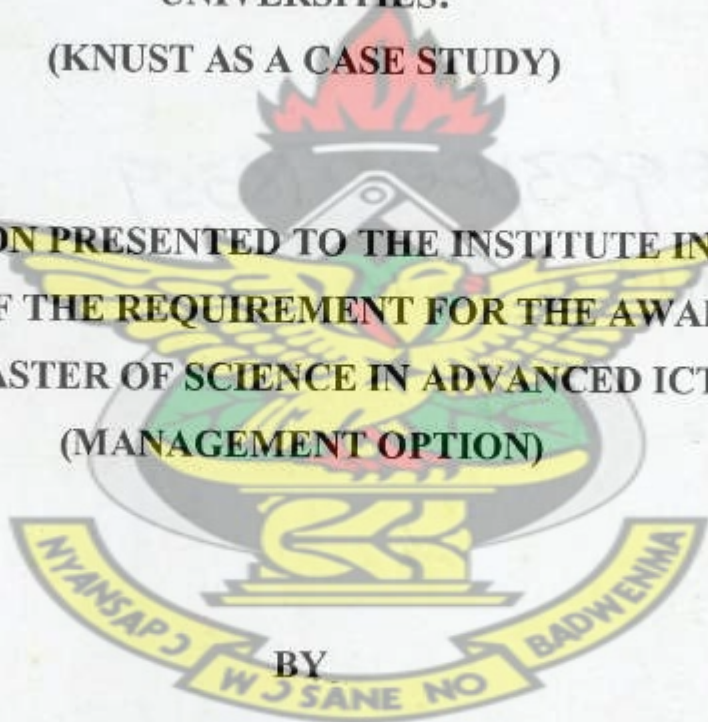# OSEI TUTU II INSTITUTE FOR ADVANCED ICT STUDIES, GHANA
AFFILIATED TO
KWAME NKRUMAH UNIVERSITY OF SCIENCE AND TECHNOLOGY, KUMASI
SCHOOL OF GRADUATE STUDIES

IMPLEMENTING IT GOVERNANCE IN GHANAIAN PUBLIC UNIVERSITIES:
(KNUST AS A CASE STUDY)

A DISSERTATION PRESENTED TO THE INSTITUTE IN PARTIAL FULFILMENT OF THE REQUIREMENT FOR THE AWARD OF THE DEGREE OF MASTER OF SCIENCE IN ADVANCED ICT STUDIES (MANAGEMENT OPTION)

BY

GADDAFI ABDUL-SALAAM
BSc. COMPUTER ENGINEERING (Hons.)

OCTOBER, 2009

DECLARATION

The work described in this thesis was carried out at the Osei Tutu II Institute for Advanced ICT studies, Ghana. I declare that the study was under taken independently and it is original copy. It is not replication of any work either published or unpublished. All references made in this study are duly acknowledged.

21-10-09

....
Abdul-Salaam Gaddafi

....
Signature

....
Date

Certified by:

....
Prof. Dr. Ir. Maarten Looijen
(Supervisor)

....
Signature

....
Date

ii

DEDICATION

I dedicate this study to my parents Alhaji Abdul-Salaam Ahmed and Adamu Abdul-

Salaam.

ACKNOWLEDGEMENT

My greatest gratitude goes to the Almighty God for making me go through this dissertation.

I am thankful to my supervisor Professor Dr. Ir Maarten Looijen, the rector of Osei Tutu II Institute for Advanced ICT Studies, for his guidance, criticisms, comments and contributions throughout this project. Prof., working with you has been an excellent learning experience. I am also grateful to Professor Vasil Fournadjiev, the Academic Officer, and indeed all my lecturers at the Institute for their contributions.

