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Ph.D. Dissertation in Engineering

**National Information Technology
Policy and Governance Issues,
Challenges and Solutions:
From a Global Perspective to
Named Policies of Nigeria and South
Korea**

August, 2015

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Technology Management, Economics and Policy

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이 논문을 ○학○사 학위논문으로 제출함

2015 년 8월

서울대학교 대학원

협동과정 기술경영경제정책전공

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와리오웨이 디미에 십리의 박사 학위논문을 인준함

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Abstract

National Information Technology Policy and Governance Issues, Challenges and Solutions: From a Global Perspective to Named Policies of Nigeria and South Korea

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The pervasive use of ICT has made it an indispensable growth enabler and a critical ingredient in nations' socio-economic valuation and competitiveness. This multidisciplinary application in all sectors has come with many issues and challenges particularly in the subdomains of national IT policy outcomes and public sector IT governance, with comparatively few solutions. Founded on a strong theoretical background, and using qualitative and quantitative analysis, this research proposed two frameworks that contribute to the theoretical understanding of the concepts and serve to overcome challenges of practice.

ICTs have tremendous impact on society, businesses and governments. Realizing its strategic importance, national governments have utilized policies as instruments for engagement in this multi-billion dollar industry with varying degrees of success. Policies are well-articulated abstract action plans that prescribe mechanisms by which intended objectives can be achieved. The implementation component of the policy life cycle is

very crucial because it embraces all the activity of executing the plan, with many subtle factors swinging it between success and failure. The fast pace of technology development and societal influences are additional challenges for IT policies. Also, country dependent issues have limited the effectiveness of learning from frontier nations.

The literature is rife with theories and frameworks proposed to guide policy implementations, albeit many IT policy implementation failures and very few specific researches on IT policy implementations. Establishing its conceptual foundation on Theory of Structuration, Policy Implementation Framework and organizational concepts, global trend on structural issues of IT policy implementation were analyzed to propose the Framework for IT Policy Implementation Structures (FIPIS). Operationalizing it on named IT policies of Nigeria and South Korea identified profound strategies for overcoming IT policy implementation challenges in all nations. Findings from the quantitative analysis support previous research as all variables are positive and significant; but in contrast, human resources are the most important factor. The study contributes to theoretical efforts at identifying indicators that explain policy effectiveness, and aids practice.

The second part of the research is on issues, challenges and solutions of Information Technology Governance (ITG) adoption and implementation. ITG entails the systemic utilization of IT for realizing corporate business objectives with strategic decision making bestowed on top management. There is a vibrant stream of extant literature on inhibitors to successful ITG implementation with very few solutions proffered, particularly for public

sector organizations.

The public service is differentiated by its statutory functions of improving the socio-economic wellbeing of citizenry, which comes with performance demands from society. With well-publicized information on performance and sustainable growth accruing from ITG implementations as control structures that oversee prudent and strategic investment in information technologies, especially in the private sector, the public sector is wooed to uptake ITG strategies.

Drawing from theories of technology diffusion and organizational behavior, as well as juxtaposing inhibitors from extant literature, this research develops the Committees, Operations, Knowledge and Environmental (COKE) framework for potential adopters in the public sector using results from a qualitative case study on government agencies in Nigeria. The framework prescribed instruments requiring national and organizational action that are articulate, yet abstract for the peculiar circumstances of all strata of potential adopters in the public sector. The study, which revealed additional issues as well as solutions, holds great implications for academics, policy makers and ITG practitioners.

Keywords: IT policy implementation, FIPIS, structure of implementation, IT governance, corporate governance, COKE, public service, SEM.

Student Number: 2012-30754

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Chapter 1 Introduction

1.1 Background on IT policy implementation

The importance of public policy is not in dispute as it delivers products of governance to the citizenry (Weimer, 2011). In IT policies, a subset that has got unprecedented recognition lately due to the pervasive use of IT in all endeavors of life, these products include enhancing socio-economic benefits, business efficiency, research, leisure, national competitiveness, and creates a platform for nations to partake in the networked global economy (Ulrich et al., 2004). ICTs exhume the enormous potentials nations have to improve their economic status, creating platforms to leapfrog frontrunners. In order to achieve these potentials, nations need to formulate visionary policies and implement them in the face of diverse issues including leadership, will power, coordination and tailoring IT strategies in tandem with other developmental goals, creating legal and policy frameworks and evaluation of outcomes (Ulrich et al., 2004). In response, virtually all nations, developed and developing, have conceptualized, formulated and implemented ICT Policies in the last two decades with varying degrees of success (Liu & Jayakar, 2011).

A public policy is the abstract specification of guidelines, norms, regulations and strategic direction for achieving national goals and objectives. Some countries' policies are in monograph form while others are a compendium of Acts, ordinances, Decrees, judicial judgments and

committee reports. Policies are not rule books, but statements that are translated to sub policies, programs and projects that form building blocks delicately put in place by the implementer to achieve set objectives (Kim et al., 2010). Scholarly and practitioners' discourse on policies have revolved around who has the most potent impact on policy outcomes among formulators and implementers (deLeon & deLeon. 2002; Liu & Jayakar, 2011); stakeholders (Liu & Jayakar, 2011; Oosterwaal & Torenvlied, 2012; Burger, 1993), and issues of linking formulation and implementation stages (Pressman & Wildavsky, 1993; Sharifi & Manian, 2010; DeGroff & Cargo, 2009). In Information policies, however, the scope is multidisciplinary, multi-stakeholder, and covering dynamics of technologies, social inclusion, internet, cyber security, intellectual property, information privacy, legal and institutional frameworks, infrastructure, eGovernment, universal access and more (Ulrich et al., 2004; Burger, 1993).

This multifaceted, multidisciplinary nature has come with additional issues for IT policy formulations and implementations. Despite a plethora of scholarly works, theories and frameworks, albeit a parsimony in IT policies, there is a gross lack of success in some national IT policy implementations. Nigeria and South Korea are at the extremes of the success barometer, and are used in this study to examine what differentiates countries even when common cardinal objectives are targeted.

The global landscape of IT policy implementation practice is explored, and narrowed to named policies of Nigeria and South Korea. Further, because of the many issues and challenges, this study is focused on structural issues, which have two dimensions of organizational control systems and the creation of governance entities for solving peculiar problems. The two perspectives of structures are integrated into the Framework for IT Policy Implementation Structures (FIPIS) which has strategies for aiding nations to overcome IT policy implementation challenges in practice, and contributes to the theoretical understanding of national IT policy implementations effectiveness.

1.2 Background on Information Technology Governance

Information and Communication Technologies have become indispensable strategic tools for competitiveness, especially in this globalization era (Yannis & Michael, 1986; Daneshvar & Ramesh, 2010; McNurlin & Sprague, 2006). Information Technology Governance (ITG) is a well-researched concept with many frameworks and standards to guide users on its implementations. The large array of research work with many viewpoints means that it is difficult to agree on a single definition for IT Governance (Robinson, 2005; De Haes & Grembergen, 2009; Bowen et al., 2007). Regardless of the diversity in definitions, the theme is how effectively controlled decisions on direction, initiation, infrastructure, business applications, investment, evaluation and strategic

use of IT could enable organizations achieve corporate objectives and goals.

Three keywords, and extensions thereof, used by researchers (including this) to study ITG are: structures, processes, and relational mechanisms (Weill & Ross, 2004; De Haes & van Grembergen, 2009; Bowen et al., 2007; van Grembergen & De Haes, 2005). The structures are concerned with the composition and roles of governance teams to foster effective synergy of decisions for the organization. The processes are concerned with institutionalizing procedures for projects selection, monitoring, evaluation and information systems planning, while relational mechanisms are concerned with business / IT relationships, and intra and inter departmental communication.

Corporate business objectives and goals delineate implementers of ITG into two broad segments definable by profit-making and service to humanity, with semi government organizations and NGOs in-between these extremes. This difference comes with differing procedures for corporate decision making (Campbell et al., 2009; Winkler, 2013; Ali & Green, 2007). While private organizations' main objective is profit maximization, that of the public service is welfare maximization. Campbell et al., (2009) opine that because of profit incentive, private sector organizations are more likely to make risky adoption decisions, unlike their public sector counterparts. Consequently, unlike private sector organizations, public sector organizations have wider stakeholders

with corresponding pressures; stricter and more bureaucratic decision making structures.

In extant literature, inhibitors to successful implementation of information technology governance are particularly focused on the private sector, with very little on the public sector. These inhibitors include but are not limited to: overlapping functions, lack of project champions, composition of committees that are skewed towards favoritism based on political and tribal lines, issues of knowledge and complexity of ITG tools, legal and institutional framework, funding and a lack of national IT direction and articulate implementation of such strategies.

These issues and challenges constitute grave impediments to successful exploitation of IT as a sustainable growth engine. This study, therefore, used qualitative case study methodology to analyze four government agencies in Nigeria to examine the inhibitors in their perspective, and proffer solutions that are universally applicable to potential adopters in the public sector. The result, the Committees, Operations, Knowledge and Environment (COKE) framework, consisting of national and organizational instruments, serves as solutions to practice, and aid theoretical understanding of ITG. Further, a self-assessment model is formulated to enable adopters to determine their current status and apply the instruments of the framework to elevate their maturity.

1.3 Problem Description and Motivation

The problem description and motivation is subdivided into national IT

policy implementation issues and public sector IT governance.

1.3.1 National IT Policy Implementation Issues

The multidisciplinary application of IT has come with many issues and challenges in the subdomain of national IT policy implementation outcomes with comparatively few solutions. Some nations have successfully repositioned themselves into frontier nations in socio economic terms by implementing well-crafted visionary and dynamic IT policies with verve and commitment. In particular, the Asian tigers have utilized IT policies to positively reposition their economies from seemingly unattractive economic backgrounds (Ulrich et al., 2004). However, there are many cases of unsuccessful policy regimes with the prospect of economic and socio-political development attributable to investment in IT becoming a mirage. The puzzle, however, is, virtually all nations have formulated and implemented policies in same thematic areas of infrastructure, R&D, capacity building, legal framework and eGovernment (Adamali et al., 2006).

Implementation has been particularly difficult and complex because implementers (usually different from formulators) have to decipher rationale from policy statements that are abstract (Burger, 1993). They also have to contend with issues of funding, organizing, make decisions and requisite changes in response to practicalities that were not hitherto envisaged or adequately catered for at the formulation stage (Pressman & Wildavsky, 1984). The possibility of implementers' personal

motivations having a toll on alternatives proffered and chosen has led to the debate on who impacts on outcomes more between policy makers and implementers. Noting that the implementation part of policies is most susceptible to flaws that swing outcomes of policy objectives (Robertson, 1984), this study concentrates its analyses on implementation. A further focus is on structural issues subdivided into organizations' administrative control systems and adhoc governance compositions.

Among the nations that have reported unsuccessful national IT policy implementations is Nigeria (Omowunmi et al., 2010; Olatokun, 2006; Baro, 2011). On the other hand, South Korea has reported success, with little details of the implementation available which countries with unsuccessful policy regimes could learn from (Chin & Rim, 2006; Business Software Alliance, 2013; Park, 2012; Shin & Kweon, 2011). Investments in IT are enormous, and there are justifiable competing alternatives for funding. Despite the importance of IT as a growth enabler, there is a lack of universally applicable solutions to ameliorate implementation problems; evident in the unavailability of solutions and the inability of some nations to improve their status despite such investment. In this respect, this study is motivated to proffer a solutions set that will effectively tackle this multidimensional issue.

It is worthy to note that there has been similar effort at overcoming policy implementation barriers, amidst a lack in specific focus on IT policies. Implementation Analysis (IA) is a US based solution

proposed for the public sector to eliminate or reduce the challenges of implementation, but takes a pre-formulation and feedback approach (Weaver, 2010). In another vein, a policy implementation assessment tool was developed by a USAID assisted project. It proposed that effective field study, from several case analyses, should form a feedback system for improving implementation performance (Bhuyan et al., 2010). However, despite these and countless other frameworks, theories and applications of same, the problems persist (section 2.1.3). Further, the realization from literature and practice that national IT policy implementations have attracted very negligible attention despite their relative importance, this study aims to fill this gap in theoretical understanding of national IT policy implementation and provide solutions to aid practice.

1.3.2 Information Technology Governance (ITG)

The benefits of ITG procedures include transparency, mitigation of risks, avoidance of IT service management pitfalls, compliance, accountability and effective control, attainment and sustenance of corporate business objectives, and effective use of IT investment (Gartner, 2004; Ernest & Young, 2006). However, the multidisciplinary application of IT in all sectors has come with many issues and challenges that have threatened effective public sector IT governance adoption and practice, particularly in the public sector, with comparatively few solutions. These issues and challenges (called inhibitors – discussed in section 2.2.2) are prominently listed as lack of requisite knowledge and support from senior

management, unavailability of an effective project champion, inadequate provisioning of funds and lack of awareness of the business environment. Others are timing and selection of tools/framework, the 3Cs (culture, communication, and change), resistance to accountability, and inappropriate provisions for organizational and environmental peculiarities in the planning of ITG, non-transparency, less than adequate attention to internal controls and inconsistencies in management processes, among others (Yannis & Michael, 1986; Al Omari et al., 2013; Kallaya & Praneetpolgrang, 2011).

These inhibitors have to be overcome before public service organizations can truly benefit from ITG. To the best of our knowledge, most of the literature is on expanding theoretical understanding, without solutions for practice (Table 2.2), amidst a negligible uptake and research on public sector organizations (Winkler, 2013; Nfuka, 2012).

In order to contribute to solving the above issues this research proposes the COKE framework, which consists of national and organizational instruments that serve as solutions to practice, and aid theoretical understanding of ITG. The framework will enhance effectiveness of constituting committees, instituting effective operational mechanisms, building requisite domain knowledge, and fashioning ways to cohabit in the socio-economic environment for public sector organizations.

1.4 Research Objectives

This study identified issues and challenges of national IT policy implementation and governance in the previous sections. In order to contribute to overcoming these myriad of issues, the main objectives of this study are:

- a) to proffer an integrated set of solutions to aid nations to overcome structural challenges of national IT policies implementations in practice;
- b) to contribute to the theoretical understanding of informatization of societies by using the indicators from our solution in explaining the effectiveness of national IT policy implementations;
- c) to proffer a universally applicable solution set, departmentalized for easy practice, for potential adopters of ITG in public sector organizations, and
- d) extend the literature on the inhibitors of ITG.

In order to achieve these objectives, Figure 1.1 depicts the strategy and synergy of sections, theories, research questions and analysis in pictorial form.

1.5 Research Questions

Four research questions are developed to address the research objectives. The first set of three, addressing national IT policy implementation issues, challenges and solutions, is discussed in chapter 3. The last is on public sector information technology governance and is addressed in

chapter 4. The research questions are:

- a) How can the structural challenges of national IT policy implementations be overcome?
- b) What role does authority and mediating bodies play in the coordination of multiagency policy implementation and in what environmental context is it most effective?
- c) What explanatory power do the FIPIS indicators have for national IT policy implementation effectiveness?
- d) What are the challenges (inhibitors) of successful adoption and implementation of ITG and what solutions are beneficial to potential adopters in the public sector?

Figure 1.1 shows the relationship between research questions, methodologies applied, results and contributions of this study.

1.6 Methodology

Figure 1.1 shows the general overview of methodologies and procedures employed in this research. It includes research questions, the theoretical foundations and the methodological framework in graphical detail. Furthermore, included in the introduction section of each chapter is a detailed step by step methodological procedure.

Chapters 1 and 2 are the introduction and review of relevant literature respectively.

Chapter 3 is on the national IT policy implementation issues and challenges. It drew its conceptual foundation from the Theory of

structuration, policy implementation framework (PIF), policy implementation profile (PIP), and other frameworks, methodologies, theories, applications and literature (see Table 2.3). These concepts were examined to determine its relevance and contributions to the procedures and theoretical arguments of this study. For a concise and valuable contribution to this burgeoning problem of this chapter, the scope of analysis was narrowed to structural issues covering organizational control systems and the institution of governance structures, after focusing on implementation. The following major steps were adopted:

- a) a scrutiny of global IT policy implementation trends of selected countries, representative of diversity in economic, political, IT capacity and social cultural underpinnings;
- b) a comprehensive literature review was done to decipher what factors are most difficult in national IT policy implementations;
- c) to achieve an insightful analysis, two policies each from Nigeria and South Korea were chosen that incorporate all the major thematic areas of IT policies;
- d) interviews were conducted to fill the gap between literature and practicalities of implementations;
- e) the totality of evidence was inductively aggregated to form the FIPIS framework;
- f) an empirical analysis was conducted to validate the FIPIS indicators using Structural Equation Modeling. The data was

collected from an online questionnaire with respondents limited to IT professionals internationally, to increase credibility for the generalization of results.

Chapter 4 is on the public sector IT governance adoption and implementation issues and challenges. It drew heavily from the concepts of technology adoption and organizational behavior (section 4.2). Multiple case study methodology was adopted. The following major steps describe the procedure employed:

- a) Extant literature was comprehensively searched to identify what inhibitors existed in ITG practice, particularly for potential adopters in the public service. Juxtaposing these with findings of this study enabled the identification of new inhibitors;
- b) Criteria was set to select the organizations for the study;
- c) Semi-structured focused qualitative online questionnaires were sent through contact at the selected offices;
- d) Personal interviews were conducted to uncover issues that questionnaires could not adequately account for, or issues that required further clarification;
- e) The research maintained the elements of quality research such as internal, external and constructs validity, reliability and design (Yin, 1994);
- f) The results of the data collected were analyzed inductively to formulate the COKE framework; and

- g) an assessment model for the COKE framework was proposed to enable implementers to determine their current status and apply the framework instruments to improve their maturity status.

Though the details of the methodology are discussed in corresponding sections of Chapters 3 and 4, Figure 1.1 shows the research framework pictorially, indicating the interrelationships between the various chapters and the research methodologies applied.

1.7 Contributions

The major contributions of this study are:

- The FIPIS framework (a new framework for overcoming implementation issues that are structural in nature, integrated into components of organizational characteristics, implementation operations, external factors and implementation strategy) was proposed to help nations with difficulties overcome IT policy implementation challenges
- The validated FIPIS variables or indicators provided strong explanatory power for national IT policy implementation effectiveness, thus contributing to the theoretical understanding and measuring the impact of IT in the informatization of societies - noted as difficult (Taylor & Zhang, 2007; Delone & McLean, 1992; Sabatier & Mazmanian, 2005; Matland, 1995). This analysis compared positively in direction and sign of

indicators, but contrasted in magnitude with some previous research findings;

- The COKE framework (a new framework proposed by this study for overcoming Committees, Operations, Knowledge and Environmental issues) was proposed to overcome some inhibitors of ITG in the public sector. This is a conceptual framework for understanding the elements of ITG, and at same time contributing to practice serving as a solution;
- Identified additional inhibitors to ITG adoptions and implementations to enrich the literature from the perspective of public sector organizations.
- Finally, the COKE and FIPIS frameworks are abstract enough to be applied in every situation, yet articulate to address the issues. The COKE framework comes with a maturity model for assessing and improving the status of implementers of the framework.

1.8 Research Outline

For the rest of the thesis, Chapter 2 is an overview of relevant literature in IT policy implementation and ITG. Chapter 3 discusses the procedure and methodologies for identifying the problems and solutions for national IT policy implementations. Using a mixed (qualitative and quantitative) analysis model, the inferences culminated in the proposal of the FIPIS framework. The empirical analysis that validated the FIPIS indicators

used Structural Equation Modeling (SEM). Chapter 4 detailed public sector information technology governance issues and challenges and the COKE framework proposal. It also includes an assessment model for identifying the maturity status of organizations. Chapter 5 concludes the research with concluding remarks, implications for policy, theory and practice, and lists the limitations and suggestions for further study.

Figure 1.1 shows the research questions and methodologies for Chapter 3 on the left. It includes the various layers of analysis as global, national and policy, with an interview guide attached as Appendix E. The results serve as input to the empirical study (questionnaire attached as Appendix A), which forms the final contributions of the chapter. The last column represents the multicase study approach of the ITG study. It is a qualitative analysis of Nigerian government organizations, and data was gathered from literature, online questionnaire (attached as Appendix D) and personal interviews.

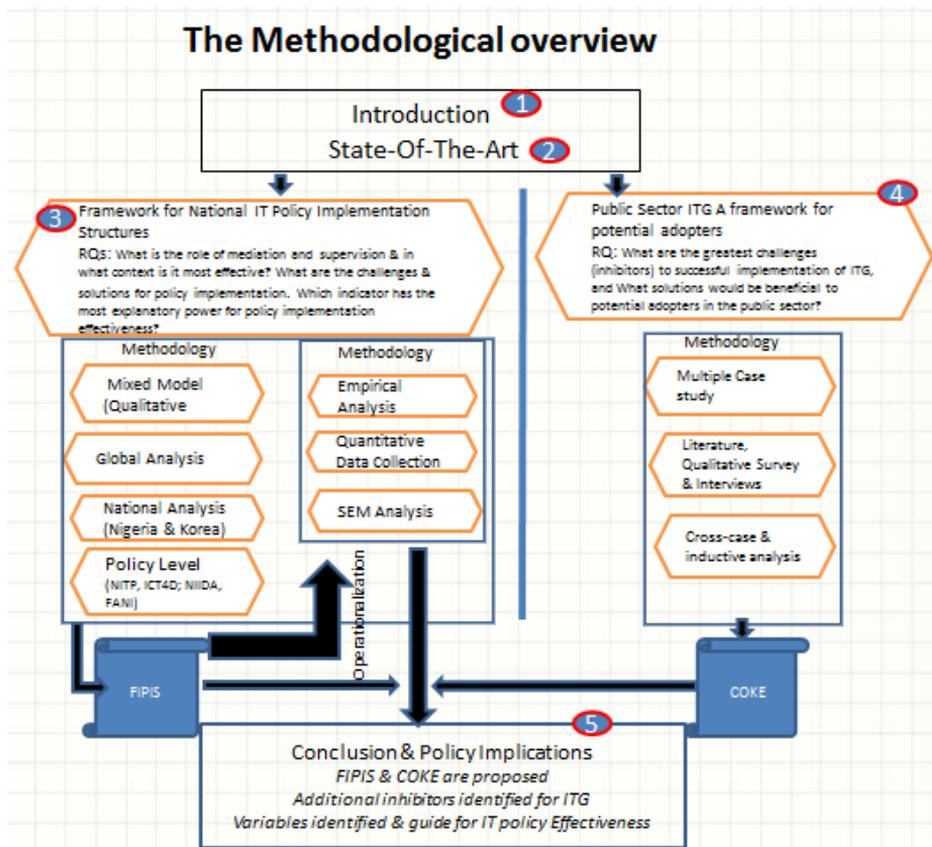


Figure 1.1. Methodologies and research framework

Chapter 2 State-of-the-Art

2.1 National IT Policy Implementation

This section discusses literary works on information technology policy and challenges surrounding its implementation. It also explains the use of “structures of implementation” in this study and its broader use in the literature. The plethora of frameworks, theories and standards for solving policy problems and their contributions and comparisons are also discussed.

2.1.1 The Scope of IT Policy and Challenges regarding Implementation

The pervasive use of IT gave it a multi-disciplinary scope with blurred boundaries for analysis and associated difficulties regarding definitions (Burger, 1993; Trauth, 1986; Weimer, 2011). In nations, different forms of documentation and judicial rulings guide the strategic use of the technology. The US and UK are high profile nations known for their fragmented and technology-based information policies with disparate information policy sources and sponsors (Trauth, 1986; Gert & van Audenhove, 1999; Owen et al., 2012). On the other hand, a good number of developed and developing nations have national information technology policies in different formalization and approval stages. Some national policies are committee documents, Acts of Parliament, Decrees, and departmental guidelines and instructions depending on how decentralized the policy regime is.

Information technology policies have drawn its origin from industrial and science and technology policies, which have goals immersed in attaining strong economy and sovereignty. The realization of IT as a future growth engine for sustainable development has driven most nations to prioritize IT as a national agenda from industrial policies (Song, 1990; OECD, 1992; Shin & Kweon, 2011). Its use as a catalyst for socio-economic growth has further extended the degree of precision required. In addition, the IT policy realm had required a close and strongly coordinated symbiotic relationship between the government and the private sector to be successful (Lee, 2012; Business Software Alliance, 2013; Park, 2012)

According to Burger (1993), the scope of the information policy includes federal information resources management, information technology for education, innovation and competitiveness, information disclosure, confidentiality and right to privacy, telecommunication, broadcasting and satellite transmissions, computer regulations and cybercrime, intellectual property, library and archives and information systems and management (Burger, 1993). Considering this wide scope, the challenges of effectively utilizing IT policies for economic development are daunting. Some identified barriers are: the political structures of government agencies with overlapping functions and struggle for leadership role (Singh, 2010), political stability and continuity in government programs; level of development in economic

context (Roche & Blaine, 1996), and social effects in education (lack of researchers), lack of stakeholder participation (Omowunmi et al., 2010; Olatokun, 2006; Roche & Blaine, 1996), cultural interferences (Roche & Blaine, 1996); political will (Etta & Elder, 2005), disparate and ineffective evaluation mechanisms, funding and impact of donor organizations (UNCTAD, 2013; Gert & van Audenhove, 1999), lack of effective legal, regulatory and institutional framework (Zambia, 2013; Ogbah, 2011), difficulty in or willful (mis)interpretation (Robertson, 1984; Oosterwaal & Torenvlied, 2012; Olive, 2013), monitoring and evaluation of socio-economic impact (Lyu, 2012; Burger, 1993; UCD, 2014), implementing organ and its leadership, and interagency collaboration (Kwapong, 2007; Zhang & Liang, 2012). In addition, the special knowledge required to forecast technology direction is not readily available (Rosacker & Rosacker).

Writing on “Trends in National E-Strategies: A Review of 40 Countries” in a World Bank publication, Adamali et al. (2006) opine that implementation is affected by structural issues of organization ranging from communication, management, role allocation, and leadership (Adamali et al., 2006].

The IT policy process has been affected by international influences ranging from developments in technology (Larson & Park, 2014), learning from frontier nations in global analysis (Adamali et al., 2006; Ulrich et al., 2012).

In another vein, a lot of skepticism is expressed by neo-colonial scholars that the liberalization stance of World Bank (WB) and International Monetary Fund (IMF) in IT policies is anti-developing countries; and in favor of western ICT manufacturers. In particular, the literature emphatically ties some implementation failures to “coerced adoption” without regard to dynamics in culture and technology (Kwapong, 2007; Lyu, 2012; Ulrich et al., 2012; Etta & Elder, 2005; Audenhove, 2000). External influences from colonial alliances, in Avgerou and Walsham’s opinion, have caused less than rational and suboptimal decisions to be made even when there is enough justification otherwise (Avgerou & Walsham, 2000). With this, it is clear that a lot of influences (organizational, national and international) work in complex web of activities to impinge or enhance IT policy implementations.

The complexity and difficulty of policy implementation is acknowledged by many researchers. (Crosby 1996; Thomas & Grindle, 1990; Van de Walle, 1994), and the unavailability of theories or models with limited number of explanatory variables that predict under what conditions policies are implemented (O’Toole and Montjoy, 1984; Matland, 1995; Sabatier, 1991) and the lack of empirical data that provide an adequate understanding of how to overcome the barriers, delays, and disincentives associated with implementing policies. Further, Matland (1995) decried the multiplicity of variables for analyzing policy implementation success. He noted the vagueness of measurements and

the difficulty of determining success and failure, particularly when defining indicators considering the dichotomy of top-down or bottom-up perspectives. He noted that conflict and ambiguity are inherent in policies, and that policy implementations contain a certain degree of both conflict levels so better outcomes can be achieved if formulators look at areas where the conflict and ambiguity would affect the implementation.

The literature lacks specific studies on national IT policy implementations, but Wood (2011), working on IT security policies which are more of enterprise level studies, opined that IT security policies do not get implemented because of the misunderstanding of organizations arising from a failure to research the cultural, ethical, economic, and operational implications of the policy implementation process. Further he stated that multilayered nature of local, national and international regulations in an organization are also crucial to implementation effectiveness. Further, long-term requirements in cost, user needs and details, communication and conflict arising from cultures are additional issues.

Other studies are merely on project level implementations both in developing and developed countries. Some studies noted differences and similarities in the implementation, stressing that success depends on peculiar problem solving traits of a country (Heeks 2002; Westrup 2002; Odedra 1993). They listed many inhibitors, enablers and problems of policy implementations as: skilled personnel, leadership styles, culture,

and bureaucracy, technology, coordination, ICT policy and donor push (external influence).

On issues of procedure, Peters (2014) sees literature as acknowledging multi agency collaborations in implementation. McLaughlin (1987) believes that policy, made at the national or macro level, is a response to the smallest unit level, which is affected by implementers individual incentives and beliefs.

From the above analysis of literature, it is clear that complex factors impinge the successful implementation of policies, which national IT policies share as subsets. However, the lack of IT related empirical studies, and the unabated failure of some nations' policy implementations have motivated this study.

2.1.2 Structures of Implementation

In order to produce insightful contributions, the scope of this study is focused on the implementation component of the policy lifecycle with an emphasis on structural issues. Structural issues are divided into organizational control systems and establishment of adhoc governance units. The organizational control systems look at the basic elements of organizational structure which includes control, chain of organizations, division of roles, line of authority and decision making (McLaughlin, 2013; Stralser, 2004; Griffin & Moorhead, 2010). The establishment of governance units concentrates on statutory or administrative imperatives that strive to circumvent ambiguous and specialized functions that

traditional agencies could not effectively handle (Hult & Walcott, 1990; Altier, 1987). Though not holistically applicable, the concept of structures used in Sabatier & Mazmanian's Policy Implementation Framework falls into this category (Sabatier & Mazmanian, 2005). The usefulness of this application of structures is that organizational behavioral features and composition of committees or task forces can be delicately combined to provide solutions and create an understanding of IT Policy implementation.

