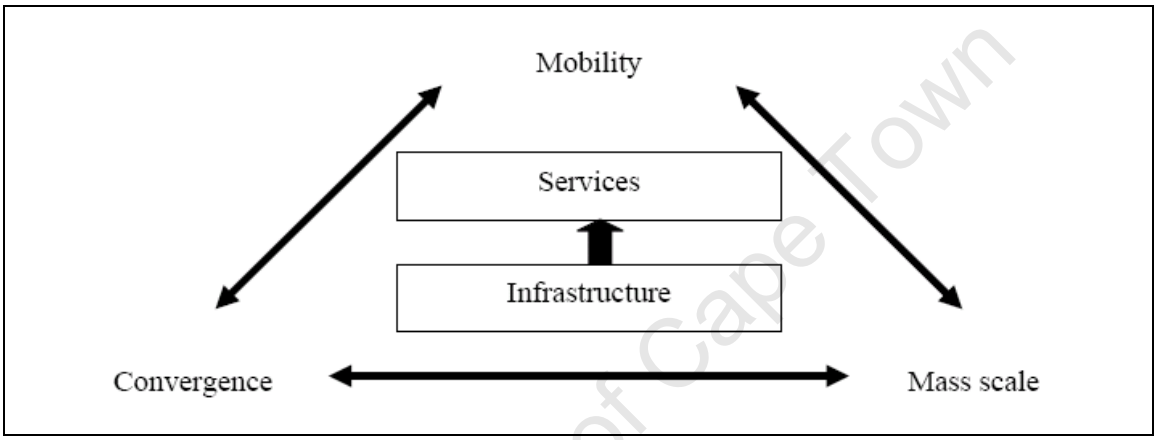

Figure 8.2: A Framework for Nomadic Information Environments (Source: Lyytinen and Yoo, 2002).

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For instance, *mobility* as a feature of nomadicity does not only reflect the array of devices that characterize the nomadic computing phenomenon but also reflects user behavior. E-Government applications are accessed from a number of computing devices and as well present a virtual environment for users to access government services. In many instances, users (citizens, businesses, and government) have options: access government services manually or electronically via various modes (e-mail, websites, online chat forums, online surveys, etc). In part therefore, the proposed nomadic framework by emphasizing the feature of mobility, seeks to enhance e-government conceptualization that has been shown to have an *ineffective consumer focus.* Thus mobility of government service delivery is expected to play a critical role in attaining

[20] Nomadic information environment is viewed as an interconnected assemblage of technological and organizational elements, which enables physical and social mobility of computing and communication services between organizational actors both within and across organizational borders (Lyytinen and Yoo, 2002).

consumerism: improving the proactivenes of government service delivery by increasing options of access to the consumer.

Convergence is linked to the fact that e-government relies on heterogeneous technology and that these technology platforms are converging. It is also intuitively linked to the notion of ineffective counter-networks that are part and parcel of governance in developing countries. Ineffective counter-networks arose from weak local actor mobilization. In opposition to the predominant e-government conceptualization of solidifying central government control, the proposed nomadic framework views the creation or the utilization of various counter networks (such as constituency development offices and local authorities) to attain e-government objectives. This requires that these centers have converged interfaces (technically and socially) that can help realize common national objectives. In effect, the approach should curtail the process of enhancing power centralization, without due regard to checks and balances afforded by other organizing institutions.

The concept of Mass Scale is a key envelop of the proposed nomadic framework presented below. Attaining *Mass Scale* adoption of e-government services is partly hampered by an inadequate national technological infrastructure which leads to the *social exclusion* of large segments of the population (Chapter Five). Therefore in proposing a framework, the problem of *social exclusion* needs to be addressed. Warschauer (2004) recognizes this need by addressing four aspects of social exclusion: physical, social, digital and human resources. Thus the research agenda, as envisaged by Lyytinen and Yoo (2002), in part calls for finding a solution to the social exclusion problem which is currently being exacerbated by the adoption and diffusion patterns of the Internet. Addressing the social exclusion to achieve mass scale adoption calls for a new way of looking at building e-government information infrastructures which is not purely IT related but has other defining aspects not linked to technology (Hanseth, 2002) and also recognizes that the mandate of e-government can also be approached from a public administration perspective (Sections 8.2). Details of how these intuitive links are attained are discussed further in the sections below.

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The interest in referring to Lyytinen and Yoos' (2002) work is to highlight one research pointer relevant in this thesis; that is that:

> From a social standpoint, adoption and diffusion patterns, pricing and maintenance and regulation related to price and content will become major issues that will require managers' and IS researchers' attention (Lyytinen and Yoo, 2002, p. 7).

At the national level, adoption and diffusion patterns in Kenya was presented in Chapter 5, which showed the starkness of the social exclusion problem. Issues of pricing of telecommunications services (under the *cost of Internet Access*) as well as expensive *constituent access technologies* were brought out as some of the concerns impacting on adoption and diffusion patters of the Internet as an antecedent to e-government. The issue of content and its relevance was also highlighted since developing countries contribute less to the digital content of the Internet. Thus, the Internet content, either for business or governance issues may largely be irrelevant to the rural and poor urban populations in the developing countries. The diffusion and adoption pattern of the Internet therefore directly impacts on e-government adoption since the Internet forms a critical foundation for e-government services. These issues impact on mass scale adoption of e-government, considered as one of the key envelops of the proposed nomadic framework. The next sections discusses the intuitive links of the various concepts in detail.

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8.3.1: NECE: NOMADIC E-GOVERNMENT CO-EVOLUTIONARY FRAMEWORK

The NECE (Nomadic E-Government Co-Evolutionary) framework is based on a number different literatures sources and frameworks. Lyytinen and Yoo's (2002) framework is based on a synthesis of literature on nomadic information environments, and provides a foundation of the NECE framework. Heeks (2002) also brings to light, the *design-reality* inconsistencies that have bedeviled African e-government initiatives which eventually lead to the e-government divide. The e-government divide is prominently reported in various assessments that attempt to categorize countries at various levels of e-government maturity. African governments are consistently poor performers in these rankings (UN, 2008). In response, Heeks (2002) proposes a strategic *generic* model that elevates the best practice of *customization* to match African

realities. The proposed NECE framework considers the problem of the e-government divide as a *social exclusion* problem (Warschauer, 2004) which is likely to be exacerbated by local e-government implementation practices (Chapter 5; Chapter 7 and Chapter 8). Therefore, the proposed NECE is partly a *framework-based* proposition (Heeks and Bailur, 2007) as well as an *empirically- based* proposition arising from the need to provide a solution to a social problem.

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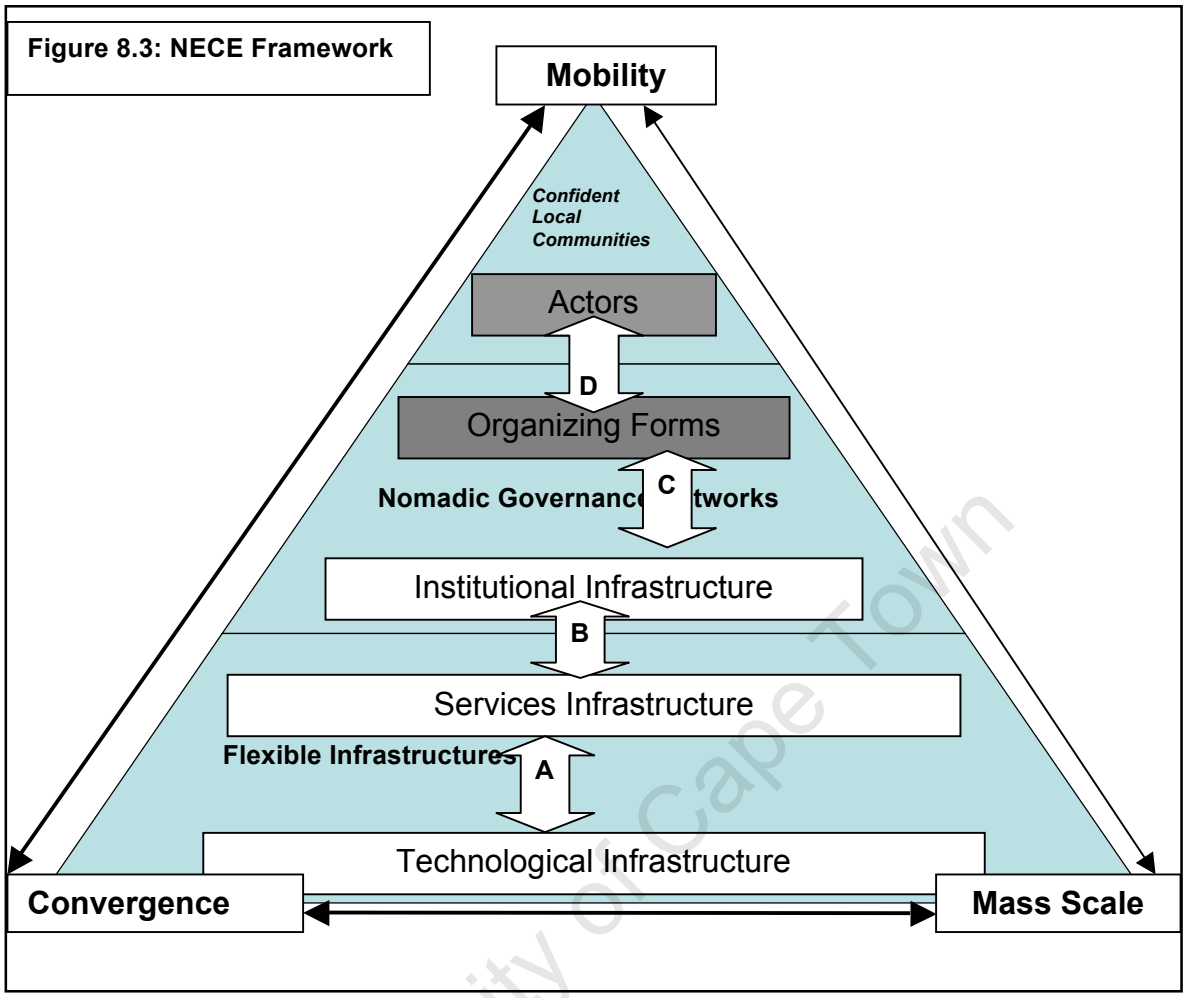
8.3.2.1 Defining Characteristics of the NECE Framework

The aspects that characterize the framework (Figure 8.3 below) are its nomadic and co-evolutionary nature. The relevance of *nomadicity*[21] is best understood by looking at the cluster of technologies that support e-government systems (PCs, servers, file systems, mobile phones, software applications, various portable computers as well as the various transmission media). There is an impressive variety of these technologies that influence users to act like nomads (6, 1995). Nomadicity is driven by different technologies, particularly portable computers ranging from laptops, notebooks, Personal Digital Assistants, Smart Card devices, and now mobile telephony.

[21] The term nomadicity was coined by Kleinrock (1996) while discussing nomadic computing as a combination of portable computing and that access to computing and communications is necessary, not only from one's "home base", but also while one is in transit. Desirable characteristics include independence of location, of motion, of platform and with widespread access to remote files, systems and services



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In addition, the capabilities of these devices have been increasing tremendously. Thus the combination of portability and increasing capability of these devices has given prominence to the concept of nomadic computing (6, 1995). Nomadicity is relevant as metaphor for national information infrastructure (NII) conceptualization, especially when the explosive mobile phone adoption in African countries is taken into account. For instance, the Ministry of Education is relying on the mobile technology platform to present examination results. This concept has also been implemented by most universities in Kenya. In addition, the Ministry of Health is using the mobile technology platform to provide health related services through a web portal known as Afriafya.org. Thus mobile telephony presents a unique opportunity for realizing the concept of e-government in developing countries.

The uniqueness of e-government is based on the claim by Heeks (2002) that the promise of e-government has arrived in Africa. Nomadicity is therefore employed as one of the guiding principles for proposing a framework. The argument is that *nomadicity* gives *mobility* a distinct meaning. Users are mobile, not only in terms of the devices that they use, but are mobile in the sense that the current move towards increased digitalization, globalization and virtualization enables services to be available over a number of Internet interfaces such as websites, e-mail, mobile telephony, etc. Thus mobility is argued to become one of the most distinctive characteristic of future computing environments, enabling nomadic information creation and sharing (Lyytinen and Yoo, 2002). Unlike the traditional stationary computing technologies that were tied to a physical location, emerging wireless and handheld computing tools can be taken to different places and held in different places at ease, while still providing both access and adequate computational services. Therefore, the framework presented attempts to capture the ethos of this emerging and increasingly pervasive information environment.

The *co-evolutionary* term in the framework name recognizes a number of aspects that are relevant in building national information infrastructures such as e-government. The first concerns the evolutionary approach used in the building of information and knowledge infrastructures, in which the building of infrastructures never start from scratch but build upon existing infrastructures (Hanseth, 1998; Heeks, 2002; Ciborra, 2004). Therefore, the framework captures the evolutionary, as opposed to a revolutionary approach to the development of NII for supporting e-government. *Co-evolution* exalts the notion of heterogeneity of various information infrastructures required to support e-government activities either horizontally or vertically, and the fact that the initiatives for their realization develop in parallel. The pyramid structure captures increasing *personalization* (which can be equated to Heeks *customization*) of services to take into account user (actors) characteristics and interests without exclusion.

To provide an alternative view of addressing the negative implications (such as solidification of power relationships and social exclusion) of the current e-government conceptualization reported in the earlier sections, the framework also recognizes that the key technological drivers that underlie the development of computing technology are *mobility, digital convergence*, and *mass scale* (Lyytinen and Yoo, 2002). These drivers canvass the framework to show their influence in all the aspects and any envisaged relationships in the dimensions of the model. At the apex of the framework is *mobility*, which captures the diverse modes of services available to the users which

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are highly dependent on the capability of the portable computing devices. Services are also available through various interfaces such as websites which can be accessible on a global scale. Prior research on mobility has primarily focused on the "physical" mobility part of nomadic computing (Bellotti and Bly, 1996; Luff and Heath, 1998). However, there is currently an explosion of the notion of *social networking* that may play a critical role in a reconsideration of the concept of social mobility[22]. This is expected to increase as the global society continues to become more fluid and dynamic; thus increasing the avenues for social interactions amongst the various actors.

Digital *convergence,* as the second canvass, implies that data will be captured in digital format, a trend largely enabled by low cost digitization and open standards. Convergence is taking place at various levels: organizationally, industry-wide, vendors, products and services. As the power of portable devices continue to increase, their capacity to support more services, products, vendors, etc, is also increasing. In a device such as a mobile phone, users are currently able to receive radio information, access the Internet, chat, TV, video, bank services, etc. Thus, potentially, the services and products which are converging are increasingly reliant on universal, yet heterogeneous information infrastructures largely enabled by flexible standardization.