Special thanks go to Mr Sulemana Mahaweya, Mr. Abass Alhassan and Dr. Nafiu Amidu for their generous assistance in writing this project. I also thank Mr. Nii Armah Tagoe and Mr Oswald for their assistance. Finally, my heartfelt gratitude to my parents, for the foundation stone they laid for me in life and for my education in particular.
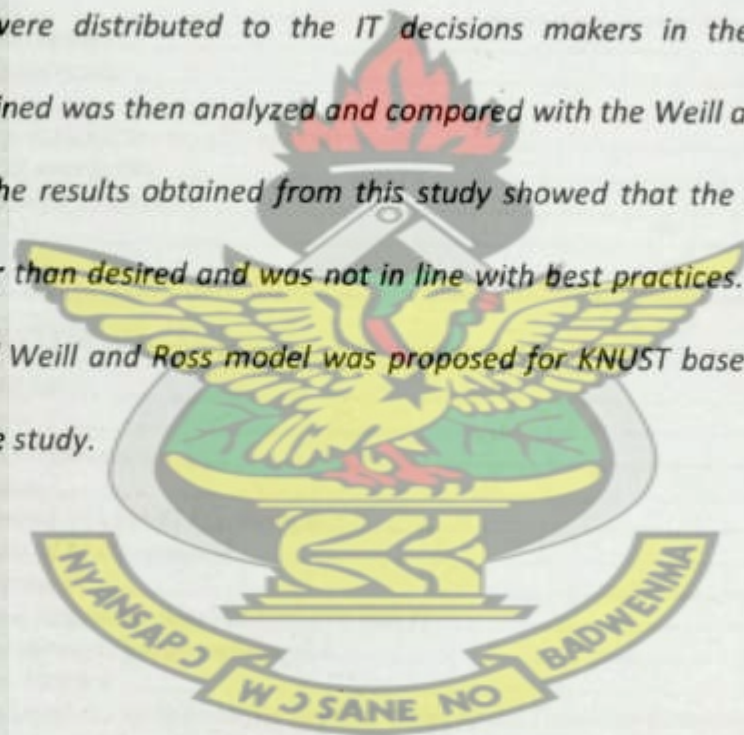
Notwithstanding the acknowledgements made above, all omissions and commissions remain my sole personal responsibility.
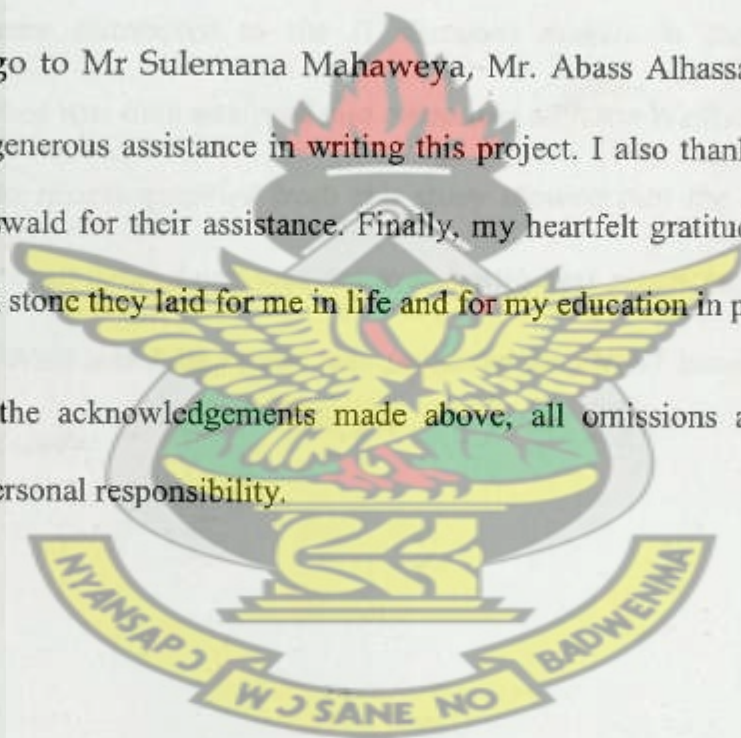
ABSTRACT

Relatively new in Ghana, IT Governance is defined as specifying the framework for decision rights and accountabilities to encourage desirable behavior in the use of IT; this is in order to guarantee that the IT system of an organization sustains its goals and strategies. This intends to guide and control the IT function in order to add value to the organization and to minimize IT risks. The purpose of the research was to determine the current IT governance in KNUST, determine if KNUST IT governance was in line with standard best practices and to find suitable IT governance model for KNUST. Questionnaires were distributed to the IT decisions makers in the university. The information obtained was then analyzed and compared with the Weill and Ross model of IT governance. The results obtained from this study showed that the IT governance of KNUST was lower than desired and was not in line with best practices. And therefore a modified form of Weill and Ross model was proposed for KNUST based on information provided from the study.

v

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF ABBREVIATIONS

KNUST   Kwame Nkrumah University of Science and Technology

INFORMATION Information Technology within the context of this dissertation
TECHNOLOGY (IT): is used in the broad sense and encompasses both the notions of
         Information Systems and Information Technology, including
         the technology and management of the same.