The Giddens' Structuration Theory which conceptualizes structure as rules and resources used by actors in interactions (Turner, 1986; Giddens, 1984) is a concept used extensively in IS research (van Veenstra et al., 2014). The rules are generalizable informal knowledge, while the resources are material and organizational capabilities used to achieve set goals. The use of Structuration Theory in Information Systems research is justified as it is seen to have the capability to account for the differences between outcomes of an implementation and its intended design (Orlikowski, 1992). It could also be used to account for intended and unintended consequences arising from the existing structure and agency, and the development and implementation of public sector IT (Heinze & Hu, 2005). The relevance of these to this study is the identification of a wider range of factors that influence the outcomes of change as a result of development and implementation of public sector IT (van Veenstra et al., 2014).

The scholarly work of Hall & O'Toole Jr., (2000) and Hjern & Porter, (1981) on structure of implementation had been on the complexity of multi-actor program implementation structure, noting consequences for outcome if underlying salient informal linkages in structural complexity is underestimated in initial settings. Hjern and Porter (1981) defined implementation structure as administrative entities for program execution, usually comprising many staff from different, private or public organizations. These have their own organizational imperatives in voluntary formation with equal authority, and control arising from competence and professionalism.

Sabatier and Mazmanian(2005) see “structures” as the ability of a statute to formulate the implementation by creating the implementing agency and the operational activities that will “shape” it to achieve the statutory objectives of the statute. They state:

“From the perspective of our framework, a statute constitutes the fundamental policy decision being implemented in that it indicates the problem(s) being addressed and stipulates the objective(s) to be pursued. It also has the capacity to “structure” the entire implementation process through its selection of the implementing institutions; through providing legal and financial resources to those institutions; through biasing the probable policy orientations of agency officials; and through regulating the opportunities for participation by nonagency actors in the implementation process.”

(Sabatier & Mazmanian, 2005, page 544)

It is worthy to note that, as useful as their views of structure are in the analysis of policy implementations, their main foci on implementing organizations establishment from policy's formulation is partially different from this research. Structures of Implementation as used in this study combine the organizational control aspects as well as the imperative for establishment of functional organizations for special problem situations, thereby merging the Structuration Theory and the many frameworks that have been developed for policy studies.

2.1.3 Existing Frameworks and Applications to Policy Implementation

A number of frameworks have been proposed in the policy implementation discourse (Table 2.1). Notable among these are the Institution Alliance & Development Framework (IAD), which believes in the shared view, while the Advocacy Coalition Framework (ACF) looks at conflict resolution for many agencies in negotiated understanding (Weible et al., 2012). The Policy Implementation Framework (PIF) notes 3 components of contextual, material and structural variables tied to a dependable variable expressed in five levels. The structural component: the crux of this study was subdivided into seven structural variables that influence policy implementation: (1) clear and consistent objectives, (2) incorporation of an adequate causal theory, (3) hierarchical integration within and among implementing institutions, (4) decision rules of

implementing agencies, (5) recruitment of implementing agencies, (6) access by outsiders, and (7) the initial allocation of financial resources (Elson, 2006). In essence, the FIPIS extends the PIF by encompassing some of its variables in slightly differing combinations in parts of its four pillars. The FIPIS is emphatically representative of IT policies with technology dynamics, external regulatory obligations and human capacity as pivotal factors.

In addressing policy or project implementation challenges, many scholars have used Critical Success Factors (CSF) to inform practitioners of areas that are sensitive for success or failure. Slevin and Pinto (1986) noted that their Project Implementation Profile (PIP) is both a framework for the project implementation process as well as a diagnostic instrument for a project manager. Analyzing it as CSFs, they identified and validated factors such as clear project objectives, top management support, client consultation, personnel (recruitment, selection and training of team personnel), schedule/plan, acceptance, monitoring/feedback, communication, technology and troubleshooting (Slevin & Pinto, 1986). Chen (2012) also identified internal organization management, external technical and policy environment, and coordination and support as CSFs when studying the implementation of Emergency Management Engineering Information System (EMEIS) policy in Guangdong province, China (Chen, 2012). Some of these factors are relevant to this study. Some of them use slightly different nomenclature but have the

same meaning, such as; are leadership (top management), team formation and human resources (personnel), external technical and policy environment, coordination and internal organizational management.

Spratt (2009) utilized a similar procedure as that adopted by this study, but used the Contextual Interaction Framework's (CIF) major assumption of motivation, information, interactions and power of the actors as influencing policy implementation. Although his work created constructs for analysis under a USAID/Health Initiative's program of Policy Implementation Barriers Analysis (PIBA) on health policies in Indonesia, Vietnam and China, the identified barriers to policy implementation of: conflicts with other national policies, lack of motivation/commitment, vertical hierarchies (multilevel) coordination, stigmatization and formulation/implementation differences, were important to this study. He proposed a holistic view and stressed the importance of supervision and monitoring; decentralization planning as operational gaps describing roles and responsibilities in policy implementation. He also highlighted the dichotomy between national policies direction and operational policies, and the human and knowledge requirements.

Table 2.1 shows some basic frameworks in the literature addressing policy implementation. A closer look indicates that no specific frameworks have addressed the peculiar issues of national IT policy implementations.

Table 2.1 Existing frameworks and applications in policy implementation.

Framework	Description / Focus	Reference
Advocacy Coalition Framework	Understanding the policy process requires a long time span, a focus on subsystems, and belief systems. The policy process viewed from the perspective of learning and implementers	Sabatier(1988)
Contextual Interaction Framework.	Delves on motivation, information, interactions and power of the actors, but applied in health policy. Interactions between players and the application of political and resource power	Spratt(2009)
Institutional Analysis & Development framework.	Focus on cognitive and contextual role of individuals and institutions in shaping the policy process. Institutional rules and their impact on individuals carrying out the objectives of the institution	Weible et al (2012)
Policy Implementation Framework	It uses an integration of material, structural and contextual variables for explaining policy effectiveness through the entire policy process and linking same to independent variables	Mazmanian and Sabatier 1983); Elson (2006)
Implementation Analysis	Takes a solution approach to solving identified problems of policy implementation in general. Utilized in a learning & refining cycle to guide implementation	Weaver, Kent (2010)
Policy Implementation Profile	Using CSFs to showcase their sensitivity to project implementation success	Slevin and Pinto (1986)
Policy Implementation Assessment Tool	Assessing policy implementation by analytical study against a checklist for making recommendation for improvement. A practice based approach, but basically on the health sector	Bhuyan et al.,(2010)

2.2 Information Technology Governance

This section discusses the relationship between corporate and IT governance and the inhibitors to effective IT governance adoption and implementation, especially in the public service, and the parsimony of

appropriate solutions for overcoming these inhibitors. A brief look at existing frameworks and standards is discussed at the end of the section.

2.2.1 Relationship with Corporate Governance

Scholarly works in ITG became prominent in the 1990s (Robinson, 2005). The need for IT Governance had arisen from broader corporate governance concepts, which were instituted to avoid corporate collapse. Globally, several legislation and international professional bodies contributed to the campaign to avoid corporate collapse. Worthy of note were The International Federation of Accountants (IFAC), Committee of Sponsoring Organizations of the Tradeway Commission (COSO) and Information Systems Audit and Control Association (ISACA). The Sarbanes Oxley Act¹ (2002 in US) and Basel II/III² (EU) addressed corporate governance issues in organizations and banking respectively (Robinson, 2005; Oye, 2013). These organizations strived to ensure transparency and accountability by inculcating new ethics and enforcing compliance.

Nationally, Australia is known for its corporate governance process initiatives that led to the publication and subsequent adoption of AS38500 as an ISO standard, which was mainly an IT Governance standard (Australian dbce). The Federal Government of Nigeria is in the

¹ Sarbanes Oxley Act <http://www.soqlaw.com/compliance.htm> accessed 12/09/20

² Basel III. International regulatory framework for banking. <http://www.bis.org/bcbs/basel3.htm>. Accessed 09/12/2014.

process of enacting and ratifying a National Code for Corporate Governance expected to be effective on January 1, 2014. The code is expected to incorporate existing departmental corporate codes under one umbrella, and could punish infractions, unlike the persuasive nature of the existing ones. Nigerian Communications Commission (NCC) established a (Corporate Governance Working Group) CGWC in 2012, to enact a code for corporate governance in the telecoms industry so as to ensure conformity and compliance with transparency requirements needed to attract the required foreign investment to sustain the industry³.

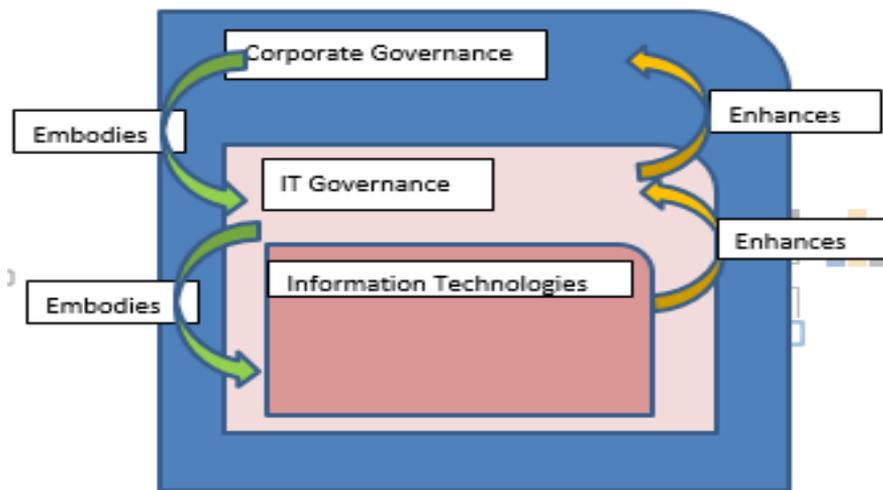


Figure 2.1 Relationship between Corporate and IT governance and Information Technology

As depicted in Figure 2.1, corporate governance is composed of, and regulates ITG; which is composed of and regulates IT operations. On the other hand, IT enhances ITG, which ensures success of corporate

³ Orija Bankole. NCC pushes up corporate governance practice in telecoms sector. *Nigerian Communications Week*. 28/6/2013. <http://www.nigeriacommunicationsweek.com.ng/node/6014> Accessed 01/03/2014

governance. In general, ITG ensures that IT operations are kept functional in a cost effective and transparent manner, while mitigating risks and flexibly responding to changing environmental influences and regulatory regimes to sustain the organization.

2.2.2 IT Governance Inhibitors

Since overcoming the debate on the actual contribution of IT investments to economic growth and productivity (productivity paradox) in the 1990s, attention has shifted to the current need for greater accountability and the justifiable use of IT funds (Ernest & Young, 2006; Brynjolfsson & Yang, 1996; Ibragimov, 2008). This need has arisen due to a number of IT project failures in recent times (Wijsman et al., 2014; Robinson, 2005; Bowen et al., 2007). While some scholars say IT projects' failures are attributable to selection and adoption of appropriate technologies/technical issues (Weill & Ross, 2004), others say they are managerial process inefficiencies (Gartner, 2004; Lee et al., 2008; Wijsman et al., 2014). These failures are further attributable to implementation inhibitors such as lack of requisite knowledge and support from senior management, unavailability of an effective project champion, inadequate provisioning of funds and to lack of awareness of business environment. Others are timing and selection of tools/framework, the 3Cs (culture, communication, and change), resistance to accountability, and inappropriate provisions for organizational and environmental peculiarities in the planning of ITG, non-transparency, less than adequate

attention to internal controls and inconsistencies in management processes, among others (Yannis & Michael, 1986; Al Omari et al., 2013; Kallaya & Praneetpolgrang, 2011).

Othman and Chan (2013), in an investigation of Australian public and non-public organizations on formal ITG implementations found a number of inhibitors. These include resistance to change, complexity, lack of knowledge and skills, geographical proximity and middle management support, among others. Its contribution was to serve as basis for further studies (Othman & Chan, 2013). Winkler (2013) examined three Germany municipalities for ITG structures, procedures and relational mechanisms in aiding IT/business alignment. They found a positive relationship between structures and relations, but not processes. However, his work was also to elicit further research (Winkler, 2013)

Oye (2013), on talking about the potential of using IT adoption in fighting corruption and ensuring transparency in developing nations highlighted inhibitors such as political instability, corruption and insufficient planning (Oye, 2013).

Van Grembergen and De Haes stated that ITG designs are affected by a variety of conflicting internal and external factors, even for organizations in same sector and share similar characteristics (van Grembergen & De Haes, 2005). Theories of organizational behavior state that organizational culture, history, norms, vision, leadership, and innovative human capacity (for individuals and groups) constitute barriers

in varying degrees for organizations (Allaire & Firsirotu, 1984; Eisenhardt, 1989). Bowen et al opine that appropriate metrics are delicate, and evaluating success should go beyond traditional economic valuation to include the risks, uncertainties and other intangible elements such as organizational change (Bowen et al., 2007). These organizational characteristics have a crucial impact on the realization of corporate business objectives (Atsu et al., 2010; Burger, 1993).

Another difficulty is adopting multiple frameworks because some scholars say no one framework can address the full gamut of IT operations (which range from infrastructure, software development, training, research and development, services) (Cater-Steel et al., 2006). Weill and Ross on the other hand, tend to separate organizations based on their IT governance structure in deciphering their cost sensitivity and propensity to invest in IT Governance (Weill & Ross, 2004). They stated that profit growth made firms more inclined to go for a centralized, private sharing and asset management structure, while structurally decentralized organizations are more disposed to meeting customer responsiveness and innovation. They concluded that top performing firms are differentiated by transparency and standards in their IT decision making.

In developing countries, however, there are additional inhibitors which are internal and external. Internal challenges include managerial capacity, knowledge of the frameworks, standards and their interoperation synergies, skilled personnel for the day-to-day operation of the systems

and paucity of funds. The external inhibitors are the general socio-economic and political factors including corruption, lack of effectively implemented information technology policies that enlist national and organizational direction in the short, medium and long-term. (Yahya, 1993; Oye, 2013).

Table 2.2 lists a selection of inhibitors of ITG in the literature. This research notes that none of these prescribed universally applicable solutions for the public sector.

Table 2.2 Existing studies in ITG inhibitors and contributions

S/N	Scope/Contribution	Literature
1	Australian public and non-public organizations on formal ITG implementations. Identified inhibitors as resistance to change, complexity, lack of knowledge and skills, geographical proximity, middle management support	Othman & Chan, 2013:
2	Studied 3 German municipalities on elements of ITG, finding positive relationship between structures and relations, but not processes. However, their work was also to elicit further research	Winkler (2013):
3	A general discussion finding under listed as inhibitors: effective design, communication between top and middle management, and appropriate concern for operational disparity	Wibowo, 2014
4	Use of IT for fighting corruption in developing nations; identifying inhibitors as political instability, corruption and insufficient planning	Oye, 2013:
5	ITG effectiveness hindered by conflicting internal and external factors, without solutions	Van Grembergen & De Haes, 2005
6	Noting no single framework covers all IT thus multiple framework needs to be adopted, but complex knowledge is required	Cater-Steel, et al, 2006:
7	Relate ITG structure of centralized or decentralized to cost and propensity to invest	Weill & Ross, 2004:
8	Identified IT adoption strictures in developing countries as: Internal: managerial capacity, knowledge of the frameworks, standards & interoperation synergies, skilled personnel,	Yahya, 1993; Oye, 2013:

	paucity of funds External: general socio-economic and political factors including corruption, lack of effectively implemented information technology policies	
9	Weak ITG structures in public organizations in Tanzania, particularly in processes	Nfuka, 2012

2.2.3 Existing IT Governance Frameworks and Standards

There are a number of ITG frameworks and standards implementers could use. Prominently in use are: a) Information Technology Infrastructure Library (ITIL) which is a framework of best practices and templates that tackle security issues, availability, infrastructure management, software and assets management (De Haes and Van Grembergen, 2009); b) Control Objectives for Information and related Technology (COBIT) framework (specially known for its audit features) is concerned with hierarchies of control objectives in the domains of planning and organization, acquisition and implementation, delivery and support and monitoring, from which implementers can choose relevant processes and add as their maturity improves (Al Omari et al., 2012); c) ISO/IEC 38500:2008 is a standard of corporate governance of information technology particularly suited for all sizes and characteristics of organizations, including public, private, government and not-for-profit organizations. The standard provides a framework that comprises definitions and six principles (Responsibility; Strategy; Acquisition; Performance; Conformance; and human behavior) for good corporate governance of IT (Australian dbce); d) The Capability Maturity Model (CMMI) was developed at Software

Engineering Institute (SEI) and was intended for a maturity measurement model comprising of five stages: initial, managed, defined, quantitatively managed, and optimized. It is widely used for fostering software development which is a potent source of economic development (De Haes & Van Grembergen, 2009; Microsoft Corporation, 2014).

Table 2.3 shows a broad comparison of the scope and areas of use of some of the major frameworks and standards.

Table 2.3 Comparison of existing ITG standards, tools and frameworks

Framework/ Standard	Scope & specialty	Reference/Remarks
IT Infrastructure Library (ITIL)	De facto standard for IT service management & delivery; platform for COBIT objectives; 4 domains of service, security ICT infrastructure & software assets management support; uses best practices of IT service management	Greenfield (2007) Carter-Steel et al., 2006), Robinson, 2005)
ISO/IEC: 38500.2008 A de facto standard that is a best practice.	International standard; de facto. Broadly based on Responsibility; Strategy; Acquisition; Performance; Conformance; and human behavior	Greenfield (2007) Very broad so requires other frameworks (Calder-Moir) for full benefits. Can be applied by any size and nature of organization
Control objectives of Information & related Technologies (COBIT)	Open standard, independent of software & hardware; 4 domains of planning & organization, acquisition & implementation, delivery & support, and monitoring; Strategy, value delivery, performance, risk & resource management	Known for its audit capability, and step-wise implementation (Cater-Steel et al., 2006; Robinson, 2005)
CMMI Capability Maturity Model Integration	Process management; 5 levels of self-assessment , where position and future aspirations could be tailored systematically	(De Haes & Van Grembergen, 2009) Mostly used in the software industry

The above review of relevant literature reveals that although there are

many works identifying inhibitors to ITG, there are no universally applicable solutions to guide, particularly, public sector organizations. Secondly, the various standards and frameworks are more of vendor based, and does not seem to address adoption and the implementation challenges of public sector organizations. In this respect, this study, in addition to confirming most of the inhibitors by extant literature, has identified the impact of committees/boards' membership of political appointees, and career induced memberships of management committees skewing professional decisions in ITG implementations as additional inhibitors.

Chapter 3 A Framework for National IT Policy Implementation Structures

3.1 Introduction

Information and Communication Technologies (ICTs) have attracted enormous attention in the past few decades, due partly to the vast opportunities and challenges it has brought to ways of conducting business, manufacturing, health, research, governance, and even leisure (Brynjolfsson & Hitt, 2000; Davenport & Short, 1990). National governments have utilized policies as instruments to define the direction and strategic engagement in this industry, spending staggering amounts on basically four cardinal policy areas of infrastructure, human capacity, eGovernment, and legal framework (World Bank, 2006). Some nations have used effective implementation of such policies to reposition their economies from seemingly unattractive backgrounds; yet others have struggled to reap the benefits of such policies.

There is a plethora of extant literature on analytic and descriptive studies, policy implementation frameworks, theories, issues, challenges, inhibitors and critical success factors (see Table 2.2) to aid understanding and practice of public policy. Despite these countless studies, and the prospects of using ICTs to overcome industrialization setbacks and derive social economic benefits, many nations have struggled to realize their intended objectives. The implementation component of the policy process has been identified as pivotal to swinging outcomes negatively or

positively (Ikelegbe, 2006; Nweke, 2006; Ulrich et al., 2004; Mankinde, 2005). The main objective of this study, therefore, is to contribute in two fronts, to:

- a) aid IT policy implementation practice by proposing a framework (FIPIS) to help practitioners overcome the challenges, and
- b) contribute to theoretical discourse by offering insight and explanations of national IT policy implementation effectiveness in nations from empirically validating the conceptual constructs of the FIPIS framework.

From a prescriptive viewpoint for solutions, it would be illogical to look at all facets of this hydra-headed problem. So, the scope of analysis is on implementation; and further focused on structural issues covering organizational control elements and the institution of governance structures. Structures can be viewed from many perspectives. Of specific interest to this study are the organizational control and governance entities viewpoints. The organizational control viewpoint sees structures as a consummation of management of organizations using the basic elements of control such as chain of organizations, division of roles, line of authority and decision making (McLaughlin, 2013; Stralser, 2004; Griffin & Moorhead, 2010). The governance perspective sees governance structure as differentiated, formal and informal. The differentiated governance structures are a response to aid decision making in public policy and involves the setting up of organizational units in response to

solving issues of conflict and ambiguity which routine organizations are inefficient at coping with (Hult & Walcott, 1990; Altier, 1987).

In essence, this study incorporates these two viewpoints in the first two research questions: a) how can the structural challenges of national IT policy implementations be overcome?, and b) what role do mediating bodies play in the coordination of multiagency policy implementation and in what environmental context is it most effective?.

A public policy is the abstract specification of guidelines, norms, regulations and a strategic direction for achieving national goals and objectives. Policy implementation is the carrying out of a basic policy decision (Mazmanian & Sabatier, 1983). A policy could be in the form of a monograph, incorporated in a statute, an important executive order or even court decisions (Mazmanian & Sabatier, 1983). Effective implementation and evaluation of public policy are complex tasks because various internal and external contextual issues swing outcomes to success or failure (Calista, 1994; Ikelegbe, 2006; Nweke, 2006; Mankinde, 2005), and because political, economic and social context differ from place to place (Ulrich et al., 2004). Therefore, considering the impact of these contextual issues on policy success, a one size fits all policy implementation is not possible (Mazmanian & Sabatier, 1983; Bhuyan et al., 2010; Cerna, 2013).

Noting the above structural issues from the IT policy implementation perspective, and the parsimony of literature on details of

IT policy implementation practice, two policies each of Nigeria and South Korea; two nations at the extremes of the IT policy success barometer, characterized by a common purpose, yet with very disparate outcomes, are, in the opinion of this study, well poised to exhume what differentiates nations in IT policy implementations analysis.

In the Nigerian case, many studies acknowledge the abysmal performance of the implementation of National Information Technology Policy (NITP) at realizing its set objectives (Omowunmi et al., 2010; Olatokun, 2006; Baro, 2011), without identifying which part of implementation constitutes the most impediments to success. On the other hand, the literature on South Korea's IT policy has been more on its success story and not on the details of implementation that have brought about the economic and socio-political development attributed to ICT (Chin & Rim, 2006; Business Software Alliance, 2013; Park, 2012; Shin & Kweon, 2011).

To actualize the objectives, the following research questions are analyzed:

- a) How can the structural challenges of national IT policy implementations be overcome?
- b) What role does mediating bodies play in the coordination of multiagency policy implementation and in what environmental context is it most useful? and

- c) Which indicators have the most important explanatory power for national IT policy implementation effectiveness?

To answer these research questions, the following set of methodologies were applied:

- a) Conceptualized the study on the theory of structuration, policy implementation framework (PIF), concepts of organizational behavior; and identified variables (indicators) crucial to policy implementation success from extant literature;
- b) Analyzed the global landscape of countries' IT policy implementation practice (10 countries in OECD, non-OECD, BRICKS, MENA and sub-Saharan African), utilizing international indexes as platform for comparison of policy effectiveness;
- c) Chose Nigeria and South Korea as nations that could exhumate the detailed organizational, institutional, human capital and technology (Orlikowski, 1992) issues and challenges that could affect IT policy implementation effectiveness. The countries have varied economic, demographic and cultural, IT research and policy backgrounds; yet very similar objectives and strategies for using IT as a growth engine, and the structuring of implementing organizations and provision of special funding;
- d) To foster an in-depth analysis, chose two policies (National IT Policy and ICT4D in Nigeria, and Framework Act on National

Informatization (FANI) and National Information Technology Industry Promotion Act (NITIPA) in South Korea). The policies were chosen because they share similarities in objectives, structuring of implementing organization, special funding; and dissimilarities in respect of intensity, commitment to implementation and contextual institutional backgrounds;

- e) Formulated a new framework, named FIPIS, from inductive qualitative analysis deriving input from literature, interviews, the NITP & ICT4D, FANI & NITIPA, and national official publications, and follows the design principles of UNCTAD's National IT Policy Review Framework (UNCTAD, 2013);
- f) Validate the indicators of the FIPIS framework using an online survey of IT professionals globally, increasing the potential for generalization of the results. This exercise contributed to the understanding and theoretical explanation of the relationship between the indicators and national IT policy implementation effectiveness. The results support aspects of previous research findings and contrast others.

For the rest of this chapter, conceptual framework is presented in section 2, the global analysis and cases of Nigeria and Korea in section 3, while section 4 details on the data collection. Section 5 examines the model design and analysis (FIPIS). Section 6 outlines the FIPIS proposal, section 7 x-rays the empirical analysis and section 8 concludes with a

discussion.

3.2 Conceptualization

This section sets the conceptual foundation on which the plethora problems inhibiting nations from achieving planned IT policy outcomes are discussed. Drawing from many frameworks, theories and literature, it identifies indicators that impact on policy outcomes to formulate the FIPIS framework.

The efficiency and performance of organizations can be affected by structure, and there are diverse organizational, environmental and human factors that make success neither anticipated nor guaranteed (Hult & Walcott, 1990). From this vintage point, it is clear that a critical analyses of organizational factors, human factors and environmental concepts could benefit studies of policy implementation. In view of the above, the Policy Implementation Frameworks (PIF's) application of structures in the assignment of structural capabilities to implementing organizations to execute policies is useful (Mazmanian & Sabatier, 1983; Elson, 2006), and the Theory of Structuration's use of rules and resources (organizational capabilities) (Turner, 1986; Giddens, 1984) to achieve goals is also important (section 2.1.2). Other frameworks and theories applied are the organization theory of implementation (Weiner et al., 2009), and the organizational implementation effectiveness model (Klein & Sorra, 1996). These are depicted in Figure 3.1.

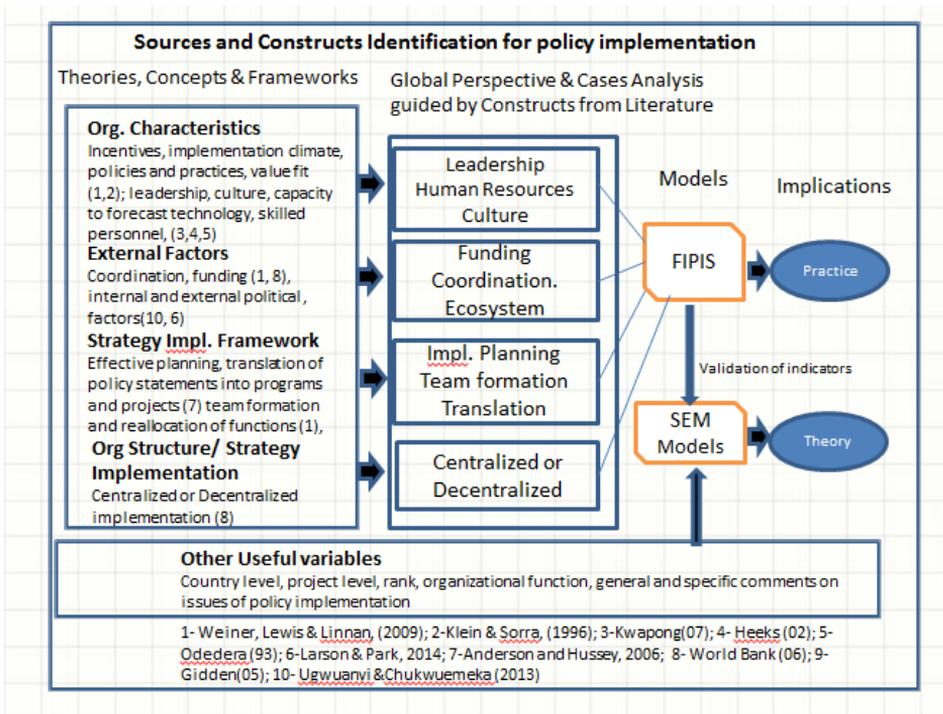


Figure 3.1 Conceptualization and construct identification for policy implementation

Figure 3.1 shows the application of various frameworks, theories and findings from previous studies in the first columnar box. The thick arrows depict the transformation of conceptual theories and frameworks into corresponding sub-boxes which indicate the variables (section 3.3) in the second columnar rectangle. These are corroborated by input from the global analysis of implementation practice, case analysis and supported by literature. The two beveled-edge rectangles depict the models while the oval shapes represent the implications for theory and practice arising from the study.

Implementing organizations draw their administrative spine from national administrative regulations. In addition, circumstances outside

the powers of the implementing agency such as economic, social, political and statutory administrative norms under which policies are formulated and implemented are crucial (Grindle & Thomas, 1990; Calista, 1994). These factors beyond the control of the implementing organization are grouped under External Factors (EF). For the purpose of this study, EFs are limited to funding, coordination and the socio-political ecosystem.

The hierarchical nature and internal characteristics of organizations are captured in the Organizational Characteristics (OC) subcomponent. This involves the basic functions of managing an organization including the leadership, human capacity and internal rule system depicted by the elements of organizational structure.

Closely related with the organizational characteristics is the Implementation Operation (IO). This subcomponent includes the issues surrounding implementation effectiveness. Noble (1999), in his strategy implementation framework, highlighted implementation organizing, implementation effort and managing the implementation process. Furthermore, elements of organizational structure depicted as dispersed control, role allocations and lines of authority are in this subcategory (McLaughlin, 2013; Stralser, 2004; Griffin & Moorhead, 2010). IOs are represented by implementation planning, translation of policies to programs and directives, and team formation.

The model of implementation is captured in the Implementation

Strategy (IS) subcomponent; where Nigeria is classified as implementing a centralized model while South Korea, a decentralized model of implementation (World Bank, 2006).

Together, these depict the command and control system, the role and functional allocation system, the cross agency coordination system, the incentive, evaluation and motivation system, which must synergistically and holistically work together for achieving policy objectives. This complex web of theories, models and frameworks form the basic foundation of this study as depicted in Figure 3.1.