Prior researches show that achieving *convergence* of technologies is possible through flexible standardization by adopting a strategy of modularization (see Braa et al, 2007). *Vertical modularization* is aimed at achieving layering of services and technologies, such as in the OSI model. Flexible standardization, through *virtual modularization,* can be achieved by separating the various data elements (from the numerous information sources throughout the country) from the technical elements. *Horizontal modularization* is a strategy of encouraging the use of several standards for different sub-domains of the infrastructure rather than have one universal standard (Braa et al, 2007). This is inevitable since e-government is being deployed in a heterogeneous environment where there are counter networks, diverse communities and different technological and human capacities. Inevitably, *gateways* are needed for translation of protocols between the various networks. These gateways can either be software-based or manual depending on a particular context. In cases where individuals depend on an intermediary, then the gateway service can be in the form of written procedures (Braa et al, 2007).

[22] Social mobility refers to the ways in which and the ease with which individuals can move across different social contexts and social roles, and be still supported by the technology and services (Lyytinen and Yoo, 2002)

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The third canvass of the framework deals with *mass scale*, which implies that the deployment and the use of nomadic information environments will take place in principle at a global level characterized by massive scale in service volume, service types and the number of users. The characteristic of e-government adoption intentions of national governments globally has witnessed this approach to deployment. Most governments spearhead e-government reforms from the national level to ensure that adoption of services is on a mass scale. However for this to be achievable, there are technical and social issues that need to be addressed. From a technical standpoint, this is interpreted to be a concern for interoperability, scalability, reliability and performance of services (March et al, 2000; Lyytinen and Yoo, 2002). The technological infrastructure, upon which e-government relies, grapples with these technical issues constantly to enhance information sharing amongst government agencies. Lyytinen and Yoo (2002) also point out that the social concern for mass scale adoption need to assess adoption (extent of spread and use) and diffusion patterns, pricing and maintenance, and regulation related to price and content. These issues are especially poignant in large technological infrastructures such for e-government where concerns of social inclusion are paramount for governments of the day.

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8.3.2.2 Dimensions of the NECE Framework

The model proposed by Lyytinen and Yoo (2002) recognizes that building a nomadic information infrastructure is two layered: the infrastructure layer and the services layer. These are referred to as *technological infrastructure* as well as *services infrastructure* respectively. The lower layer of technological infrastructure based upon open and flexible standards are expected to provide a stable platform on a mass scale. Such an infrastructure is technically heterogeneous, geographically dispersed, and institutionally complex without any centralized coordination mechanism (Lyytinen and Yoo, 2002). For instance, there are various information infrastructures at the national level. There are infrastructures belonging to railway systems, which in large measure cover major segments of the country. There are water and electricity infrastructures as well as telecommunications infrastructures (both physical and wireless). The concept of the installed base (Chapter 4 and 7) would recognize that potentially, the existing infrastructures, though heterogeneous, are possible starting points for building information infrastructures for e-government. The key challenge is technical: ensuring that the existing networks can form the base for the services infrastructure for e-government.

The next layer is the *Services infrastructure* for providing a minimum set of *common infrastructural services* like directory services of users, available services, and social ontologies. The claim is that:

> A new critical challenge enabled by mobility is to provide location awareness for mobile users. Such awareness cannot be effectively provided without the directory services at the infrastructure level. Furthermore, to support both physical and social mobility, the directory must include information related to social ontologies (with varying levels of detail depending on the use context and role of the user), as well as technical and physical service and location information (Lyytinen and Yoo, 2002; p. 8).

The *services infrastructure* layer requires personalization, dynamic mobility for services and users, and associated channel adaptation. The services infrastructure, though concerned with personalization, should be focused on providing translation services to recognize the diversity of different population groups. For instance, the issue of computer illiteracy and the irrelevance of digital content in most instances due to the language problem (Chapter 5) is both a physical and social mobility problem. The Services infrastructure need to recognize that in the case of addressing governance issues, most of the African population is quite diverse within a single country. For instance, Kenya has 43 distinct ethnic communities whose cultural diversity need to be addressed in designing services. The population is also largely rural-based, requiring that provision of e-government services need to take account of the language inhibitions. Necessarily, some services need to be in ethnic languages to ensure inclusiveness. Thus, the necessity of translation services captures the provision of services based on different interfaces.

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Translation is also required at the services level to ensure that the heterogeneous networks, which are linked together at the technological infrastructure layer are able to communicate. Further, the technological infrastructure may involve the integration of various counter-networks, not necessarily under the control of a single institutional entity. For instance, in the local communities, there may be networks which are run under the constituency offices, school networks, local authority networks and other parallel government networks. The services infrastructure should translate the various protocols emanating from different user groups in the population. For instance, forms submitted in Luo or Kikuyu (local Kenyan languages) should be

translated at the services level. This is only possible if the national information infrastructure takes note and plans for diversity of the various population groups.

The contribution of the model presented here recognizes other levels: the need for strengthening institutions (*formal institutions of governance*), use of other forms of interaction (*organizing forms*) as well as a specific focus on the individuals (*citizens, civil servants, businesses*) as actors. The model referenced does not address how the formal institutions, the organizing forms and the actors do interact, especially given the unique differences between developed and developing countries. For instance, Heeks (2002) point out a number of assumptions that belie adoption of e-government based on a Western model. He points out one extreme view that public sector problems in both are similar, yet the failure rates that have been witnessed so far may point to differences in context which require unique designs in developing countries. Also the view that African countries are completely different from Western countries is an unwelcome view, since this would create a situation where experience, knowledge and ideas from African countries would be belittled. Therefore, these assumptions are considered in the above model by taking into consideration the unique context of Africa, while also recognizing that some of the experiences in Africa are similar to developed countries.

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Thus the NECE framework makes additions to the technology and services layers by taking into consideration the additional *formal institutions* (even though these are captured in Heeks strategic model), *organizing forms* (mentioned in Heeks model) and the *role of actors*. The point of departure from prior models stems from an exposition of the relationships between the various layers (using Warschauer's (2004)) concepts as well as linking the various institutional forms (institutional infrastructures and organizing forms, Heeks, 20020) and the services and technological infrastructures (various sources such as Lyytinen and Yoo, 2002; Hanseth, 1998; Ciborra, 2004).

The structure of the model therefore expresses the relationships between the various levels by addressing the various concerns of *social exclusion* (physical resources, digital resources, human resources and social resources), which links the various layers as A, B, C, D. The framework has five layers of *technological, services, institutional, organizing forms* and *actors'* layers. The

clustering of these layers with the various resources result in three primary dimensions: *Confident Local Communities*, *Nomadic Networks* and *Flexible Terrains*. The pyramid structure captures increasing personalization from the technological infrastructure towards the actors who are the ultimate users.

(a) Building Confident Local Communities Dimension

This dimension of building the e-government infrastructure is aimed at economically empowering individuals to enable them actively participate in governance. This is linked to the improvement of the *Social Capital* or *Social Resources* of a community, hence an individual. Improving the Social Resources of Communities enhances their Social Capital and therefore helps them in building their confidence. The focus is to have enlightened individuals who can afford, progressively, relevant e-government technologies/applications.

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This layer has two aspects: focus on *individuals* and the informal *organizing forms* they interact with. Organizing forms are the immediate structures that the individual interacts with frequently to help in ordering his/her life. These may affect how they live on a day-to-day basis. These organizing forms are normally not part of the mainstream public sector and include institutions such as churches, schools, market places, informed retailers, community centers, etc. Actors and the various organizing forms are normally in an interactive relationship, based on mutual benefit, reciprocity and trust. There are no formal agreements between the actors and the organizing forms as a result. Thus community actors are free to be engaged in any network based on the mutual benefit, trust and reciprocity. This form of social co-ordination is based on a network mode of governance which has been used for regeneration of communities in various countries (Lowndes and Skelcher, 1998). The resource linking individuals and local organizing forms are social resources (Warschauer, 2004). If the social resource base is weak, then the result is weak communities and individuals who are not empowered. A strong' social resources base results in confident communities.

Regenerating local communities to participate in e-governance requires a change of mindset by government. Regeneration targets building of the social capital of individuals and hence

communities. One component of adopting e-government is the building of external interactions or an emphasis on the e-society (Heeks, 2002), which deal with the relationship between public agencies and other institutions. In order to achieve the e-society goal, Heeks (2002) notes the need to develop local communities aimed at building their social and economic capacities. The critical focus should be on information and computer literacy so as to build the confidence of individuals to participate. Of course, it is also questionable whether individuals can participate if they live on a 'dollar per day', even though there is now considerable evidence linking information as a vital element for development (Kenny, 2007; Handrinath, 2004). Further, that the critical problem for e-government infrastructures such as the Internet amongst poor people is one of use rather than access (Kenny, 2007). This has been corroborated from a number of surveys that have been undertaken:

> A survey of two villages in Uganda at the time Internet-enabled telecentres were set up in the villages, suggests usage rates at below 5% (compared with close to 30% and 100% for telephone and radio usage, respectively). Again, a survey involving villages in Gujarat (India), Mozambique and Tanzania all located near towns with Internet access found that less than 2% of those surveyed had ever used the technology. Even in richer urban areas and wealthier developing countries as a whole usage is considerably below access. In urban India and South Africa, as many as one quarter of the population has access to the web, but only 10% are regular Internet users. Low usage rates are connected to low utility of the Internet to poor people. The average person living on a dollar a day is illiterate. And full use of the Internet takes far more than basic literacy (Kenny, 2007, p. 86).

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Therefore, priority should concentrate on information and computer literacy, which, it is proposed in this framework, can be achieved through the *mediation* of the various forms of organizing closer to the individual actors. The role of aiding individuals to build their social and economic capacities, thus resulting in improved social resources should not be limited to formal government outlets, but should be mediated by those organizing forms that individuals trust, and where reciprocity and benefit is mutual.

Changing the mind set of information and computer illiterate local communities takes time, just like building of information infrastructures take time. However, e-government, for it to achieve its intended objectives, requires that this becomes the ultimate focus. Developing countries, as recipients of technologies, need to start building the base for relying on ICT as part and parcel of governance, because e-government has already arrived in Africa (Heeks, 2002). Building the confidence of local communities may require introduction of ICT, through the mediation of these organizing forms, by coalescing the individuals around common ideals that they identify with.

For instance, *security* is a universal problem that communities grapple with frequently. The law enforcement agencies of government are normally overwhelmed. For example in Kenya, the lowest administrative officer is the Assistant Chief, who is both an administrator and is the point man for the government in addressing security at the sub-location levels (the lowest administrative unit under a civil servant). In the Kenyan scenario, the Assistant Chief is in charge of an average of 6,000 citizens, which can be a daunting administrative challenge, considering the poor physical and telecommunications infrastructure. The various organizing forms can augment government efforts since they are closer to the people. You would typically find a school or a church in a village in most local communities. These can become centers for building networks for addressing security challenges. Community policing can hence start embracing Internet-based policing, where informed personnel at these local levels can be used as mediators for channeling and interpreting security information. The numerous community-based organizations, NGOs and other donor funded agencies can be sensitized to refocus their efforts towards achieving information and computer literacy, since this will be a challenge for a long time in developing countries. The organizing forms hence should start becoming *mediation centers* for building of social capital of local communities.

Another area that may be a coalescing point common to the local communities is the various *cultural practices* which abound. Typically, most African culture is not captured, for instance in formal texts, but are oral. For instance, there are various cultural fetes, such as initiation rites, worship rites, marriages rites, etc, which are rarely documented. These normally form the basis for enhancing and cementing *social cohesion*, yet are sometimes ignored, presumably because they are considered backward. A number of practices, such as bull fighting in Spain have always existing in Africa, yet these have not been captured, but continue to this day. For instance, amongst the Luhya tribe of Kenya, they have always held annual bull fighting festivals (Figure 8.4) (locally known as *mayo*), yet it only captured the national interest probably in the last ten years. These festivals have since become a tourist attraction, as well as avenues for communicating government information to the public by local administrators. The other 43 ethnic communities also have their own cultural practices. The challenge is therefore to use, document and adapt cultural practices as a form of *cementing social cohesion*, which is considered as a critical impact of e-government (Chrissafis, 2005). In addition, these encourage tourism, so that culture also becomes a critical driver in impacting on the local economy-thus boosting social capital.

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Figure 8.4: *Mayo* Bull Fighting in Western Kenya

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Achieving the status of a knowledge-based society should involve capturing cultural knowledge, evidenced through cultural practices. The mediating role of the organizing forms is critical in galvanizing local community participation. Documentation of cultural knowledge and practices should therefore form the basis of building national databases to capture the diversity of populations.

The framework recognizes personalization as critical in achieving the goals of e-government. This requires understanding local communities so that services can be tailored to their needs. Service delivery thus becomes 'nomadic' in the sense that diversity is celebrated by presenting an e-government interface that is capable of being interpreted by the local communities. This will address the myth that "Africa is all the same", discounted by Heeks (2002) as a Western notion not real in Africa. The approach to packaging e-government as a 'silver bullet' solution for the whole country cannot work if the process of building the social capital of different cultures in a country does not recognize diversity. Organizing forms thus need to form the basis for achieving social cohesion and development.

(b) Building Nomadic Networks

In order to maximize participation in governance, the *organizing forms* and the *formal institutional infrastructure* of the government need to be *'joined up'*. This is a form of *mainstreaming* that recognizes that other structures that individuals interact with can augment or support governance activities. The proposal therefore is to link disparate organizing forms (informal structures such as churches) and the administrative institutions of governance such as the local authorities, lowest administrative units of public service (Assistant Chiefs, Chiefs, Postal Services, E-Government Kiosks, etc), constituency offices, judicial offices, etc. Given their heterogeneity, the resource that can be used for 'joining' them up is the optimal use of the institutional capacity of those in charge. In the language of social inclusion, there is necessity to build the *human resource base* to ensure that mainstreaming is successful. Therefore, the focus of this dimension is building a *nomadic network of governance*. This dimension is nomadic in the sense that there are various institutions that potentially are outlets of governance. The concept of network as a metaphor is invoked to highlight the critical role of ICT in shaping social transformation (Castells, 1996; 2004). The choice is for the individual to choose which nodes of the network are accessible in time and space. A number of its facets are underscored below.

One of the concerns is on how to facilitate linkages of these institutional forms and the individuals. The logic that can be used to illustrate how these linkages can be achieved is that of *counter networks* (Castells, 1996; 2004; Mosse and Sahay, 2005). Castells (1996) forcefully provides the logic of how the counter network concept operates, while Mosse and Sahay (2005) provide a practical example of building these networks. The counter networks concept is relevant since it exposes how actors setup contradictory networks (Gao, 2005; Braa et al, 2004). For instance, there are various networks created either by the government or outside the government to pursue sometimes contradictory objectives. For instance in the context of Kenya, the Constituency Offices (under members of parliament) are centers of development, just as local authorities (under the Ministry of Local Government) are. There are also a host of district committees falling under various ministries which also co-ordinate development activities at the local levels. The private sector also participate in development activities, either complimentary to or in opposition to the government. Facilitation of linkages should therefore embrace the concept that counter networks exist, whose actors' interests may not be complimentary. The question then is how linkages can be facilitated to achieve governance goals, especially by recognizing the role of ICTs in building these forms of organizing.

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Governments need to identify specific objectives that are best addressed by linking with other agencies and individuals outside mainstream public administration. These networks outside government should not be viewed as having objectives counter to the government's, but should be used for enhancing interactions with citizens. The challenge is to *craft the message of e-government* to be directly linked to those of individuals, partnering organizations and those of the government. This avoids the mistake of a top-down approach, where policy, developed by the technocrats is implemented without relevant input through *knowledge contextualization*.