UE   University Executives

EC   Executive Council

ITGI   Information Technology Governance Institute

DEFINITIONS

IT Governance: Is specifying the framework for decision rights and accountabilities to encourage desirable behavior in the use of IT.

Decision Right: This refers to the person or group who makes final IT decisions, and may or may not need participation from other people.

Input Right: This refers to the person or group who participates in the proceedings of making IT decisions, but do not take part in the final decisions.

IT principles: High level statements about how IT is used in the University.

IT architecture: Set of policies and rules for the use of IT and determines the way business will be done (including data, technology, and applications).

IT infrastructure: Strategies for centrally coordinated IT capability (both technical and human), shared throughout the University as reliable services, (e.g., network, help desk, shared data).

IT application needs: Specifying the business need for purchased or internally developed IT applications.

IT Investment and prioritization: Decisions about how much and where to invest in IT including project approvals and justification techniques.

University Executive: A group of or individual senior executives (i.e., CXOs). Includes committees comprised of senior University executives.

IT Leaders: Individuals or group of IT executives and professionals.

Federal: C level executives and at least one other business group (e.g., department/unit leaders) - may include IT executives.

IT Duopoly: IT executives and one other group.

Anarchy: Each individual user.

CHAPTER ONE

INTRODUCTION

1.0   Introduction

This chapter gives the reader an introduction to the subject matter – IT governance. The background of the research, the problem statement and the purpose of the thesis are explained. Furthermore, the research questions are displayed; the delimitations and the thesis disposition are also outlined.

1.1   Background

It is a reality that, these days many organizations would not exist or be able to function easily without the use of IT (Peppard, 2004), and its impact can be felt in all aspects of the business right along the value chain (Tallon, 2000). Originally, IT was used only to automate manual processes, and its function was generally a supportive (Ward, 2002) and reactive one (Porter, 1985). Nowadays, IT has a more essential role, with most organizations having already reaped the benefits of automation (Davies, 1999), they are looking for IT to aid competitive advantage in a diverse and changing marketplace (Luftman, 1999; Peppard, 1999; Peppard, 2004; Ross, 1996). This implies that the use of IT has taken a strategic focus, and many organizations, especially those heavily reliant on information (Porter, 1985), are very much dependent on IT to help achieve this (Davies, 1999; Peppard, 2001; Peppard, 2004; Ward, 1999).

However, the IT baseline costs are significant and rising (Marshall et al., 2004). It has been reported that they make up about 75 percent of the operating budget and represent approximately four percent (4 percent) of gross revenue (Gartner-Group, 2003). IT underpins an organization's operations to such an extent that an IT related failure or

1

breach can precipitate a significant financial loss or the development of serious legal risks and issues for an organization (Abu-Musa, 2002; Cockcroft, 2002). Little wonder then that organizations are recognizing the need for increased control of IT via IT governance. In similar way to corporate governance, IT governance within organizations can only occur when there is high level involvement. To reiterate the words of Bird (2001). *Executives manage organizations by virtue of the authority delegated to them by those who govern.* By implication management and governance are separate activities and governance requires the highest level of direction, leadership and control.

Researchers were examining and addressing the fundamental concepts of IT governance even as early as the 1960's, but it was not until the late 1990's that the notation of Information system (IS) governance frameworks and then later IT governance frameworks started to feature prominently in the academic literature (Brown, 2005). Due to the dynamic and highly competitive business environment nowadays where firms spend around 3-5 percent of their revenues each year on IT just to stay competitive, good IT governance is no longer nice to have but it is a must have (Webb, 2006; Yayla, 2008). It is rarely a matter of just working harder or longer to extract greater value from IT, instead it requires development of new techniques for designing, implementing and involving different people in the IT decisions (Weill, 2000). High-level IT governance models are therefore being created and today IT governance is high on the agenda in many organizations (Haes, 2008).