The theories and frameworks, global analysis of IT policy implementation practice, the analysis of the case policies, and interviews have collectively and individually fed the collation of indicators/constructs/variables that impact the effectiveness of national IT policy implementations. It is worthy to note that varying application of some of the constructs exist in literature with some validated by previous scholars as Table 3.1 in section 3.3 depicts.

3.3 Construct Description and Sources

In this section, the study looks at the existing literature to determine which constructs are most crucial in explaining challenges of policy effectiveness. Some constructs have already been validated by scholars, and are stated in the corresponding explanation. These constructs indicate the organizational viewpoint of structural impacts on policy implementation. Arising from Table 3.1, subsections 3.3.1 to 3.3.9

discussed the constructs, sources, and their aggregation into the FIPIS components: Implementation Operations (IO), Organizational Characteristics (OC), External Factors (EF) and Implementation Strategy (IS).

Table 3.1 Variable definitions, sources and relationship with FIPIS components

SN	Construct/Variable & Description	Framework Component	Sources
1	Implementation planning	Implementation Operations	Pinto & Prescott (1988); Slevin & Pinto (1986); Ghapanchi et al. (2008)
2	Translation of policy statements to directives and programs	Implementation Operations	(Anderson & Hussey, 2006)
3	Team formation	Implementation Operations	Pinto & Prescott (1988); Ugwuanyi & Chukwuemeka (2013); Slevin & Pinto (1986)
4	Human resources	Organization Characteristics	Pinto & Prescott (1988); Gichoya (2005); Ugwuanyi & Chukwuemeka (2013); Slevin & Pinto (1986); Ram et al., (2014)
5	Leadership	Organization Characteristics	Crosby (1996); Gichoya (2005); Mora et al., (2013); Ugwuanyi & Chukwuemeka (2013); Slevin & Pinto (1986); Sarker & Lee (2003)
6	Organizational culture	Organization Characteristics	Humble et al., (2003); Pinto & Prescott (1988); Gichoya (2005); Leidner (1996)
7	Funding	External factors	Crosby (1996); Gichoya (2005); Ugwuanyi & Chukwuemeka (2013); Ram et al. (2014)
8	Ecosystem	External factors	Humble et al., (2003); Ugwuanyi & Chukwuemeka (2013); Yumei (2012); Ram et al.,

			(2014); Gibbs et al., (2003)
9	Coordination	External factors	Crosby (1996); Gichoya (2005); Yumei (2012); Brinkerhoff (1993)

3.3.1 Implementation Planning.

Implementation planning is a crucial component that determines the effectiveness of implementation. The literature notes that effectively planned implementation could reveal project risks, and resource requirements which could enable managers to avert the risks or provide alternatives (Bhuyan et al., 2010; Australian Government, 2006). Pinto and Prescott (1988) validated this construct in their analysis of 20 critical success factors of project implementation

3.3.2 Translation of Policy Statements

Policies are abstract, high level statements of intent, which must be implemented for realization of change (the achievement of goals and objectives). This is a crucial part of the implementation discourse. Translation of policy statements into executive directives is central in the discussion of policy diversion prominent in the literature which led to the top-down, bottom up and hybrid dichotomy (Mazmanian & Sabatier, 1983; Bhuyan et al., 2010). Anderson & Hussey (2006) clearly stated the importance of this variable when talking about the crucial factors in policy implementation.

3.3.3 Team Formation

Team formation is important to achieving policy, and organizational

effectiveness. Policy and organizational success is enhanced by the availability of motivated and skilled personnel to carry out technical and administrative duties. Pinto and Prescott (1988) discussed this construct/variable and validated it. This was supported by Ugwuanyi and Chukwuemeka (2013).

3.3.4 Human Resources

The issue of human resources is crucial. This is vital at the managerial level, and the basic level. Pinto & Prescott (1988), called this personnel and included recruitment as well as the skill sets requirements. Bhuyan, et al., (2010), considered the need for retraining and changes to processes as it impacts effectiveness of policy; while others discussed its dynamics in terms of mobility and impact on project success (Ugwuanyi & Chukwuemeka, 2013; Gichoya, 2005; Kamba, 2014). Pinto and Prescott (1988) validated this but noted that though it was positively related to policy effectiveness, the magnitude was less than expected.

3.3.5 Leadership

Leadership has been viewed in the organizational literature as the capability of a leader at achieving set organizational goals. However, the debate on types of leadership has had many variants based on scholarly perspectives and contributions to organizational theory. Various stages in history had some predominant school of thought, and these have been inherently deemphasized because of changing needs in the organization (Parry & Bryman, 2006). Some of the basic discourse has been on trait,

style, contingency, new leadership and distributed leadership (Parry & Bryman, 2006; Neufeld et al., 2007). However, for the purpose of this study, we define leadership as those traits of a person (or group) that performs the role, and can be differentiated by the success at achievement of goals. Fuller & Green (2005) see leadership as beyond education and skills, and deeply rooted in integrity. Noble (1999); Gichoya (2005); Pinto & Prescott (1988); Bhuyan et al. (2010), all consider leadership as a vital variable. The leadership construct/variable was validated by Pinto and Prescott (1988).

3.3.6 Culture

Understandings and commitment around what needs to be done and gets done in organizations tie up to the cultures that are institutionalized, and these get changed by policy, and are usually resisted. Thus organizational culture affects policy implementations (Yang et al., 2008; Hofstede centre, 2014). Culture is considered to have a valuable influence on the success of an organization. It is considered adaptive to environmental changes and is the belief system that gives an organization its identity. Organizational culture is a critical factor to firm performance (Kotter & Heskett, 1992). Yang et al., (2008) agree that because culture is difficult to control, it is less utilized in the analysis of project implementation. However, this study found a simple way of incorporating it to measure its impact on policy implementation effectiveness.

3.3.7 Funding

Funding is a crucial component of policy implementation effectiveness. This encompasses provisioning of funds, human resources, and physical resources. To this end, the cases of this study have used the policy instrument to ensure that funding is adequate and timely. Although country level differences in the effective monitoring and applications differ, its importance is cardinal with provision of special funding (NITDA Act, 2007, Act-FANI, 2010, Act-NITIPA, 2009). The importance of funding is acknowledged by most authors (Ugwuanyi & Chukwuemeka, 2013; Ram et al., 2014; Bhuyan et al., 2010). Further, because the process of its allocation and approval is external to the implementing organization, this study grouped it as an external factor.

3.3.8 Ecosystem

External factors ranging from socio-economic, political and administrative influences affect the implementation of policy (Humble et al., 2003; Ugwuanyi & Chukwuemeka, 2013; Yumei, 2012; Ram et al., 2014; Gibbs et al., 2003). The socio-political setting under which policies are formulated and the dynamics of these are crucial to policy implementation effectiveness.

3.3.9 Coordination

Effective coordination is crucial for implementation effectiveness, especially when several agencies are involved (Brinkerhoff, 1993; Leite & Buainain, 2013). Policy outcomes are affected because of varying levels

of experience and the need for compromises in order to agree on common decisions. They may have diverse perceptions and objectives (Bhuyan et al., 2010).

3.4 Analysis of National IT Policy Implementation Practice and Cases

3.4.1 Global National IT Policy Implementation Practice

Most nations have either established a new organization or created one in existing ministries with ICT functions to implement their national IT policies (Adamali et al, 2006). This section of the study analyzed the structural composition of the implementing bodies and related issues in selected OECD, non-OECD, MENA & BRICKS countries represented in Egypt, South Africa, Nigeria, South Korea, Canada, Malaysia, Sweden, UK and Singapore, giving an indication of global IT policy implementation practice. This is expected to provide diversity in political, economic, industrialization history, population and IT industry valuation for determining the overarching factors that affect IT policy implementation outcomes.

Various international indexes that aggregate the performance of nations' effectiveness in policy regimes are available. Figure 3.2 shows the countries' standing in four indexes: Economist Intelligence Unit's (EIU) digital economy (2010), Business Software Alliance's (BSA) IT competitiveness (2009, 2011) and Wadesa University's Institute's eGovernment ranking (2012).

A comparison done by the World Bank (World Bank, 2006) grouped nations of similar economic standings; however, the indexes above used uniform criteria for analysis, which could place some countries at disadvantage. Overall, countries' placing on the indexes reflect a general standing in major aspects of IT, showing only slight variations from one index to another. However, it could be deduced that the closeness of the rankings is an indication of effectiveness in all fronts; while a wide disparity could represent outliers. Nigeria revolves around 51 and 62; Korea, 3 and 19, and Singapore revolves around 1 and 9.



Figure 3.2 Countries' standings in four IT indexes. Sources⁴

⁴ a) http://www-935.ibm.com/services/us/qbs/bus/pdf/eiu_digital-economy-rankings-2010_final_web.pdf b) <http://www.e-gov.waseda.ac.jp/images/Press%20Released%20on>

Structurally, for countries with established IT implementation agencies, boards exist for governance and policy approval functions. Sweden, Malaysia, Nigeria, Singapore and Egypt have boards but with slightly different compositions (PTS, 2014; Malaysia, 2014; NITP, 2001; Singapore IDA, 2014; Egypt, 2014). While the board of Singapore's IDA is headed by a Permanent Secretary and comprises heads of international IT companies like IBM, SAP, a senior leadership team plays a strategic role in ensuring IDA's work is closely aligned to Singapore's wider economic and social development goals, and in sync with the dynamics of the local and global infotechnology landscape (Singapore IDA, 2014). Malaysia shares the same principles, where a national expert group at the ministerial and agency level charged with leading, deliberating and proposing policies to the National IT Council, which has 5 ministerial level members (Malaysia, 2014). Sweden's PTS also has a board of 10, a Director-General and Deputy Director-General and management consisting of heads of departments (PTS, 2014). The case of Egypt is a striking PPP in ITIDA, under the MCIT (Egypt, 2014).

The case of the UK and Canada are slightly different. The UK does not have an NITP and an organization with implementation responsibilities (Orna, 2008). Rather, it has two ministries (Justice and Cabinet Office) sharing various aspects of generating and coordinating information technology policy responsibilities. By this arrangement,

policies could originate from any interested ministry with cross-cutting issues requiring individual ministerial approval. However, in such circumstances where governance and central coordination does not exist, a policy framework for content, accessibility and regulation is required (Owen et al., 2012). Orna (2008) opined that countries that operate such uncoordinated implementation structure, such as the US, have strong information industries (marketplace) that enable them to play a leading role. Canada's case is similar, but with special governance mechanisms that control all departments under the umbrella of the Treasury Board, which is chaired by the President (Canada, 2007), with very effective monitoring and government-wide implementation with citizenship focus (Canada, 2014).

In comparison, countries with decentralized implementation such as Canada, South Korea, Malaysia and Sweden, have, with the exception of Malaysia, shown good placing in the indexes. Sweden is a member of the EU and thus has obligatory regulations therefrom, including the framework for common electronic communication networks and services (EU, 2002). However, the EU's regulations provide for decentralized implementation, where a community or nation could promote cultural and linguistic diversity. An application is the celebrated case of a stringent implementation of the EU's copyright infringements policy, addressing its specifically notorious identity (Münch, 2013).

The composition of telecommunication, postal and other IT

related functions in one agency in Singapore and Sweden is worthy of note. The contribution of that to IT policy implementation success needs to be explored, as there are obvious coordination advantages. Issues of coordination and mediation are prominent in the literature. South Korea, which has a series of structural changes exemplifying political changes saw a powerful presidential level committee, which took care of interoperability challenges. The contribution of these structural features from the global analysis and the influence of other external national level economic, administrative, cultural and socio-political influences would be utilized in the formulation of the framework.

3.4.2 Case Analysis of Nigeria and South Korea

Having discussed the global trend in IT policy implementation practice in the previous section, an overview of the IT landscape of Nigeria and South Korea is undertaken in this section. A justification of their selections is attempted through analyzing the peculiarities and disparities in the policy implementation context.

Table 3.2 enlists the socio-economic, demographics and Internet and IT industry statistics of the two cases.

Table 3.2 Governance, economic and IT facts of Nigeria and South Korea.
Source: CIA Fact book

Facts	Nigeria	South Korea
Governance	Democracy since 1999	Democracy since 1992
Population	177,155,754	49,039,986 (July 2014 est.)
Land size	923,768 sq km	99,720 sq km

Economic growth and contribution	6-8% growth due to expansion in agriculture, telecommunications and services. The monolithic economy arising from overdependence on oil is a key challenge.	South Korea's export focused economy was hit hard by the 2008 global economic downturn, but quickly rebounded in subsequent years, reaching 6.3% growth in 2010. Korea is the 12 th largest economy but aging, regulations on the chaebols system, and export orientation over consumer goods are key challenges
GDP - ppp	\$478.5 billion (2013 est.)	\$1.666 trillion (20.3 est.)
GDP per capita	\$2,800 (2013 est.)	\$33,200 (2013 est.)
IT investment: private and public	Fixed lines deficiency results in only 1 of 100; but mobile cellular subscribership is 60 of 100. The landing point for the SAT-3/WASC fiber-optic submarine cable provides connectivity to Europe and Asia. There are 3 satellite earth stations (2 Atlantic Ocean and 1 on the Indian Ocean) (2010)	Fixed-line and mobile-cellular services widely available with a combined telephone subscribership of roughly 170 per 100 persons; rapid assimilation of a full range of telecommunications technologies leading to a boom in e-commerce. There are numerous submarine cables providing links throughout Asia, Australia, the Middle East, Europe, and US. There are 66 satellite earth stations (2011).
Percentage contribution of sectors to GDP	agriculture: 30.9% industry: 43% services: 26% (2012 est.)	agriculture: 6.9% industry: 23.6% services: 69.4% (October 2013 est.)
Internet & Telecomm statistics	1,234 (2012) internet hosts 43.989 million (2009) users	315,697 (2012) hosts 39.4 million (2009) users

From Table 3.2, the growth rate of the economies is almost the same at around 6%. The disparity in GDP is enormous and may explain the colossal gulf in terms of ability to sustain a persistent investment culture.

Deriving an Internet Consumption Framework from technology adoption,

Zhang (2013) posited that high income countries have a steeper Internet adoption slope, and a shorter time lag than lower income countries. (Zhang, 2013). The percentage contribution to GDP shows that Nigeria is more agrarian, and Korea derives more from the service sector. Interestingly, the number of Internet users and hosts could have defining implications for IT policy and effective use of IT for eCommerce and economic growth. Because access, availability and cost are key components of IT evaluations, the infrastructural variety, quality and availability also have policy implications.

IT policies are formulated in response to national objectives, and subsequently to the trend of technological changes that are driven mostly by global circumstances. The frequency of policy formulations is an indication of desire and commitment to addressing identified lapses in the policy landscape. Having both originated from industrial policy, countless further initiatives and policies adorn the road for these nations as depicted in Figure 3.3. Nigeria started the first S&T plan in the 1980s while Korea had its first comprehensive long term plan in the late 60s. Nigeria's NITP was in 2001, and the revised one in 2011 which was yet to be formalized, showing a slow turnover. For the Korean case, however, even with some initiatives not included, the turnover clearly shows the commitment to using IT as a national strategy.

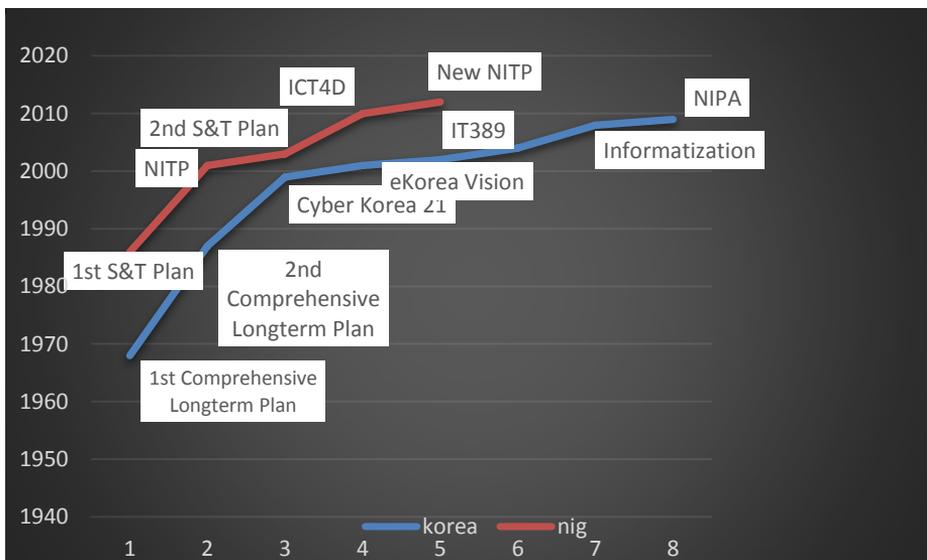


Figure 3.3 Relevant IT policies of Nigeria and South Korea (1968-2012)

A thorough comparative analysis for the detailed implementation structures of the chosen policies of Nigeria and South Korea is listed in Appendix B, and a Strengths Weakness, Opportunities and Threats (SWOT) analysis that incorporates wider societal contexts is in Appendix C.

3.4.2.1 Nigeria

Nigeria is a sovereign nation that had her independence from Great Britain in 1960. After several exchanges of rulership between democratic governments and military dictatorships, Nigeria now enjoys a more enduring democracy since 1999. Nigeria had a destabilizing civil war in the mid-1960s, with lasting impacts on this multi-cultural state's development still evident.

As stated earlier, most nation's IT industry developments are

rooted in industrial policies or science and technology (S&T) policies. Nigeria's is no exception. The first national science and technology (S&T) policy was formulated in 1986. The revised 2003 S&T policy gave prominence to the national innovation system and other flagship programs such as biotechnology, information and communication technology (ICT), space science & technology, as well as energy and material engineering.

3.4.2.1.1 Nigeria National Information Technology Policy (NITP) 2001.

The NITP was formulated with the vision to make Nigeria an IT capable country in Africa and a key player in the information society by the year 2005. In equal vein, the mission was to effectively use IT for wealth creation, eradication of poverty, education, job creation and global competitiveness. It was an administrative document, meaning it is not an Act of Parliament. The document had 31 general objectives and 20 strategies, including the creation of National Information Technology Development Agency (NITDA) (Nigeria, 2013).

Like most countries, Nigeria's NITP gave strong cognizance to human resources development, infrastructure, eGovernance and research and development, as strategies to fast-track the deployment and use of IT as a growth engine. However, the overall valuations and effect of the implementation had not shown good results in international indexes (Figure 3.2). In view of the above, the implementation of the NITP and the information and communication technology for development (ICT4D)

strategic action plan are chosen for this study.

NITDA was created on the recommendations of the NITP and has been ratified in the National Information Technology Development Agency Act, 2007 (NITDA Act, 2007). A fund (NITDEF – National Information Technology Development Fund) was created from tax-deductible levy on IT intensive companies and telecommunication companies. Structurally, NITDA has a board with members drawn from academia, representatives of industry associations, and one representative from each of the 6 geopolitical zones to be appointed by the President. The main functions of the board were to approve policies and create a good environment for IT to thrive as a national economic growth engine. The Chief Executive Officer is the Secretary to the Board.

3.4.2.1.2 Information Communication Technology for Development (ICT4D)

The Nigerian government, recognizing the need to review the national information technology policy in the light of global changes in the IT sector internationally and in Nigeria, set up the ICT for Development (ICT4D) strategic action plan committee to develop a new ICT plan (NITDA, 2011a). Developed in conjunction with the United Nation Economic Commission for Africa (UNECA), the plan was launched at eNigeria 2010, a flagship program of NITDA. The national ICT4D plan targets at improving the use of ICT to achieve the government's seven point agenda and 'Vision 20:2020'. Vision 20:2020 was a government

development plan which aimed at positioning Nigeria among the first 20 developed economies by year 2020. The plan was also to achieve Nigeria's Millennial Development Goals (MDGs), New Partnership for Africa's Development (NEPAD) initiatives and the World Summit on Information Society's (WSIS) plan of action (NITDA, eStrategy 2011; eInfrastructure, 2011; NITDA, 2010).

ICT4D addressed 11 sectors: health, agriculture, education, R&D, human resource development, governance and legislation, national security and law enforcement, eGovernment, infrastructure, private sector and awareness. It contains actionable programs for short, medium and long term implementation by identified stakeholders (NITDA, eStrategy 2011). Each action plan contains a description, time bound and measureable targets, implementing agencies and sometimes, prerequisites. Though Nigeria's IT implementation structure is centralized (Adamaili et al., 2006), this was decentralized. A decentralized implementation model requires that national agencies implement and maintain local policies, and share in issues of national concern such as interoperability. The centralized, on the other hand, has an implementing organization that implements the national policies (Adamaili et al., 2006).

3.4.2.1.3 Policy Implementation Highlighting Structural Features

In this section, this research highlights the features of the NITP and ICT4D implementations in Nigeria, and concludes with an opinionated discussion of the process. The conclusions arise from interviews

conducted, literature and government publications.

NITDA is a parastatal of the Ministry of Communications Technology since 2011, indicating the hierarchy with supervisory powers. Before that time, it belonged to the Ministry of Science and Technology. The bicameral legislative bodies have oversight as well. NITDA's association with external MDAs in the discharge of its duties is a contentious issue. Issues of fragmentation and overlapping functions (Gbengasesan, 2011) with other agencies are evident, grossly needed a mediating body with power, for effective realization of policy outcomes. Secondly, an obvious gap in the NITP, as is in the ICT4D, is the omission of statutory funding mechanisms that are tied to short and long term implementation plan (NITDA eStrategy, 2011). For instance, NITDEF was provided but it does not have a guaranteed amount because it is dependent on levies (NITDA Act, 2007).

Overall, our interviews reveal that staff motivation, incentive and individual and organizational evaluation systems do not seem to be elaborate, and strictly pursued. Even though the NITDA Act includes a caveat for a remuneration system that is more flexible and competitive, and an internal staff development programme that is pursued rigorously, how these positively affect the number and quality of staff that could fill the demands of a centralized implementation remains unclear, with likelihood of profound impact on implementation.

This study's assessment of the ICT4D plan is too superficial, and

most of the objectives seemed to be drawn from the NITP. In fact, some of our interviewees (see analysis section below) called it an implementation plan for the NITP. Secondly, the bogus target of achieving international and national developmental targets with one plan seems overambitious (NITDA eStrategy, 2011). Thirdly, agencies are listed as the implementers without distinct ownership and funding mechanisms with grave implications for implementation. Further, though it claimed to have extensive consultations with stakeholders (some agencies were members of the committee), buy-in and committed ownership are contentious issues in the yet to be reported outcomes of the implementation of the ICT4D plan.

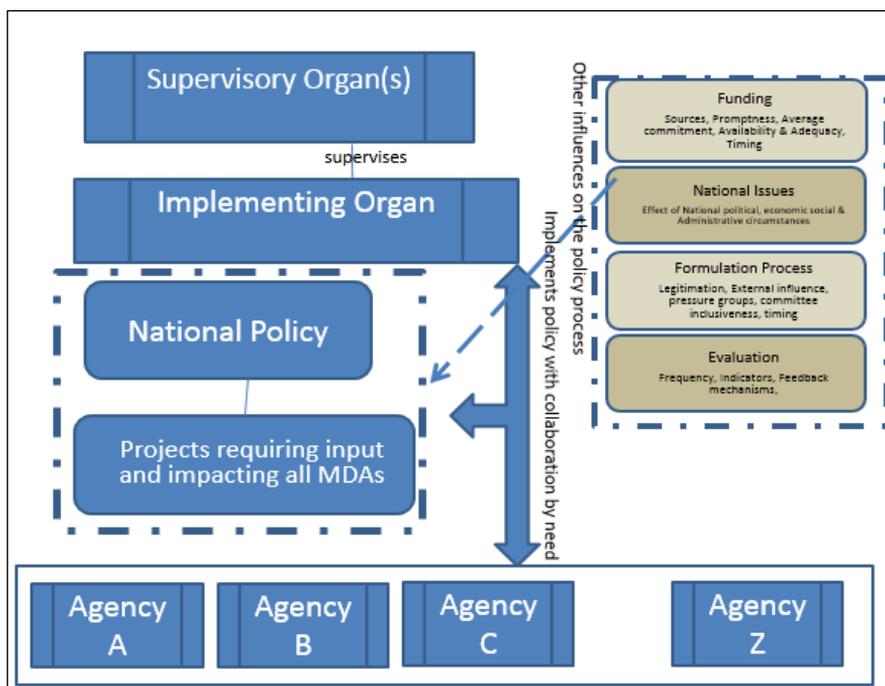


Figure 3.4 Structural details of the implementation of the Nigerian National Information Technology Policy.

Figure 3.4 shows the interrelationships between the supervisory body, the

implementing organ and the collaboration of other relevant agencies in the implementation of the NITP. The right hand part shows the external factors that influence the activity of implementation. Although all agencies are affected, only selected agencies whose statutory mandate has significant functional importance with the part of the policy partake in collaborations. It is worthy to note except for those agencies mentioned in the policy, collaborations are at the discretion of NITDA (NITDA, Act, 2007).

3.4.2.2 South Korea

South Korea is a sovereign state since overcoming conquests by China and Japan in recent history but had a devastating civil war in the early 1950s. It had military dictatorships, but unlike the military of most other countries, that era heralded the foundations for the success story of today, culminating in strong government's support and leading role for IT development and the sustenance by successive governments (Innovation and Development Network, 2012; Larson & Park, 2014; Lee, 2012; Kim, 2010).

South Korea has one of the most successful stories of utilizing IT to reposition its socio-economic status amongst the first 12 economies from very humble and war ravished backgrounds (Table 3.2). South-Korea achieved an unprecedented growth (economic indicators) and is at the pinnacle in some IT related indices such as number of household with broadband services, mobile and fixed telephone lines (CIA, 2013; Choi,

2014, Chin & Rim, 2006; Lee, 2012). Added to that is its capability of churning out leading global technological standards, a lavish and exponential growth contribution to GDP, and its placement among the elitist nations in IT indices (Figure 3.2).

Like most countries, South Korea benefitted from industrial and science and technology policy. Several 5-year technology promotion plans, and comprehensive and long term S&T development plans with input from Advisory Council on S&TP under the Economic Planning Board, were established (Chin & Rim, 2006, Innovation & Development Network, 2012). The 1968 long-term plan, drawing input from 400 S&T experts and research input from Korea Institute of Science and Technology (KIST), Korea Productivity Centre (KPC), Korea Engineering Consultants Corporation (KECC), heralded an increased effort on S&T; culminating in the selection of information industry, materials technology, component technology, energy resources, public welfare and promising fields for future development. A further subdivision of the information industry comprised computer, software, semiconductor, telecommunications and life information.

A few general IT initiatives, which are worth of mention because of their trailblazing role to the chosen Acts of this study are: The Cyber Korea 21 Initiative (1999-2002), the eKorea Vision(2002-2006) (Yoon, 2002) and the IT839 Strategy(2004). The Cyber Korea 21 Initiative was formulated for the IT needs of the 21st century. Initially aimed at

repositioning Korea to benefit from IT as a growth engine, it later targeted the transformation of Korea into a knowledge-based economy. (Shin & Kweon, 2011). The eKorea Vision was intended to further the benefits of the cyber Korea 21 initiatives by firstly noting and correcting the shortcomings of the former. It heavily embarked on human capacity development and expanded the national infrastructure. One of the targets was a bold initiative to enable households access to high-speed Internet regardless of income, age and region. The IT839 strategy heralded the broadband era and was the first real attempt at a National Information Infrastructure (NII) in Korea, aimed at providing high-speed futuristic infrastructure. The naming of the strategy referred to eight services, three infrastructures, and nine new growth engines. Subsequently, Government spent billions of dollars on creating Internet services and ensuring commercial buildings got high-speed connectivity. The strategy created a value chain, in which networks, devices and content created a symbiotic growth engine (Chin & Rim, 2006). Structurally, the project created a synergy between government and the private sector with government initiating and leading the strategy and the public sector partaking of it (Chin & Rim, 2006).

3.4.2.2.1 Information and Communication Technology Industry Promotion Act (2009)

The purpose of the Information and Communication Technology Industry Promotion Act is to promote the competitiveness of the industry and

establish and strengthen the foundations for the industry for economic development of the nation. Medium, long and annual plans from intermediate plans were to be done by the defunct Ministry of Knowledge Economy (MKE). But, certain nationalistic functions across ministerial boundaries were to be prescribed by “Presidential decree”. Funding, standardization and use of local standards internationally, professional human resources, research on demand and supply projections, prescription of educational programs, international cooperation, establishment of complexes, and subsidy and support for organizations were part of its functions. Industry Promotion Institute (NIPA) was created by pulling other related agencies and associated legislation (Act-NITIPA, 2009).

The supervisory responsibility was assigned to the defunct Ministry of Knowledge Economy, focusing on business plan, budgeting, results of business performance and settlement of accounts annually, and compliance with other Acts and corrections therein. Funding, which is partly from sales of spectrum, and royalties from products of its R&D investment in companies, is operated and managed by (the defunct) MKE. Five members from ante-organizations were empowered to recommend the head of institute, and stand dissolved thereafter (Act-NITIPA, 2009).

3.4.2.2.2 Framework Act on National Informatization (FANI) (2010)

The basic thrust of the Act is the realization of knowledge and

information based society with ethical values based on human dignity. It expects communities, state and private sectors to have a unified integrated informatization direction. The Ministry of Public Administration and Security (MPA&S) is to develop a 5-year basic plan, and its implementation by integrating the sectional plans for state and local governments, and support for private sector, into a national plan for deliberation by the Presidential Council. The council is made of 35 members including commissioned technical personnel, and co-chaired by Minister of Public Administration and Security and a Presidential nominee (Act-FANI, 2010).

Funding was systematically provided and tied to the implementation plans, and a performance review of the previous year. Funding proposals were deliberated and approved by the Council and effected by Budget Office. The council's functions include establishment of basic and implementation plans, the inspection of implementation records, and other roles assigned to it by eGovernment Act and other statutes, prioritization and distribution of information resources and implementation of Presidential decrees (Act-FANI, 2010).