For this to be achieved, a key aspect of this dimension is to enhance the capacity of existing individuals in government, private businesses, community based institutions to acts as change agents for championing local context e-government. The framework therefore calls for an emphasis on developing the *human resource* capacity, not only of those individuals in public administration, but also for those in other arms of government (judicial and legislative agencies and representatives) as well as private business, NGOs and influential individuals. The emphasis should be on *electronic literacy* encompassing computer literacy, information literacy, multimedia literacy and computer-mediated literacy (Warschauer, 2004) of individuals in these institutions. However, these literacies should be repackaged in local languages to improve acceptance. Therefore, attainment of *electronic literacy* should be the basis of *crafting a brand for e-government* to enable its pervasive use. How can this be achieved?

The concept of ***communities of practice*** provides a vision of the various possibilities. Communities of practice are networks of people who engage in similar activities and learn from each other in the process (Warschauer, 2004). They can be in formal structures such as schools, or informally grounded such as families, professional groups, or other social circles. It has long been recognized that almost all human learning takes place within these communities of practice, usually through a process of *apprenticeship* (Lave and Wenger, 1991). Warschauer (2004) illustrates that the concept of communities of practice is important since its emphasis is on how to achieve competence in something. And further, that *learning how*, within a community of practice, is intimately linked to *learning to be*. He describes learning to be as developing the disposition, demeanor, outlook, and identity of the practitioners (p.122).

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Learning to be is therefore depicted as being able to identify with the object of learning and hence accept as part of self. It also means that the learner needs to develop mental models of the object that is relevant for his own users. For instance, many students in universities now learn various programming languages within their own informal networks, outside the formal school systems. For instance, Hoffman and Blake (2003) found out that students acquire only those skills *they* consider meaningful on their own and that although sophisticated in the use of these skills, they do not understand the underlying technology that makes them possible. These skills become an integral part of their lives. Identifying with these objects ensure acceptance and thus use. The dissemination of *electronic literacy* should therefore target these *communities of practice of individuals, as centers of learning*.

In the context of e-government, this calls for a reconsideration of the electronic literacy to focus on *how to get services from the government* using technology. Government services are structured around the social, political and economic goals they would like to achieve. Therefore, the relevance of the electronic literacy, as a pathfinder for improving use of e-government services, should be structured around the social, political and economic objectives of governance. Electronic literacy attainment therefore becomes the 'glue' for involving the various governance structures (civil service, judiciary and legislature) with the NGOs, influential individuals and businesses and other community - based organizations. The formal governance structures are referred to as *institutional structure*s in the framework, while the non-governance structures are referred to as *organizing forms*. Formalizing the mode of relationships between the institutional structures and the organizing forms can then be the basis of achieving a *legal rationality for e-government*.

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Legal rationality requires some institutional barriers for e-government to prevent the government from invading people's freedoms (Zouridis and Thaens, 2005). The danger for a joined up government through ICT is that of progressively making the public administration have control over every aspect of governance due to the dominant information ideology. To counter this, e-government can be used for integrating other institutions to help in its application, within the ambit of the broader social, political and economic goals of the government. In developing countries, informal institutional structures are sometimes used for communicating government information, since the administrative reach of the government can be quite limited. These organizing forms have also been involved in achieving certain governance goals such as

education and health. For instance, there are many church run schools and hospitals in developing countries. Even though these institutions run and fund these schools and hospitals, they are still regulated by the government. Using these as an example, the e-government message, couched in an electronic literacy paradigm, should find a conduit through these organizing forms.

ICT education should therefore embrace electronic literacy, not only in formal educational setups, but also in work practices. For instance, those employed in the institutional structures should be evaluated on the role they have played in enhancing electronic service delivery to the public. For instance, the Government of Kenya is in the process of passing the Freedom of Information Bill (GOK-FIB, 2007, Chapter 4). The bill, once passed, will legalize electronic information. Thus, part of the evaluation process for all staff in all the arms of government should be on how they have innovatively used electronic means to address service delivery requests from the public. For instance, in the court system, a frequent way of assessing performance of a judge is the number and duration of cases. The onus should be placed on those in charge to think of how to use ICT to improve service delivery.

Informal networks can also be *incentivized* either through regulation or financial rewards. For example, the syllabuses for schools are often under the control of the government. Attaining electronic literacy can be enhanced by including it in the syllabus, not only for educators but also for learners. Further, many African countries have implemented adult literacy programs. The current era dictates that there should be a shift of focus to include information and computer literacy. This also requires a re-training of all cadres of educators. This is because in most African countries, educators in all parts of the country play a critical mediating role between the mostly information and computer illiterate citizenry and various governance structures. As a prerequisite, qualifying as an educator should include electronic literacy.

Churches should also become centers for providing government services since they are widespread in all parts of the country. Churches have acted as institutions which bulwarks society against social malpractices because community members trust them. Given that acceptance of ICT requires behavioral change, they can hence become centers for debunking the

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myth of e-government (Chapter 7). However, this can only be achieved if the influential individuals (such as pastors, priests and elders) are convinced of the role e-government can play in helping them attain their own objectives.

Building of nomadic networks by linking of the organizing forms and the institutional structure of governance achieves the *legal rationality* of e-government by maintaining institutional barriers of the various counter networks. This is achievable by conceptualizing e-government as a service delivery mode for attaining social, political and economic goals of a country. Typically, these goals are similar across both government and the non-government institutions. Achieving *electronic literacy* should be the glue that links the various networks, since it enhances the *mediating capacity* of the various institutions serving information and computer illiterate populations. Therefore, mainstreaming of organizing forms into governance is advocated in this thesis as a *human resource capacity issue*. Given the myth status associated with e-government, its conceptualization should be re-packaged and learnt through relevant *communities of practice*.

Legal rationality is therefore attained by specifying various roles for those involved. For instance, the mediating role of the organizing forms requires that they harness the flow of information/knowledge to and from the government (similar to AfriAfya case above). They thus become hubs, whether virtual or not. For instance, the various community websites (Chapter 5) are playing an important role as centers of building social capital. This role can be enhanced by using them to augment government services. They can be centers for interpreting standards of receiving and sending information (sms, e-mail, web, manuals, government forms, etc) for those who are able to access the Internet. They can be used for contextualizing the transition to information - based culture, which relies on ICTs as well as become conduits for promoting government programs and channeling of government resources. These outlets should be used because the community members or the community of practice members trust them. However, to pique the interest of the *communities of practice*, the information being harnessed should be relevant to them. The proposal is therefore to structure the electronic literacy project around relevant information content. Warschauer (2004) refers to *digital resources* (labeled B in the framework) as critical for ensuring the use of the web and the Internet (Chapter 5). Therefore, to engage the various communities of practice throughout the country, the Digital Resources or Digital Content becomes the pull for the use of e-government.

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The role of the government and its institutions should be on strengthening the institutions to help in building the digital resources of various communities of practice. Given that information harnessed through the organizing forms are in various formats (data, voice, image, and video), the critical role of the government is to act as a hub for digitalization of the various knowledge sources relevant for different groups. Facilitating digitalization requires developing standards for conversion from various languages and platforms, providing electricity to the lowest administrative levels of governance (Chapter 5), undertaking participatory needs assessment of communities and coordinating with the informal networks on content production. It also requires the facilitation of community capability to build databases to capture activities in their communities, and the hosting of these databases under relevant service options. For instance, capturing information of the economic activities of the community can be an information source for the government to design specific interventions for accelerating development in those communities.

In summary, this dimension of the framework advocates for *mainstreaming of other forms of organizing into e-governance*. This requires a change of government literacy efforts towards electronic literacy (*human resources*), which can be made relevant through the accumulation of local knowledge through content production (*digital resources*). The overall results are to enhance the legal rationality of e-governance by maintaining institutional separateness. The relationship between the organizing forms and the institutions of government should be reciprocal, 'incentivizing' the former, while the latter benefits through attaining social, political and economic goals of governance.

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(c) Building Flexible Infrastructures/Terrains

This process straddles two dimensions: the *Technological Infrastructure* and the *Services Infrastructure*. The resources that enable the effective use of e-government services (G2G, G2C, and G2B) are the physical resources (labeled D) and digital resources (labeled B). The process of building flexible infrastructures main emphasis is to have a responsive physical infrastructure of heterogeneous technologies of e-government that are able to support the services. This process is underpinned by the need to embrace *convergence* of heterogeneous technologies as well as that

of ensuring *mass scale* adoption of e-government services. Achieving convergence, despite disparate technologies, is argued on the basis of *flexible standardization*; while achieving mass scale adoption is framed in the language of *scalability*. Thus, the building of a technological infrastructure proposed in this framework finds justification in extant empirical studies as well as a synthesis of findings from this study.

The *physical resources* for e-government require that computers need to be affordable, extending and making the telecommunications infrastructure affordable and establishing public access centers (Warschauer, 2004). The telecommunications infrastructure for e-government is quite limited in developing countries, even though mobile technology adoption provides exciting alternatives for extending connectivity. While building the technological infrastructure takes time; the problem of social exclusion need to be addressed, whether it takes five, ten, or a hundred years in developing countries. Therefore the dimension of this framework situates contributions of other authors in order to provide a complete picture of processes that lead to successful adoption. The framework recognizes the fluidity of the process of building technological infrastructures.

In arguing for the building of technological infrastructures and the services infrastructure, the framework borrows largely from research that has been undertaken in the building of large mobile and health information infrastructures (Braa et al, 2007; Hanseth, 1998; Nielsen and Hanseth, 2006). For instance, Braa et al (2007) used complexity science to study the development of large health information systems in South Africa, Mozambique and Ethiopia, while also drawing on experiences from other developing countries. Their findings in large measure reveal the complex, heterogeneous nature of these infrastructures. They advocate for a number of strategies which are deemed relevant for implementing e-government's technological and services infrastructure: adoption of flexible standardization in design, principle of integrated independence, mining information from minimal data, radical change through small steps and scaling. These strategies are therefore used for cementing the dimensions of services and technological infrastructures in order to build the *physical* and *digital resources* that can support adoption of e-government.

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The view adopted in the framework is that the *Services Infrastructure* dimension captures the various e-government evolutionary models, while the philosophy of the *Technological Infrastructure* is the need to embrace diverse technology platforms geared more towards data orientation rather than technical orientation. At the center of flexible standardization are emphases on flexibility and adoption of open standards. Flexibility has two variants of use and change flexibility (Hanseth et al, 1996, in Braa et al, 2007).

Change flexibility is the ability to change standards enabled by modularization (Braa et al, 2007). Modularization is attained by making use of simple standards by employing the use of gateways. These gateways can be used for translation purposes between computer-based infrastructures and also those incorporating paper- and computer-based infrastructures. This in most instances is the reality of the African situation given the limited telecommunications and electricity reach (Chapter 5). Braa et al (2007) document how the building of a health information infrastructure in Ethiopia incorporated both these interfaces. Likewise, the broader e-government programs need to be conceptualized taking into account the realities of the sometimes manual, but needed interactions in provision of government services. The drive towards e-governance, given the long' term nature of infrastructure building, should be geared towards incremental changes through the adoption of simple standards. As communities and their members get confident and as the infrastructure reach extends, the standards can be changed if simplicity is the rule. This should be taken into account since computing standards have a tendency to accumulate resistance as it attains growth and diffuses (Egyedi, 2002; Hanseth et al, 1996; Nielsen and Hanseth, 2006). Adoption of *use flexibility* determines the extent to which a standard can support many different activities and tasks. Therefore, use flexibility makes it possible for users to change the practices supported by the standard without changing the standard (Braa et al, 2007).

Given the heterogeneous nature of both the technological and the Services infrastructure for e-government, flexible standardization offers away for its growth without major disruptions in the process. In many different countries, there are many infrastructures which are complimentary. All these infrastructures potentially provide a physical base for a telecommunications infrastructure for the transmission of different types of information such as voice, video, image and data. The high information and computer illiteracy and minimal access to physical resources (Chapter 5 and Chapter 8) dictates that governments should focus on simple solutions. One such example is to focus on technologies that can translate audio (voice) into digital format.

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Community knowledge and broadcasting can be tapped into via the use of community radios which can then be translated into digital format. Audio technologies are already evident in the explosive growth of Internet phone. This is a practice already being experimented with in countries such as India (UN-ICT Task Force, 2005). The focus of the standardization should be on how to tap into community knowledge by using simple solutions that are currently understood and accepted by community members. Radios have been used in Kenya for decades. Further still, the use of audio does not require someone to know how to read and write, but to speak. The challenge is how to use *natural speech* as the input in building the *knowledge base* of the communities. Community knowledge then becomes the foundation for government policy interventions, since decisions can be made based on knowledge.

Wireless data access can also be explored as a next step since given that despite decades of investments in physical telecommunications media; the telephone density is still quite low, thus contributing to low Internet diffusion (Chapter 5). Further, investing in wireless data options such as Wi-Fi currently makes much more sense than continued investments in expensive switches and copper line to each household.

Achieving convergence of technologies is therefore possible through flexible standardization by employing a strategy of modularization (Braa et al, 2007). *Vertical modularization* is aimed at achieving layering of services and technologies, such as in the OSI model. Flexible standardization, through *virtual modularization* in e-government, can be achieved by separating the various data elements (from the numerous information sources throughout the country) from the technical elements. *Horizontal modularization* is a strategy encouraging the use of several standards for different sub-domains of the infrastructure rather than have one universal standard (Braa et al, 200). This is inevitable since e-government is being deployed in a heterogeneous environment where there are counter networks, diverse communities and different technological and human capacities. Inevitably, *gateways* are needed for translation of protocols between the various networks. These gateways can either be software-based or manual depending on a particular context. In cases where individuals depend on an intermediary, then the gateway service can be in the form of written procedures (Braa et al, 2007).

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Given the low and biased nature of Internet adoption in Kenya, it was argued earlier that this has contributed to the social exclusion of certain groups (Chapter 5), yet for e-governance to be realized, then *mass scale* use should be evident, in order for its intended impacts to be realized (Chapter 6). The LAIFOMS case study (Chapter 7) showed how its spread as an infrastructure is incrementally being achieved through the process of replication. Therefore, achieving mass scale can be partly realized through scaling or replication (Braa et al, 2007) of similar parts of a network. Scaling requires a focus on the *content (digital resources)* rather than the conduit used for the transmission of content. This is the link that cements the *Services Infrastructure* dimension to the *Technological Infrastructure*. So while the technological infrastructure aims at the building of physical resource, the services infrastructure focuses on the building of digital resources. However, the relevance of digital content (partly forming the basis for building network forms of governance) would dictate whether e-government is adopted on mass scale. Scaling therefore provides that focus.

Therefore, realization of e-government models such as G2G, G2B and G2C would depend on their conceptualization based on the digital content. Content, as has been argued in earlier sections of this chapter should be bottom-up, which can then be used to inform policy interventions of the government. There should be a shift in the mindset of stakeholders in developing countries on how to conceptualize the focus of e-government. The current focus is dominated by economic rationalization; however, when embracing the concept of community networks and other counter networks, the need to embrace political rationalization of e-government is clearly paramount. *Political rationalization* calls for democratic governance and it is the view in this framework that a *bottom up* approach to developing e-government services is more *participatory, thus democratic*.