Many leading organizations use IT governance to pursue gains in efficiency, accountability, and regulatory and other forms of compliance (Lee, 2008). In the words of Guldentops (2004a) in a study on "Governing Information Technology through COBIT" it is revealed that to be able to implement effective IT governance, organizations need to assess their current performance and be able to identify where and how improvements can

2

be made. And that the use of maturity models greatly simplifies this task and provides a structured approach for measuring how developed the IT governance process and the processes managed within IT are against a consistent scale(Guldentops, 2004b).

All the issues described above point out the need for a specific focus on IT governance that will ensure desirable behavior in the use of IT. A desirable behavior   in the words of Weill (2004) is one that is consistent with the organization's mission, strategy, values, norms and culture, such as behavior promoting entrepreneurship, sharing and reuse or relentless cost reduction. Good IT governance draws on corporate governance principle to manage and use IT to achieve corporate performance goals. Effective IT governance encourages and leverages the ingenuity of all enterprise personnel in using IT, while ensuring compliance with the enterprise's overall vision and principles (Weill, 2004).

In the same study mentioned above, Weill asset more executives are realizing that if IT is to extend its value to their respective institutions, they need to have some kind of IT governance framework in place. But the problem is that a lot of the managers are not clear about what IT governance is all about. If alignment between the University and IT strategies is to be strengthen, understanding IT governance can help executives to solve the innovation paradox: achieving business and IT agility and compliance with laws and regulation.

Joel Etzler (2007) in a thesis work on IT governance state that, it is no longer enough to look at talented individuals to manage IT projects, the projects regularly need to be structured as sustainable processes, where documentation and measuring is standardized. The thesis further revealed that many organizations acknowledge this need and put more effort into standardizing the IT structure, policies and procedures and focus on aligning

3

them to the business objectives. This practice is called IT governance and will be further explained and discussed throughout this report.

In 2006 the IT governance Institute (ITGI) conducted a global survey drawing on 695 organizations. The survey reports that 87 percent of participants considered IT crucial to the delivery of their business vision and strategy (ITGI, 2006). With this major IT dependency comes a huge vulnerability that is inherently present in complex IT environments. There is a wide spectrum of external threats that accompanies the risk factor, such as errors, omissions, abuse, fraud and cybercrime (Grembergen, 2004). For the above mentioned reasons, most organizations are vulnerable to IT risks and IT governance helps mitigating this risk (Grembergen, 2003).

1.3   Problem Statement

IT is now used for most of KNUST's academic and administrative business processes. This has led to millions of cedis being spent to acquire IT facilities, including hardware equipment, software applications and the Internet services. Decisions in acquiring these facilities are made by individuals, departments and units. At times critical decisions that affect the entire University community are taken by these individuals or groups who feel that they have the right to do so by virtue of their positions. There are occasions when a unit or department struggles to acquire a technology from outside the University, whiles as a matter of fact this technology could have been acquired internally. The more disturbing issue is that, the authorities that take these decisions are more often not held accountable if those decisions they take tend to fail. This problem is due to the fact that there are no well defined mechanisms in place as to who is able to make critical decisions and who is held accountable for the failed decisions. This problem leads to inaccurate investment decisions in IT and thus waste of the scarce resources available to the institution. Based on this background, the core of the study is to investigate and come out

4

clearly with defined structure on how KNUST's IT governance should be. In the hope that when it is properly implemented will not only enhance efficiency, but will align IT decisions to conform to desirable behaviors and best practices.

1.4   Research Questions

Even though several studies have examined the issue of IT governance, the particular IT governance model to use very much depends on the organization the study is conducted. In light of this, this dissertation contributes to the IT governance literature by examining three issues within KNUST. The three questions considered are:

1. What is the current IT governance situation in KNUST?

2. How does KNUST IT governance compare to the Weill and Ross Model of IT governance?

3. What is the best way to govern IT in KNUST?

The answers to these questions may aid the University to increase effectiveness in IT governance, by identifying critical success paths to follow in taking IT decisions.

1.5   Objectives

Based on the above, the broad objective of the study is to examine IT governance. However it is specifically intended to:

(i)   Determine the current IT governance of KNUST.

(ii)   Determine if KNUST's IT governance is in line with standard best practices.

(iii)   Find suitable IT governance direction for KNUST and other institutions.