The Act included roles and mechanisms for national agencies, local governments and the private sector to participate and add value nationally. The Government's role was to mediate, where there are overlaps, in areas of standardization and interoperability and on measures to develop the national IT infrastructure.

National Information Society Agency (NIA) was established to provide technical support for informatization, operate a national infrastructure, manage information resources and ensure efficient use of common information resources, trends analysis, education and publicity. Reporting was to be made to the National Assembly by MPA&S on trends and actual performance of the informatization project. (Act-FANI, 2010).

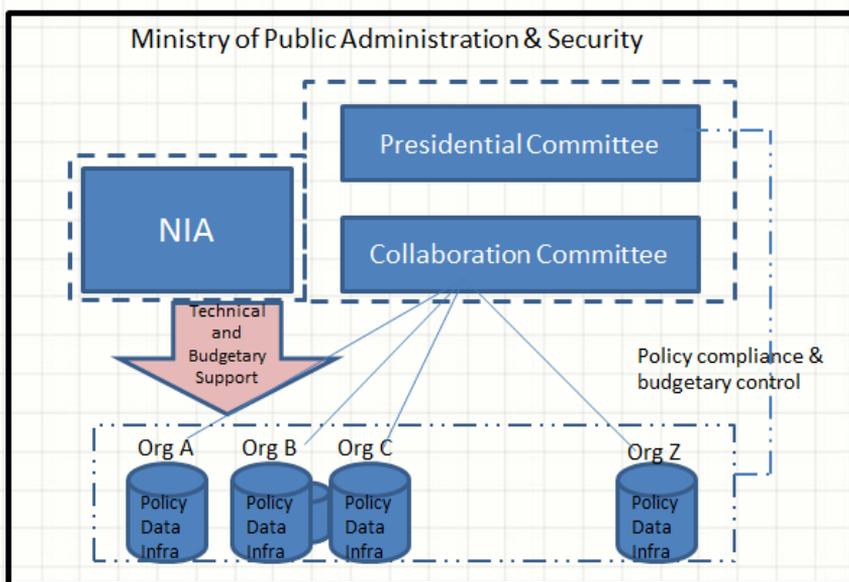


Figure 3.5 Structural details of the implementation of the Framework Act on National Informatization (FANI) of South Korea.

Figure 3.5 shows the implementation of the FANI in the context of the roles of participating agencies, the Presidential Committee and the coordinating ministry (Ministry of Public Administration and Security). Organizations in bold dotted lines are created by the Act, and the line covering the agencies implies the supervisory and control mechanisms the

Presidential committee had over other agencies. National agencies had their own information systems but provided interoperable platforms in order to facilitate sharing of common information resources. The big arrow implies the technical support from NIA to other agencies. The collaboration committee was made up of officers from the agencies, sharing experiences. The presidential committee also did conflict resolution as prescribed by the Act.

3.5 Data Analysis and Model Design

This section sets out to address the first two research questions of this chapter. The first research question is on identifying challenges to effective IT policy implementation and proffering solutions, while the second is on finding the mechanisms of mediating bodies in inter organization policy implementation and the context under which it works best. Data collection methods and analysis are discussed to create a synergy between research questions, data collection, analysis and inference leading to the FIPIS proposal.

A comprehensive literature review of critical success factors, inhibitors, issues and challenges to effective policy implementation from a structural lens revealed 9 indicators; namely implementation planning, translation of policy directives, team formation, human resources, leadership, organizational culture, funding, coordination of multiagency implementation and socio-political ecosystem. These are individually and collectively discussed in Section 3.3.

In order to work in sync with previous literature, existing frameworks, theories and their applications, methodologies for solving policy implementation challenges were scrutinized for shortcomings and possible contributions to this study. Table 3.3 lists the scope, gaps and contributions of the concepts.

Table 3.3 Scope and shortcomings of existing policy frameworks/theories

Framework/Theory or application	Scope and Shortcomings	Contributions to this study
Advocacy Coalition Framework Sabatier(1988)	Understanding the policy process (long time span, subsystems, and belief systems). perspective of learning and implementers	FIPIS as a learning process, systems outlook and belief systems are cultural
Contextual Interaction Framework. Spratt(2009)	Framework hinged on motivation, information, interactions and power of the actors, but applied in health policy	Methodological similarity and use of motivation and interactions
Institutional Analysis & Development framework. Weible etal (2012)	Role of individuals and institutions	Human capital and organizational characteristics
Theoretical Explanatory Power of policy outcomes (O'Toole and Montjoy, 1984; Matland, 1995; Sabatier, 1991)	Bemoan the difficulty of finding a dependent variable. Did not aggregately use these combinations of vital structural ingredients of IT policy implementation	We used a latent variable thus avoiding the complexity of the dependent variable for explanations. Explanatory and descriptive value of the empirical study
Policy Implementation Framework Mazmanian and Sabatier 1983) Elson (2006)	Used material, structural and contextual variables for explaining policy effectiveness. It covered the entire policy process, widely applied in general policy areas. Based on consistency of objectives and causal theory so more	Implementing agency selection, skillful human capital, socio-economic landscape and influence of political environment

	of formulation guide than implementation.	
Organizational theory of implementation (Weiner et al., 2009)	Procedures and policies of the organization, applied in technology adoption scenarios	Organizational procedures, implementation climate and incentive system
[Policy Implementation Assessment Tool Bhuyan ., 2010] [Implementation Analysis (Weaver, 2010)]	Analytical study approach to aid policy learning. Applications in health policy Weaver 2010 identified problems of policy implementation and application is general, especially a proposal to US GAO (government Accounting Office).	The identification of most of the inhibitors in the policy discourse, and futuristic learning

From Table 3.3 it can be seen that a lot of effort had been put into strategies to resolve policy implementation challenges. Recall from the introduction that theories and frameworks exist in the policy discourse, but their applications in general policy scenarios and a lack of focus on IT and the persistence of implementation failures motivated this study. Table 3.3 is a slightly modified version of Table 2.1, to reflect the applications and shortcomings. It shows the frameworks, theories or its application and references on the first column, and explains the scope and shortcomings in the second column. The last column explains the contributions to this study’s formulation of framework components or identification of variables

3.5.1 Data Collection

In order to augment the findings from literature and government publications; and establish those hidden issues only interviews could

reveal, contacts were established in each of the selected agencies in the Korean cases. Respondents were selected by these contacts concentrating on those that actively participated in the implementation of the chosen policies. This gave the assurance that their experiences both in the planning, execution and collaboration with other agencies would provide firsthand information on the details of the implementation. The researcher's personal knowledge informed the selection of respondents in the Nigerian case.

Interviews were arranged and conducted using the interview guide in Appendix E. A test run was conducted with colleagues to reveal areas of ambiguity and identify gray areas with good value. This was to keep us focused on the theme, and not deviate substantively; even though different circumstances and interviewees required slightly different approaches for effectiveness. The interviews lasted an average of 85 minutes and were conducted one-on-one and over the telephone from May to August, 2014.

In all, four interviewees from Korea, two from NIPA, one from NIA, and a presidential committee member were interviewed. All of these were senior managers. In Nigeria, one person each from administrative cadre, middle management and senior management were interviewed. As a strategy, questions on issues prevalent in Nigeria were asked the Korean interviewees and vice versa. It is worthy to note that our understanding of the work ethics and cultural circumstances of the two countries helped

in the collection of evidences. Some of the interviews are discussed in the next paragraphs.

The interview with NIPA official took place on 18 June, 2014. It discussed structural and capacity issues in implementation of IT policies. He was very precise in his explanation of the workings and structural hierarchies of NIPA (NIPA, 2012a). He expressed the MBO technique in ensuring staff motivation and commitment, and also expressed NIPA's mediatory role for conflict resolution among IT companies. The conflict resolution technique is akin to the mediation role of the Presidential Council in framework Act on national Informatization (FANI) policy, but in another scope and context with highly significant success.

The first interview with the Presidential Council member held on the 2nd of May, 2014; and was repeated on 25 May, 2014. The interviews focused on definitive factors that impinge on IT policy implementation. His interest on eGovernment was ever present in all the discussions. He was vivid in his stance on presidential support, and pined success to power of coordination. However, even in a presidential committee setting, interoperability and common operational platform for data sharing was noted as a big challenge. We discussed the role of international research, prompt budgetary provisioning and the synergy of thorough project evaluation and use of implementation planning.

The interview with the NIA staff held on June 5 2014. This was fruitful, but mostly hinged on human capacity and its impact on

technology related policy implementation.

The interviews with NITDA staff held on 20 May, 2014. This study used the circumstances of one country to ask respondents of the other how they would respond to the challenge. The officers expressed the lack of “political will”, or presidential level “project champion”. On issues of staff incentive and evaluation systems, they referred to the efforts of Mr. President at instituting an evaluation system, but stated it was just beginning and would take time and effort to institutionalize it. In all, these interviews shaped this study’s understanding of different political, economic and administrative circumstances under which the two countries’ IT policies were implemented; and formed the basis for universally applicable solutions.

3.5.2 Analysis

An inductive analysis was utilized in this part of the research. This meant the gathering of specific observations and data, and analyzing and identifying patterns that can lead to generalizations and theories (Burney, 2008). It involved the collation and categorization of keywords in the course of the interviews and recurring features in the literature, in part from Table 3.2. For instance, the role of leadership was very prominent both in the interviews and the literature, thus requiring an inclusion as one of the important factors in the organizational characteristics component of the framework. In a likewise manner, other factors were derived and included. It is worthy to note that a bit of phenomenological

analysis (deciphering meaning from firsthand experiences of respondents) was also utilized (Waters, 2014).

3.5.3. Results

The results in this section would be better appreciated if read in conjunction with Section 3.3, where the indicators from literature are elaborated together with their sources and background information, and the grouping of components of the FIPIS framework.

3.5.3.1 Organizational Characteristics

Organizational policies and procedures, including implementation climate and incentive systems which are crucial to implementation (Weiner et al., 2009; Klein & Sorra, 1996). These issues touch on leadership, organizational culture, history and human capacity (Table 3.2). The human capacity development was a crucial success factor in Korea (IDN, 2012; Yoon, 2002). Yoon (2002) enlisted the value of concerted efforts at the initial planning and building of research capacity which culminated in the establishment of cyber universities. The inter-relationships and communication between managers, and the manner of exercising authority as a practice of organizational characteristics was used in a question to our interviewees. In response to a question on divulging percentages of authority and control over the budget of his division to his boss, one Korean interviewee paused for a while before saying, "*Ha I will lose my authority and that is unimaginable*". It is obvious from his response that the protection of his authority was imperative for the

exercise of command and control in his department, and reducing it will reduce his authority.

A Korean interviewee explained how high human resource performances are maintained. He explained a complex performance evaluation system that trickles from CEO to managers and down to staff. The superior agrees with subordinate to set target, with final evaluations used in career growth. The role of leadership was also commented by another respondent but quoted in the section for external factors. In addition, an interviewee from South Korea said, *“the IT capabilities of the implementing agency staff is crucial as they are assigned to do research on other countries in the frontiers ...”*.

These discussions highlight the indispensable need for effectively refreshed leadership and staff and the need for mechanisms and incentives for optimal productivity. This study proposes an evaluation system that ties career growth to performance assessment.

3.5.3.2. External Factors (Funding and Interagency Coordination)

Recall that we grouped funding as an external factor, in conjunction with interagency collaborations/coordination. While commenting on budgetary provisioning, a Korean interviewee said, *“...budgeting is done from a fixed national pool, where organizations without new innovative proposals lose portions of their allocation of the previous year to those with innovative ideas. This is done after a thoroughly objective assessment and evaluation of the previous year’s performance”*. Also the

Presidential Committee member recalled the synergy between the Council and the Budget Office, which ensures that budgets approved by this body are expressly provided for. The above statements indicate the extent of competitiveness embedded in implementing policies, and mechanisms for smooth provisioning of funding for IT policy implementation. It also shows the importance attached to policy evaluation and how analysis of previous performance affects the planning for the next phase. Furthermore, an important point to note is the special arrangement for funding the policy implementation.

On interagency collaborations/coordination, issues of allegiance and turf-fighting are to be avoided (The Ministerial Committee on ICT Harmonization, 2012; Amaefule, 2012). The literature has utilized the use of task forces or ad hoc organizations for solving such issues (Altier, 1987; Crosby, 1996). Overlapping functions of organizations and associated wastages and implementation gaps necessitated the committee that led to the recommendations for mergers in the Nigerian public service (Gbengasesan, 2011). Even in a Presidential Committee regime, the presidential council member from South Korea identified interoperability as the most daunting of challenges. He said, “... *ensuring interoperability in terms of real-time data sharing was most challenging*”.

On issues of political impact and ecosystem, political interference was identified to inhibit government bureaucracy from effective implementation of policies in Nigeria (Ugwuanyi & Chukwuemaka, 2013).

In discussing the political and environmental impact, a Nigerian interviewee sums it up this way “... *most of the time political factors have huge and serious influences on development and implementation of national policies, programs or strategies. ... Therefore the success of any project mostly depends on the political climate within the country and even the organization. However the leadership plays a significant role in the realization of a project since effective and efficient management with human and financial resources, team-building, coordination, conflict management and forecasting the potential threats on the way of implementation are all about good leadership. The "destiny" of any project mainly depends on these 2 factors to be taken into account.*”

Arising from the discussion and brief summaries above, it is clear that special funding mechanism is needed. Further, the ecosystem and coordination of interoperability require definitive executive support (Australian Government, 2006); which could be implemented by establishing an organ that has close ties with the highest authority.

3.5.3.4 Implementation Format/Strategy

Recall that the implementation model could be either centralized or decentralized, and the Nigerian NITP operates the centralized, and Korea's FANI, the decentralized (Adamali et al, 2006). In the centralized, the implementing agency undertakes the activity of implementing the policy – decipher rationale, arrange for funding, plan and execute the projects, and possibly conduct reviews and evaluations

In a decentralized implementation, however, each agency has its own plan but needs a master plan to make it work (Australian Government, 2006), a strategy that was effectively used in FANI (Act-FANI, 2010). This comes with communication and coordination issues that require a formidable lead organization. (Australian Government, 2006). This implies that thorough assessment of the context and project characteristics is needed to decide which strategy to adopt.

3.5.3.5 Operational Issues

Operational issues tend to be closely related to implementing agency characteristics, but this study decided to differentiate the two because of some specific functions. Firstly, an issue of interest is the translation of policy statements to bureaucratic directives (Anderson & Hussey, 2006; Weaver, 2010). Secondly, a systematic and structured implementation planning can avert risks; ascertain timeframes, phasing of implementation, roles and responsibilities assignment, and resourcing (Australian Government, 2006). Thirdly, monitoring, reevaluation and contingency approaches could also benefit from effective planning. Team formation at the individual level and identification of sympathetic organizations that partake in policy implementation is crucial (Elson, 2006). In general, operational factors affect policy implementation in various ways and must be adequately provided for in policy implementation.

3.5.4 The FIPIS Proposal

In this section, the FIPIS framework is defined, making references to the analysis (Section 3.5.3) and the state-of-the-Art sections. The subsections corresponding to the four pillars offer explanations and justification of the FIPIS framework

Drawing from the literature on theories of technological and organizational issues and strategies for implementation, responses from the interviews, and personal experiences, this study inductively collated the occurrences of these key factors in the literature to categories that represent the pillars of the FIPIS framework. Benefiting heavily from the design and structural principles of UNCTAD’s National IT Policy Review (NITPR) framework (UNCTAD, 2013), the FIPIS framework was developed. Table 3.4 and Figure 3.6 offer elaborate explanations of the framework.

Table 3.4 The FIPIS Framework

Framework for IT Policy Implementation Structures			Requires transparency and commitment on each of the subcomponents, with executive support (Australia Government, 2006).
Implementation Strategy (Centralized and Decentralized)			
Implementing Organization Characteristics	External Factors	Implementation Operations	
<ul style="list-style-type: none"> ● Leadership ● Organizational culture and flow of control ● Human capacity and incentive 	<ul style="list-style-type: none"> ● Coordination of collaborations & supervisory ● administrative, political ecosystem 	<ul style="list-style-type: none"> ● Statements translation ● Team formation ● Implementation plan 	

system	● Funding		
Improved IT policy implementation			

Table 3.4 depicts the four pillars represented in the second row and three columns under it. The implementation format indicates how decentralized or otherwise the policy implementation is. The other three pillars indicate the interaction between the human content of organizational characteristics, external influences and specificity in implementation mechanisms.

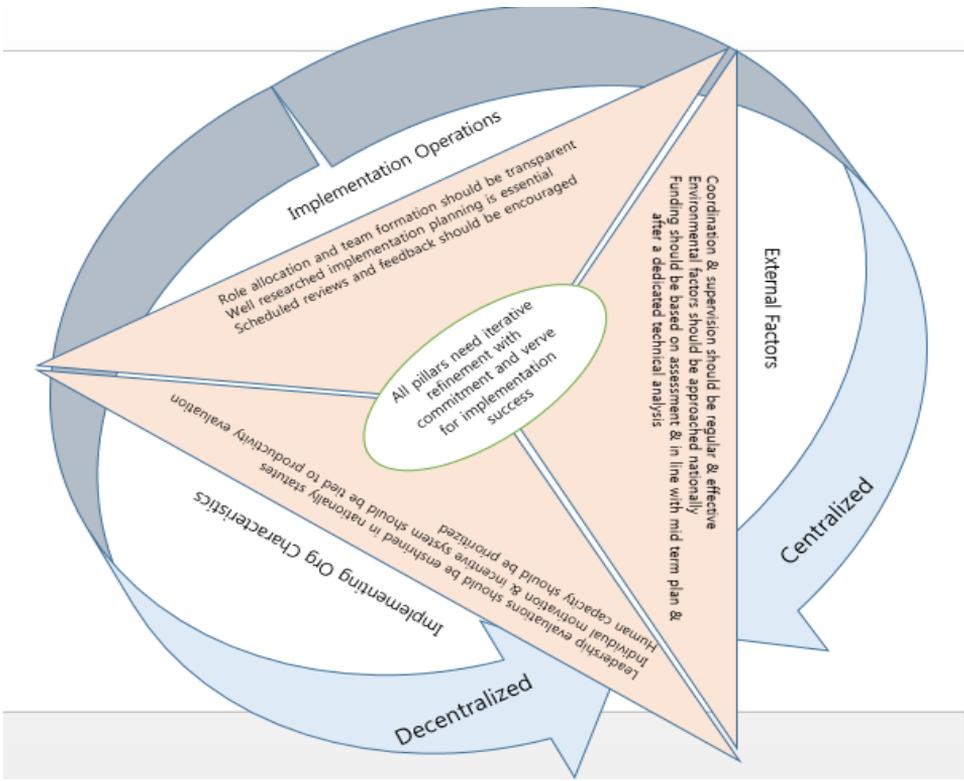


Figure 3.6 Pictorial view of the FIPIS Framework

Figure 3.6 indicates guidelines under which an effective implementation of the FIPIS framework could lead to effectiveness of national IT policy

implementations.

3.5.4.1 Implementation Strategy

The implementation strategy is a crucial component of the policy implementation process. Recall the successful use of decentralized implementation of an EU policy with intensity commensurate to local circumstances by Sweden in section 3.4.1 (Münch, 2013; EU, 2012). Following the discussion in the relevant section of the analysis section, our proposition is that the choice of implementation strategy should critically consider the project requirements in the context of wider geographic, technology, funding and human capacity needs.

3.5.4.2 Implementing Organization Characteristics.

The role of leadership (Matavire et al., 2010), human capital ((Yoon, 2002; Lee, 2012)), organizational culture (Roche & Blaine, 1996) are crucial to achieving corporate objectives. The interviews (refer to section 3.5.3) reveal that the leader's capabilities are critical to success.

Again recall from section 3.4 the value and effort required to maintain and improve the performance of the human resources of a nation. Korea realized the importance of human capital by investing heavily in human capital (Yoon, 2002; Lee, 2012, IDN, 2012). In view of this, human capacity must be given more than a passing attention; particularly, considering the dynamics of the IT industry and its knowledge requirements.

Therefore, this study proposes that the leadership of organizations be subject to critical performance assessment that is coordinated nationally, leading to rewards and sanctions. For a holistic value creation nationally, this should trickle down to all staff and their performance evaluation and incentive system be attached to career progression, and based on agreed objectives.

3.5.4.3 External Factors.

The external factors were grouped into coordination of interagency implementation, funding, and the effect of socio-political, economic and environmental issues. Interagency collaboration requires a master plan and formidable agency to produce good results (Australia Government, 2006). The use of ad-hoc committees was also noted in literature (Altier, 1987; Crosby, 1996). In Korea, the Presidential Council was used in the implementation of FANI (Act-FANI, 2010). In Nigeria, suggestions were made and committees set up to address fragmentation and interoperability issues (Amaefule, 2012). All the policies studied had supervisory bodies to perform oversight functions (NITDA, 2001; Act-FANI, 2010; Act-NITIPA, 2009). On the issue of management of funding mechanisms, Korea is known for its application of performance-based budgeting and indexes in the evaluation of its ministries/agencies (OECD, 2007), ranging from self-evaluations to Acts of Parliament that legislates on organizations' budgetary systems (Act-EDA, 2013).

Wider administrative, social and political circumstances of the

nation impinge on policy success (Orlikowski, 1992; Waiver, 2010; Ugwuanyi and Chukwuemaka, 2013) and international developments (Larson & Park, 2014).

In view of the above circumstances, input from the interviews and solutions applied by nations, this study proposes the utilization of a powerful mediating committee on a project-by-project basis. A committee with powers to instill discipline on all participating organizations, to whom they derive some responsibility; and one that is acting on strict rules with national objectives as main foci (Altier, 1987).

In addition to that, oversight should include regular and predefined reporting procedures and on-site physical confirmation of reports (Act-FANI, 2010). Furthermore, funding mechanisms should articulate procedures specifically instituted for IT policy implementation; and not follow the general budget initiation and execution process. And a performance-based budgetary system should be considered for monitoring effectiveness and feedback.

3.5.4.4 Implementation Operations

From the results, this study is in support of the proposition that implementation planning is crucial to success in policy outcomes (Australia Government, 2006). Effective planning will exhume hidden issues and ensure phased implementation and contingency arrangements for risk aversion, reveal resource requirements, enhance ability to preempt other challenges, and articulate lessons learned from previous

experiences for the current activity (Bhuyan et al., 2010; Australia Government, 2006). The policies of Korea were overtly critical of implementation planning (Act-FANI, 2010). Secondly, issues of team formation should be given attention. Requisite skill requirements should be made and teams built on competence and transparency. Thirdly, regular and effective reviews and monitoring (Australia Government, 2006) should be encouraged so as to feed future learning, and provide contingency platforms for risk aversion and mitigation.

3.6 Empirical Analysis

There is a difficulty of using empirical studies to describe as well as predict the outcomes of informatization of societies. This lack of an integrated theory which could be tested and that is purely based on empirical data that is not subjective is acknowledged (Taylor & Zhang, 2007). In implementation studies, case studies have been more prevalent, with difficulty arising from different evaluation criteria and assessment perspectives (Weiner et al., 2009; Bhuyan & Sharma, 2010).

Section 3.3 discussed some critical factors that swing policy implementation such as implementation planning, translation of policy statements to programs and projects, team formation, leadership, organizational culture, human capacity, multiagency coordination, funding, and ecosystem. These constructs were applied in further analysis to formulate the FIPIS framework. In order to contribute to theorizing IT policy effectiveness, the main objective of this empirical analysis is to

validate the relationships between these indicators/constructs and national IT policy implementation effectiveness across nations. The empirical analysis aims to stratify the constructs according to its descriptive and explanatory power on national IT policy implementation effectiveness.

A quantitative survey was used to gather data from the perspective of IT professionals who have partaken in the IT policy or project implementations in the last 3 years. One hundred and fifty five IT professionals, categorized by the role of their organization as either implementing, supervising or collaborating, from government, private and non-governmental organizations (NGOs) from 12 countries participated. This international scope was adopted to overcome the challenge of generalizability that is prevalent in the literature, particularly for case studies. Structural Equation Modeling (SEM) was used in the analysis..

In order to achieve the objective, the following research question was used: Which indicators or variables have the most important explanatory power for national IT policy implementation effectiveness? Further, the following methodological steps were followed:

- a) hypotheses formulation from the research question (Section 3.6.1);
- b) data collection procedure and preparation (section 3.6.2);
- c) the SEM analysis in Section 3.6.3 with subsections for model specification and modification and corresponding general and SEM equations;

- d) the results of the analysis in Section 3.6.4, and
- e) the section conclusion in Section 3.6.5.

3.6.1 Research Questions and Hypotheses

This section discusses the research question and hypotheses formulated for the empirical study. The research question is: Which indicators have the most important explanatory power for national IT policy implementation effectiveness?

The FIPIS framework elucidated strategies for overcoming the national IT policy implementation challenges. The indicators identified as crucially impacting national IT policy effectiveness (PEffec) were: leadership (ldr), human resources (hr), culture (cul), implementation planning (iplan), translation of policy objectives to programs (tra), team formation (tf), socio-economic and political ecosystem (ecos), funding (fnd) and collaborations (cord). PEffec is a latent variable (meaning it cannot be observed) and is indicated by the above indicators. In order to implement this model, 9 hypotheses (H1 – H9 for effects on PEffec) were proposed. The SEM model is as shown in Figure 3.7.

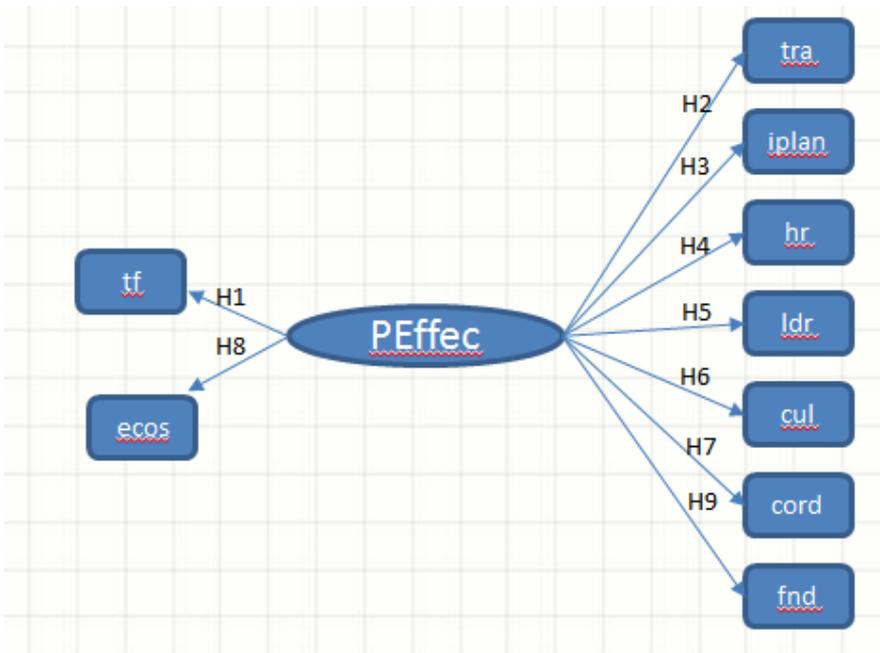


Figure 3.7 Model showing relationships between indicators and national IT policy implementation effectiveness

These hypotheses are:

- H1: Team Formation (TF) positively affects effectiveness of national IT Policy Implementation (PEffec). Depicted by link between TF and PEffec in Figure 3.7.
- H2: Translation of policy statements to projects and programmes (TRA) positively affects effectiveness of national IT Policy Implementation (PEffec). Depicted by link between TRA and PEffec in Figure 3.7.
- H3: Implementation Planning (IPLAN) positively affects effectiveness of national IT Policy Implementation (PEffec). Depicted by link between IPLAN and PEffec in Figure 3.7.
- H4: Human Resources (HR) positively affects effectiveness of

national IT Policy Implementation (PEffec). Depicted by link between HR and PEffec in Figure 3.7.

- H5: Leadership (LDR) positively affects effectiveness of national IT Policy Implementation (PEffec). Depicted by link between LDR and PEffec in Figure 3.7.
- H6: Organization Culture (CUL) positively affects effectiveness of national IT Policy Implementation (PEffec). Depicted by link between CUL and PEffec in Figure 3.7.
- H7: Effective coordination (CORD) positively affects effectiveness of national IT Policy Implementation (PEffec). Depicted by link between CORD and PEffec in Figure 3.7.
- H8: Administrative, political and economic ecosystem (ECOS) positively affects effectiveness of national IT Policy Implementation (PEffec). Depicted by link between ECOS and PEffec in Figure 3.7.
- H9: Effective funding (FND) mechanisms positively affect effectiveness of national IT Policy Implementation (PEffec). Depicted by link between FND and PEffec in Figure 3.7.

3.6.2 Data Collection and Descriptive Statistics

This section describes the data collection, descriptive statistics and sample size justification. The survey was designed to analyze widely disparate IT policy implementation practices, regardless of the economic, political and IT deployment status of the country. This strategy was supportive of the

cardinal objective of the study's target of generalizations of the results. The only major restriction was that respondents should be IT professionals who have partaken in the IT policy or project implementation recently; and that could be either as a representative of a collaborating, supervising or implementing organization in a governmental, private or non-governmental sector.

The unit of analysis was the policy level which meant the collection of less personal descriptive data. However, the respondent's rank, organization and country were collected. The education level of respondents was not collected because the rank serves as a surrogate for education level. Respondents were allowed to select a policy or project of choice, state its objectives, operational and geographical disparity of the implementation exercise together with a success/failure valuation. The valuation was an ordinal 0 for very successful, 1 for reasonably successful and 2 for unsuccessful. Because of the difficulty at establishing a precise success value for policy/projects, a superficial view of success was enough for the analysis.

The survey instrument was designed for online data collection. Data collection was particularly difficult probably because of the sensitivity attached to implementation data. Because the responses were few, offline paper printed questionnaires were used to augment the responses from the online survey. Although using the offline strategy gave the research additional work of transcription and personally visiting IT

conferences for responses, the exercise was worthwhile. Further, a translation in Korean was included alongside the original English version to reduce ambiguity and facilitate responses. In the end, we had a total of 155 valid responses from 12 countries. A copy of the survey questionnaire is attached as Appendix A. Table 3.5 shows the measurement ranges, explanations and abbreviations of the indicators. The variables collaborating, implementing and supervising (not included in the table) were ordinal control variables.