In summary, Building Flexible Infrastructures require a focus on continued and incremental development of the physical and digital resources of e-government. The proposition is to embrace simple solutions built around wireless data access options and audio technologies, especially for physical resources. Building of digital resources should focus on relevant digital content, developed from the fringes, where communities are based. Adopting such as approach would ensure scalability and thus mass adoption of the services.

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8.3.2 CRITICAL REFLECTIONS ON THE NECE FRAMEWORK

Self-reflection forms part of a critical realist agenda in order to overcome a possible inaccurate image that the NECE framework is a panacea for e-government conceptualization in the local contexts of developing countries. Thus the critical reflections reported in this section, while not exhaustive, seeks to ensure that that the thesis remains true to the researcher's intentions of offering an explanatory critique. In offering the critique, arguments are made based on the primacy of the overall managerialist intentions of e-government; that of increasing bureaucratic control by the central government with the attendant negative implications (which are assumed are addressed by the NECE framework from the description above). The reported conceptualization of e-government in Kenya also seems to exacerbate the social exclusion problem.

The NECE framework advocates for the mainstreaming of informal and formal organizing forms which is likely to provide more options for stakeholders in need of government services. Electronic and computer literacy are also to be given primacy through institutionalization in various centers that stakeholders interact with in an attempt to improve the digital resource base for e-government. These initiatives are expected to address some aspects of social exclusion in addition to the contributions by the novel approaches of building physical and the services infrastructure presented in the NECE framework for e-government.

However despite the possible laudable alternative redefinition of a broad-based approach to building e-government infrastructures offered in the NECE conceptualization, the framework's approach to overcoming increasing managerialization is less clear cut than was anticipated. Managerialization emphasis on control over emancipation appears to be partly hinged on the complexity of public administration in general and the *values (legal, economic and democratic)*[23] upon which public administration's bureaucracy is founded on. The NECE framework elevates the need to move towards some form of network governance by emphasizing *linkages* of various

[23] Kernaghan (2003) defines Values as enduring beliefs that influence the choices we make among available means or ends. Three categories of values are distinguished: legal, economic and democratic values. Legal values comprise the belief in legislation as the guiding principle in public administration. Economic values are values like effectiveness, efficiency, flexibility and customer orientation. Democratic values include a focus on transparency, accountability, openness and social equity.

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organizing forms and counter-networks. For instance, the proposition in the NECE is that there should be mainstreaming of informal and formal institutions of governance. It is in the process of mainstreaming these institutions that the NECE framework could inadvertently strengthen the managerialist intentions of e-government.

This is based on the fact that if public administration is based on the aforesaid values mainstreaming would actually imply implementing some legal guidelines, which, according to Snijkers (2005) implies enhancing the rule of law, legal equity, legality, uncertainty reduction and neutrality (which are all important objectives of e-government from Chapter Six). Developing regulations and laws to realize legal values is a quest to ensure that public administration applies the law in the same way for each citizen who should be protected from abuse by (administrative) courts or ombudsmen (Snijkers, 2005). The process of attaining legal rationality of e-government, through the realization of these legal values is likely to have the effect of extending the bureaucratic power of central government agencies. Giving more power to already existing institutions of governance to develop these laws to realize legal values of public administration's bureaucracy is likely to have the effect of extending the notion of control, rather than emancipation.

Increasing bureaucratic control (as the predominant e-government managerialist intention) by no means encourages the claim be made that such intentions of e-government lead to failure. Rather, in concurrence with Olsen (2005), bureaucracy implies a larger organizational and normative structure where rationality and control are critical *attributes* of the emerging structure in contrast to the *process* of building an e-government information infrastructure which should not deify these attributes (Chapter Seven). The technical and procedural rationality of bureaucracy require emphasis rather than the notion that bureaucratic organization should be replaced by other structural forms such as networks forms, co-operative and power sharing forms (Olsen, 2005).

Bureaucratization should not be viewed as a monolithic principle underpinning public administration reforms through e-government and therefore considered to be undesirable, rather that it forms part of a hybrid based on various *structural mechanisms* linked to governance in general: hierarchical authority (bureaucratic organization), competition (competitive markets)

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and cooperation (network forms of organization). Thus from an analytical and explanatory perspective, these are mechanisms that can be all at play in conceptualizing e-government in the context of a developing country. The NECE framework should be seen, not as a stand alone "silver bullet" conceptualization of e-government, but as part of a hybrid that can enrich the process of administrative reforms in developing countries based on the e-government paradigm.

8.5 CHAPTER SUMMARY

The overall aim in this chapter was to provide a synthesis of the analyses from other chapters as well as additional readings from various literature sources in order to propose a framework for conceptualizing the building e-government information infrastructures in developing countries. This chapter began by highlighting the predominant social problem that e-government seeks to address in developing countries. E-Government is implemented in developing countries as an export from Western nations to help in improving governance. The good governance paradigm of E-Government has mainly three defining logics: organizational, policy and political locus.

The organizational locus has its overall defining logic being service delivery improvement. The policy locus seeks to strengthen the government's management control over policy interventions. The political locus was also minimally present, albeit with a bias towards entrenching democratic supervision as opposed to increased democratic deliberation, requiring the participation of the citizenry. Thus overall, the lack of citizen locus reinforced the social problem of the social exclusion of e-government services.

The chapter also highlighted that the predominant ideology underpinning e-government adoption was that of *information Taylorism* focusing on economic rationality and some form of political and professional rationality. Legal rationality was perceived to be missing from the process in how e-government is presently conceptualized in Kenya. The result is a dominant *information Taylorism ideology* which helps in solidification of certain relationships amongst certain stakeholders in government as well as changing power distribution.

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The last section presented a framework that can act as a blue print for developing the required national e-government infrastructure in the context of a developing country. Dubbed the NECE (Nomadic E-Government Co-Evolutionary) framework, the critical dimensions focused on the macro level of building *Flexible Infrastructures*; the meso level of building *Nomadic Networks* and the micro level of building *Confident Local Communities*. The critical linkages of the various levels focus on having in place the social, human resources, digital and physical resources that are necessary for addressing the unintended negative consequences of e-government in developing countries. The next chapter reflects on the conclusions, limitations, and suggestions for further research and an evaluation of the contribution of this thesis.

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CHAPTER NINE

CONCLUSIONS AND EVALUATION OF THE RESEARCH CONTRIBUTION

9.1 INTRODUCTION

This chapter provides an overview of this research, a summary of the key findings, limitations and suggestions for further research. The aim of this research as outlined in Chapter One was to explore how the e-government artifact is taking form in Kenya. Particular emphasis was on meanings it acquires in policy papers, conceptualization of e-government and its impacts at both national and local levels and to suggest potential implications of adoption patterns of e-government. This chapter summarizes the main findings by focusing on these areas. The first part of the chapter provides the general conclusion of the thesis. The second part is a discussion of the consequences 'gleaned' from the emerging e-government artifact. The third part of the thesis is an evaluation of the contribution of the thesis. The fourth and last part discusses the limitations of the thesis and also provides suggestions for further research.

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9.2 RECAPITULATION

The study set out to investigate the meaning of the e-government artifact and how it is taking form in the context of a developing country. Chapter 8 provided a synthesis of the relevant literature and also used the insights gained from the various analysis chapters to clarify the emerging e-government artifact in the context of Kenya. The synthesis of the literature and inferences made from the analyses chapters revealed that the overall defining logic of e-government is primarily geared towards having *e-services* by *improving service delivery*; *improving managerial control of policy implementation* as well as encouraging some form of *democratic supervision*. To achieve this defining logic, the focus or ideology for addressing the social problem is that of information Taylorism with an emphasis on economic rationality and some form of political rationality. Thus it may be concluded that the emerging *e-government*

artifact is based on an ideology of information Taylorism with a defining logic of improving governance and managerial control.

To address the shortcomings of this artifact concept, Chapter Eight further presented literature and insights from prior analyses to underpin a nomadic e-government model for building information infrastructures (NECE Framework). The emphasis of the framework is on the need to adopt long term organizing visions in building these infrastructures and a focus on the existing installed base as a foundation. The nomadic framework, anchored on strong modular design borrowed from an information infrastructure perspective, is clustered around three major layers of building confident local communities, building nomadic networks of governance and building flexible infrastructures. The 'glue', cementing these layers elevates a critical need for building social, human, digital and physical resources targeting the individuals, various organizing forms and formal institutions, services infrastructure and physical infrastructure respectively. Such an approach to building an e-government information infrastructure is postulated to minimize the unintended negative social implications of its adoption.

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9.3 CONSEQUENCES OF THE EMERGING E-GOVERNMENT ARTIFACT

From the explorations presented in various chapters, a number of consequences maybe contemplated, albeit in a speculative manner, especially given the nascent nature of the innovation of e-government in developing countries in Africa. Its nascent state may lead to concluding that most of the e-government projects are still in a state that may be characterized as interpretative (Swanson and Ramiller,1997) in which most countries are still grappling with articulating the meaning of the concept. The e-government artifact, considered as an organizing vision of shared meanings of a particular country or community, may therefore have been taking place over a number of years, with various stakeholders involved - ranging from private sector, public sector, academics' and international development organizations.

Swanson and Ramiller (1997) indicate that organizing visions normally fade away between five to ten years. Thus in attempting to address the research question in the Kenyan context, an

assumption was made: that emerging visions of e-government may not last. For instance, increasingly new terminologies such as Mobile Government or Knowledge Government are beginning to gain prominence (UN, 2008). This may be illustrative of the fact that the success of an organizing vision may lead to the adoption and sustained use of the innovations it promotes (Internet, Mobile Technologies, ICTs), but ironically also the demise of the organizing vision itself (Klecun-Dabrowska, 2002). In light of the above assumption on organizing visions, Millard et al (2006, p. 214) predict that 'by 2020, observers and practitioners will no longer talk about e-Government.' Their prediction is based on the claim that by 2020, e-government technologies and applications would have become part of government and that the focus would change to that of public value.

The interest in this thesis therefore is to recognize that meanings attached to artifacts that emerge are constantly in flux, and thus the artifact that has emerged from the analyses and literature synthesis are temporal. The emergent e-government artifact concept revolving around the logic of Information Taylorism, Managerialist forms of stakeholder interactions and Economic and Political rationality is therefore considered as a snap shot in flux. The consequences of the emergent artifact concept discussed in this section take this assumption into account.

There are two consequences that are pointed out which are clustered around two major trends: the societal evolution towards a technocracy as well as increasing managerialization (Pollit, 2005; Garson, 2006). The themes reflect on the double hermeneutics of the relationship between society and technology, similar to findings by Dabrowska's (2001) study on telehealth. In order to contemplate adoption of e-government, especially in the context of a developing nation, it is useful to ponder on how it is conceptualized and take on particular meanings. The research reported here illustrates that, in order to contemplate adoption of ICTs and their consequences for governance, it is useful to think about how these technologies and systems take particular meanings. These meanings then suggest what type of public service (and in a more general sense - society) e-government would encourage and reinforce. The first part of this section re-states how wider societal trends influence e-government, and what meanings e-government is seen to acquire in policy, strategy and practice. The second part considers the potential implications of e-government to public service delivery.

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9.3.1 EVOLVING TOWARDS A TECHNOCRACY

One theme that emerged was that the basis of transfer of e-government, as an NPM reform package based on a Western technology model, may likely be in conflict with the reality of African contexts in which the NII is not adequate for its adoption. This *'design-reality'* gap, as espoused by Heeks (2002), results in national and local re-conceptualization of e-government, which may be conflictual to the design goals of NPM.

The literature on NPM highlights the necessity for changing governance in African countries ostensibly due to a crisis in how they manage their affairs. Thus e-government envisages revolutionalizing public sector management of African countries, based on Western ideals. This necessity can only be claimed to be revolutionary, given that African ideals and priorities may sometimes be conflictual with Western ideals and values. This is evident not only as reported in literature on e-government failures (Heeks, 2002), but also in interviews with respondents that were reported in this thesis.

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The point of the argument: while NPM may advocate for revolutionizing governance in Africa into a Western-type model, the reality on the ground is evolutionary, where e-government is primarily being employed to attain greater *internal automation of government processes (old model)*, as opposed to the new model which envisages transforming and supporting the external workings of government. While the policy texts analyzed recognize the latter transformative potential, the dominant meaning is more evolutionary as evident in the adopted strategies. Conflicts in meanings are therefore arising at two interwoven levels of international vis-à-vis national.

While the visions expressed in the policy papers (by national policy makers) as well as international edicts (by NPM pundits) envisage a more transformative consequence of e-government, the action-steps envisaged and adopted are more evolutionary (by national implementers and policy designers). This may enable a claim be made in this thesis: that e-government is merely becoming a *vocable for galvanizing and rallying more ICT investments* by the national governments, which will possibly contribute to achieving governance goals. This

claim is based on the analysis undertaken in Chapter Four, where the envisaged transformative role of e-government was recognized and expressed in the vision; however the strategy for its realization was evolutionary. Likewise, the analyses of policy implementers in Chapter Six recognize the artifact as a *technical* and *evolving value network*. Further analysis in Chapter Seven captured the *managerialist intentions* of e-government adoption at the local levels which were already codified in the national strategies (Chapter Four).

The overall managerialist discourse unveiled in this thesis, seem to reflect a quest for focusing on *efficiency and effectiveness in government service delivery*. However, this discourses, when coupled with the acute lack of resources in Kenya as a developing country, may also be playing a role in influencing the meanings that e-government is acquiring. In the strategy and policy papers, e-government applications are perceived as a means of attaining financial management control objectives (e.g. monitoring budgets, planning for expenses and revenues), supporting human resources management goals, enabling standardization of information processing (e.g. standardizing information inputs of SBP in the LAIFOMS), and as an *overall technological infrastructure on which governance* can be based. And from the adoption process of LAIFOMS, which is through replication, the government of Kenya appears intent on *standardizing* service delivery in LAs using ICTs. The crucial role of technocrats in this process was brought out in Chapter Seven, in some instances they had to 'take out' those who were opposing the process. This was taking place even though technocrats do not have political capital, as compared to councilors, yet the technology-based solutions of the technocrats are sometimes being implemented outside the interests of the former.

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This latter view allows for another claim to be made: the overriding managerialist intentions of e-government in Kenya, being spearheaded by technocrats at implementation levels within government are changing delivery of services towards *technocratic governance*. This claim is being made since the meanings that are influencing the adoption of e-government are serving as a 'forceful and social equalizer' (Garson, 2006) for enrolling local authorities ostensibly to attain the *same* governance objectives. Thus the implementation of LAIFOMS apart from attaining horizontal integration of the LAs is also attaining vertical integration of the LAs, a trend which qualifies as one towards *technocracy*. In its more telling form, this trend towards technocracy is also evident in not only the conceptualization of e-government as an evolving network (Chapter Six), but the seeming increase in the number of interactions with citizens as well as

improvements in the quality of exchange (Waema, 2007) point to this fact. In its more subtle form, the wresting of control from the political wing at the local authorities through the adoption of LAIFOMS entrenches the belief that unintended implication of e-government is a move towards a technocracy.

9.3.2 BUREACRATIC EFFICIENCY THROUGH MANAGERIALIZATION

Another claim that can be directly linked to conflictual undertones emanating from the micro-levels of e-government implementation relates to a trend towards enhancing bureaucratic efficiency through replication. For instance, local government agencies may view e-government adoption as an opportunity to attain some delivery objectives, due to increased resources flowing from central government. The dependence relationship on the central government puts to question a well articulated meaning of e-government relevant to local context. Thus the central government's intention is to use ICT to enhance a *paternalistic relationship* with the local government agencies. This is propagated in the form of certain meanings and roles of e-government propagated by the technocrats from central government to achieve their professional objectives; which may be in opposition to the personal agendas of political officers, largely unclear of the role of e-government. The resulting paternalistic relationship between central government and the semi-autonomous local government agencies is likely to enhance the meaning of e-government to be within a managerialist discourse. The emerging meaning may point to e-government being engulfed in the trend towards *managerialization,* in which ICTs are perceived as means for achieving organizational changes and for enforcing controls (Doolin, 2002).

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Despite the emancipatory claims of the e-government vision, and the probable laudable goals of its adoption within the managerialist discourse of changing governance, there are some counter veiling consequences. Its aims are also considered as emancipatory since e-government envisions more participatory and open government *delivered electronically*. However, the consequences for such a vision are not necessarily emancipatory. For example, Chapter Five critically pointed out the inadequacies of the NII as an antecedent to e-government adoption in developing countries, yet this may not be a priority in Western nations from which it emerged. The outcome of basing provision of government services on an NII model, based on a computing model would lead to excluding those who are currently unable to access these government services. In African

countries, the lack of connectivity, as well as the low penetration rate of electricity and poor infrastructures means that the poor cannot adequately access government services, *delivered manually*. Thus basing government service delivery emphasizing e-government, will undermine, rather than diminish the social exclusion problem, in which the *status quo is reinforced* (in this case, bureaucratic control). This would further polarize the service provision model of e-government, based on NPM, and it is the duty of a critical realist researcher to illuminate such consequences, while still remaining true to the positive insights of e-government in developing countries.

9.3.3 SUMMARY

The research recognizes the speculativeness of these consequences, given the assumption that was highlighted earlier. At both the local and national levels, lack of resources impairs the quick realization of e-government objectives, as well as the ambiguity of emerging meanings of e-government. E-Government still remains a myth amongst a large majority of the rural and urban poor, and rightly so, taking into account the demands on the poor to 'survive' (Kenny, 2007). Thus the focus of Chapter 8 was to attempt a proposition encouraging a long term commitment to realization of e-government objectives, which is linked to a process of developing social, human, digital and physical resources. How these resources are built up over the years is context-dependent, linked to the need to build *confident local communities* (composed of individuals, informal networks), *nomadic networks of governance* (fluid links between informal and formal networks) and *physical networks* (addressing digital and physical infrastructure needs). There are myriad options for achieving these potentialities, and thus potential implications of e-government on the social issue of good governance are still an open question in developing countries.

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In summarizing this section, a recapitulation of the intent of this study was to establish the nature of the e-government artifact. The interest was to undertake an exploration of how it is taking form by focusing on the following research question:

"How is the e-government artifact conceptualized in the context of a developing country"?

The data collection and analysis was aimed at reaching an understanding of the meanings of e-government that unfolds, where meaning formation is the outcome of interactions of various actors with a stake in government. The analysis drew on various perspectives, some of which were grounded on empirical results of the study, while some were premised on an analysis of literature. The latter was unavoidable, considering not only the emergent nature of e-government in developing countries, but also its interwoven nature with other disciplines, notably Public Administration. Empirical knowledge was unpacked in Chapters 4,5,6,7 and synthesized in Chapter 8 as a basis for the *NECE* framework. In order to develop the NECE framework, this study first proposed a framework for understanding the emergent e-government artifact, shown as Figure 9.1 (which is a repeat of from Chapter 3 and 4).

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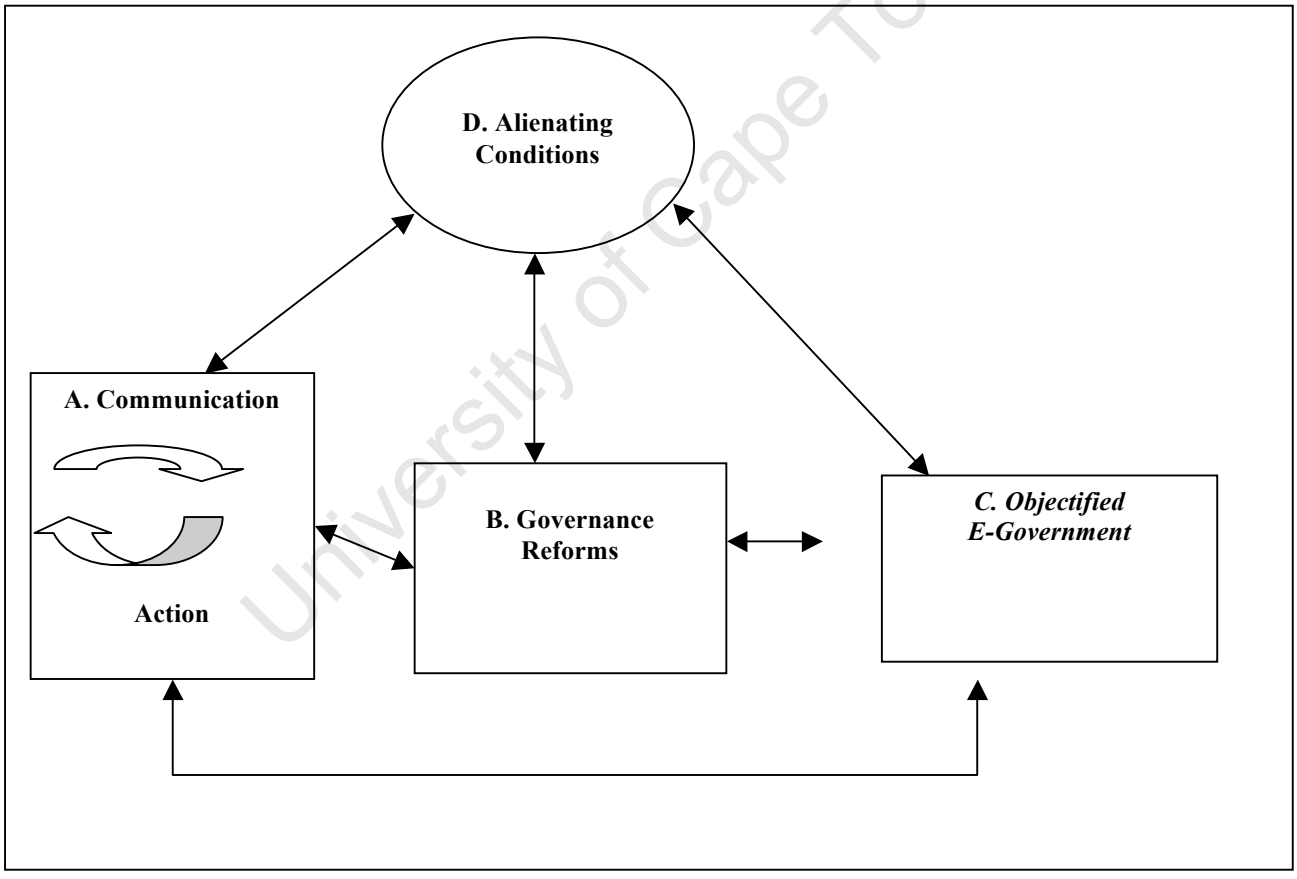

Figure 9.1 Emergent E-Government Artifact

Meaning formation, in which stakeholders engage in processes of communication and action is captured by [A]. For instance, there are a number of interpretive, legitimization and mobilization activities normally underway during the formation of an innovation such as e-government. However, the formations of such meanings emerge within particular problem domains. In this thesis, the meanings of e-government that were considered were addressed from a governance perspective, especially as advocated for in the literature by NPM pundits [B].Both [A] and [B] influence and are influenced by the context in which e-government is taking form [D]. From a critical realist research agenda, the research considered which alienating conditions would critically aid in critique of the lofty goals of e-government. [D] could have been referred to as context, however, the political agenda of the research was to point out the unfavorable context in developing countries into which e-government is being imported. The alienating conditions of the emerging e-government form were therefore illustrated in the various chapters by pointing out the *social exclusion* of various groups, yet there is an assumption that it would be inclusive. Under these alienating conditions, the emergent e-government artifact is considered as an *evolving and technical artifact, with strong' managerialist orientations of augmenting and reinforcing central governments control over its polity* [C].

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9.4. CONTRIBUTIONS OF THE RESEARCH

A contribution can be regarded as reflecting on the world as it exists, providing alternative interpretations or guiding action (Dabrowska, 2001). After having conducted a study, Whetten (1989) proposes asking the following questions: *What is new? So what? Why so? Well done? Done well? Why now? Who cares?* The sub sections below highlights the main contributions of the thesis with the above questions providing the basis for the researcher's reflections.

9.4.1 THEORETICAL AND METHODOLOGICAL CONTRIBUTION

From an e-government research practice perspective, Heeks and Bailur (2007) highlight a number of areas that can be considered critical for broadening and encouraging the significance and the theoretical contribution of e-government researchers:

9.4.1.1 Exposing the E-Government Ontological Ambiguity and Commitments

At the initial stage of this research, the concern that was highlighted was the dominant thinking that tended to 'black box' the concept of e-government as an artifact with a universal meaning. The argumentation that has been developed rebuts this generalization in the various parts of the dissertation, that is: that generalization fails to account for the highly situational and contextual aspects of the social phenomenon of e-government. It is from this premise that the study's theoretical contribution partly finds traction.

From the title, this thesis attempts to make a contribution to the ontological clarity of the concept of e-government. Chapter Two explored relevant literature and creatively used the Organizing Vision (OV) framework to organize the diverse knowledge that informs the various discourses concerning e-government. Evidently the interpretations from the review a largely instrumental view of e-government with predominantly realist (positivistic) images dominated by evolutionary models of e-government that reveals various levels of maturity (Chapter Two). Thus an assertion was made that e-government is predominantly regarded as a 'black box' at the global level of meaning formation. However given the critical intent of the research, the researcher was incited not to 'take for granted', the portrayal of e-government as a black box, and focus turned to local contexts of developing countries.

Chapter Four, Five and Six therefore exposed in-depth what the national strategies of e-government focus on as well as how the prevailing conditions in a developing country influence meaning formation. Chapter Four and Six brought to light the internal efficiency and effectiveness focus of the e-government paradigm, yet e-government visions are inundated with images of an external focus. This dominant image, that is of instrumental rationality (thus regarding e-government as a tool), has been questioned in this thesis as unjust to many stakeholder groups in the society since it leads to social exclusion. The contribution emanates from the view that e-government is transformative and inclusive, yet the practice reveals a predominantly *'economic –technical' rationality* (Chapter Four and Eight) that continue to bedevil Information Systems research. Thus in effect, e-government is a *new form of control* that has been added to the IS toolkit which is being used to enhance the power of central government over the affairs of the state (Chapter Seven).

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Therefore, the thesis makes a contribution to the IS knowledgebase by pinpointing an ontological gap and commitments from various discourses about e-government theory and practice. That overall, e-government is universally objectified in policy discourses as being transformative, yet its ontological commitments boil down to 'economic –technical' rationality with an emphasis on performance improvement and fostering a new form of control which relies on IT, used to solidify the interests of certain stakeholders (political rationality). It is in successfully expounding on this ontological ambiguity, i.e. an e-government knowledge domain characterized by a lack of clarity, that a claim on the theoretical contribution of this thesis is made.

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9.4.1.2 Explicit Engagement with Information Systems, Public Administration and Other Social Science Theories

Heeks and Bailur (2007) prescribe that in the long term, e-government research makes a contribution through their explicit engagement with information systems, political science, and other social science theories in order to improve communication and accumulation of knowledge. The approach adopted in this thesis required engaging with theories from a diverse set of fields to meaningfully resolve the research problem, thus making a theoretical and methodological contribution to e-government research.

For instance, Actor-Network Theory (ANT), traditionally from Science and Technology Studies (SST), was employed at the micro-level of analysis to bring out the stakeholder dynamics in an e-government implementation process. ANT showed that through the interaction of actors, an actor-network is formed from the mutual translation. The resulting network diagram revealed that the state of the resulting actor-network, with implications on the future of the e-government adoption process. The Global Diffusion of the Internet (GDI) framework, finding its traditions in the National Systems of Innovation (NSI) and Diffusion Theory provided the theoretical lens for capturing the state of the Internet at the country level and therefore was useful for delineating aspects of the research problem. The IS Infrastructure perspective, Organizing Vision, IT conceptualization and the Nomadic Computing approaches provided an IS and Computer Science perspective. The study also engaged with specific e-governance frameworks that emanate from Public Administration such as the e-governance model (Chadwick and May, 2003,

Navarra, 2007). Engaging with these diverse theories and approaches enabled the researcher to illuminate different aspects of the object under study. The outcome of the research process was a framework, again founded on a number of perspectives, which hopefully will enrich the budding knowledge-base of e-government.

The creative use of these diverse sets of theories helped in boosting the "knowledge-building and academic legitimacy" (Heeks & Bailur, 2007, p. 262) of this research, thus making a contribution but with a caveat that the use of these external theories can potentially reduce the legitimacy of the research domain (Benbasat and Weber, 1996). Thus the study also engaged directly with frameworks and models (Chapter Two, Four, Seven, and Eight) not only to try and mitigate on over reliance on external theories, but also to aid in creating an "ancestry of e-government models in appropriate referent theories" (Heeks & Bailur, 2007, p. 262).

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9.4.1.3 Uniqueness of Critical Realism and Methodological Pluralism

There are increasing claims of contributions being made by research that use a broad range of research traditions, especially in Information Systems. Specifically, Heeks and Bailur (2007) make this claim for critical realist, social constructionist and critical type of research. Their argument is that such an approach can help illuminate current blind spots in e-government research and may be more relevant to the current issues facing e-government practitioners. Others, such as Mingers (2004), have decried the dearth of an appropriate philosophical underpinning for multi-methodological approaches to research, with critical realism a possible and oft quoted candidate as a philosophical base. Especially in complex and multidimensional objects of inquiry, Mingers (2001) argues that IS should draw upon a very wide range of disciplines that encompass different research traditions and advocates "strong pluralism". This study responded to the need for researchers to be more explicit in their theoretical foundation of e-government research (Heeks and Bailur, 2007) and the need for an appropriate philosophical base for multi-methodological approaches to Information Systems (IS) research (Mingers, 2001). This study, as one of the first in a developing country, used critical realism to ground a pluralistic qualitative research approach encompassing the use of qualitative and quantitative modes of analysis and thus makes its contribution from that front.