Table 3.5 Indicators, abbreviations and measurement scale of data

Construct/variable/indicator	Abbreviation of Variable	Measurement range
Team formation	tf	Likert scale (1 -5)
Leadership	ldr	Likert scale (1 -5)
Culture	cul	Likert scale (1 -5)
Human resource	hr	Likert scale (1 -5)
Funding	fnd	Likert scale (1 -5)
Environmental Effects	ecos	Likert scale (1 -5)
Implementation planning	iplan	Likert scale (1 -5)
Coordination	cord	Likert scale (1 -5)
Translation of policy objectives	tra	Likert scale (1 -5)

The inter-variable correlations is analyzed. Table 3.6 lists the relationships between the variables.

Table 3.6 Correlation matrix of model variables

	iplan	tf	ecos	fnd	cord	hr	ldr
iplan	1						
tf	.40	1					
ecos	.18	.35	1				
fnd	.36	.39	.34	1			
cord	.14	.30	.49	.50	1		
hr	.41	.55	.37	.60	.47	1	
ldr	.44	.37	.34	.50	.46	.45	1

Table 3.6 shows the correlation matrix variables. From the table, it could be seen that the correlations are relatively low, meaning that the scores can

measure different aspects of the factor. If the correlations were high, it could have meant same content or similarity. Thus the discriminant validity is satisfactory (Mueller, 1996).

Table 3.7 gives the general descriptive statistics of the data. At a glance it could be seen that the standard deviation of responses was not too far away from the first standard deviation, which is good. The mean values are very close to the maximum, which shows that respondents were considerably consistent, and close to the maximum.

Table 3.7 Descriptive statistics of the sample

Variable	Observations	Mean	Standard deviation	Range
Iplan	155	3.574	1.038	1-5
Tra	155	3.426	0.789	1-5
Tf	155	3.729	1.002	2-5
Hr	155	3.980	0.893	2-5
Ldr	155	3.852	1.005	2-5
Cul	155	3.729	0.996	2-5
Fnd	155	3.826	1.152	1-5
Cord	155	3.684	0.917	2-5
Ecos	155	3.684	1.011	1-5
Role	155	0.994	0.716	0-2
Succ	155	0.819	0.649	0-2
Natnum	155	3.096	0.945	1-4

3.6.2.1 Sample Size Justification and Model Fit

There is a vibrant debate on sample size and model fit. The SEM utilized in this empirical study is a confirmatory test, implying that a model specified on theory, research or speculation (Suhr, 2014; Bollen & Bauldry, 2012) could be tested by fitting the collected data using some estimation method (STATA manual, 2012). Estimation methods chosen should be mindful of the sensitivity of some sample sizes, particularly

Chi2 likelihood function, X^2 .

Apart from estimation issues, sample size issues are contentious in the literature. Sample size restrictions depend on the model's intended purpose and complexity. Larger sample sizes have comparably more stable estimates (Kline, 2005). In all, some scholars agree that a sample size of between 5-20 times the number of parameters is reasonable (Suhr, 2014; Kline, 2005), or sample size stabilize from 100 and above (Liu et al., 2012). However, sample size has additional effects on models if the model fit statistic used is sensitive to sample size (Hoyle, 1995).

The model fit statistic is assessed to determine whether to accept or reject the null hypothesis. The Fit function F_{\min} which is the parameter estimates can be used to determine the discrepancy between sample covariance matrix and the covariance matrix implied by the model to determine sample fit. The ChiSquare statistic $(N-1)F_{\min}$ (where N is sample size) can be used to test the null hypothesis when the model is specified correctly (Lei & Wu, 2007). However, this statistic is sensitive to sample size (Lei & Wu, 2007; Hoyle, 1995; Kline, 2005; Mueller, 1996), and has strong assumptions and misleading consequences if power issues are ignored (Bollen & Long, 1993).

Root Mean Square Error Approximation (RMSEA), Comparative Fit Index (CFI) and Tucker & Lewis Index (TLI) do not place much penalty on restriction thus are used for general misspecification or over specification, while AIC and BIC are used for over specification (Liu, et

al, 2012). RMSEA measures the difference between sample data and the assumed correct model, thus the smaller the better. The CFI is not affected by model complexity, while TLI compares how effective model is against a null hypothesis thus higher values are better (Dion, 2008). Considering a behavioral experiment, $RMSEA < 0.08$, $CFI \geq 0.9$ and $TLI \geq 0.9$ are good fit (Liu et al., 2012). If the model fit statistics are acceptable, it is plausible for inference; otherwise, there is an opportunity to modify the model.

3.6.3 The SEM Analysis

This section discusses (a) the basic procedure of Structural Equation Modeling (SEM) and the reasons for its selection, (b) data preparation, (c) the model specification, general equations and (d) model testing and modification.

SEM is defined as “a comprehensive statistical approach to testing hypotheses about relations among observed and latent variables” (Hoyle, 1995). SEM is a statistical modeling approach that can be used for both experimental and nonexperimental data. It begins with the specification of a model based on theory, research, knowledge or even speculation apriori (Bollen & Bauldry, 2012; Suhr, 2006), and this model is tested for fit on the data, to confirm the theory or knowledge. It consists of a path analysis (structural) and measurement which are two distinct aspects, but could be used in the same model. The structural analysis stipulates directional causal relationship between variables, and it

is the basis for confirmation of theory. The measurement part consists of observed variables used to estimate the latent variables, which are conceptualizations of the model. The observed variables are sometimes called indicators or manifest, and measure the underlying factor and an error term representing all other unique sources of causation, Confirmatory factor analysis (CFA) is a measurement model that minimizes measurement error by spreading the factor among various indicators, and assume the factors covary, meaning the relationships are unanalyzed (Kline, 2005). A combination of the CFA and the path model form the SEM framework. (Salaswright, 2012).

A model must be identified for it to converge to a plausible solution for statistical inferencing. For a model to be identified, the number of free parameters must be less than or equal to the number of observations, and latent variables. Latent variables have an arbitrary scale and thus must be scaled for the model to be identified. The scaling of the latent variable can be fixed to one of the indicator's parameters which would then not be estimated. If the indicator is also a latent variable, its anchor variable is constrained accordingly. The number of free parameters is calculated by adding all variances and covariances of exogenous variables together with direct effects of factors. The number of observations is $(v(v+1))/2$, where v is the number of observed variables (Kline, 2005).

Maximum likelihood is one of the methods used for estimation. It

assumes normal distribution of the observed variables. Iterative estimations are diminished (minimized) with fit function at each iteration from the observed covariance matrix against the model implied covariance matrix until it is minimal enough that further minimization could not be done, and that the model is said to have converged (Hoyle, 1995). It is sometimes called full information method because it estimates all variables simultaneously. It is the motor of SEM, implying it is the most reliably used form of estimation, even though multiple regressions are used for just identified recursive models, it offers better statistical reporting (Kline, 2005).

This study chose the Structural Equation modeling (SEM) for a number of reasons. It has the capacity to perform regressions and multiple regressions, but with less stringent assumptions and conditions. When a SEM model contains measurement and structural components, the results can be devoid of measurement errors, and as such can be used to evaluate relations among variables (Hoyle, 1995). The nature of the data with imminent measurement errors likely to arise from measuring blurred societal factors like impact of ecosystem and leadership, a statistical method that can eliminate or reduce the error to an acceptable minimum is required. Furthermore, SEM is capable of generating testable hypotheses regarding impacts and interactions of the information sector (with economic, social, cultural and governmental factors) leading to a descriptive as well as predictive theory to explain the informatization of

societies. (Taylor & Zhang, 2007).

Another reason is SEM is capable of handling real life concepts, named (unobserved) variables such as the core of this research; the effectiveness of IT policy implementation. Further advantages over Ordinary Least Squares (OLS) regression include the ability to: analyze data simultaneously, analyze time series data, test non-normal data, model mediating variables rather than additive models, model error terms, multi-collinearity resolution, and has more flexible assumptions and could test models with large number of equations as a whole and obtain global fit measures (Suhr, 2006; Albright & Marinova, 2010). The discussion in the above paragraphs are justifications for selecting Structural Equation Modeling (SEM).

3.6.3.1 Data Preparation

A preliminary assessment of the data was conducted to eliminate possible errors arising from erroneous entries that could produce misleading conclusions. To achieve this, an additional column was created at the end of the data to test the standard deviation of the entries. This was done in Microsoft Excel in order to determine whether respondents willfully or erroneously entered same number, such as 2 or 3 in response to all questions. If the standard deviation is close to one, we double check such entries and make a judgment on whether it is an acceptable entry or otherwise.

Two major quality attributes of sample data are reliability and

validity. The reliability measures the degree to which a score is free of measurement error (random error). Cronbach alpha is a statistic commonly used for consistency within which responses measure items of a single construct (Kline, 2005). Thus, before proceeding to use the data statistically, the internal reliability and consistency of variables using the Cronbach alpha was conducted and found to be acceptable at 0.82. Cronbach alpha calculates the reliability by conducting a correlation between variables, and an acceptable value is 0.75 (Salaswright, 2012).

Validity confirms if the data really measures the construct it is supposed to measure. A construct's validity could be content, criterion, convergent or discriminant, which represents how these attributes are measured by the data. Although Kline (2005) opines that expert opinion is the basis for determining the representativeness of an item on its variable, Salaswright (2012) used 0.45 as not being representative in his analysis. Considering the above, confirmatory factor loadings were sought to confirm if the variables load well enough on the latent variable. This exercise led to the elimination of two variables, culture (CUL) and translation of policy statements (TRA) which loaded below 0.45. The rest of the variables loaded well so were used in the models in Figures 3.8 and 3.9.

3.6.3.2 Model Specification

There is a plethora of literature on the effect of various factors on policy outcomes. Many variables have been identified either as critical success

factors or inhibitors that must be considered for successful implementation of a policy or project. Table 3.1 listed the variables utilized for this study, some of which had been validated. Particularly, Pinto & Prescott (1988) validated ten constructs using empirical analysis. This model validates the relationships between the indicators and national IT policy implementation effectiveness across nations based on the FIPIS framework. The national IT policy implementation effectiveness construct (PEffec) is latent, which means it cannot be observed, but can be estimated from indicator variables.

The model is a partially recursive model. This implies that the causality depicted by the model among variables is unidirectional. For instance the directed line from PEffec to tf cannot be considered the opposite direction. Partially recursive model with a bow-free pattern classification include disturbances that are correlated (Kline, 2005). This assumption is needed for the analysis in order to reduce complexity.

The model consists of the FIPIS indicators: leadership (ldr); human resource (hr); implementation planning (iplan); funding (fnd); economic and socio-political effects (ecos); team formation (tf) and coordination in collaborative policy implementation (cord). Finally, the construct, effectiveness of national IT policy implementations (PEffec) was conceptualized as a latent construct because it is conceptual and cannot be directly measured. Figure 3.7 depicts the model specification in SEM notation.

In path analysis notation, constructs in an oval shape are latent variables while those in a rectangular shape are observed variables. Arrows indicate causality. Endogenous variables (identified within the system and dependent) are those that have arrows pointing to them, and could be latent or observed; while exogenous variables (external and independent) have arrows emanating from them, pointing to others. From Figure 3.7, it could be seen that PEffec is exogenous and latent while the others are observed endogenous variables. In SEM, latent variables start with an upper case letter while ordinary variables begin with a lowercase letter.

Equations 1 through 7 show the model as an equivalent of ordinary regression analysis. Notice that each of the paths represents an equation in the general model.

$$\text{iplan}_1 = \alpha_1 + \text{PEffec} * \beta_1 + e_1 \quad (1)$$

$$\text{tf}_2 = \alpha_2 + \text{PEffec} * \beta_2 + e_2 \quad (2)$$

$$\text{cord}_3 = \alpha_3 + \text{PEffec} * \beta_3 + e_3 \quad (3)$$

$$\text{fnd}_4 = \alpha_4 + \text{PEffec} * \beta_4 + e_4 \quad (4)$$

$$\text{hr}_5 = \alpha_5 + \text{PEffec} * \beta_5 + e_5 \quad (5)$$

$$\text{ldr}_6 = \alpha_6 + \text{PEffec} * \beta_6 + e_6 \quad (6)$$

$$\text{ecos}_7 = \alpha_7 + \text{PEffec} * \beta_7 + e_7 \quad (7)$$

where PEffec represents the national IT policy effectiveness, and the α_1 represent the individual intercepts of the equations, and β_1 represent the coefficients and an individual error term, e_i and i ranging from 1 to the

maximum number of equations. This is the representation of an ordinary regression model of each of the paths in the SEM model.

3.6.3.3 Model Testing and Modification

The model was fitted and the results of the goodness of fit statistic are as shown in Table 3.8. Recall that a model is considered a good fit to the data if RMSEA $<.08$, CFI $\geq .9$ and TLI $\geq .9$ (Liu et al., 2012). The fit statistic of the original model was not very good as we could see that RMSEA was greater than 0.08, and CFI less than 0.9 as shown in the second column of Table 3.8. Using the modification index from the appropriate command, the model was refitted with paths included to indicate a covariance between cord and iplan (and cord and ecos), with a substantive gain in reduction of chi2 resulting in a better model fit as expressed in the third column of the table. The modification Index (MI) for cord and iplan was 13, and that of cord and ecos was 11; giving a cumulative projected reduction in Chi2 of 24. However, the gain was slightly less, at 22, which was similar to that reported by Lei & Wu (2007). Effectively, the modified model can be used in statistical analysis.

Table 3.8 Intermediate model fit statistic using modification index

Description	Original Model	Modified Model
RMSEA	.122	.081
CD	.846	.851
CFI	.904	.964
TFI	.855	.936

Chi2	46.406	24.244
------	--------	--------

Misspecifications were handled by use of the modification index. Modification allows for the release of fixed or constrained parameters or the constraining of free parameters to enable the model overcome specification problems (Joreskog, 1993). However, model modification must be based on appropriate substantive theory (Bentler & Chou, 2005).

Error handling can be done in 3 ways: a) create separate factors to explicitly model invalid components; b) use second order factor analysis to implicitly model invalid components; or c) use a correlated errors model (Cote & Greenberg, 1990). This study utilized the third option of correlated error model. This was done by the constraining of errors by means of the modification index. In fact, the correlated errors were constrained for cord and iplan, and cord and ecos. This enabled the identification of the model, and a matching of the covariance matrix, for a better fit.

3.6.4 Results

This section discusses the results of the analysis. A brief discussion of model features is followed by that of the results and ends in concluding remarks.

3.6.4.1 Results of the Model

The results show that all the constructs hypothesized had positive and significant effects on the latent variable, Effectiveness of National IT

Policy Implementation. Table 3.9 shows the loadings and construct descriptions of the model while Figure 3.8 depict the SEM notation with results.

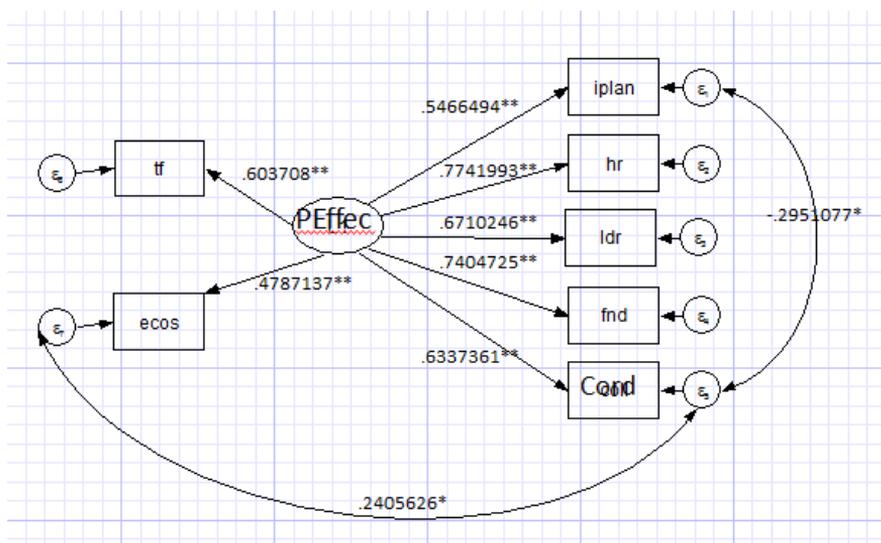


Figure 3.8 Relationship and results of Model

From Figure 3.8, the model was built on the effects of human resources, implementation planning, funding, collaboration, economic and socio-political impact, team formation and leadership from literature (Table 3.1).

Table 3.9 Results of the Analysis

S/N	Variable	Description	Strength
		Measurement	
1	cord	Coordination management	.6337361**
2	ldr	Leadership	.6710246**
3	Hr	Human resources	.7741993**
4	fnd	Funding	.7404725**
5	Iplan	Implementation planning	.5466494**
6	Ecos	Ecosystem	.4787137**
7	tf	Team Formation	.603708**
		Variances	
	Cord		.60
	Ldr		.55
	Hr		.40
	Fnd		.45
	Iplan		.70

	ecos		.77
	tf		.64
		Covariances	
		Iplan*cord	-.2951077*
		Cord*ecos	.2405626*

** implies results are significant at the .001 level

* implies results are significant at the .05 level

Hypothesis (H1) which analyzed the impact of team formation on national policy implementation effectiveness was positive and supported with a coefficient of .603708 at significance level of $p < .001$. Hypothesis (H3) which analyzed the impact of implementation planning on national IT policy implementation effectiveness (PEffec) was positive and supported with a coefficient of .5466494. Hypothesis (H4), which analyzed the effect of human resources on IT policy effectiveness (PEffec), was positive with a coefficient of .7741993. In a likewise manner, hypotheses (H5, H7, H8 and H9) were found to have positive significant effects on national IT policy effectiveness (PEffec). H5 analyzed the impact of leadership. In this, however, we looked at the basic meaning of leadership, not subjecting domain-specific details. H7 was on the effect of coordination of collaborative implementation which was also positive at .6337361, H8, the effect of economic and socio-political was positive at .4787137. And finally, H9 was on funding mechanisms, with positive effect of .7404725. In essence all the hypotheses of the analysis were positively supported, except hypotheses H2 and H6 which were exempted because of loadings below the required number.

The residual variances of .60, .55, .40 (to discuss only the first 3 from the Table 3.9, which applies to the other variables) of cord, ldr and hr

respectively represent the unexplained part of the variance by the respective variables (Lei & Wu, 2007). In same vein, the latent variable PEffec accounts for (1 – unexplained part of the error variance) of .40, .45 and .60 of the cord, ldr and hr variables respectively (Schreiber et al., 2006). According to Kline (2005), the error term of the measurement variable represents the confounding causes outside the model and the coefficient of the predicted factor.

The results also show the covariances of iplan and cord, and cord and ecos as -.29 and .24 respectively. The negative covariance implies that the signs of the two random variables are opposite. This could be:

$Cov[X,Y]>0 \implies X \text{ and } Y \text{ tend to have same sign}$

$Cov[X,Y]<0 \implies X \text{ and } Y \text{ tend to have opposite sign}$

The results imply that by increasing, for instance, leadership by one standard deviation, national IT policy implementation effectiveness can increase by .67 standard deviations. In conclusion, this analysis shows that human resources have the greatest explanatory power for national IT policy effectiveness and should be given greater attention in implementation planning and design. This is in contrast with the findings of Pinto & Prescott (1988), which found the effect of human resources as being significant, but lower than expected. A plausible explanation of this finding is the value and significance attached to the human factor in IT related technology developments, implementations and service delivery. Secondly, funding was found to be next in significance, and leadership

was placed third in that order.

3.6.5 Summary of Empirical Analysis

The empirical analysis was motivated by the difficulty of theorizing the impact of informatization of societies (Taylor & Zhang, 2007; Delone & McLean, 1992) and the evaluation of outcomes of implementation of technology (Weiner et al., 2009). Issues, challenges and critical success factors of policy implementation reported in the literature were systematically collated and categorized to formulate the FIPIS framework. These variables were validated to determine the explanatory power of each of them on national IT policy effectiveness in this empirical analysis. Using structural equation modeling (SEM), the magnitude and direction of the latent construct, national IT Policy Implementation Effectiveness (PEffec) from the indicative variables was estimated from the observations.

In section 3.6.1, the relationships between the variables (indicators: implementation planning, translation of policy statements, human resources, leadership, economic and socio-political ecosystem, funding, coordination of multiagency policy implementation, culture and team formation) and national IT policy implementation effectiveness concept were hypothesized. The constructs: culture and translation of policy statements, were eliminated from the analysis because they did not load enough on the factor. The results show that all the hypotheses were

positive and significant ($p < 0.001$) as shown in Table 3.9. Human resources had the greatest positive impact (or explanatory power) on national IT policy implementations, followed by funding mechanisms and effective leadership with 0.77, 0.74 and 0.67 respectively. The results have added to theorizing the informatization of societies by providing a plausible explanation of IT policy implementation as impacted by structural issues of the implementing agency, collaborative implementation and implementation operations.

In extant literature, Pinto & Prescott (1988) had concluded from their validation of factors impacting policy implementation that human resources (personnel as they called it), though positive, was not up to the magnitude they expected. In this study however, the magnitude of the human resources variable was not only significant, but also the most important and offered the most explanatory power for national IT policy implementation effectiveness. This could be explained as the value the human resources have to play in contemporary society and economy in knowledge based economies. Secondly, the critical impact of human resources in the ever changing IT industry is another plausible explanation of substantive value of human resources in the analysis.

3.7 Discussion and Conclusion

Despite the availability of countless research findings, theories and policy institutes, most outcomes of policy implementations are saddled in evaluators and benefactors' dissatisfaction. Information technology

policies implementations are not common. Implementation has been particularly difficult in policy discourse because implementers (usually different from formulators) have to decipher rationale from policy statements that are abstract and could be intentionally ambiguous. They also have to contend with issues of manpower, funding, organizing, make judgments and requisite changes in response to practicalities that were not hitherto envisaged or adequately catered for. The possibility of implementers' personal motivations having a toll on alternatives proffered and chosen has led to the debate on who impacts more on outcomes between policy makers and implementers (Olive, 2013; deLeon & deLeon, 2002; Mazmanian & Sabatier, 1983).

This study drew its conceptual framework from The Theory of Structuration, Policy Implementation Framework, Concepts of Organizational Behavior, and other frameworks and methodological applications. Structural issues are divided basically into organizational control and operational systems (*McLaughlin, 2013; Stralser, 2004; Griffin & Moorhead, 2010*), and the establishment of functional units for the execution of specialized functions that traditional agencies could not effectively handle (*Hult & Walcott, 1990; Altier, 1987*). This study utilized both standpoints as expressed in the two research questions. It further used inductive analysis to categorize inferences to formulate the framework for the IT policy Implementation Structure (FIPIS). The FIPIS is the result of comprehensive research on global IT policy

implementation practice, narrowed down to the named policies of Nigeria and South Korea for specificity, yet abstract enough for insightful contributions that are generalizable. The FIPIS promises to provide profound strategies to help nations overcome the challenges of IT policy implementations.

In summary, the four components of the FIPIS (implementation strategy, implementing organization characteristics, external factors and implementing operations) are discussed below. Firstly, the implementation model has to be thoroughly examined and chosen from either the centralized or decentralized (World Bank, 2006) model, and the choice should be driven by the nature of the policy goals, project specifications and technicalities, and actors. The decentralized format promises good results because of internal knowledge that provides for peculiarities to local circumstances (Spratt, 2009; EU, 2002). Secondly, the administrative and structural characteristics of the implementing agency are crucial to success. The human capacity should be given a commensurate attention vis-a-vis the leadership (Business Intelligence Unit, 2010; Hulp & Payan, 2008) function of the agency. We infer that issues of motivation, incentives and evaluations (McLaughlin, 1987) are indispensable ingredients to productivity. An ineffective evaluation system could breed laxity and tepidity in performance and as such impact IT policy outcomes. In this regard, a well-crafted hierarchical evaluation and incentive system from individuals to groups to departments and units

to heads and chief executives is recommended. Act-EDA, (2013) is a Korean legislation that supports evaluations systems for research organizations. Thirdly, external factors should be given adequate attention. Where interagency collaboration is needed in implementing policy projects, a mediating organ with highest administrative powers is proposed (Van de Walle, 1994; Altier, 1987). In such circumstances, presidential level powers with the will for the project should be sought to avoid hindrances and victimization. A word of caution is that the administrative and cultural contextual circumstances should be given adequate attention. A presidential council with a clear mandate and in constant meetings with the President was used in the implementation of the FANI (Act-FANI, 2010). Fourthly, implementation operations that cut across team formation and policy interpretation and implementation planning should be handled transparently, without prejudice or favoritism (Anderson & Hussey, 2006; Business Intelligence Unit, 2010).

To contribute to the theoretical understanding of policy implementation effectiveness, an empirical analysis and validation of the FIPIS was conducted with very useful results. With generalizability in mind, a survey of IT professionals from 13 countries was conducted. The results show that human resources had the most plausible explanatory power for national IT policy implementation effectiveness. This was followed by effective funding mechanisms and leadership. The implication of this is that nations should pay adequate attention to these

variables when considering the implementation of their policies.

The study has not been without challenges. Our experience revealed that most of the literature reviewed and even government publications have, somehow, kept a 'closed lid' on the details of implementation. In essence, it was extremely difficult to gather data for analysis. This is probably the reason for the unavailability of quantitative research in this area, so we recommend that researchers should seek collaboration with agencies whose activities they intend to research on so as to create a sense of belonging, and reduce mutual suspicion.

For further studies, the framework needs to be tested in countries under various socio-economic settings. Particularly, the frameworks strong emphasis on paying adequate attention to human capacity and leadership needs to form the basis of application. External coordination in the context of interagency collaborations can be applied and outcomes monitored in different country contexts over time to ascertain the effectiveness. However, the context under which coordination is most effective needs to be studied to help national IT strategy implementations.

Chapter 4 Public Sector IT Governance: A Framework for Potential Adopters

4.1 Introduction

Information technology governance (ITG) is a well-researched concept founded in theories, and its implementation in practice is aided by international frameworks and standards. There are several definitions of ITG because organizational and operational contexts affect governance (ISACA, 2009). Noting these variability's scholars define ITG from the perspective of performance and risk management (Brisebois et al., 2015⁵), governance structure of dispersion of authority (Schwarz & Hirschheim, 2003), a variation of the structural dispersion perspectives above that notes other activities within and beyond the structures of centralized, decentralized or hybrid decision making (Sambamurthy & Zmud, 2000), as well as a set of controls, processes and organizational activities that ensure technology sustains business at an effective cost (AT Kearney, 2008). The definition that this study adopts is the one given by the Information Technology Governance Institute (ITGI) in 2003, which states that ITG is "... the responsibility of the board of directors and executive management, where it is an integral part of enterprise governance and consists of the leadership and organizational structures and processes that ensure the organization's IT sustains and extends the organization's strategy and objectives." (ITGI, 2003).

⁵ This is a web resource without date so access date is used.

The ITGI definition highlights corporate governance, leadership and organizational structures and processes, and the use of IT for realizing organizational objectives. The corporate governance component implies that IT governance is an integral part of the governance structure of the enterprise (ITGI, 2003). Summarizing, this and most definitions revolve around three key elements: structures, processes, and alignments (De Haes & Van Grembergen, 2009; Van Grembergen & De Haes, 2005, Amali et al., 2014). The structures represent mechanisms on how decision making entities could effectively coordinate strategic directions in IT investments in an organization. The processes comprise the refining of project selection and initiation procedures, but include performance measurement and monitoring (Van Grembergen et al., 2004). The alignment element is aimed at ensuring proper understanding and functional synergy between IT and business departments.

A renewed interest in investing in ITG implementations has arisen because of many IT project failures (Robinson, 2005; Bowen et al., 2007). ITG deals with how well-coordinated investments in IT could enable organizations overcome such failure, to attain and sustain corporate survival and efficiency in this globalization era (Brisebois et al., 2015; ITGI, 2003; Schwarz & Hirschheim, 2003). Specifically, ITG proponents believe that, with proper structuring of decision procedures, institutionalized processes and a symbiotic relationship between IT and business units, there will be quicker return on investments, enhanced

performance, avoidance of IT project failures, and fulfillment of compliance requirements (Robinson, 2005; Juiz et al., 2014; Schwarz & Hirschheim, 2003). In addition, a critical dependency on IT by firms (Van Grembergen et al., 2004) requires governance mechanisms to could overcome vulnerabilities that have a potentially high toll on customer loyalty and satisfaction, risks of downtime and low quality service (Acquisti et al., 2006; Arcuri et al., 2014). Furthermore, meeting international regulatory compliance requirements (Schwartz, 2007; Ali et al., 2009), its use for competitive advantage (PWC, 2008; Chun, 2005; Albayrak & Gadatsch, 2012), cost saving, risk minimization, and reduction of IT project failure (SAICA, 2014), have increased the need for IT governance.

The application of ITG procedures in IT decision making is prominent in the private sector, with less emphases on public sector organizations (Wibowo, 2014; Nfuka, 2012). The situation is even grimmer in the case of developing nations (Nfuka, 2012). Realizing this lack of scholarly attention and the plethora of business prospects in implementation of ITG, the potential of realizing the benefits enumerated above, this study aims to find the current status of ITG implementations in Nigeria, identify the challenges that are present (either similar or different from those reported in the literature for the private sector), and proffer solutions for potential adopters in public sector organizations,

Scholars have researched organizations' implementation of ITG

using the three elements of structures, processes, and alignments (De Haes & Van Grembergen, 2005; Sethibe et al., 2007; Bermejo et al., 2004). However, as further research delved towards aiding practice, these three elements were subdivided in five domains: risk mitigation, value creation, IT resource management, strategic alignment, and performance measurement (ISACA, 2009; ITGI, 2003). Some scholars have used the 5 domains in their analyses of ITG different organizational contexts (Kurti et al., 2014; Ab Razak & Zakaria, 2014; Wibowo, 2011; Amali et al., 2014; Lubbad, 2014). In particular, De Haes and Van Grembergen (2005) argue that a mix of structures, processes and alignments is sufficient to analyze the ITG of an organization, but considers an optimal mix as elusive because of organizational differences. Following this line of argument, this study also utilizes the three elements in the analysis of public sector organizations.