The approach, and therefore the methodological contribution of this study arise from the use of a broader range of research methods and move away from:

> the dominance of "hunt and peck" and personal reflections to greater use of both "traditional" methods such as interviews, surveys, and observation; plus others such as participant observation, content analysis, and critical incident technique.[…] greater use of out-of-office data gathering (Heeks and Bailur, p. 262).

The four analyses chapters (Four, Five Six, Seven) showed this methodological diversity and why such an approach is unavoidable when dealing with complex multifaceted concepts such as e-government. Thus the employment of various methodologies in this study served and was relevant for specific aspects of the study. Using the survey methodology provided a way for capturing general perceptions of e-government implementers, while the use of content analysis was inevitable in order to bring out the dominant language on e-government websites. Interviews provided insights into various qualitative aspects of the study, while hermeneutics, as a mode of analysis (Myers, 1997), provided the 'means' for making interpretations of various documents to get to the underlying mechanisms of the e-government artifact. Theoretical thematic analysis made it possible to 'draw out' various inferences from interview transcripts, while the researcher's knowledge of the context made participant observation possible and interpretations meaningful.

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The uniqueness of Critical Realism in pluralistic research is claimed as a contribution in this thesis, not to the exclusion of possible other approaches, but as one of the fruitful alternatives to the debates on the dominance of the social constructionist ontology associated with postmodernism and to the empiricist realist ontology associated with positivism (Fleetwood, 205).

9.4.2 PRACTICAL CONTRIBUTION

The new conceptualization of e-government presented in the NECE framework can be seen to have some practical implications. Viewing the concept of e-government 'myopically' as a 'black

box' of technology modules and applications poses danger given that such a deterministic view leaves out various antecedents that need to be in place. The 'drive' to e-government maturity is not just about a progression from basic functionality to superior functionality as espoused by the various evolutionary models (Chapter Two). Rather the success of building an e-government infrastructure is linked to the presence of other resources, which on the surface do not appear remotely connected to e-government. The conceptualization advocated for in the NECE framework recognizes that e-government is not only a technology solution, but also a social system that elevates the need for empowered individuals, communities and whole societies through the building of social, human, digital and physical resources. Thus the adoption of e-government should pay attention to the 'localities' within which the artifact is finding expression and that it is difficult to achieve successful implementation as long as it remains foreign, myth and regarded universally as a 'black box'.

The need for local adaptations of the concept of e-government is unavoidable and universal 'objectification' of the meaning of e-government should of necessity be rejected by African countries. Local adaptations and accommodation of e-government conceptualization requires re-contextualization and re-interpretation of the e-government organizing vision to fit in the long term, macro-economic, social, legal and political objectives of the government. Fitting the e-government vision at these levels, is hoped, elevates their visibility and diffusion at various levels. The argument is that if the populace cannot visualize e-government's link to these broader objectives of governance, then its applicability shall remain 'close-looped' amongst the technologically savvy, yet with increasing technologization of society, this cannot be allowed to happen. The NECE framework provides a way of perceiving e-government that allows for elevating the visibility of e-government to fit in these broad societal objectives of governance.

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9.5 LIMITATIONS OF THE RESEARCH

In this section, the limitations of the research are discussed in general. This study was an attempt to conduct a critically-informed research within the IS domain, and give due weight to both empirical and theoretical aspects. However, the scope of the endeavor was challenging, especially given the dearth of critical realist research in the e-government domain. As a result, the outcome of this research could always be improved. A number of the limitations are considered below.

With respect to the analysis of policy papers, one limitation was the fact they are historical in nature and therefore describe a phenomenon that is still very much on-going and changing. The policy papers were enacted in 2004, 2006 and 2007. Opinions and ideas about what is expressed in these policy papers keep on changing as new information emerges about e-government. Therefore, no finite conclusions can be drawn concerning the meanings emerging from the interpretation of the policy papers, but, the results provided a snapshot for structuring and capturing how the e-government artifact is taking form. This limitation is however an opportunity as well since it provides a first glimpse into how e-government is conceptualized in developing countries without simply relying on extant literature to understand the phenomenon. Furthermore, this research suggests that building of the e-government information infrastructure may be a long-term process for which finite conclusions may be very difficult to draw. The black-boxing of e-government will constantly be challenged. The research covered a period of about 5 years, from 2004 to 2008. Further research could provide more insight into the dynamic adoption process such as conceptualized in this research from a policy perspective.

Another limitation concerns the case study (LAIFOMS). It was evident that under the ambit of e-government, technology projects keep on changing their form and thus they are always in flux. E-Government projects also involve many stakeholders and sometimes getting the views of all stakeholders becomes a problem. The study was conceptualized to capture the process of adoption with a limited focus of understanding the translation and inscription processes. However, these may not have been adequate to capture in-depth, certain characteristics of the adoption process, especially from various stakeholder perspectives. The approach in this study was therefore at an aggregate level in order to respond to the mandate of the thesis. Further study can focus on the impacts of these e-government projects on specific stakeholders in order to provide directions on how to solve social problems that e-government was set out to solve. Additional new cases of longitudinal research could also add to the understanding of the implementation process in further uncovering attempts at black-boxing.

Another limitation was captured from the survey component of this research. E-Government is considered to be multi-disciplinary in nature, comprising contributions from Computer Science, Information Systems, Operations Research and even Public Administration. The survey

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component relied heavily on theoretical bases largely from IS. In addition, the variables have not been tested before, and therefore were being tested for the first time in a developing country's context. The theorized relationship impacts influencing conceptualization of e-government was also largely based on conjecture and observations of adoption of technologies in developing countries. The relationship also did not consider the influence of mediating or moderating variables that may exist. However, it was regarded as adequate to undertake the survey, especially given that the variables were untested and the study was very exploratory. Further research can be helpful in validating the theorized relationship between the intended impact of e-government adoption and the conceptualization.

9.6 SUGGESTIONS FOR FURTHER RESEARCH

The suggestions highlighted include ways of overcoming the limitations of the thesis, as well as a discussion of related areas that merit further exploration.

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It would be important to conduct a longitudinal study and consider additional e-government projects being undertaken in various government agencies in order to take forward the discussion of the impacts realized. A number of angles could be considered; with one of those being to explore the actual impacts of e-government adoption from a user-centered perspective. For example, this study was undertaken between the periods 2005-2008, at which time the short-term initiatives in the policy papers should be at advanced levels of completion. Assessing various projects to establish their impacts would provide invaluable insights as e-government unfolds. A second angle would be to consider whether the adoption of e-government has had a noticeable effect on the delivery of public services to the citizens. This can involve undertaking interviews, surveys or ethnographic studies in order to unearth various aspects of the impact realization process.

At the methodological level, this research was conducted at various levels, and therefore of necessity was not intensive within these levels. Further research could focus solely on each level to unearth the dynamics involved in conceptualizing e-government. Such an approach can now

benefit from a holistic study, such as this one, that has researched the e-government artifact at various levels.

Another area of research, related to the proposed framework, should be the continuous research into the applicability of the NECE framework within various developing countries. Since the framework is modular, intensive research into the dynamics actually involved in the realization of the various aspects would further help in refining the framework. This would aid in advancing the theoretical foundation upon which e-government research and practice can be based, complimentary to other models that have been developed. A further possible thoughtful area that can be the focus of e-government research is on the assessment of the developmental impact that adoption of e-government. This concern for the developmental impact is predicated on the assumption that e-government has much more to offer to developing countries than the industrialized countries.

These suggestions for future research indicate that this research domain can be taken further in a number of directions and conducted at a number of levels. This research has covered a relatively nascent area, and hopefully achieved its aim of opening discussion on meanings that emerge at different levels of the organizing vision of e-government, in order to avoid 'black boxing' the artifact, and more critically where developing countries that depend on technology transfer are concerned.

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APPENDICES

[Insert Appendix A – Ethics Committee Approval Letter]

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Appendix B:
Case Study Interview Schedule

A. Interviewee Demographics

1 Please provide the following information:

Position		
Organization/Department and Ministry		
Address		
Phone	Fax	Email
Reporting to		
Date of Interview		
Venue		
Duration (Hours)		
Language used during interview		
Interviewer		

2. Education and Training _____
3. Age _____
4. Gender (Male/Female):_____
5. Career:
   i) Number of years with the organization/Department/Ministry: _____
   ii) Previous positions (in organization, elsewhere): _____
6. What is your experience level with ICT in general and e-Government Systems?

_____
_____
_____
_____

7. How would you describe your role in respect of E-Government Technology Implementation in your organization/Department or Ministry?

_____
_____
_____

B. Conceptualization of the E-Government Technology Artifact:

1. How is E-Government Technology viewed/perceived/conceptualized in the agency? Explain.

_____
_____
_____

2. What were the initial requirements that the e-Government initiative set out to address? Explain.

_____
_____
_____

3. What were the initial objectives that guided the initiation of the implementation process? Explain.

_____
_____
_____
_____

1. How was the e-Government Technologies implemented (e.g. what was the implementation strategy, policy, directives)?

_____

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_____
_____
_____

2. To what extent was/is the implementation of the e-Government Technology viewed as a:

View	At initiation	Presently	Future
Tool			
Proxy			
Ensemble			
Computational			
Nominal			
Other (Specify):			

3. Who were or are the main stakeholders of E-Government Technology Implementation in your agency? Describe their various roles.

_____
_____
_____

4. How would you define success of E-Government Technology Implementation?

_____
_____
_____

5. What prompted the implementation process? Was it:

As a conviction of one person	What is the position of this person in the organization:
As a reaction to internal events	Which events?
As a reaction to external events	Which events?
As a result of formal planning	Specify
Other	Specify

6. Who are the main role players involved with E-Government Technology initiatives? Indicate the extent of involvement of the role players on a rating of 1=not at all, 5=intensively.

	Start	Present	Future
Parent Ministry official			
Agency's top management			
Line management			
IT management			
Users			
Others (Specify):			

7. Is there an e-Government project champion? If so why does s(he) play the role and how does s(he) handle the role of champion?

_____
_____
_____

8. How effectively was the technology implemented? Could you describe the process?

_____
_____
_____

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9. What is/are the goal(s) of the adopted e-Government Technology? Explain.

_____
_____
_____
_____

10. Explain the degree to which regulation from various levels of government have influenced the conceptualization of the e-Government Technology project.

_____
_____
_____

11. Do you think that the external environment impacting E-Government projects is:
    a. Growing: _____
    b. Shrinking: _____
    c. Stable: _____
    d. Other (Specify): _____

12. What is your view of the influence of a centralized/decentralized governmental structure on how the technology is conceptualized? Explain.

_____
_____
_____

13. Did reporting relationships at various levels of the government and your agency influence the way the e-Government project was conceptualized in your agency/organization/ministry? Explain.

_____
_____
_____

C. The Nature of Interactions in E-Government Technology Projects

1. Please describe the present situation of the E-Government Implementation process.

_____
_____
_____

2. Describe the present awareness of E-Government Technology in the organization/department/agency/Ministry_____
_____
_____
_____

3. How widespread is the use of E-Government Technology in your agency/organization/ministry? Explain.

_____
_____
_____
_____4. Describe the E-Government Technology Implementation at present (e.g. stage of implementation, level of attainment of goals, usefulness, etc.)

_____
_____
_____
_____

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5. To what extent are the services available through E-Government initiatives in your agency available through other sources? (What percentage of your service needs is met through the use of E-Government Technology?)

_____
_____
_____
_____

6. What are the main challenges of e-Government Technology Implementation?_____
_____
_____
_____

7. How would you summarize the implementation process of e-Government Technology to date? (Key events, episodes).

_____
_____
_____
_____

8. Describe the implementation process in the following general terms:

	Start	Present	Future
Top-Down			
Bottom-Up			
Middle-Up			
Middle-Down			
Other (Specify)			

9. How was e-Government promoted in your agency (e.g. advertising campaigns, promotional materials or initiatives)?

_____
_____
_____
_____

10. Describe the extent to which organizational members were informed about the E-Government initiative:

	Start	**Present**	**Future**
The entire agency informed (specify)			
Only certain units informed (specify)			
Only heads of units informed (specify)			
Only certain individuals informed (specify)			
No one informed			

11. Describe the present awareness of E-Government Technology in the organization/department/agency/Ministry

_____
_____
_____
_____

12. To what degree has the concept of E-Government Technology become institutionalized in the agency; e.g. would the agency be able to function if e-Government Technologies were removed today?

_____

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_____
_____

13. Explain the Implemented E-Government Technology in terms of:
    a. Improved coordination:
    _____
    b. Citizen-public interaction:
    _____
    c. Private sector-public sector interaction:
    _____
    d. Citizen-citizen interaction
    _____
    e. Organizational control and power
    _____

14. Assess the implementation process in terms of :
    a. The recognition and acknowledgement that the current public service delivery of services is untenable and disempowering to those who need the services
    _____
    b. Was this need confirmed with recipients of your services?
    _____
    c. How was the case for the need for E-Government established within your Department and Ministry?
    _____
    d. How were other stakeholders enrolled in this point of view?
    _____
    e. How were results from client interviews, E-Government systems practices, guidelines and protocols explored to establish a need for E-Government Technology in your Department/Ministry?
    _____
    f. How were powerful champions and other stakeholders within and outside the department/organization sought out who were willing to support the implementation process?
    _____
    g. Describe the process of putting together a case for allies and mobilization of resources.
    _____
    h. In implementing the systems, how did you challenge existing modes of public delivery of services, overtly or covertly?
    _____
    i. Explain how you were able to identify stakeholders who would resist/support the change process?
    _____
    j. How were you able to persuade users and other stakeholders to take part in the implementation process?
    _____
    k. What are the internal political and wider public activities you used to raise awareness and change attitudes?
    _____
    l. What are the steps you undertook to persuade leaders and those with executive authority to provide the right environment for change?
    _____
    m. How did you develop a citizen-centric public-service delivery philosophy accessible and comprehensible to the stakeholders?
    _____

D. E-Government Technology Impacts:

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1. The impacts of the implemented E-Government Technology may be assessed in terms of whether they have been realized as well as if they were intended or not. Please provide an assessment of the following impacts:

Constructs	***Start***	***Present***	***Future***
The growth of the output of the ICT industry			
Overall governmental cost savings			
Optimization of governmental revenues			
Increased opportunities for citizens			
Organizational/state/agency efficiency			
Transparency and accountability of government			
Enhanced Rule of law			
Enhanced Cooperation			
Enhanced openness and participation			
Improved Foreign Direct Investments			
Others (Specify):			

2. What are some of the intermediate impacts of e-Government Technology Implementation?
   a. _____
   b. _____
   c. _____
   d. _____
3. Do you expect the usage of e-Government applications to:

Increase	Explain
Stay about the same	Explain
Decrease	Explain

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Appendix C:

Early Steps in the Analysis: Knowledge Phase of LAIFOMS

The relevance of LAIFOMS, as one of the e-government initiatives in Kenya, is therefore traced from 1996 onwards (Chapter One, section 1.3.2). However, the analysis recognized that certain actors may have started influencing the process much earlier. These will be identified in Chapter Seven during the ANT analysis. The historical brief considered the period 1996-2002 as the first phase relevant for the analysis. This was considered the first phase since there were several parallel events which were at play during this period.

The Kenya Local Government Reform Program (KLGRP) was setup in 1996 as a secretariat within the MoLG to consolidate and spearhead all reform efforts targeting local authorities. The operationalization of KLGRP arose from the need to have an institution within the MoLG mandated to spearhead a decentralization initiative started in 1996 (Mitullah and Waema, 2007). This initiative was aimed at strengthening local authorities (LAs).

Two components of the decentralization effort relevant for this analysis was the need for LAs to put in place Single Business Permits (SBP) as well as implement Integrated Financial Management System (IFMIS) (GOK, 1999). The SBP was aimed at streamlining licensing which would result in an enabling environment for business in the LAs. Adoption of IFMIS would strengthen financial management as well as encourage stakeholder participation in governance (DFID, 2006).

Therefore, the KLGRP was setup with the aim of improving management of LAs through the deployment of IFMIS and SBP as part of the reform instruments. Funding from these projects under KLGRP was from the World Bank as well as the Government of Kenya prior to 2002. The support was in the form of technical assistance (TA) as well as budget support to the Ministry of Local Government. DFID (2006) reported that due to a problem with a related project, World Bank provided funding up to 2001. DFID then started offering Technical Assistance from 2002.

Initial reforms by KLGRP targeted enhancing inter-governmental fiscal transfers, improving financial management, debt resolution, streamlining the budgeting system and service provision capacity building for LAs (Mitullah and Waema, 2007). In support of the KLGRP, the Minister of Local Government issued a directive to all LAs to implement the SBP in line with the Finance Act of 2000. In addition, the Local Authority Transfer Fund (LATF) Act in 1998 was adopted. The act provides 5 percent of national income tax to LAs in line with population size, resource base and financial performance. In order to qualify for these LATF funds, LAs are required to develop a Local Authority Service Delivery Action Plan (LASDAP) using a participatory approach. LASDAP hopes to achieve participatory governance through the involvement of citizens in identifying development projects in their locales. The implementation of IFMIS, the precursor to LAIFOMS, was on a pilot basis in eight LAs (Mavoko, Nyeri, Kiambu, Wareng, Eldoret, Kirinyaga, Embu and Karatina). A series of workshops and seminars was organized in the early 2000 to sensitize the participants on the need for a computerized approach to LA management.

These sensitization seminars and workshops can be regarded as forums in which the *Knowledge Phase* was being institutionalized in the LAs. This knowledge gained by the selected LAs could be characterized as *'sensitization-knowledge'*, which was passed on to them to alert them that the IFMIS (LAIFOMS) innovation exists and can aid them in solving their management problems. This is in contrast to what may be characterized as *use-knowledge*, which comprised creating awareness on how LAIFOMS was to be used given from the design that was initially revealed. The other type of knowledge that was passed on to the LAs was *functional-knowledge*, which required that participants be trained on the functioning of the LAIFOMS system. The *Knowledge Phase* was not only evident at the point of realization of need for LAIFOMS, but throughout the process of persuasion through to implementation. For instance, part of *functional-knowledge* was being passed on to the participants during the implementation process.

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Appendix D: Sampling Frame

Government Ministries/Parastatals
1. Office of the President
2. Office of the Vice President
3. Ministry of Finance
4. Ministry of Planning and National Development
5. Ministry of Foreign Affairs
6. Ministry of East African and Regional Cooperation
7. Ministry of Roads and Public works
8. Ministry of Education
9. Ministry of Agriculture
10. Ministry of Livestock and Fisheries Development
11. Ministry of Health
12. Ministry of Tourism and Wildlife
13. Ministry of Information and Communication
14. Ministry of Transport
15. Ministry of Local Government
16. Ministry of Gender, Sports, Culture and Social Services
17. Ministry of Water and Irrigation
18. Ministry of Regional Development Authority
19. Ministry of Energy
20. Ministry of Environment and Natural Resources
21. Ministry of Labor and Human Resource Development
22. Ministry of Co-operative Development and Marketing
23. Ministry of Justice and Constitutional Affairs
24. Ministry of Science and Technology
25. Ministry of Youth Affairs
26. Ministry of Housing
27. Ministry of Lands
28. Ministry of Defense
29. Ministry of Trade and Industry
30. Immigration and Registration of Persons
31. Pharmacy &Poison Board
32. Higher Education Loans Board
33. Kenyatta University
34. National Council for Science and Technology
35. University of Nairobi
36. Kenya Electricty Generating Company (KenGen)
37. Kenya Pipeline Company
38. Kenya Power and Lighting Company Ltd.
39. Central Bank of Kenya
40. Consolidated Bank of Kenya
41. Export Processing Zones Authority
42. Export Promotion Council
43. Industrial Development Bank
44. Kenya Commercial Bank
45. Kenya Post Office Saving Bank
46. Kenya Re-Insurance Corporation
47. Kenya Revenue Authority
48. National Bank of Kenya
49. Capital Markets Authority
50. National Health Insurance Fund
51. Pharmacy and Poisons Board
52. Film Censorship Board
53. Hotels and Restaurants Authority
54. Industrial & Commercial Development Corporation (ICDC)
55. Investment Promotion Center

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56. Kenya Tourism Board
57. Kenya Tourist Development Corporation
58. Safaricom Kenya Limited
59. National Social Security Fund
60. NGO Coordination Bureau
61. Communications Commission of Kenya
62. Kenya Broadcasting Corporation
63. Kenya Railways Corporation
64. Postal Corporation of Kenya
65. National Social and Security Fund
66. Telkom Kenya Ltd.
67. Kenya National Trading Corporation
68. Tana Athi Rivers Development Authority
69. Kenya Shipping Agency
70. Tea Board of Kenya
71. Tea Research Foundation
72. Egerton University
73. Jomo Kenyatta Foundation
74. Kenya Agricultural Research Institute
75. Kenya Literature Bureau
76. Kenya National Examinations Council
77. Kenya Institute of Administration
78. Kenya National Library Services
79. Moi University
80. School Equipment Production Unit
81. Electricity Regulatory Board
82. National Oil Corporation of Kenya
83. National Water Conservation and Pipeline Corporation
84. Kenya Institute for Public Policy Research & Analysis
85. Kenya Medical Research Institute
86. Kenyatta National Hospital
87. Moi Referral and Teaching Hospital
88. Radiation Protection Board
89. Agro-Chemical and Food Company
90. Betting Control and Licensing
91. Bomas of Kenya Ltd.
92. Kenya Bureau of Standards
93. Kenya Industrial Estates
94. Kenya Utalii College
95. Kenya Wildlife Service
96. Kenya Wine Agencies
97. Presidential Music Commission
98. Kenya Airports Authority
99. Kenya National Shipping Line
100. Kenya Ports Authority
101. Kenya Wildlife Service

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Appendix E: Survey Questionnaire and Interview Schedule

Department of Information Systems,
Faculty of Commerce,
University of Cape Town
Private Bag, Rondebosch, 7701
South Africa

Department of Management Science
School of Business
University of Nairobi
Box 30197, Nairobi, Kenya

==========

8 March 2013

Dear Sir/Madam,

RE: E-GOVERNMENT IMPLEMENTATION IN KENYA

I am a Lecturer in the School of Business, University of Nairobi as well as a Doctoral Candidate in the Department of Information Systems, University of Cape Town, South Africa. I am in my research year of my Doctoral studies focusing on e-Government Technology implementation in developing countries.

The purpose of my Doctoral research is to determine the nature of e-Government Technology in government agencies. This is the very first national and comprehensive survey focusing on E-Government in Kenya and my expectation is that there will be some interesting insights emerging from this study. Some of the specific objectives of the survey component of the research include:

14. To determine how e-Government Information and Communications Technology initiatives are conceived,
15. Investigate the factors that influence the diffusion rate of e-Government Technology as well as
16. To determine the intended impacts of e-Government projects

If you are interested in the results from this study you are welcome to request a copy of the final report by supplying your name and email address. Any queries regarding the questionnaire or the overall study can be directed to the undersigned.

Please be assured that this information is sought for research purposes only and your responses will be strictly confidential. No individual's responses will be identified as such and the identity of persons responding will not be published or released to anyone. All information will be used for academic purposes only.

Please assist me in gathering enough information to present a representative finding on the current status of E-Government implementation by completing the attached questionnaire. Your participation is entirely voluntary and the questionnaire is completely anonymous. Thank you very much for helping with this important study.

Sincerely,

Nixon Muganda Ochara
Lecturer, University of Nairobi and Doctoral Candidate, University of Cape Town, South Africa
Mobile: +254-722-883851 Email: nmuganda@uonbi.ac.ke

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SURVEY OF E-GOVERNMENT IMPLEMENTATION IN KENYA

Thank you for taking the time to complete this questionnaire. Completion of this questionnaire is voluntary and all responses will remain confidential.

Please indicate to what extent the views in your organization agree or disagree with each of the following statements.

E-Government Technology Conceptualization	Strongly Disagree	Disagree	Indifferent	Agree	Strongly Agree
1.1 E-Government is a tool for substituting government workers					
1.2 E-Government is a tool for restructuring of administrative processes of Governments					
1.3 E-Government enables the government to serve the public more cheaply and efficiently					
1.4 The performance capabilities achievable by E-Government are defined by the technical features					
1.5 E-Government enhances the capabilities of workers and public institutions					
1.6 E-Government is a social relations tool for conveying social presence					
1.7 E-Government is a tool that provides more variety in communications choices					
1.8 E-Government is a tool for modification of administrative processes and stakeholder roles, as well as flattening of hierarchies					
1.9 E-Government alters and enhances how people and organizations process information					
1.10 E-Government is a large-scale repository of government information that can be searched, manipulated and used for socio-economic gain					
1.11 The Ease of Use of E-Government determines its conceptualization					
1.12 The perception of the Usefulness of E-Government technology influence its conceptualization					
1.13 The perceived availability of resources such as human skills, hardware, software, money and documentation influenced the conceptualization of E-Government					
1.14 A strong intention to use services provided by E-Government influenced its conceptualization					
1.15 E-Government is conceived by considering the number of people, organizations and other nations using its technology					
1.16 The spread and use of technologies such as e-mail, Internet, Intranets, Extranets, Mobile Computing and Mobile telephony are indicative of e-Government implementation					
1.17 E-Government conception is influenced by the barriers that people, organizations and nations experience when adopting its technologies					
1.18 E-Government is conceptualized by focusing on the critical mass of people required to adopt its technologies					
1.19 E-Government is viewed in terms of the financial resources spent on its technologies					
1.20 E-Government is viewed in terms of how positively IT spend has been changing over time					
1.21 E-Government is conceptualized in terms of the productivity impact of its technologies					
1.22 E-Government is regarded as a complex socio-political process which is influenced by the roles of various stakeholders					
1.23 E-Government is a network of stakeholders, industries, technologies and nations which keeps on evolving					
1.24 E-Government is defined by how the various users integrate and engage with its technologies					
1.25 E-Government is defined by the social influences(conditions) in the organizations					

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E-Government Technology Conceptualization	Strongly Disagree	Disagree	Indifferent	Agree	Strongly Agree
1.26 Introduction of E-Government considers the intended and unintended consequences					
1.27 E-Government demonstrates the computational power of ICT for Public Service Delivery					
1.28 E-Government provide a means for simulating decision making and information retrieval in the public service					
1.29 E-Government represents processes, structures, events and knowledge which is accessible through the use of integrated database technology					
1.30 E-Government Technology is absent and cannot be described, conceptualized or modelled.					
1.31 Information and Communications technology for E-Government Systems is normally implied					
1.32 E-Government Technology features, functions, models, measures and computational elements are difficult to define during implementation					

Please rate the extent to which you agree or disagree with the following intended impacts of E-Government implementation.

Impacts of E-Government Implementation Implementing E government ….	Strongly Disagree	Disagree	Indifferent	Agree	Strongly Agree
2.1 leads to ICT output growth due to increased hardware investments					
2.2 leads to ICT output growth due to increased software investments					
2.3 leads to ICT output growth due to increased human capital investments					
2.4 results in improved inter-administrative integration resulting in general cost savings					
2.5 leads to improved communication between various administrative units resulting in reduced inter-connectiveness costs					
2.6 leads to a single-approach to applications development within the government sector					
2.7 leads to a one stop-shop approach to handling within government departments/organization and country					
2.8 leads to the reduction of costs as a result of integration of the diverse distributed databases					
2.9 leads to a percentage reduction in administrative costs of procurement of goods and services					
2.10 leads to cost savings per transaction within government					
2.11 leads to a reduced number of internal transactions in government					
2.12 Leads to a visible percentage decrease of revenue collection time					
2.13 is visible in terms of the widening of the revenue base of government					
2.14 leads to the dollar increase of revenues due to collections from new premium services such as e-commerce/e-business					
2.15 leads to a percentage increase of certified health, business, education guidelines available online					
2.16 leads to an increase the number of cases of chronic disease outbreaks managed online					
2.17 leads to a considerable ease of enrolment at educational institutions					
2.18 leads to increased access to public e-learning resources					
2.19 leads to an increased ease of access to job information for public institutions					
2.20 leads to a number of increased vacancies filled via the online job portal					
2.21 leads to improved organizational and governmental efficiency due to a decrease of percentage of resources released for internal processes					

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Impacts of E-Government Implementation **Implementing E government ….**	**Strongly Disagree**	**Disagree**	**Indifferent**	**Agree**	**Strongly Agree**
2.22 leads to a decrease in the number of cross-agency managed files resulting in the decrease of internal costs of processes					
2.23 leads to a high level of demand aggregation as a result of improved organizational efficiency					
2.24 leads to a percentage reduction of data processing costs					
2.25 leads to an increase of the productivity of public employees in terms of hours worked					
2.26 leads to an increase of employee output per hour worked due to better targeting of constituents					
2.27 results in better targeting of services to various sectors					
2.28 results in a percentage increase in constituent coverage					
2.29 results in increased digitalization of data which enables organizational charts and contact information be available online					
2.30 results in increased clarity of taxation information					
2.31 results in increased percentage of legislation available online					
2.32 ensures that most regulatory agencies make information available online					
2.33 Enhanced cooperation is noticeable from the increased daily usage of cross-agency networks					
2.34 The quality and volume of interaction amongst various government levels is enhanced					
2.35 results in an increase in the number of persons supported online					
2.36 results in an increased interaction with the public due to public administration information available online					
2.37 results in increased interaction due to the online forums available for public usage					
2.38 results in a general increase in online consultation					
2.39 ensures an increase in the accessibility of public procurement opportunities to SMEs thus generally increasing the business environment					
2.40 results in an increase of access to export opportunities					
2.41 results in reduced administrative burden for businesses					

Thank you for taking the time to complete this survey. The results of this survey will be available in November 2007.