Internationally acclaimed frameworks, tools, and standards are available to aid implementations of ITG. Some of these are COBIT, ITIL, ISO/IEC 38500, and Prince 2. However, their implementation is considered complex and constitute inhibitors (Al Omari et al., 2012; Cater-Steel et al., 2006). For instance, Al Omari et al., (2012) noted the complexity of using COBIT 5, proposing a piecemeal implementation. Furthermore, ITGI also suggests that the starting point should be based on the strengths and maturity level of the organization (ITGI, 2003). In addition, these are vendor promoted tools that do not specifically address

pre-implementation procedural issues and challenges that tie all the elements of ITG together for application in public sector organizations. Although these tools are good for service availability, process improvement, and general corporate behavioral guidelines, none of these tools (Table 2.3) has prescribed universally applicable solutions to ameliorating problems and challenges associated with the three elements of ITG, formulated for easy departmentalized implementation for new adopters, particularly, in the public sector.

Contextual decision making and administrative procedures, and cardinal objectives differentiate public and private sector organizations. These contextual issues extend to organizational structure, political influences, regulatory, and bureaucratic, as well as service-orientation thus requiring different approaches to ITG practice (Ab Razak & Zakaria, 2014). In line with that, Sethibe et al., (2007) opine that considering the systemic differences, a one-size-fits-all for private and public organizations in ITG implementation may not work.

Noting the contextual differences between private and public sector organizations, the main objective of this research is to articulate the inhibitors and challenges of ITG implementations from various sources, and proffer a solutions set that enhances deeper understanding as well as aids practice for potential adopters in public sector organizations.

The research questions associated with the research objective are:

(a) What are the challenges (inhibitors) of successful adoption and

implementation of ITG? (b) What solutions are beneficial to potential adopters in the public sector? (c) How can these solutions be integrated to aid practice and yet contribute to a deeper conceptual and theoretical understanding of ITG?

The following methodological steps are taken to answer these research questions:

- a) Conduct a thorough research of theories and concepts on which this study is based, identifying technology adoption and organizational behavior;
- b) Examine extant literature for inhibitors, challenges and critical success factors to successful adoption and implementation of ITG, listed as Table 2.1;
- c) Using the above background knowledge, design a questionnaire and interviews to identify additional inhibitors, and plausible solutions for potential adopters of ITG;
- d) Select four public sector organizations in Nigeria based on their functions as either regulators or intensive users of IT, for conducting the survey and interviews;
- e) Collect data through online questionnaires and interviews with respondents from top managements and boards - the people responsible for ITG decision making and enforcement (ITGI, 2003). To ensure reliability and quality of the research, a case study protocol was established, following design principles

proposed by Yin (1994), ensuring that the evidence is kept in an organized and systematic manner to facilitate referencing and tracing the path from data through inferences.

- f) Analyze the data using induction, categorization, and across-and-within case techniques to understand the relationship between inhibitors and solutions. In this process, inhibitors and challenges identified from this study were checked against inhibitors in literature, finding new inhibitors in the process;
- g) Integrate the analysis results into a framework (i.e., the COKE framework) which aids conceptual understanding, and is structured as a departmentalized implementation solution for practice universally;
- h) Discuss an exemplary assessment model of the COKE framework.

The rest of the chapter is arranged to discuss the conceptual foundation of the study in section 4.2 and data collection in section 4.3. Section 4.4 describes the COKE framework proposal. A self-assessment model, which aids potential adopters of the COKE framework in deciphering their present and desired status, is introduced in section 4.5. Section 4.6 ends the chapter with a discussion and conclusion.

4.2 Conceptual Foundation

This study has its foundation on theories and concepts of organizational behavior and adoption/diffusion of complex innovations. The technology

adoption concept is relevant to ITG adoption and implementation because they both acquire technologies foreign to the organization, with the aim of improving efficiency or competitiveness. The organizational behavior concepts are applied, as the activities of decision making, control, and organizational imperatives determine the success of an organization. Arising from the foregoing, it is clear that a strong background knowledge of relevant features of these concepts is indispensable. Figure 4.1 depicts the concepts, literature references and their relationship with the design of this study.

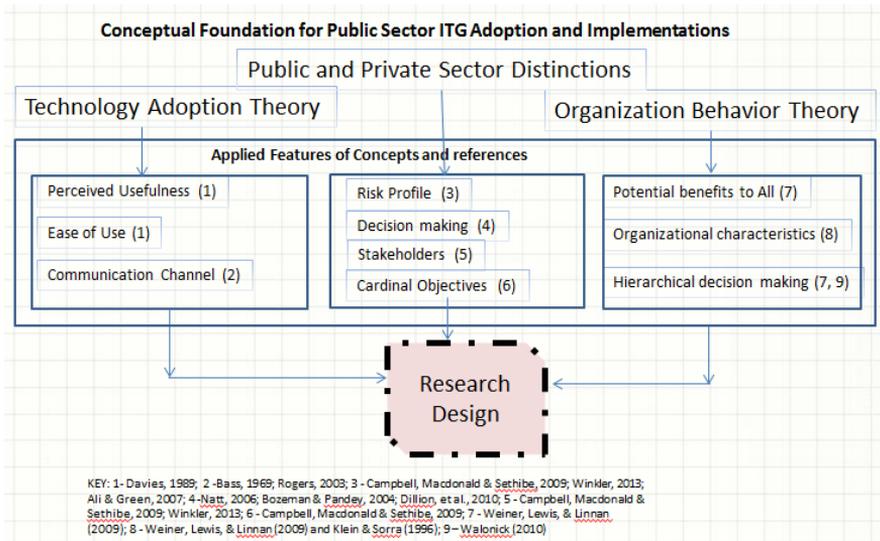


Figure. 4.1. Conceptual foundation for public sector ITG implementation.

In Figure 4.1, the relevant features from technology adoption and organizational behavior theories and references are shown in the first and last rectangles, respectively. The distinctions between public and private sector organizations and references are shown in the middle rectangle.

4.2.1 Technology Adoption Theory

Relevant features of the technology adoption concept utilized are: risk, value creation or perceived usefulness of technology adoption (Davies, 1989), dissemination (process of word of mouth or contagion), and adoption trends from innovators through to saturation (Bass, 1969; Rogers, 2003). A strong relationship exists between technology adoption and ITG as risk mitigation and value creation are two of the 5 domains of ITG (section 4.1) as put forth by ITGI (ITGI, 2003). Further, there are tools for value creation-ValIT (ISACA, 2008) and risk mitigation -RiskIT (ISACA, 2009b)- based on COBIT for implementation of ITG in practice.

4.2.2 Organizational Behavior Theory

The concept of organizational behavior plays significant roles in successful adoptions and implementation of technology (Klein & Sorra, 1996; Weiner et al., 2009; Allaire & Firsirotu, 1984; Eisenhardt, 1989). Weiner et al. (2009) and Klein & Sorra (1996) noted the role of organizational policies and procedures, command and control, role and function allocation as well as implementation climate as it affects the implementation effectiveness of technology. ITG activities involve composition and allocation of roles and responsibilities, decision making, capacity and internal rules and procedures guided by the board of directors and executed by management (ITGI, 2003), exemplifying hierarchical decisions which are traits of organizational characteristics (Weiner et al., 2009).

4.2.3 Public and private sector organizations in ITG context

There are contextual differences between public and private sector organizations in the ITG discourse. In this section, a brief discussion that differentiates the two, particularly in decision making, risk profile, and stakeholders and their satisfaction is worthwhile. It is the basis on which this study focused on public sector organizations.

The risk profile separates public sector and private sector organizations in adoption of ITG (Campbell et al., 2009; Winkler, 2013; Ali & Green, 2007). Other differentiating factors include cardinal objectives of profit incentive and service to citizens (Campbell et al., 2009; Winkler, 2013; Ali & Green, 2007; Suomi & Tähkäpää, 2004), decision making process and content (Nutt, 2006; Bozeman & Pandey, 2004; Dillion et al., 2010), and issues of accountability and capability to deliver services (Murphy, 2013). These functional foci have come with differing ways of decision making, processes, and alignments between IT and business units – the three elements of ITG. Considering these systemic differences, Sethibe et al., (2007) opine that a one-size-fits-all for private and public organizations in ITG implementation may not work (Sethibe et al., 2007).

4.3 Case Study Data Collection

The data collection was designed to actualize the research objectives: a) contribute to the literature on inhibitors and critical success factors for public sector agencies by comparing inhibitors from extant literature to

those of the cases of this study; b) provide a practicable solutions set to those inhibitors as opposed to the mainly theoretical contributions of extant literature; c) compose the results into a new framework. This rest of the section is subdivided to discuss inhibitors of ITG in extant literature (Section 4.3.1), the criteria used for the selection of cases and the description of the cases (Section 4.3.2), and the descriptive analysis of the sample (Section 4.3.3).

4.3.1 Inhibitors of ITG in extant literature

There are many inhibitors identified in extant literature that limit implementers from effectively benefiting from IT investments. These are explained in section 2.2.2 but are mentioned here to highlight their use as a source of checklist for examining the challenges faced by the cases of this study. Even though Brisebois et al., (2015) state that the list of inhibitors cannot be exhaustive because inhibitors are as a result of various contextual issues (e.g., economic, political, environmental, geographical, social) that organizations face in conducting business, the next paragraphs discuss some of the key inhibitors and challenges of ITG implementations.

Some of the inhibitors and references are: bureaucracy and accountability (Murphy, 2013); political factors and associated changes (Sethibe et al., 2007); internal and external factors, resistance to change (De Haes & Van Grembergen, 2005); lack of ownership, poor strategic alignment, lack of senior management support, poor risk management,

ineffective resource management (Brisebois et al., 2015); and external environment (e.g., regulatory environment, technological tendencies and inter-firm integration demand) (Lederer & Salmela, 1996).

Others include resistance to change, complexity, lack of knowledge and skills, geographical proximity, middle management support (Othman & Chan, 2013); effective design, communication between top and middle management, and appropriate concern for operational disparity (Wibowo, 2014); political instability, corruption and insufficient planning (Oye, 2013); complexity of knowledge and multiple frameworks (Cater-Steel et al., 2006); centralized or decentralized operations dictated by cost sensitivity and propensity to invest (Weill et al., 2004); internal inhibitors (e.g., managerial capacity, knowledge of the frameworks, standards & inter-operational synergies, skilled personnel, paucity of funds); and externally influenced inhibitors (e.g., general socio-economic and political factors including corruption, lack of effectively implemented information technology policies) (Yahya, 1993; Oye, 2013); and weak processes (Nfuka, 2012).

To the best of our knowledge, none of these studies and contributions prescribed universally applicable solutions to inhibitors in a manner departmentalized for easy implementation that would guide adopters in the public sector. To this extent, the COKE framework proposed in this study prescribes a solution set for potential adopters in public sector organizations, as well as to aid theoretical understanding of ITG processes

and procedures.

4.3.2 Case Study Methodology

A multiple case study methodology was adopted for this study as it is well-suited for investigating a contemporary phenomenon and its real life state, where the real life state is difficult to analyze (Yin, 1994). Another advantage of the methodology is capability of utilizing and evaluating evidence from multiple sources such as documentation, interviews, observations, archives, and questionnaires. Case studies enable inter and intra case comparisons by comparing dissimilar characteristics and contrasting similar ones, in order to bring out hidden issues (Yin, 1994). In addition to this, the dearth of ITG implementation information in the public domain, partly due to the peculiarities, sensitive classifications of such information, requires that personal interviews and/or survey questionnaires focusing on the cases of selected organizations are the best way(s) to obtain evidence.

The under-listed procedural steps for case study investigations proposed by Yin (1994) were followed: a) design the research, b) select cases and determine data gathering, c) prepare to collect data in the field, d) evaluate and analyze data, and e) prepare the report. We maintained a chain of evidences (evidence database) to foster reliability. This allows for a transparent, systematic process that could be repeated if confirmatory tests are required.

4.3.2.1 Criteria for Selecting the Cases

The literature reveals that the selection of cases is crucial to the success of the case study methodology (Yin, 1994). Guided by that, three simple criteria were used for the selection of the cases of this study. The first criterion constrained organizations to have statutory regulatory role in IT. This study expects such agencies to be exemplary in adoption, implementation and utilization of contemporary IT technologies and serve as trailblazers in the industry. The second criterion requires organizations that use IT to deliver their core mandate. With this, they should be more technology savvy and be at the frontier of new technologies. The third criterion is on diversity of the agencies in sectors, sizes, capacity, and scope of application of IT to enrich our inferences, and avoid representative bias.

The first two ensure the selected organizations are deeply involved in IT matters, and the third ensures spread and diversity of the sample. While an organization qualifies for inclusion if it meets either of the first or second criterion, the third criterion further filtered the selection.

Based on these criteria, four cases were selected from government agencies in Nigeria. Organizations A and B were chosen for their statutory functions as regulators of IT. Organization B also met the criteria of operational disparity and size. Organizations C and D were chosen for intensive use of IT to realize their mandate or corporate objectives, and met the third criterion of sectorial diversity and size. In all, the selected

organizations are heavy users of IT, who are primed to be using IT as enabler of their mandate; and regulators who should set the pace for adoption and implementation of new technologies. Considering this, it can be stated that the selection represents commitment to realizing ITG benefits that could exhume all the inherent issues and challenges of potential adopters in the public sector.

4.3.2.2 Description of the Cases (Organizations)

Because of privacy issues, the four organizations are codenamed A, B, C, and D. The profiles of the organizations are:

- (a) Organization A has a total staff to IT staff ratio of (>200 / <100).

It has a comparatively minimal spread of offices, but has IT projects in all parts of the country.

- (b) Organization B has a total staff to IT staff ratio of (>500 / <100).

It has a vast array of sub-offices located in all 36 states and local government council headquarters throughout Nigeria. Most of these have telecommunication connections that facilitate real-time monitoring of data and information. They have a centralized organization-wide operational strategy for initiation, procurement, implementation, support, and decision making.

- (c) Organization C has a total staff to IT staff ratio of (>2000 / <100),

and has a wide coverage, represented in all local government councils throughout Nigeria. It also has some services connected in real time. It is in the financial sector.

(d) Organization D is in the oil and gas industry. It has a total staff to IT staff ratio of (>500 / <100). It conducts online, real time monitoring of its activities in all parts of the country where it has operational presence.

All organizations have different governance structures, Organizations A, B, and C are parastatals while Organization D is a ministry. The parastatals are headed by boards and administratively managed by chief executive officers (CEOs), and the ministry is administrated by a minister and a permanent secretary.

Therefore, these cases have a strong potential to reveal the inherent structural, decision making and procedural challenges, prospects, and solutions for ITG adoptions and implementations in the public sector of Nigeria.

4.3.3 Descriptive Analysis

The data utilized for this study was collected from many sources. Extant literature provided inhibitors to effective ITG adoption and implementation that were not specific to the public sector. The online questionnaire on the selected cases provided data specific to the public sector but considered other administrative and fundamental challenges and plausible solutions. Further, interviews were also conducted to clarify contentious issues that were not adequately addressed with either of the two sources (left part of Figure 4.2). The rest of the section describes the sample, the scope of questions in the questionnaire, and the conduct of

interviews.

4.3.3.1 Respondents

Recall that ITG, as an integral part of corporate governance (section 2.2.1), is the function of the top management and the board (ITGI, 2003). With this in mind, the respondents of this study were limited to top management and board members. This scoping of respondents limited the number of questionnaires distributed (25 questionnaires) with a 40% return rate (10 responses). Baruch (1999) suggested that academic work targeted at senior management with a lower level response rate of 36% is a good response rate, so in that respect, 40% is considered to be good.

Respondents were selected by contacts in the chosen offices, and online questionnaires were distributed. The 4 respondents from organization A are two senior managers with technical backgrounds, one senior manager of administrative cadre, and one technical member. Those of organization B are two managers with technical backgrounds. Organization C is presented through one manager with a technical background. Organization D had three managers with technical backgrounds.

4.3.3.2 Questionnaire

The questionnaire contained Likert-type questions as well as percentile, selective, and open ended questions. Since the cardinal aim of the study is to identify issues and challenges to ITG adoption and implementation and

proffer solutions, the questions were made in 3 categories (Appendix D). The first set of questions (questions 1 to 13) were about the current status of IT effectiveness and challenges in the organization, ranging from project initiation, funding, technologies in use, composition of steering committees (where it exists), decision making, operational distribution, mandate, staff strength, and the awareness level and application of ITG.

The second set of question(s) sought for inhibitors and challenges peculiar to the organizations (Question 14) and the best ways of overcoming the challenges to facilitate collation of solutions (question 25).

For an in-depth analysis, the third set of questions (questions 15 to question 24) asked respondents to select their favorite IT projects, so that further details could be determined, ranging from the application of ITG frameworks or principles, level of awareness and focus on the three elements of process, structures, and alignments, through monitoring and evaluation, success rating, and associated challenges.

4.3.3.3 Descriptive Statistics

Descriptive statistics can only be applied to numeric data to show the distribution and statistical behavior of these variables in the sample. In order to achieve that, relevant questions were either transcribed or encoded or converted to facilitate numerical analysis for this descriptive purpose. These selected questions gave an indication of the use of established procedures in project initiation through approval and

execution, degree of success of the selected projects, the effect of project champions, and contribution to corporate mandates. The Likert-scale questions are:

- Question 9: If there are well-documented guidelines and procedures by which IT projects are selected from initiation to execution, how does that influence the outcomes of projects? (Percentages converted to Likert scale 1-5 with 5 being the highest)
- Question 10: To what extent do IT projects enable your organization achieve its mandate?
- Question 18: How would you rate the success of the project? (Likert scale 1-5 with 5 being the highest)
- Question 19: What, in your opinion, is the contribution of this project to the realization of corporate goals? (Likert scale 1-5 with 5 being the highest)
- Question 20: Was there a project champion? (yes/no)
- Question 21: If your answer to the project champion question is "Yes", how would you rate the champions contribution to the success of the project? (Likert scale 1 -5 with 5 being the highest)
- Question 24: By what scale do you think effective IT Governance framework adoption and compliance could have improved the performance of this project?

Table 4.1 Descriptive statistics of the quantitative part of the questionnaire

Question	min	max	mean	standard deviation
established guidelines (question 9)	3	4	3.7	0.4830459
IT support to mandate (question 10)	3	5	4.2	0.788811
success (question 18)	2	4	3.3	0.6749486
Chosen project to corporate goal (question 19)	2	5	3.3	0.9486833
Project champion (question 21)	2	4	3.4	0.9660918
Likely improvement due to ITG frameworks (question 24)	3	5	4.3	0.948683

Table 4.1 shows that the respondent's valuation of whether project initiation procedures are well-established and adhered to (question 9) was answered positively with a minimum, maximum, mean and standard deviation of 3, 4, 3.7 and 0.48 respectively. The question on IT support for realizing corporate mandate was recorded as minimum, maximum, mean and standard deviation of 3, 5, 4.2 and 0.79 respectively. The success rating of the project of choice (question 18) was above average, with minimum, maximum, mean and standard deviation of 2, 4, 3.3 and 0.67 respectively. The question about how well the project of choice supports the corporate goals of the organization (question 19) is also positive with minimum, maximum, mean and standard deviation of 2, 5, 3.3 and 0.95 respectively. We identified whether there was a project champion (question 22) and how that contributed to project success.

Project champions had a positive impact with minimum, maximum, mean and standard deviation of 2, 4, 3.4 and 0.97. The Question 24 which sought the likely improvement of success due to use of ITG frameworks resulted in minimum, maximum, mean and standard deviation of 3, 5, 4.3 and 0.95.

4.3.3.4 Conduct of Interviews

In order to augment the questionnaire and clarify contentious issues, one respondent from each of the four organizations in the study was interviewed either personally or over the phone. An interactive environment was created through the assurance of anonymity and discussion-promoting questions. The interviews took about 55 minutes and were conducted between March 2014 and July 2014⁶.

The interview with the respondent from organization A was conducted on April 25th, 2014, and highlighted the organization's desire to create ITG awareness in MDAs. He has 30 years of work experience since his graduation in 1985. His experience spans private sector managerial positions before switching to the public service. He decried infrastructural and funding challenges to ITG adoption.

The interview with the respondent from organization B was postponed from June 20 to July 14, 2014 because of poor network service. When the interview was eventually held, issues of middle management

⁶ Interviews and other sources of data are kept in a database, to ensure reliability and easy access to needy researchers.

buy-in were considered most prominent challenges for implementing IT projects. He has 33 years of work experience, having started in 1983 and went on study leave to pursue a BSc degree in Computer Science. He has attended national and international conferences. The respondent was not specific about ITG but IT management.

The respondent of organization C stated the organization's quest for utilizing IT in achieving their mandate, mentioning the use of a wide range of management structure for project decision making and approval. The respondent stated that the modernization effort could position the organization to effectively deliver on its mandate. He also stated that their procurement involves IT regulators who bring professionalism to the bidding process.

The interview with the respondent from organization D basically hinged on the management of IT investments in technologies that could transmit information live to their headquarters, and the likely challenges. He has 25 years work experience, has a Master's degree (M.Eng) in Petroleum Engineering, and has attended technical and managerial workshops and conferences in United Kingdom, United States of America and India. Challenges of manpower and knowledge transfer were brought to the fore and likely solutions were discussed.

4.4 Data Analysis and Model Design

This section utilizes the data gathered from literature (section 4.3.1 and 4.4.2), the online questionnaire (section 4.3.3.2), and the interviews

(section 4.3.3.4)⁷ for further analysis and the model design. Two questions that form the spine of the analysis are questions 15 (which identified peculiar inhibitors) and question 26 (respondents' suggested solutions to question 15) of the questionnaire. Some of the answers were incoherent while others were too general to engender practicable solutions and were rejected. However, the distinct ones such as training, dissemination and awareness, suggestions for external challenges fed the contents of the proposed COKE framework. In addition, inferences were made from the interviews and personal experience. Figure 4.2 depicts the analysis procedure.

4.4.1 Data Analysis Technique

This section describes the data analysis techniques utilized in this research. The analysis techniques include induction, categorization, and within and cross case analysis.

Inductive analysis is an analytical technique that commences with gathering observations, and transforming same in ways that culminate in generalizations and theory (Burney, 2008; Gabriel, 2013). Categorizations were based on grouping recurring patterns of responses in the context of meaning and functionality. In the context of this study, the vast number of inhibitors is firstly categorized in semantics, as various contexts used various nomenclature for their classification. These were further grouped to provide the platform, from which they could be compared with

⁷ The data can be accessed by researchers on request.

inhibitors identified from the questionnaire.

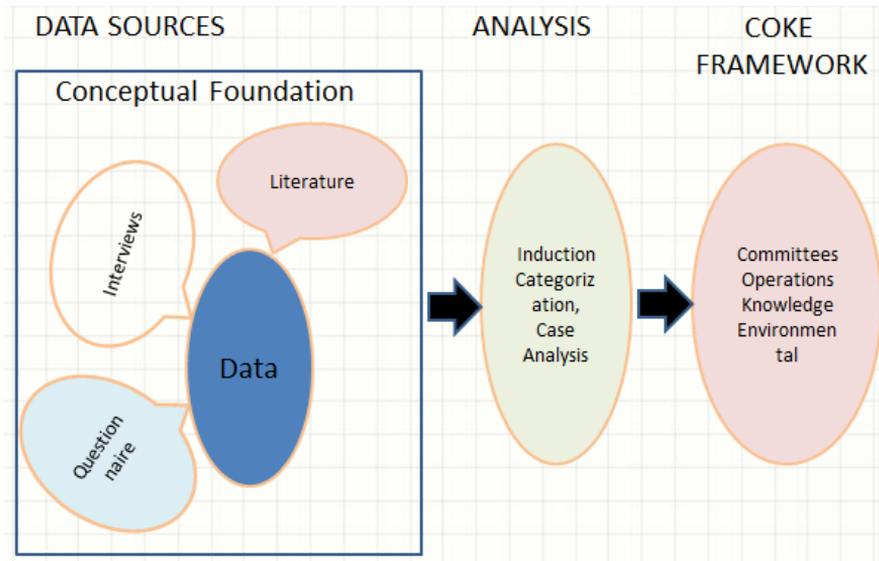


Figure 4.2 Generalized procedure of sources of data, analysis and COKE formulation

4.4.2 Inhibitors

Existing literature is rife with ITG inhibitors. This research found that the inhibitors are identified from mainly case studies of private, public and semi-private organizations from many diverse political, economic and social backgrounds. Brisebois et al., (2015) opine that inhibitors cannot be exhaustive because of these contextual issues that organizations are subjected to. With that in mind, inhibitors from literature and this study (Figure 4.3) are categorized semantically to depict commonality in functionality, which would serve as input to further analysis (see Figure 4.2 for analysis procedure).

The inhibitors (see 4.3.1 for details) range from management

mobility and operational dispersion (Othman & Chan, 2013; Wibowo, 2014), management support and budget (Oye, 2013; Othman & Chan, 2013), board compositions and formations (study), resistance to change and organizational culture (Yannis & Michael, 1986; Othman & Chan, 2013). Others are allegiance, transparency and accountability; complexity of multiple framework implementation challenges and knowledge requirements (Cater-Steel et al., 2006), understanding ITG principles, political stability corruption and availability of funds (Yahya, 1993; Oye, 2013).

4.4.3 Components as Proposed Solutions to Inhibitors

As listed in the problem statement of this research, however, these inhibitors and critical success factors are without prescriptive solutions to overcoming them (Table 2.2 in section 2.2.2). Further, in response to the second research question, a solution that integrates all the categories of inhibitors into manageable, departmentalized components was derived. This culminated in the proposed solution which is an integration of the various inhibitors (Figure 4.3) into a form that can easily be solved with prescribed instruments.

There are basically three elements (structures, processes and alignment mechanisms) used in analyzing ITG studies (De Haes & Van Grembergen, 2009; Van Grembergen & De Haes, 2005, Amali et al., 2014). However, these are subdivided into 5 in some studies (Kurti et al., 2014; Ab Razak & Zakaria, 2014; Wibowo, 2011; Amali et al., 2014;

Lubbad, 2014) as discussed in the introduction. The structures element represents mechanisms on how decision making entities could effectively coordinate strategic directions in IT investments in an organization. In order to reflect these fundamental study patterns, this study categorized the solutions for all inhibitors that are of the structures element in function into the Committees component of the framework. For instance, management mobility, operational dispersion (Weill & Ross, 2004; Winkler, 2013; Yannis & Michael, 1986) board and committee composition (this study) and allegiance and accountability (this study) issues that address the structures element were grouped into the solution prescribed for committees (section 4.4.4.1). In a likewise manner, the inhibitors that belong to the process and alignment elements were grouped into operations (section 4.4.4.2). This grouping was necessitated because they are operational issues that could be tackled in a composite manner.

The knowledge component of the solution was informed by the fact that it cuts across the whole organization; for individuals and organization where certifications are used internationally for capabilities and compliance. This is placed as a separate component in order to allow for focused attention at the organizational level with input from departments.

The environmental component was added because, it raised critical issues that are inhibitors from responses from the questionnaire and interviews. In addition it was not directly addressed in the elements.

For easy implementation in a departmentalized manner, committees, operations, knowledge and environment components form the bedrock of the framework. The detailed instruments for the implementation and the justification of the prescribed solutions are discussed in the corresponding subsection of Section 4.4.4.

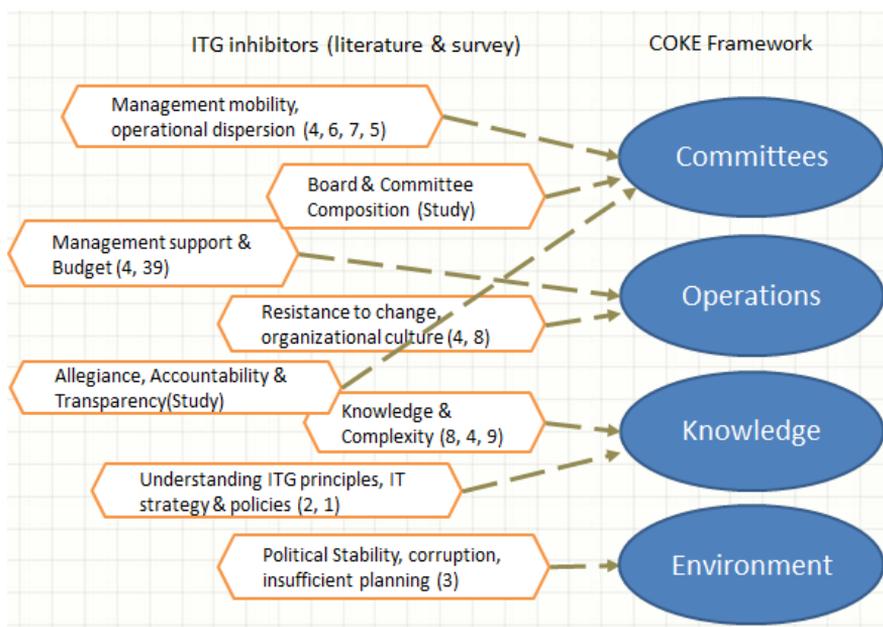


Figure 4.3 Components categorized as solutions to inhibitors ⁸

4.4.3.1 Structural Issues

The structures element in ITG literature refers to formal decision making committee(s) (there may be several with differing nomenclature and function, but are mostly called steering committees) which ensures synergy between business and IT decisions in an organization (De Haes & Van Grembergen, 2009, Peterson, 2003). To establish the extent of

⁸ **Key:** 1) Bowen, et al, 2007 , 2) Lee et al 2008 , 3) Oye, 2013 , 4) Othman & Chan, 2013 , 5) Weill & Ross, 2004 , 6) Wibowo, 2014 , 7) Winkler, 2013, 8) Yannis & Michael, 1986 , 9) Castel_Steel et al., 2006

utilization of such composite decision making operations in the organizations of this study, questions on the project initiation, strategic direction, membership, composition, and scope of committee/top management were asked (questions 7-8 of questionnaire – section 4.3.3.2).