Please provide you e-mail address (For a full report)	**Please provide your postal address (For a summary)**

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Appendix F – Extracts of Interview Sources

Determinant	Interview Extract	Interviewee
Forces of Change (*"change"*)	You know the key players that have played a role in the Internet industry since its inceptions are fellows like Ayisi , Nanji, Amolo and Ochuodho the politician	David Ngigi, E-Touch Manager, Africa Online (1999-2003).
Adequacy and Fluidity of Resources (AFR) (*"resource"*)	There is quite a bit of financial resources now being channeled into the ICT sector and the challenge is to utilize these to the benefit of Kenyans. Universities should take advantage and tailor their course offerings to be relevant to the ICT sector.	Athman Fadhili, Kenya Data Networks
Perceived Value of the Internet (PVI) (*"value"*)	The Internet has given me an opportunity to undertake better research. Now I am bale to go to a cyber café and research on biblical items for my sermons, even though I am scared of the negative influence that the availability of pornography is having.	Church Pastor in Nairobi
Demand for Capacity; Multiplicity of ISPs and Services (DCMS) (*"demand"*)	I know that you have been in the Internet industry and during the early years, Jambonet (a subsidiary of the National Operator) was offering lousy service even though there were already many ISPs whose customers demanded very high levels of services. This forced a number of ISPs to look for alternatives outside Kenya in order to meet bandwidth requirements.	Peter Owenje, Corporate Account Manager, Africa Online.

OTHER SOURCES: Such as observations and interviews required that the researcher consolidate various sources in order to come up with an informed opinion regarding what is influencing Internet diffusion in Kenya.

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Appendix G: Rotated Component Matrix: E-Government Conceptualization							
Variables	**Factor 1**	**Factor 2**	**Factor 3**	**Factor 4**	**Factor 5**	**Factor 6**	**Factor 7**
Administrative Restructuring Tool(TV2)	0.086	0.149	-0.035	0.191	0.697	0.317	-0.191
Cheap and Efficient Enabler(tv3)	0.612	0.497	0.157	0.050	0.118	0.014	-0.134
Technical Enable Performance(TV4)	0.167	0.764	-0.024	0.105	0.173	0.093	0.064
Enhance Worker Capabilities(TV5)	0.193	0.169	0.017	0.272	0.724	-0.202	0.150
Communication Choices Variety(TV7)	0.393	0.248	0.093	0.192	0.512	0.294	0.394
Repository of Information(TV10)	-0.016	0.450	0.053	0.147	0.387	0.502	0.284
Ease of Use(PV1)	0.175	0.556	0.091	-0.053	0.434	0.262	0.119
Resource Availability(PV3)	0.564	0.152	-0.434	0.408	0.107	0.118	-0.009
Intention to Use(PV4)	0.255	0.039	0.070	-0.070	0.037	0.050	0.864
Numbers Using Technology(PV5)	0.026	0.126	-0.062	0.720	0.454	0.118	0.027
Spread of Technology(PV6)	0.631	-0.034	0.034	0.355	-0.070	-0.046	0.449
Experienced Barriers(PV7)	0.709	0.004	0.024	-0.042	0.078	0.428	0.123
Critical Mass Required(PV8)	0.603	0.121	0.136	0.008	0.160	0.255	0.222
Financial Resources Spent(PV9)	0.060	0.160	0.014	0.765	0.114	0.301	0.108
Change in IT Spend(PV10)	0.105	0.123	0.138	0.850	0.063	0.177	-0.082
Productivity Impact(PV11)	0.130	0.243	0.723	0.306	0.082	0.244	0.117
Complex Socio-Political Process(EV1)	0.311	0.085	0.139	0.162	0.065	0.772	-0.049
Network of Stakeholders(EV2)	0.259	0.055	0.129	0.257	0.162	0.714	-0.129
Integration & Engagement of Users(EV3)	-0.036	0.211	0.320	0.265	-0.394	0.513	0.248
Social Influences(EV4)	0.147	-0.197	-0.145	0.175	0.033	0.658	0.407
Computational Power(CV1)	0.102	0.753	-0.114	0.382	0.009	-0.144	-0.088
Simulating Decision Making(CV2)	-0.033	0.517	-0.720	0.136	0.059	-0.032	0.026
Integrated Database Technology(CV3)	0.560	0.294	-0.112	0.023	0.351	0.190	0.233
Expl.Var	2.824	2.626	1.510	2.763	2.247	2.881	1.686
Prp.Totl	0.123	0.114	0.066	0.120	0.098	0.125	0.073

Appendix G. E-Government Conceptualization Communalities								
Extraction: Principal components Rotation: Varimax normalized								
Variables	**From 1 Factor**	**From 2 Factors**	**From 3 Factors**	**From 4 Factors**	**From 5 Factors**	**From 6 Factors**	**From 7 Factors**	**Multiple R-Square**
Administrative Restructuring Tool(TV2)	0.007	0.030	0.066	0.067	0.553	0.653	0.690	0.575
Cheap and Efficient Enabler(tv3)	0.374	0.622	0.624	0.649	0.663	0.663	0.681	0.596
Technical Enable Performance(TV4)	0.028	0.612	0.623	0.624	0.653	0.662	0.666	0.651
Enhance Worker Capabilities(TV5)	0.037	0.066	0.139	0.140	0.664	0.705	0.727	0.580
Communication Choices Variety(TV7)	0.155	0.216	0.253	0.262	0.524	0.611	0.767	0.772
Repository of Information(TV10)	0.000	0.202	0.224	0.227	0.376	0.628	0.709	0.622
Ease of Use(PV1)	0.031	0.340	0.342	0.351	0.539	0.608	0.622	0.656
Resource	0.318	0.341	0.508	0.696	0.708	0.722	0.722	0.590

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Availability(PV3)								
Intention to Use(PV4)	0.065	0.066	0.071	0.076	0.078	0.080	0.826	0.573
Numbers Using Technology(PV5)	0.001	0.016	0.535	0.539	0.745	0.759	0.760	0.699
Spread of Technology(PV6)	0.398	0.399	0.525	0.526	0.531	0.533	0.735	0.588
Experienced Barriers(PV7)	0.503	0.503	0.505	0.505	0.511	0.695	0.710	0.676
Critical Mass Required(PV8)	0.364	0.379	0.379	0.397	0.423	0.488	0.538	0.563
Financial Resources Spent(PV9)	0.004	0.029	0.615	0.615	0.628	0.719	0.731	0.719
Change in IT Spend(PV10)	0.011	0.026	0.748	0.767	0.771	0.802	0.809	0.780
Productivity Impact(PV11)	0.017	0.076	0.170	0.693	0.700	0.760	0.773	0.631
Complex Socio-Political Process(EV1)	0.097	0.104	0.130	0.150	0.154	0.751	0.753	0.693
Network of Stakeholders(EV2)	0.067	0.070	0.136	0.153	0.179	0.689	0.706	0.683
Integration & Engagement of Users(EV3)	0.001	0.046	0.116	0.218	0.373	0.637	0.698	0.587
Social Influences(EV4)	0.022	0.060	0.091	0.112	0.113	0.546	0.712	0.638
Computational Power(CV1)	0.010	0.578	0.724	0.737	0.737	0.758	0.765	0.629
Simulating Decision Making(CV2)	0.001	0.268	0.287	0.806	0.809	0.810	0.811	0.614
Integrated Database Technology(CV3)	0.313	0.400	0.400	0.413	0.536	0.572	0.626	0.741

Appendix 3.4: Correlations: E-Government Conceptualization															
	TV2	**tv3**	**TV4**	**TV5**	**TV7**	**TV10**	**PV1**	**PV3**	**PV4**	**PV5**	**PV6**	**PV7**	**PV8**	**PV9**	**PV10**
Administrative Restructuring Tool(TV2)	1.00														
Cheap and Efficient Enabler(tv3)	0.17	1.00													
Technical Enable Performance(TV4)	0.31	0.50	1.00												
Enhance	0.4	0.40	0.	1.0											

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Worker Capabilities(TV5)	0		25	0											
Communication Choices Variety(TV7)	0.47	0.39	0.48	0.48	1.00										
Repository of Information(TV10)	0.43	0.32	0.46	0.31	0.57	1.00									
Ease of Use(PV1)	0.38	0.30	0.40	0.32	0.47	0.48	1.00								
Resource Availability(PV3)	0.28	0.32	0.21	0.25	0.41	0.19	0.32	1.00							
Intention to Use(PV4)	-0.05	0.03	0.11	0.15	0.43	0.19	0.27	0.11	1.00						
Numbers Using Technology(PV5)	0.41	0.19	0.26	0.52	0.41	0.37	0.27	0.40	0.02	1.00					
Spread of Technology(PV6)	0.07	0.31	0.14	0.20	0.39	0.23	0.05	0.40	0.44	0.18	1.00				
Experienced Barriers(PV7)	-0.23	-0.39	-0.20	-0.10	-0.48	-0.23	-0.28	-0.33	-0.38	-0.10	-0.38	1.00			
Critical Mass Required(PV8)	0.23	0.33	0.25	0.21	0.49	0.30	0.41	0.38	0.36	0.17	0.43	-0.46	1.00		
Financial Resources Spent(PV9)	-0.38	-0.20	-0.35	-0.25	-0.45	-0.42	-0.19	-0.38	-0.08	-0.51	-0.32	0.20	-0.19	1.00	
Change in IT Spend(PV10)	0.29	0.13	0.27	0.20	0.31	0.24	0.19	0.35	-0.03	0.65	0.25	-0.21	0.13	-0.72	1.00
Productivity Impact(PV11)	0.20	0.29	0.22	0.17	0.37	0.33	0.37	0.05	0.21	0.31	0.25	-0.24	0.27	-0.33	0.37
Complex Socio-Political Process(EV1)	-0.35	-0.29	-0.23	-0.07	-0.48	-0.37	-0.32	-0.31	-0.12	-0.26	-0.18	0.54	-0.34	0.37	-0.32
Network of Stakehold	0.38	0.24	0.14	0.10	0.32	0.49	0.34	0.25	0.03	0.36	0.22	-0.42	0.40	-0.38	0.40

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ers(EV2)															
Integration & Engagement of Users(EV3)	0.00	0.08	0.09	-0.13	0.17	0.28	0.06	0.03	0.20	0.11	0.14	-0.18	0.18	-0.30	0.32
Social Influences (EV4)	0.04	0.12	0.01	0.10	0.38	0.40	0.11	0.22	0.29	0.24	0.32	-0.34	0.28	-0.34	0.13
Computational Power(CV1)	0.15	0.39	0.46	0.30	0.20	0.30	0.41	0.36	-0.05	0.35	0.16	0.05	0.11	-0.31	0.35
Simulating Decision Making(CV2)	0.19	0.13	0.40	0.20	0.06	0.16	0.21	0.38	0.01	0.27	0.00	-0.03	-0.03	-0.14	0.05
Integrated Database Technology(CV3)	0.35	0.43	0.41	0.39	0.62	0.41	0.45	0.42	0.33	0.29	0.39	-0.55	0.35	-0.16	0.23

PV11	**EV1**	**EV2**	**EV3**	**EV4**	**CV1**	**CV2**	**CV3**
1.00							
-0.41	1.00						
0.40	-0.59	1.00					
0.42	-0.46	0.30	1.00				
0.15	-0.50	0.50	0.30	1.00			
0.16	-0.04	0.16	0.10	-0.14	1.00		
-0.23	0.04	-0.05	-0.10	-0.02	0.46	1.00	
0.10	-0.28	0.33	0.15	0.23	0.26	0.16	1.00

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Appendix G:	Factor 1	Factor 2	Factor 3	Factor 4
CONNECTIVITY: ICT Output Growth from Hardware Investments	0.118	0.538	0.390	-0.077
CONNECTIVITY: ICT Output Growth from Software Investments	0.204	0.373	0.601	-0.025
CONNECTIVITY: ICT Output Growth from Human Capital Investments	0.144	0.301	0.777	0.010
CONNECTIVITY: Improved Inter-Administrative Integration	0.032	0.640	0.531	-0.015
CONNECTIVITY: Improved Inter-Agency Communication	0.228	0.308	0.712	-0.061
CONNECTIVITY: Single-Approach to Applications Development	0.160	0.065	0.669	0.136
CONNECTIVITY: One-Stop-Shop Approach to handling queries	-0.025	0.225	0.605	0.298
CONNECTIVITY: Integration of Diverse Databases	0.297	-0.175	0.582	-0.144
EFFICIENCY: Reduction in Administrative Costs of Procurement	0.200	-0.135	0.709	0.257
EFFICIENCY: Costs Savings Per Transaction within Government	0.166	0.105	0.408	0.417
EFFICIENCY: Reduced Number of Internal Transactions within Government	0.107	0.243	0.641	-0.097
EFFICIENCY: Widening of the Revenue Base of Government	0.202	-0.183	0.476	0.540
EFFICIENCY: Increase of Revenues from Premium Services such as E-Business	0.045	0.576	0.210	0.234
EFFECTIVENESS: Increase of Health, Business, Education Guidelines Online	0.466	0.014	0.543	0.200
EFFECTIVENESS: Increased Management of Diseases Online	0.385	0.044	0.386	0.098
EFFECTIVENESS: Ease of Enrollment in Educational Institutions	0.187	0.301	0.030	0.608
EFFECTIVENESS: Increased Access to Public E-Learning Resources	-0.090	0.042	-0.103	0.792
EFFECTIVENESS: Increase Access to Public Job Information	0.261	0.103	0.048	0.697
EFFECTIVENESS: Increased Number of Vacancies Filled Online	0.274	0.166	0.532	0.519
EFFICIENCY: Decrease in Percentage of Resources for Internal Processes	0.681	0.219	0.412	0.109
EFFICIENCY: Decrease in Number of Cross-Agency Managed Files	0.686	-0.078	0.076	0.115
EFFICIENCY: Increased Level of Demand Aggregation	0.628	-0.120	0.306	0.304
EFFICIENCY: Percentage Reduction of Data Processing Costs	0.539	-0.084	0.566	0.101
EFFICIENCY: Increased Labor Output in terms of Hours Worked	0.695	0.196	0.295	0.062
EFFICIENCY: Better Targeting of Constituents	0.236	0.605	0.280	0.265
EFFICIENCY: Better Targeting of Services to Various Sectors	0.172	0.585	0.230	0.475
EFFICIENCY: Increase in Constituent Coverage	0.263	0.416	0.155	0.617
OPENNESS: Digitalization of Data	-0.035	0.581	0.472	0.215
OPENNESS: Increased Clarity of Taxation Information	0.073	0.142	-0.014	0.616
OPENNESS: Increased Legislation Information Online	-0.001	0.672	0.020	0.513
OPENNESS: Increased Regulatory Information Online	-0.105	0.735	-0.011	0.346
OPENNESS: Usage of Cross-Agency Networks	0.242	0.811	0.008	-0.078
OPENNESS: Increased Volume and Quality of Interaction of Various Levels of Government	0.275	0.742	-0.109	0.150
OPENNESS: Increased Support Online	0.342	0.260	0.123	0.288

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OPENNESS: Increased Interaction with Public due to Administration Information Online	0.432	0.257	0.236	0.381
OPENNESS: Interaction due to Online Forums	0.788	0.052	-0.032	0.033
OPENNESS: Increase in Online Consultation	0.602	0.224	0.485	0.001
EFFECTIVENESS: Increased Public Procurement Opportunities to SMEs	0.719	0.280	0.197	0.286
EFFECTIVENESS: Increased Export Opportunities	0.535	0.260	0.350	-0.014
EFFECTIVENESS: Reduced Administrative Burden	0.671	0.488	0.019	0.168

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