Ministerial and board appointments in MDAs are nominated by Mr. President and ratified by the Senate. This procedure has raised issues of appointments not being guided by national interest, but patronage, selfish, and primordial considerations. Thus, for governance issues, respondents were asked, “How does the path to membership of governance committees affect the performance of civil servants and board members?”. In response, the interviewee from organization B said, “*on issues of committee composition and formation, good results could arise, but only if there is unquestionable commitment, which, in my opinion, is lacking*”. This implies that the commitment of such appointees is more favorable in the allegiance to political leadership than the organization. This is in conformity with a difficulty of balancing accountability to self and organization acknowledged in literature (Juiz et al., 2014).

The implication is that having political appointments and career growth used for civil/public servants’ membership in such committees will affect the members’ accountability and commitment. Specifically, this skews the composition of committees negatively, without requisite attention to professionalism. This is this study’s contribution to literature

since it is not yet identified. The prescribed solutions are discussed in section 4.4.4.1 (committees).

4.4.3.2 Operational Issues

In this section, issues and challenges of the process of project selection and approval, monitoring and performance evaluation, communication and alignment of IT and business unit issues are discussed. The process element is concerned with the institutionalization of the decision making process, evaluations and the monitoring of IT projects (De Haes & Van Grembergen, 2009).

In order to decipher how the process element of ITG is effectively applied in initiation and monitoring of IT projects, respondents were asked in interviews and on the questionnaire if there were institutionalized procedures and guidelines (question 9) for planning, cost-benefit analysis, and comparison of alternative projects, and how that affects outcomes. Respondents were also asked what challenges existing tendering procedures have on IT projects. One respondent from organization A said “there was no established strict econometric analysis on alternative projects to determine which project is more beneficial”. He said it was dependent on the presentations from the viewpoint of initiating departments which could be externally motivated, but the departments have the vested interests and capacity to “push through”. Respondents in organizations B and C do not have established thoroughly analytic pre-project analysis either. Hulp and Payan (2008) agree that economic

reasons are not always followed, but negotiating and wooing decisions in project selection is a prevalent challenge in public service organizations (Hulp & Payan, 2008). The implication is that there are no strict institutionalized project initiation, analysis and approval systems to produce comparatively best projects. The initiating department is pivotal to project initiation and ensures that it is approved.

The Bureau for Public Procurement (BPP), a federal agency, is established by law to facilitate, monitor and perform oversight on public procurement in Nigeria (BPP, 2014). There is an approval limit for agencies. If projects exceed this threshold, approval is done by another authority (BPP, 2014b). In question 24 of the questionnaire, respondents were asked “*how does the cost range affect the initiation and approval process of a project?*” Respondents from same agency, for instance D answered differently; some selected “no difference” and others selected “requires a different approval authority”. However, the respondents of organizations A, B, and C were consistent. So we asked in the interview for clarification. The interviewee from D was emphatic and said “*the Federal Executive Council (FEC) makes the decision when it is above the threshold*”. The interpretation of this is approval authority goes to another body depending on the threshold.

On issues of process transition that requires background procedural reforms, respondents (organizations A and D) were worried about turf-fighting in terms of managers’ likelihood to increase their scope

of control into departments and functions that are more beneficial financially. A respondent from organization B stated “...it will take mutual understanding, and again management’s commitment and will power to make it work”. This means that managers need to have a common understanding and team values to make organizational progress. One respondent from organization A said, “Our present project selection procedure follows a bureaucratic layered authorization process without specific regard to subcommittee approvals so it will be difficult to make changes to reflect ITG processes. This may need far reaching consultation and possibly an Act of Parliament to effect. Moreover, truly effective use of IT is still a sector based endeavor despite a substantive increase in spending and use in every MDA”. This means process transition will be too difficult at the organizational level so an Act will be more effective to implement it. Presently, in addition to internal processes, the BPP is empowered to conduct oversight and approve procurement procedures by law. Because BPP itself is established by Act, it will require another Act to repeal the existing one.

In the area of communication, we sought how the lines of communication between and within committees and individual managers, and staff affect the realization of IT goals. The respondents from organization B stated the definitive role of directors and stressed the dangers of their commitment and buy-in to the success of ITG. This commitment of managers in IT/business relationships is acknowledged as

existent in public organizations (Kaur & Bahri, 2014). He stated that project success could improve if “... *state level executives are ‘carried along’ and are actively involved and committed in the project*”. This supports findings in the literature on middle management support (Othman & Chan, 2013; Jairak and Praneetpolgrang, 2011).

From the above analysis, this study opines that, firstly, issues of buy-in require team values, which will facilitate mutual understanding and pursuit of common values and objectives. This can be promoted by good leadership. The critical role of good leadership in IT projects in the public service is noted in the literature (Hulp & Payan, 2008). Secondly, existing project formulation processes are well established thus new ITG processes may face opposition and resistance to change (Yannis & Michael, 1986; Othman & Chan, 2013). This led to the suggestion of using national legislation by a respondent. Thirdly, on approval limits, the thresholds are government policy directives established as controls for curtailing excesses and thus will be difficult to change. However, reviews to the thresholds are made by BPP to reflect changing circumstances (BPP, 2014b). This is a crucial challenge for public sector known for its stringent decision rules (Campbell et al., 2009; Hulp & Payan, 2008).

4.4.3.3 Human Capacity and Knowledge Issues

This section discusses the combined issues of complexity of ITG implementations and skilled human resources (Cater-Steel et al., 2006; Yannis & Michael, 1986; Bowen et al., 2007; Othman & Chan, 2013).

ITG implementations are complex thus phased implementations based on maturity are suggested for COBIT (Al Omari et al., 2012). MDAs have the mandate to contract consultants or specialized companies to execute projects, which is noted as expensive (Hulp & Payan. 2008). However, there is a lack of mechanisms for knowledge transfer from project executors to public servants. A respondent from Organization D stated “*..execution of projects by contractors is often without the willingness to transfer knowledge to civil servants. I am afraid this could lead to perpetual contractual commitments*”.

Human capacity is crucial to maintaining the potential value of IT investments; and can be systematically developed and sustained through training and certifications for individuals and organizations (Redmond, 2009). Certifications for individuals and the organization should be encouraged. A respondent from organization A stated “*...in preparation for the implementation of COBIT 5, we sent some staff for human capacity building and certifications*”. Such effort at the effective certification of individuals and the organization through strategic training is commendable and should be emulated. Respondents lamented the knowledge gap between the public sector and private sector (responses to question 25 of questionnaire, section 4.3.3.2).

4.4.3.4 Environmental Issues

External environmental influences affect organizations’ operations (Ugwuanyi & Chukwuemeka, 2013; Oye, 2013). The societal, economic

and political impact on ITG adoptions and implementations was sought from respondents. A respondent from organization A acknowledged external influences, particularly the power infrastructure. He said *“...prospects of improving ... with strong political backing from the Federal Government and creation of enabling environment through good and strong infrastructure especially power which is very key and significant to the IT growth towards economic development”* This means that societal circumstances affect organizations. They expect that such issues should be solved by the federal government, in order to promote IT effectiveness.

The answers showed that wider societal issues affect implementation in economic, social and political circumstances (Adeoye & Elegunde, 2012). A prescription is that these are national problems and should be addressed nationally as suggested by the respondent from organization A.

4.4.4 The Proposed COKE Framework,

The section consolidated on the work of the analysis and model design section (section 4.4.3). None of the studies prescribed universally applicable solutions to inhibitors in a manner departmentalized for easy implementation that would guide adopters in the public sector. The proposed COKE framework comprises four components (i.e., committee, operations, knowledge, environment) systematically sewn to ease departmentalized implementation and includes national and organizational

instruments to facilitate its implementation (Figure 4.4).

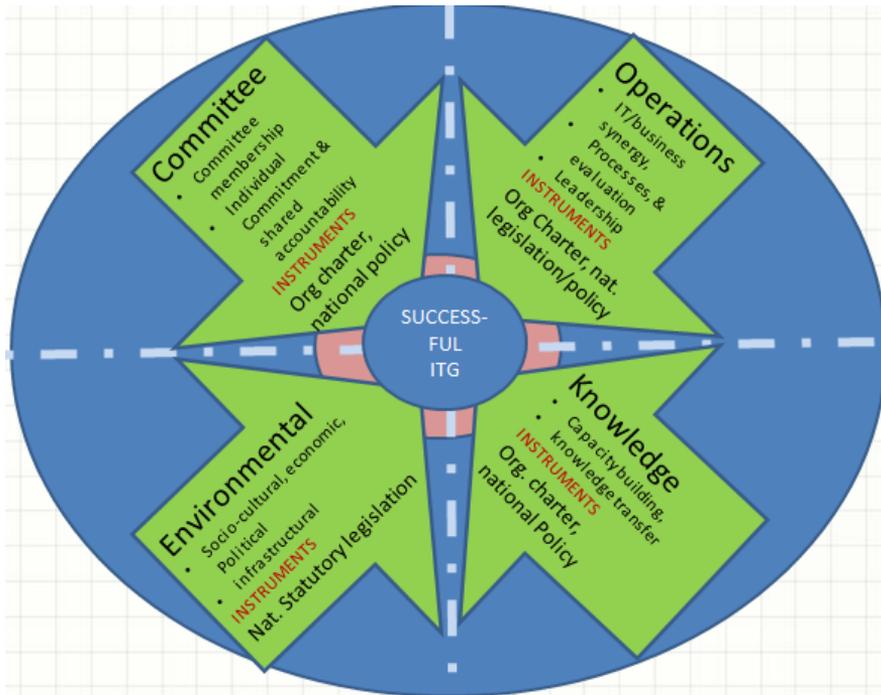


Figure 4.4 Pictorial view of the COKE framework

The actual solutions can be implemented in the form of two major instruments: organizational charter and national policy or legislation. The use of a national statutory legislation is proposed to overcome cross cutting issues that are beyond organizational control and policy. Other less flamboyant, but subtle instruments are on knowledge management and leadership mentoring that can be achieved by organizational charter. For the rest of this section, solutions are listed under “INSTRUMENTS” and the issues under the respective component heading (Figure 4.4). For instance, for the operations component, organizational charter and policy

are prescriptions for leadership training and IT/business synergy, while national legislation was prescribed as solution for process change.

The use of charter as a prescription for institutionalizing procedures of executing administrative rules is available in the ITG literature. SAICA (2014) utilized IT charter to establish internal policies, procedures and decision making to facilitate corporate governance compliance. In same vein, De Haes and Van Grembergen (2005) discussed the use of IT charter as an effective solution to IT/business alignment as practiced by their Belgian financial institution case study.

4.4.4.1 Committees

This component is derived from the structures element of ITG in section 4.4.3.1 The issues and solutions bearing on IT and business strategy interactions at the top management decision level and approval systems were aggregated. Although Caldier-Moirs ITG framework Toolkit (ITGovernance.co, 2014) discussed some roles and responsibilities for steering committees (nomenclature is slightly different for different organizations), this research found that roles are not well defined. This research found that committees' compositions are by career, and government political appointments, where executive boards exist.

Before making the proposition, it is noted that: a) since membership of committees is by political appointments, there is a likelihood of non-IT professionals making the decision ranks, b) issues of accountability and unalloyed commitment of members was noted by

respondents. Noting the above, this study proposes that membership of management or “steering” committees should be formed on the basis of strong cross-disciplinary grounds, particularly with domain experts. Professionalism and collective accountability should be inbuilt in the formation and review of committees. This could be achieved using national policy and organizational charter.

4.4.4.2 Operation

This component is derived for issues and challenges of the process and alignment/relational elements of ITG discussed in section 4.4.3.2. This study found that existing processes for project decision making are rooted in national administrative and BPP regulations. And that effective cost benefit analyses are not followed. The tendering process establishes thresholds, which alter decisions making authority. A difficulty to change (Othman & Chan, 2013) these existing processes to ones that meet ITG standards was also acknowledged by a respondent from organization A. Communication between managers and staff and departments are problematic, but effective synergy is required. Team building and providing a conducive implementations climate could be needed from leadership (Weiner et al., 2009) In same manner, the leadership mandate is critical to successful IT projects in the public sector (Hulp & Payan, 2008) .

With these issues in mind, as detailed in section 4.4.3.2, the proposition on operational issues is twofold: (1) establishing management

teams and staff with common objectives to enhance performance and avoid disaffection is in the purview of good leadership; thus the proposal for routine leadership training on managerial and communications skills, with organizational charter; (2) some current processes are established by parliamentary Acts and can only be repealed by the same authority and process thus we propose the use of national legislation and policy.

4.4.4.3 Knowledge

The knowledge component is a composite one, derived from difficulties of applying tools, frameworks & standards for implementation of ITG, and literature on experiences of technology adoptions (sections 4.4.3.3). The complex nature of the above exercise is acknowledged (Cater-Steel et al., 2006; Othman & Chan, 2013) leading to proposal for phased implementation (Al Omari et al., 2012). The effective use of these tools and frameworks requires precise domain specific knowledge, even as (Cater-Steel et al., 2006 and Hulp & Payan, 2008) note the practice of hiring experts. Further, enormous human capacity is needed for effective adoption and implementation of technology (Othman & Chan, 2013). Awareness and buy-in are issues of technology adoptions.

This study proposes (1) commitment to constant and consistent staff training and retraining to enable efficient and cost effective exploitation of technology through encouraging staff and organizational certification (Redmond, 2009) is prescribed to be implemented with organizational charter. (2) Pre-adoption preemptive training as done by

organization A in pursuit of building manpower for COBIT 5 is exemplary and is prescribed for all MDAs and to be implemented by organizational charter and national policy. (3) To achieve seamless knowledge transfer from private sector contractors to public servants (section 4.4.3.3), national policy is proposed.

4.4.4.4 Environment

Environmental issues are national in nature touching social, economic, administrative, political, security and infrastructure (Oye, 2013; Ugwuanyi & Chukwuemeka, 2013). For instance, a respondent decried the impact of power infrastructure in the analysis section, and urged the federal government for solutions.

To these national issues, this study prescribes national statutory regulations for committed leadership. However, individual organizations can initiate or lobby to expedite action on issues that affect them, as is included in the assessment model.

4.5 Assessment Model for the COKE Framework

This section discusses an assessment model for the COKE framework. This self-assessment model aims to provide the platform for potential implementers of the framework to examine and determine its current status, and strive to prescribe projects that would enable them attain the next stage. The next three subsections discuss a comparison of maturity models in the ITG literature, criteria for assessing the maturity model and an operationalization of the model on the cases of this study.

4.5.1 Selection of an Assessment Model

The maturity model as a self-assessment tool to performance evaluation, particularly in the process element of ITG is well documented. Citing Duffy (2002), Van Grembergen et al. (2004) listed a four-level assessment model for strategic alignment maturity model. Luftman (2000) used a five-level strategic alignment maturity model, while the generic maturity model of COBIT framework is a six-level model starting from zero to five. The CMMI (capability Maturity Model Integrated) by SEI utilized a five stage maturity; and the Arma's information governance maturity model is a five-level model (Arma, 2013). However, a closer look at these indicates that they are in response to the degree of detail and complexity of the feature that is measured. In this respect, the complexity of the COKE framework dictates that a three stage maturity is enough to assess the implementation status of beginners or potential adopters of ITG.

A basic principle of maturity models is that one can only move to a higher maturity level when all requirements of the previous level are fulfilled (De Haes & Van Grembergen, 2005; ITGI, 2003). In line with that, an organization can move from one level to another only when all the features of the first are satisfied.

4.5.2 Stages for Assessing the COKE Framework

This section discusses the stages attainable in the model, and the requirements for each stage. Three stages of maturity are attainable: initial, intermediate and ultimate. In each stage, a self-assessment on all

components of the framework is conducted. This is to enable users of the framework determine their stage of maturity and apply appropriate effort to improve. Assessments are made, and repeated over a time span ranging from two to five years, to determine a new status (Table 4.2).

The initial stage of the self-assessment is synonymous with the absence or formative part of the assessment component. Using the committee component for illustration, adopters are required to examine the current status of their committees. Committees could be nonexistent or in ad-hoc levels without specific roles and responsibilities. To proceed to the next stage, adopters of the framework could use the instruments prescribed to establish committees or review existing ones in a bid to improve the effectiveness of that component of the COKE framework. In same manner, the operation, knowledge and environment components are self-assessed as depicted in Table 4.2.

The second stage is the intermediate stage. This stage is noted as having some degree of established awareness of the component in the organization. Using the committee illustration, this stage is depicted in the second column of Table 4.2. At this stage, moderately effective committee activities should be visible. The third and final stage, the ultimate stage, exemplifies a good degree of achievement of ITG benefits with all staff, stakeholders and business associates are aware of the roles and responsibilities of the committees established to foster ITG. This is as depicted in the fourth column of Table 4.2.

Table 4.2 Criteria of the COKE self-assessment model

Coke Component	Criteria for the Initial Stage	Criteria for the Intermediate Stage	Criteria for the Ultimate Stage
Committees	Not established, or ad hoc - without defined committee roles	Roles are identified and communicated to staff and members	Meetings and agenda are well accustomed to principles of ITG
Operation	Processes of project selection and evaluation. alignment between IT/business units not effective, and not given attention, using old systems	All those involved are appropriately and accurately informed Values are kept as though they are norms	ITG principles are applied effectively, and it serves as basis for agenda
Knowledge	Training and knowledge requirements are not organized	Knowledge acquisition and certifications instituted	Domain experts in most fields, and continuous routine turnover
Environment	Environmental issues are treated as alien	Efforts defined for affecting issues of interest to organization's area of business.	Have good collaboration and mutual agreements with national status organizations

4.5.3 Mechanism for self-assessment of the Maturity Model

This section assesses the modalities for assessing an organization's maturity and procedures for enhancing comparisons between organizations. As an illustration, the four organizations in this study are applied in a pseudo assessment to determine their level of maturity.

In order to ascertain the degree of application of any of the components, and to facilitate comparison between organizations in a uniform manner, a scale six-scale calibration is adopted. A scale of zero through five is adopted. Scale 0 implies that the evaluated function is not known. Scale 1 indicates a subtle existence or application of the feature.

Scale 2 means a reasonable level of application. Scale 3 recognizes that component as a routine part, while scale 4 implies a good knowledge by staff and its application is an internal norm. Scale 5 implies a perfect knowledge, which extends to stakeholders who interact with the organization. It is worthy to note here that scaling is the weighting of the value or extent of use of the features of the component, while the stages discussed above are maturity levels an organization could attain.

An organization's total score over all the components of the COKE framework is the basis for comparing organizations. However, using a hypothetical data applied to the cases of the study, we could place organizations on a comparative scale, as listed in Table 4.3.

Table 4.3 Maturity status of the four government agencies on hypothetic data

Organization	Committees	Operations	Knowledge	External
A	Advisory committee, but ad hoc functions (1)	Alignment issues, grounded in existing processes (1)	Unevaluated staff training, personal certifications, pre-COBIT 5 training (2)	Weak national level relationships (1)
B	No well-established steering committees, Management committee (1)	Alignment is obviously problematic, especially for outstations (1)	Routine trainings that do not seem to excellently placed (1)	Not sure
C	Comparatively wider governance system (2)	Better synergy, high IT contribution, modernization, procurement input from IT regulators & stakeholders, project champions, but delays in	Training is routinely done, not clear in the use of frameworks & tools, but mentioned (1)	Wide spread operations but relationships with legislative organs, not too clear (1)

		approval (2)		
D	Committees not elaborate but significant projects are carried out (1)	Operational synergy is not clear, but getting approval was a problem (1)	Knowledge issues were not reported (1)	Not clear

The table above exemplifies the application of the six-level scale for assessing the level of attainment of the components of the framework by each organization. The results are only illustrative of the use of the scale, but a fair assessment of the knowledge of the researcher on the organizations informed the explanatory comments on the table. The numbers in parenthesis are the valuation on each component. The not sure entries also indicate how uncertain elements could be handled.

From Table 4.3, the valuation of the four cases is depicted. A simple average is used, with indeterminate or not applicable options omitted from the calculation. An average of the respective scores for Organization A, for instance, gave a 1.25. The score for Organization B is 1, indicating the omission of value for external factor which is indeterminate. Organization C got 1.5, while Organization D got 1 point. The implication of this is that on the scale of zero through five, all the cases fall below 2, showing their application of ITG is at the initial stage.

4.5.4 Improvement through COKE

In practice, the prescriptions of the COKE framework have the potential of addressing all the issues associated with inhibitors of ITG in public sector organizations. For instance, the instruments of organizational

charter and national policy, indicative of the ways committees should be formed and share accountability and professionalism show marked improvements if practiced. In a similar manner, all the other components have practical implications for the public and private sector.

Further, the assessment model can objectively position adopters and foster the means of improvement through the review and enhancement arising from scaling and stages of maturity.

4.6 Conclusion and Discussion

4.6.1 Conclusion

The benefits of ITG implementation include enhanced transparency, mitigation of risks, avoidance of IT service management pitfalls, value creation and performance enhancement, accountability and effective control, improved competitive advantage, attainment and sustenance of corporate business objectives, and effective use of IT investment (Gartner, 2004; Ernest & Young, 2006; Amali, et al 2014; PWC, 2008; SAICA, 2014; Chun, 2005; Albayrak & Gadatsch, 2012). Despite these desirable benefits, and the increased critical dependency of modern organizations on IT, which comes with increased sensitivity for infallible IT operations that contribute to corporate survival, many organizations have struggled to implement ITG, particularly in the public sector. Internationally acclaimed and implemented frameworks (e.g., ValIT and RiskIT) and standards exist, but these have only addressed subcomponents (e.g. the process element,) of the ITG elements. For instance, Cater-Steel et al.

(2006) acknowledged that no framework can address the whole gamut of ITG issues. For instance, the ISACA's ValIT and RiskIT only addressed the process element of ITG. The literature noted dozens of inhibitors and critical success factors, but prescribed little or no universally applicable solutions departmentalized for easy implementation by potential adopters.

Noting the above gap, this study conducted a case study of four public sector organization in Nigeria, and having utilized the inhibitors and critical success factors in literature as a checklist against responses from a questionnaire and interviews, identified additional inhibitors, thus contributing to the literature. Secondly, the contentious issue of lack of solutions for practice for potential adopters has been addressed with the COKE framework, which prescribed two major instruments that potential adopters can apply to overcome ITG inhibitors.

ITG adoptions and implementations are more prevalent in the private sector (Winkler, 2013; Nfuka, 2012). Some of the inhibitors acknowledge the risk factor yet driven by perceived usefulness and performance improvement expected from ITG, organizations have embarked upon its implementation. Further, literature acknowledges the intrinsic relationship between organizational decision making and imperatives on organizational behavior. These three issues made this study hinge its foundations on technology adoption, organizational behavior, and differences between public sector and private sector organization. This provided a platform that effectively integrated the

various contexts in the organization and design of the study.

Data was collected and analyzed for the formulation of the COKE framework. The framework components' major instruments of organizational charter and national policy have been applied as solutions. The framework's components of committees, operations, knowledge and environments as applied addressed all the issues as expressed in the three elements of ITG (structures, processes, and relational mechanisms).

Committees representing the structures element of ITG depict the decision making bodies (various nomenclatures exist) and hierarchies for ensuring IT investments, controls and strategic direction and use of IT for corporate success. In our analysis of the cases, issues of commitment and accountability were prevalent at the individual level; and professionalism and transparency at the group level. These were found to be as a result of the appointment and paths to membership of the top management and board of public sector organizations. In view of the above, the framework proposed strong disciplinary grounds for compositions, and use of national policy to verify procedures in the charter of organizations.

The process and alignment elements are crucial to ITG research and practice. Grouping the process and alignment elements of ITG into the operations component of the COKE framework, the study maintained the synergy that could arise from process establishment and review and performance evaluation and value creation scenarios of an effective ITG system. In addition, the value of inter-departmental communications and

symbiotic relations between IT and business departments for overall effectiveness was explored. In all, these issues are more manageable in the purview of the leadership of the organization. In view of the above, a proposition for building and maintaining quality leadership was made, an issue supported in literature (Hulp & Payan, 2008). The instruments are organizational charter and national policy. The national policy was included because issues of national dimension could only be better tackled nationally across Ministries, Departments and Agencies (MDAs).

The knowledge component is critical as it encompasses all the elements of ITG, including the capabilities of board, leadership and technical knowledge required for applying standards and frameworks and administrative competences. The need for individual and organizational certifications to quantify the knowledge, capabilities and skill sets of members and organizations has become even more profound considering the dynamics of IT. This study found that this knowledge is lacking in many areas, and some organizations are taking proactive steps to close the knowledge gap. Respondents feel the gap is more emboldened from private sector execution of IT projects without adequate mechanisms for knowledge transfer. In this regard, this study proposed a national policy regime that could nationally implement joint project implementations with adequate sharing of knowledge between the public sector and private sector.

Environmental issues are national in nature. Public sector

organizations interact with economic, social and political systems. Solutions in this area are country specific. For instance, strong ethical issues like corruption require strong regulation and political will to eradicate them; while infrastructural challenges are crucial to ITG implementation success thus require holistic solutions. In this regard, a national policy instrument was prescribed.

4.6.2 Discussion of Framework

Having prescribed a solution set in the COKE framework that addressed most inhibitors of ITG in literature, it is worthy to sound a cautionary word that could highlight sensitive areas for the potential adopter:

- a. There is an imminent difficulty with converting existing committee structures and project initiation processes to reflect ITG principles;
- b. The alignment of IT and business units is a contentious area. Mutual disaffection is demonstrated by both members if proper efforts are not made to harmonize the units. The fear of relinquishing powers or one usurping that of the other has always been crucial in cooperation;
- c. The will power to see through the change management that is required for both individuals and processes, and identifying and finetuning dysfunctioning processes and how to correct them are overarching problems;

- d. Acquiring the domain specific human capacity required to implement the processes of some of the major frameworks such as COBIT, ITIL to synergize the use of multiple frameworks;
- e. The fact that the Boards of MDAs and ministers are political appointments provides little potential for filling technical decision making roles. In addition, the challenge of commitment and accountability between organizational progress and advancement of personal careers is endemic;
- f. Finding acceptance over other more pressing societal needs for the limited resources is critically against it since the justification of IT investments is still blurred in practice, particularly for public organizations in developing nations;
- g. Where the procurement system is coordinated nationally, bureaucratic impacts may constitute impediments to seamless passage of projects, coupled with the naturally stricter approval process associated with public organizations, and
- h. The possibility of political influences on the selection and approval of IT projects, which as obtainable, diverts authorization to other bodies, when the cost exceeds a given threshold that is agency dependent.

It is our strong conviction that, if the COKE framework is

implemented to the degree of peculiarity of nations and public sector organizations, the benefits of ITG would be realized. A self-assessment maturity model is also provided for potential users of the COKE framework to track progress.

Many scholars have used the three elements of alignment, process and structure in their analyses and solutions to overcome ITG challenges. However, we have applied a four component approach to solving the ITG dilemma, particularly viewing it from the public sector perspective. This has enabled an departmentalized and easy implementation of the various inhibitors of ITG. The proper matching of the four against the three elements would be a virgin area for further research, as we expect that an empirical test could further through more light and create knowledge in the field of study.

4.6.3 Implications

There are many implications arising from this study. Firstly, public sector organizations can derive a guide from this study in terms of areas of sensitivity and how to tackle adoption and implementation issues especially as the study was aimed at potential adopters. The prescribed instruments can be applied to any peculiar organization's internal operations. For instance, on issues of knowledge, an organization could apply concerted effort to ensure that staff are encouraged to undertake certifications like ITIL, COBIT to gather domain specific knowledge before selecting a process framework.

Secondly, at the national level, policy makers could give a critical view of these prescriptions and determine how best to focus policy to solving cross-cutting issues of infrastructure, and knowledge transfer between the public sector and the private sector. Considering the importance of ITG in enhancing corporate governance, which enhances economic growth, there is a strong need for political intervention that could create better awareness and ITG specific legislation to give a strategic direction nationally. Instruments for creating a conducive environment for increased private sector participation through creating incentive systems of tax rebates and government patronage could be initiated.

Finally, to the private sector, our results show that the public sector landscape is still virgin for product promotion and provide vendor related guidance to organizations. This has the potential for such private firms having the attendant first mover advantages. Private firms who invest in providing support to MDAs would enjoy government patronage.

4.6.4 Limitations

The major limitation of this study is the number of organizations and the associated number of respondents that participated in the empirical study. The implication of this small number is the huge impact a response has on the results. Secondly, the generalizability of the results is limited because of the focus on public sector organizations in Nigeria. Literature acknowledges that contextual issues of economic and socio-political

dimensions impact on adoption and implementation of ITG. This elicits the need for other country-level studies in the context of the COKE framework.

For further studies, the role of knowledge in all the elements of ITG and how it could be accumulated and synergized for the benefit of public sector organizations should be of particular focus.

Chapter 5 Conclusion and Implications

5.1 Conclusion

This research dealt with two issues and challenges in the information technology discipline: national IT policy implementations and IT governance in the public sector.

Firstly, there is a rich literature on policy implementation frameworks, theories and their applications: Advocacy Coalition Framework (Sabatier, 1988), Contextual Interaction Framework-application in health (Spratt, 2009), implementation analysis (Weaver, 2010) Policy Implementation Assessment Tool (Bhuyan et al., 2010), Policy Implementation Profile (Slevin & Pinto, 1986), with extremely few works, if any, on national IT policy implementations considering the importance of IT to national development (see table 3.2). Despite the plethora of studies, some nations have continued to struggle to realize the dividends of investing in IT due to implementation issues and challenges. This study focused on implementation and structural issues thereof. The structural issues further detailed on elements of organizational structure and strategies for instituting new entities for solving delicate implementation problems. Drawing variables and methodologies from previous efforts in practice and literature and extending them, a global analysis of national IT Policy implementation practice detailed into policies of Nigeria and South Korea were analyzed to formulate the FIPIS framework. The results of validating the variables of the FIPIS

framework from data collected from IT professionals globally indicate that human resources has the greatest explanatory power for national IT policy effectiveness; a result that compares with previous researches, yet contrast in magnitude. This research serves as an explanatory platform for IT policy effectiveness and a guide to policy makers and practitioners.

Secondly, there are enormous IT governance inhibitors identified in literature including organizational characteristics (Bowen et al., 2007; Atsu et al., 2010; Burger, 1993), complexity and knowledge (Cater-Steel et al., 2006), internal and external factors (van Grembergen & De Haes, 2005), managerial, human capacity and costs (Yahya, 1993; Oye, 2013; Weill & Ross, 2004), without prescribed solutions (see Table 2.3). Using these inhibitors as a checklist, four government agencies in Nigeria were studied to decipher the challenges to ITG adoption and implementation. The study based its foundation on concepts of technology adoption and organizational behavior. The study culminated in the formulation of the COKE framework which holds strong potential for aiding public sector agencies to benefit from their IT investments.

The rest of the chapter summarizes these two frameworks and discusses implications for practice, policy and theory. It ends in examining the limitations of the study and proposing areas for further studies.

5.2 Implications for National IT Policy Implementation

The implication of this research is discussed in three areas: theory, practice and policy. Sections 5.2.1 through 5.2.3 address national IT policy implementation issues.

5.2.1 Theoretical Implications

There is need for empirical contributions to informatization of societies (Taylor & Zhang, 2007) and the evaluation of outcomes of implementation of technology (Weiner et al., 2009). The results of this study have added to theorizing the informatization of societies. Firstly, the empirical analysis resulted in identifying human resources as the most explanatory indicator of national IT policy implementation effectiveness. However, this result is in contrast with the findings of Pinto and Prescott (1988) who found personnel as positive and significant but of little magnitude. A plausible explanation for this difference is that IT systems and implementations are almost solely knowledge intensive, unlike industrial era capital intensive ventures. Further, knowledge economies are hinged not on the capital base, but on accumulation and the effective use of knowledge.

A possible way of combining these variables into components to facilitate the relationships for insightful understanding of the phenomenon of infomatization of societies was actualized. Further, a methodology for combining the basics of Structuration Theory and elements of

organizational control structures was experimented with.

5.2.2 Policy Implications

Policy makers would benefit from the findings when “structuring” - borrowing from Mazmanian & Sabatier (2005) - implementing organizations. Firstly, adequate attention should be given to human resources, leadership (Hulp & Payan. 2008) and funding, the three variables found to have the most impact on national IT policy implementation effectiveness.

Secondly, strengthening the general conditions and administrative institutions of the country is imperative as the implementing organizations are impacted by wider socio-economic, administrative, political and cultural influences (Lodge, 2007; Ugwuanyi & Chukwuemeka, 2013).

Thirdly, policy could be directed at enhancing managerial prudence, and an incentive and motivation system for the human factor (Act-EDA, 2013; OECD, 2007); factors that are crucial due to the dynamics of the information technology era. In it, a systematic evaluation system for staff, management, leadership and the organization at large, with commensurate sanctioning and reward system is needed to scale performance. National statutory legislation should enshrine these for an enduring and sustained effect.

Fourthly, special funding mechanisms with effective performance evaluation systems and oversight (ACT-FANI, 2010) which includes a systematic review by specialized mediating organization to ensure that

funds are adequately provided as needed, and not misappropriated could be achieved by adequate policy.

5.2.3 Implications for Practice

The implications for practice are the availability of a solutions set that can ameliorate the challenges of IT policy implementations. Areas of sensitivity and greatest impact in the policy implementation practice are identified. In addition, practitioners can use these findings to determine which areas to commit more effort in order to achieve success.

5.3 Implications for Public Sector IT Governance

The benefits of ITG procedures include transparency, mitigation of risks, avoidance of IT service management pitfalls, accountability and effective control, attainment and sustenance of corporate business objectives, and effective use of IT investment (Gartner, 2004; Ernest & Young, 2006). The COKE framework, proposed for circumventing ITG challenges has prescriptions that have policy and organizational instruments in four components of Committees, Operations, Knowledge and Environmental.

Firstly, policy can address committee related challenges by ensuring a good percentage of professionals in the membership of ITG committee formations in organizations from the national level, including modalities for shared and individual accountability.

Secondly, operational issues can be reduced by charismatic leadership, effective training in process, communication skills and managerial competences. Policy can maintain progressive knowledge

requirements through routinely evaluated training and certification of individuals, and organizations, and ensure private and public sector knowledge sharing activities, where a platform could be provided for infractions to be penalized.

For theoretical implications, the study was able to combine theories of technology adoption and organizational behavior in understanding the movements features of these phenomena. Another implication is that the COKE framework is a conceptual contribution which adds to literature, and aids the understanding of ways of overcoming challenges of adoption of technologies. In addition, this study identified additional inhibitors to ITG implementations after confirming some of those listed in extant literature.

For practice, the COKE framework serves as a guide for practitioners to determine what measures to apply and to what circumstances by following our precautionary guide. In addition, the prescribed instruments shall solve ITG adoption and implementation dilemmas, especially for public organizations. The provision of a maturity model allows for self-assessment, and a guide to precise efforts needed to attain the next maturity phase. The prescriptions are carefully crafted for international application, regardless of the socioeconomic circumstances, yet needs peculiar tuning to local conditions.

5.4 Limitations and Suggestions for Further Study

The most challenging limitation was the difficulty at getting data for

analysis for the national IT policy implementation study. Although the small number of participants for the ITG study was a design and logical consideration owing to the fact that board and top management are the custodians of ITG, the relatively high impact of a single response is acknowledged.

The two frameworks: the COKE and FIPIS need to be extended through further application and testing in many countries under different socio economic circumstances. The relationships between the COKE components and the three elements of ITG promises to reveal understanding. In addition, the combining of the technology adoption and organizational concepts requires empirical studies to throw more light on its effectiveness.

Presidential level coordination and mediation in interagency collaborative implementation of policy was proposed. However, this study found that contextual issues which are not well understood affect their application greatly. The contextual issues of effectiveness of such ad hoc committees need to be further explored to truly reveal the details of how best to utilize such committees and in what circumstances.

This study found countries having both telecommunication and IT functions in one implementing organ are better placed in the indices. For Nigeria, there are reports of fragmentation and associated ineffectiveness arising from a separation of IT functions (Gbengasesan, 2011; The Ministerial Committee on ICT Harmonization, 2012; Amaefule, 2012).

Further studies can reveal what benefits accrue to internal organization management of all ICT issues as against fragmented management.

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Appendix A

Framework for IT Policy Implementation Structures (FIPIS) Survey [IT정책 집행 체계에 관한 조사]

Dear Respondent,

This is an academic exercise aimed at building knowledge on IT policy implementations through input from practitioners drawn from public, private and non-governmental organizations. We write to assure you of the confidentiality of your responses. It takes about 10 minutes to conclude (이 설문은 공공, 민간 및 NGO의 실무자들의 경험을 바탕으로 IT 정책 집행에 관한 지식구축을 목적으로 하는 학술적 연구입니다. 이 설문에 대한 귀하의 답변은 비밀로 보장됩니다. 설문은 약 10 분 정도 소요됩니다. 본 설문에 참여해 주셔서 감사합니다)

Thank you for contributing to knowledge

WARIOWEI, Dimie Shively

Seoul National University 서울대학교 공과대학 기술경영경제정책대학원 박사과정

***All questions are Required** * 모든 질문에 답변해주시면 감사하겠습니다

1. Please enter the name of your organization and Country * *E.g. National Informatization Agency, Netherlands* 근무하고 계신 조직의 이름과 국가명을 입력해 주세요. * 예 : 국가정보진흥원, 네덜란드

2. What is your rank in our Organization? * *E.g Director or Technical Officer* [근무하고 계신 조직에서 맡고 계신 직책을 기재해 주세요. * 예 : 이사 또는 기술 책임자].-----

3. Please name your best IT Policy/Project that you(your organization) took part in the Implementation, and its main objective * *E.g. National IT Policy/Act. To empower a society that utilizes information technologies for competitiveness* [. 귀하께서 (또는 귀하의 조직이) 집행에 참가한 IT 정책/프로젝트 중 가장 기억에 남는 것은 무엇인지, 해당 정책/프로젝트의 주된 목적은 무엇인지 말씀해 주세요. * 예 : 국가정보통신기본정책, 정보통신기본법 / 정보기술을 활용한 사회전반의 경쟁력 강화]

4. Was the implementation centralized or decentralized? *

Mark **0** for centralized, **1** for decentralized, **2** for others [집행은 중앙집중형으로 진행되었습니까 또는 분산형으로 진행되었습니까? * 중앙집중형 0, 분산형 1, 기타 2]

5. What Role did your Organization play in the named IT Policy Implementation *

Supervising Implementing Collaborating [위에서 언급한 IT정책의 집행에 관해 귀하의 조직은 어떤 역할을 담당했습니까? * 적절한 답변을 고르세요. 감독 실행 협조 기타]

6. How would you rate the success or otherwise of the Policy/Project Implementation? *

Please mark: **0** for Highly successful, **1** for moderately successful [해당 정책의 집행에 관해 어떻게 평가하십니까? * 선택해 주세요. 0 매우 성공적이다. 1 적당한 수준으로 집행되었다.]

7. How would you rate the effect of a well-researched Implementation Plan on the Success of IT Project/Policy Implementation? *

[1 is lowest rank and 5 is the highest]. 1 2 3 4 5 [면밀하게 조사된 집행계획이 성공적인 IT 프로젝트/정책 집행에 미치는 효과를 어떻게 생각하십니까? *

[1 가장 낮음, 5 가장 높음] 적절한 답변을 고르세요. 1 2 3 4 5]

8. On a Scale of 1 to 5, how would you rate the effect of Translation Of Policy Statements to Implementation Success? *

[1 is lowest rank and 5 is the highest]. 1 2 3 4 5 [정책준칙(Policy Statements)의 해석(Translation)이 성공적인 정책집행에 미치는 효과를 어떻게 생각하십니까? * [1 가장 낮음, 5 가장 높음] 적절한 답변을 고르세요. 1 2 3 4 5]

9. On a Scale of 1 to 5, how would you rate the effect of Team Formation and conflict Management on IT Policy/Project Implementation Success? *

[1 is lowest rank and 5 is the highest]. 1 2 3 4 5 [팀 구성(Team Formation)과 분쟁 관리(conflict management)가 성공적인 IT 프로젝트/정책 집행에 미치는 효과를 어떻게 생각하십니까? [1 가장 낮음, 5 가장 높음] 적절한 답변을 고르세요. 1 2 3 4 5]

10. On a Scale of 1 to 5, how would you rate the effect of Human Capacity on IT Policy/Project Implementation? *

[1 is lowest rank and 5 is the highest]. 1 2 3 4 5 [인적 역량(Human Capacity)이 IT 프로젝트/정책 집행에 미치는 효과를 어떻게 생각하십니까? [1 가장 낮음, 5 가장 높음] 적절한 답변을 고르세요. 1 2 3 4 5]

11. On a Scale of 1 to 5, how would you rate the effect of Leadership on IT policy implementation Success? *

[1 is lowest rank and 5 is the highest]. 1 2 3 4 5 [리더십이 성공적인 IT 프로젝트/정책 집행에 미치는 효과를 어떻게 생각하십니까? [1 가장 낮음, 5 가장 높음] 적절한 답변을 고르세요. 1 2 3 4 5]

12. On a Scale of 1 to 5, how would you rate the effect of Organizational Culture and previous achievements on IT policy implementation success? *

[1 is lowest rank and 5 is the highest]. 1 2 3 4 5 [조직 문화와 이전 실적이 성공적인 IT 프로젝트/정책 집행에 미치는 효과를 어떻게 생각하십니까? [1 가장 낮음, 5 가장 높음] 적절한 답변을 고르세요. 1 2 3 4 5]

13. On a Scale of 1 to 5, how would you rate the effect of timely and adequate Funding on policy/project implementation success? *

[1 is lowest rank and 5 is the highest]. 1 2 3 4 5 [시의 적절한 자금 조달이 성공적인 IT 프로젝트/정책 집행에 미치는 효과를 어떻게 생각하십니까? [1 가장 낮음, 5 가장 높음] 적절한 답변을 고르세요. 1 2 3 4 5]

14. Where several organizations with different and equal authority collaborate mediation is required. On a Scale of 1 to 5, how would you rate the effect of Mediation/Supervision on IT policy/project implementation success? *

[1 is lowest rank and 5 is the highest]. 1 2 3 4 5 [동등한 권한을 가진 여러 조직이 조정과 협력이 필요한 경우, 조정/감독이 성공적인 IT 프로젝트/정책 집행에 미치는 효과를 어떻게 생각하십니까? [1 가장 낮음, 5 가장 높음] 적절한 답변을 고르세요. 1 2 3 4 5]

15. Organizations operate as part of the national ecosystem, sharing norms, regulations, economic and political influences. On a Scale of 1 to 5, how would you rate the effect of external Political and Administrative influences on policy implementation success? *

[1 is lowest rank and 5 is the highest]. 1 2 3 4 5 [개별 국가조직들은 국가 생태계의 일부로서 규범과 규칙, 경제 및 정치적 영향을 공유하며 기능합니다. 외부적인 정치/행정의 영향이 성공적인 IT 프로젝트/정책 집행에 미치는 효과를 어떻게 생각하십니까? [1 가장 낮음, 5 가장 높음] 적절한 답변을 고르세요. 1 2 3 4 5]

16. In addition to the above factors, state other factors you consider critical to effective national IT policy implementation and kindly suggest ways by which IT policy objectives could be best achieved? 위의 요인 외에도, 주 요인은 친절 효과적인 국가 IT 정책 구현에 중요한 고려 [긍정적인 또는 부정적인 평가를 하셨다면 어떤 점에서 그런가요?]

Appendix B

SWOT

The SWOT analysis is on the implementation of FAI & NIPA in Korea, and NITP & ICT4D in Nigeria. However, where possible, a mention of cross-cutting issues such as impact on other systems of society is done.

Nigeria

Description	Nigeria	Korea
Strengths	Financial Base Support of vast population Ministry of Communication Technology to spear head the drive for Presidential focus	Government Commitment by virtue of funding & consistency by succeeding governments Availability of a strong R&D base (research support from Institutes and global tend analysis) Availability of previous experience, and analytical data to assess development based on previous years (ICT Outlook of Korea 2014) A strong supervisory culture based on routine hierarchical reporting system, and national evaluation systems Interagency collaborative implementation capability Funding sources that include R&D royalties
Weaknesses	Ineffective government backing Lack of experience Inability to forecast future trends Unavailability of a vibrant R&D landscape The legal and business landscape Administrative capacity Proficient manpower in IT industry Bogus, imprecise objectives of the NITP, and its lack of review	Multiplicity of policy implementing agencies and associated lack of cost effectiveness assessment of the policy implementation process Lack of experience The increasing disparity between the private sector and government that fuelled the successful bonding story
Opportunities	Possibility to benchmark Collaborative opportunities Possibility of a productive population Educational and R&D potential	There is still room for improvement because some indices are lagging Collaborative opportunities More implementation and

		policy exports to developing countries looking to benchmark
Threats	<p>A likelihood to be further marginalized in IT issues</p> <p>Funding that is dependent on payment of levy</p> <p>A likelihood to copy other internationally sponsored policies</p> <p>Overlapping functions and collaborative implementation of IT policy implementing agencies</p>	<p>The event of a security and infrastructural breach</p> <p>Wider economic volatility may affect intensity of investment in IT implementations</p>

Appendix C

Table for responses of interviews and inferences

Structural Issues	Korea		Nigeria		Remarks/Solutions Proposal
	NIPA	FAI	NITP	ICT4D	
Organization/Policy Details	Decentralized Agency created by combining KIEC, IITA & KIPA. Under a president and Board of Directors, it maintains high quality human capital and develops capacity. Internal administration is guided by a charter.	Decentralized NIA created from existing NCA and other affiliates. Leadership coordinated. Enormous human capacity to aid technical and project management input to FAI. Individual motivation and evaluation took national competitive traits	Centralized NITDA creation without antecedence. Headed by a CEO under a Board of Directors, the capacity issues arise in terms of the implementation format. Command and control and interlayered communication is not stringently followed, with inordinate frictions evident	Decentralized Many agencies are named for implementation, with seemingly no definitive owner. This exhumes implementation issues prominent in collaborative engagements.	Care must be exercised. Implementation model selection should be based on context of projects Strong human capacity with effective technical and administrative staff is required. Excesses of CEOs should be checked by national apparatus. Legitimacy of policies is crucial, Acts attract more value than reports.

<p>External Factors</p>	<p>By the nature of convergence, collaborative operations with other industries is necessitated for industry and economic promotion. Such is symbiotic and do not require Command. Funding is provided by national budgeting and spectrum sales. Mediation is by voluntary commitment basis. Supervision and oversight is by MKE covering books and operations and annual reporting, inspection and discipline. MKE shall manage the Fund, and where possible covered by national rules on defaults, and used for prescribed purposes.</p>	<p>Presidential Committee for mediation and coordination of interagency cooperation. Supervisory & oversight (reporting, MPA&S, Act of Public service), interlaced with presidential decrees. Funding is by budgeting but scrutinized by NIA/Committee. National work ethics, innovative and competitiveness & communication culture is permeates.</p>	<p>Supervision is under Ministry of Communications Technology. Interagency coordination does not have mediatory presidential committee.. NITDEF funds now serve both in development. An effective funding model is required.</p>	<p>Cutting across many organs, and without a mediating body, and not a voluntary committed union, leadership is envisaged to be a problem. Funding is not explicitly specified, whether it is voluntary individual contributions is not clear</p>	<p>Building collaborative bridges have not been particularly effective for NITDA. By the inherently cross-sectoral nature of IT solutions, powerful mediation like the Presidential Committee of FAI is necessary for interagency cooperation. NIPA uses it for conflict resolution for industry players. Effective supervision is indispensable. Funding should be statutorily legislated and enforced with alternate evaluation. Performance assessment of CEOs and organizations is needed. Other environmental influences require national solutions.</p>
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<p>Implementation Operation</p>	<p>Medium and long term promotion of Industry plan and its implementation by MKE is emphasized. Formation of foundations for various aspects of industry competitiveness and economy paramount. The formulation of local policy to address issues is emphatic. Specific interwoven referencing to previous acts for clear functions.</p>	<p>Implementation planning is emphasized, in basic plan & yearly for all organs. Monitoring and evaluation is part of the reporting system. Actual allocation of roles, particularly to NIA and subcommittees is evident</p>	<p>Statutory implementation plans were not provided for in the NITP thus translation and project formulation was vested on NITDA. Evaluation and monitoring against policy outcomes is not effective because of blurred boundaries of indicators and unrealistic objectives</p>	<p>It has timelines and action plans with prerequisites, the implementation plan is only superficial, without funding and specific ownership..</p>	<p>Implementation operations need to be clearly and distinctly specified in implementation plans from a long term proposition. Where these are not done, translations become dependent on agency. Monitoring and evaluation with guiding reporting is necessary.</p>
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Appendix D

Information Technology Governance & Management Survey

IT Governance is a concept that describes the strategic decision making procedure that defines how IT potentials can be coordinated to help an organization achieve its establishment objectives. This is a senior management function and it is done at the corporate level. Some frameworks and standards have been developed to guide organizations implementation IT Governance

1. Name of your Organization
2. What is your category and function
3. Does your organization operate centralized IT operations?
4. What is the staff strength in your organization?
5. What is the IT staff strength in your organization?
6. What is the cardinal mandate of your organization?
7. How are IT strategies and direction initiated?
8. In your opinion how does the initiation mechanism above affect the successful use of IT in realizing your mandate?
9. If there are well documented guidelines and procedures by which IT projects are selected from initiation to execution, how does that influence the outcomes of projects? Established guidelines was converted from percentages to Likert scale (1-5)
10. To what extend do IT projects enable your organization achieve its mandate? (was converted from percentages to Likert scale (1-5))
11. What are the prospects of improving the rating above?
12. Do you use any IT Governance framework(s) and/or standard(s) that could enhance your decision making through implementation for IT projects?
13. If answer to above question is yes, what significant gains have the use of IT Governance frameworks/standards made towards effective use of IT for the realization of your mandate?
14. What are the most daunting challenges of adopting an IT Governance framework?
15. Name the MOST important IT Project that aided achievement of your organization's Corporate goals
16. What is the scope of the project?
17. How was the project initiated?
18. How would you rate the success of the project? (Success using Likert scale 1-5)
19. What, in your opinion, is the contribution of this project to realization of corporate goals? (Corporate goal achievement, Likert scale 1-5)
20. Was there a project champion?
21. If your answer to the Project champion question is "Yes", How would you rate his/her contribution to the success of the project? Contribution of project Champion using Likert scale 1 -5)
22. What is the cost of the project?
23. How does the cost range affect the initiation and approval process of a project?

- 24 By what scale do you think effective IT Governance framework adoption and compliance could have improved the performance of this project?
- 25 Please suggest ways of improving adoption and implementation of IT Governance.

Appendix E

DRAFT QUESTIONS & REQUEST FOR ASSISTANCE FOR POLICY IMPLEMENTATION INTERVIEW.

INTERVIEW OUTLINE AND PURPOSE

The purpose of this research is to analyze “structure of implementation” as composed of Command/authority and Control (CaC) in terms of internal rules, operations and capabilities of implementing organizations, and interagency coordination and mediation strategies. The results of the interviews would eventually feed an analysis stage that would generate strategies (framework) for effective implementation of national IT policies globally. It is a purely academic exercise so you may decline on any issue that touches on sensitive classified information.

We are using the framework Act on Informatization and the National Information Technology Industry Promotion Act as case studies in Korea, and Nigeria’s National Information Technology Policy and ICT4D policy. National Information Technology Development Agency (Nigeria) and MKE & NIPA (Korea) have defining roles in the implementation, thus are the units of analysis for the study.

The concept would be discussed under four broad areas of organizational characteristics, implementation operations, external factors and implementation strategy. In addition, the effect of problem solving in uncanny circumstances would be explored as mediation and coordination.

In terms of organizational characteristics, we intend to look at the role of human capacity, leadership, organizational culture, flow of command, and its effects on national IT policy implementation outcomes. On implementation operations we are interested in internal guidelines for deciphering rationale for policy objectives (if any), resource and personnel allocation to teams, milestones and breakdown of project characteristics, implementation plan and evaluation metrics. On the effects of external factors, our interest is on interagency collaborations, funding, changes in socio-political, economic and technology and its effect on implementation.

In conclusion, I need help on mechanisms that would enable me conduct interviews with some staff who are active in the above listed areas. Further, any other secondary data sources are also important.

Thank you.

OUTLINE OF QUESTIONS

We shall use cross case examination by using Nigerian circumstance for Korean interviewees and vice-versa where necessary, to exhume strategies for solutions. The following serves as guide, not stringent questions.

- a) To what extent do the structure and capacity (leadership, command and control, human capacity, relationships between layers of authority and incentive systems) of the implementing agency impact on the outcome of policy objectives?
- b) What is the mechanism for supervision that ensures NIA/NIPA/NITDA discharges its mandate?

- c) What role did efficient and highly capable manpower play in the implementation process, and what is the composition of IT professionals and their specialty areas?
- d) Quoting relevant articles of the Acts and/or policy, ask specific questions that would enable us decipher: peculiar traits that enabled (and pitfalls that inhibited) success from a practice viewpoint. For instance: “How do you translate Article 14 (3) 3 “Support for the construction, operation and standardization of a system for the efficient distribution and common use of essential information retained by national agencies, etc.; “to projects and/programs?
- e) What role did an implementation plan and indicators for evaluation play in ensuring attainment of objectives?
- f) Where adequate and timely provisioning of funds and its prudent application to projects is lacking, how would that have affected policy outcomes? (Specific instances of this and implications)
- g) Enumerate any conflicts that arose during implementation of this Act and how they were resolved?
- h) Without a powerful mediatory team (Presidential Council with presidential powers), how different would the policy implementation landscape have been, and how would you have overcome the challenges/potentials? (Reasons for establishment in the first instance)
- i) What are the effects of a mediating organ with strong powers on the overall outcome of an IT policy implementation? What are the KSFs and pitfalls of IT policy implementation process (in terms of translation of statements, funding, conflicts, interagency collaborations, etc) in your circumstance, and what solution would you proffer?

Abbreviations and Glossary

- COKE Committees, Operations, Knowledge and External; the framework for ITG
- FANI Framework Act on National Informatization, Korea
- FIPIS Framework for Information Technology Policy Implementation Structures, the framework proposed for overcoming national IT policy implementation challenges
- ICT4D Information and Communications Technology for Development; a strategic action plan for ICT as a development engine in Nigeria
- ITG Information Technology Governance. The mechanisms for coordinating decision making and ensuring that the organization's IT sustains business objectives
- MDA Ministries, Departments and Agencies in Nigeria
- NGO Non-Governmental Organization
- NIA National Informatization Agency, Korea
- NIPA National Information Technology Industry Promotion Agency, Korea
- NITDA National Information Technology Development Agency, Nigeria
- NITDEF National Information Technology Development Fund
- OECD Organization for Economic Cooperation and Development

Leadership A FIPIS variable that describes the quality and administrative capabilities of the leader (group) that performs the role, and can be differentiated by the success at achievement of goals and efficiency

Organizational culture A FIPIS variable that means behavioral and ethical traits members of an organization imbibe by belonging to it, and differentiates one organization from another.

Structures of Implementation. The combination of organizational control elements and the imperative for establishment of functional organizations to overcome special situations

Abstract in Korean

초록

국가정보기술정책과 관리통제의 문제 및 이에 대한 도전과 제도적 보완책

나이지리아 및 대한민국의 주요 정책에 대한 국제적 관점을 기준으로

정보통신기술의 눈부신 발전에 따라, 정보통신기술은 국가 성장의 불가결한 요소일 뿐 아니라 국가의 사회경제적 가치평가 및 경쟁력 판단의 중요한 기준이 되었다. 모든 영역에서 ICT의 다양한 활용은 다양한 이슈와 도전을 야기했고, 특히 IT정책 집행, 공공분야 IT거버넌스 등에 관한 문제는 그 중요성에도 불구하고 별다른 해결책이 제시되지 못했다.

ICT는 사회, 기업과 정부에 큰 영향력을 미치고 있다. ICT의 전략적 중요성을 인식하면서, 정부는 다양한 정책을 통해 수조원에 달하는 ICT 산업을 다뤄왔고, 크고 작은 성공을 이뤄내고 있다. 정책이란 정책목적 달성을 위해 고안된 일련의 매커니즘을 체계적으로 서술한 추상적인 실행계획을 말한다. 정책의 실행요소는 계획을 실현하는 모든 활동을 포함하며, 개별 요소들은 미묘한 차이로 인해 정책의 성패에 영향을 줄 수 있는 중요한 요소이다. 기술개발의 빠른 발전 속도와 사회에 미치는 영향은 IT정책에 중요한 고려사항이다. 이와 같은 국내적 요소들은 기술선진국의 경험을 효과적으로 도입하는데 제약이 되곤 한다.

IT정책 집행에 관한 연구가 희박한 상황에서 본 연구는 정책 집행에 가이드를 제공하는 이론들과 프레임워크로 구성되어 있다. 구조화이론과 정책집행체제를 통해 개념적 프레임도 도출해내고, IT정책 실행의 구조적인 논점에 대한 국제적 흐름과 실행전략, 실행 조직의 성격, 실행운영과 외부적 요인 및 상기 조건들이 정책 결과에 미치는 종합적인 효과 등이 연구되었으며 이를 통해 IT정책 집행 구조의 체계(FIPIS)를 제안하고자 한다. 그리고 이를 나이지리아와 한국의 유명한 정책에 반추해 봄으로써, 사회경제적, 정치적 환경에 상관없이, 모든 국가에서 직면하고 있는 IT정책집행에 야기되는 문제들을 해결하기 위한 전략들을 제안한다. 이 연구는 정책효율성과 정책집행의 효율성을 제고하기 위한 활동을 지원하기 위한 일련의 지표들을 확인하는 이론적 검토를 제공한다.

이 연구의 두 번째 부분은 정보기술 관리통제체계(Information Technology Governance, ITG)를 집행하는데 야기되는 문제와 도전들을 다루고 있다. ITG는 최고경영조직에 부여된 전략적 결정과정에 따라 구체적인 사업 목적을 달성

하기 위해 IT를 조직적으로 사용하는 것이다. 그러나 ITG의 성공적 실현을 위한 장애물들이 상존함에도 불구하고, 특히 공공기관들을 위한 적절한 가이드라인이 제공되지 못하고 있다.

공공서비스는 그 사회의 기능적 요청으로 인해 요구되는 시민들의 사회 경제적 복지 향상을 위한 법률적 기능으로 구별된다. 특별히 개인적인 영역에서 검증된, 정보기술산업에서의 신중하고 전략적인 투자를 위한 ITG의 감시적 수행능력과 그로 인한 지속적인 성장들에 대한 정보들을 적절히 통합해 볼 때, 공적 영역에서도 ITG는 그 매력이 있다.

기술융합과 조직행태를 고려할 때, 본 연구는 위원회, 정부기관 등 나이지리아의 정부조직에서 정성적 사례연구에 기반해 정책을 집행할 업무 담당자들에게 도움이 되는 프레임워크를 제공한다. 또 한 이 연구는 부수적으로 리더쉽 향상과 인적역량 개발뿐만 아니라 내외 정치적 환경에 대한 대응 및 공공기관의 사회적 영향을 증대시키는 방안에 관해서도 함께 다룬다. 그리고, 국가적 기능적 부분에 대한 일정한 규정된 사안이 특정한 개별사안에 대해 명확하지 않을 경우 해당 업무를 담당할 실무자에게 가이드를 제시한다. 뿐만 아니라 학계, 정책 담당자, ITG 산업 종사자들에게도 시사점을 제시해 준다.