1.6   The focus of research and key assumptions

This study is to solve the IT governance problems in KNUST. The underlying conviction is that a solution to this problem lies within the academic domain. IT related problems are not the only problems facing KNUST and solving the IT related problems will not mean that all problems in the KNUST have been solved. It is the intention of the researcher that, if a study of the IT problem provide a solution, and other problems are solved in similar or different ways, then in the end, most if not all, of the problems in KNUST would be solved based on the findings from the various studies. The use of consultancy services is very useful in the new IT era and should be encouraged. This does not, however, preclude seeking solutions from academia where high reputation in the area of management of Information Systems has been established. The problem domain and focus are depicted in Figure 1.1.

Figure 1.1: Focus of the Research

1.7   Delimitation and Scope

The thesis is a high level assessment and is limited to gathering information on the IT decision making processes in KNUST. The study covers what is being done in respect of

Weill and Ross framework, not processes outside those borders. The project is also limited to KNUST which is further described in latter section.

1.7   Organization of the study

The study is organized into five chapters, chapter one contains the introduction as well as the background whereas in chapter two the relevant literature was reviewed. Chapter three describes the methodology and four describes analysis and discussion of the results. The final chapter contains summary and policy recommendation.

1.8   Summary

This chapter laid the foundation for this thesis by giving an outline of the problem (formulated in Section 1.3) related to IT governance in KNUST. The limitations of the study were also stated. The chapter stated the research problem and formulated the research questions and objectives. A brief statement of the purpose and overall objective of the research and an outline of the rest of the theses were presented. The theses proceeds with the approach applied to finish the study.
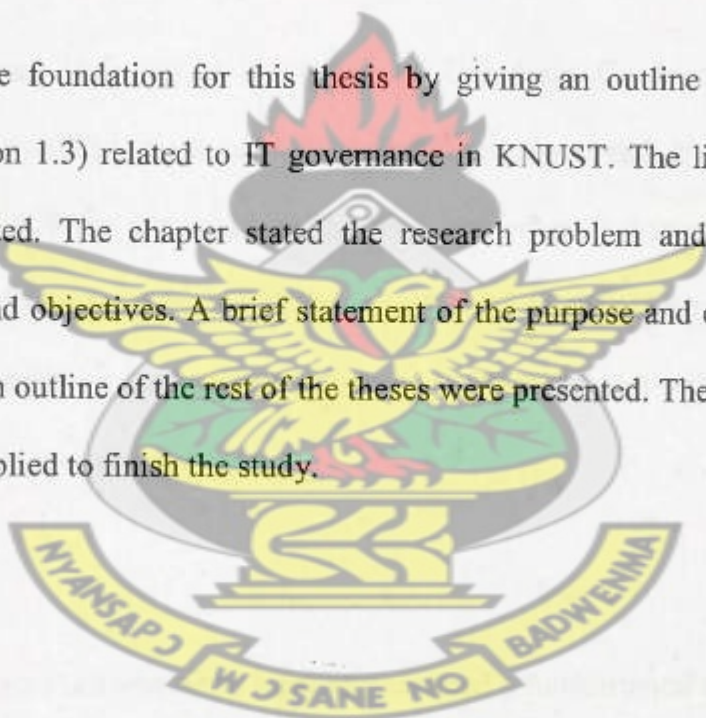
CHAPTER TWO

LITERATURE REVIEW

EMPIRICAL REVIEW

2.0   Introduction

In this chapter, the relevant theories and the latest research on IT governance are presented to form a supporting frame for this study.

2.1   What is IT Governance?

Briefly, IT governance is a subset discipline of Corporate Governance focused on information technology (IT) systems and their performance and risk management. More complete definitions will be presented in the first part of this chapter, followed by a clarification of the differences between IT governance and IT management, and the links between IT and corporate or institutional governance. The last part will explain why to look at IT governance is now mandatory.

2.1.1 Definition

IT and its use in business environments have experienced a fundamental transformation in the past decades. The influence of IT in organizations led professionals and academics to conduct research and developed theories and best practices in this emerging knowledge domain, thus resulting in a variety of IT Governance definitions, some of which are formulated below:

According to the IT Governance Institute (2007), IT governance is the responsibility of executives and the board of directors, and consists of the leadership, organizational

8

structures and processes that ensure that the enterprise's IT sustains and extends the organization's strategies and objectives.

Weill and Ross (Weill, 2006) define IT governance as specifying the decision rights and accountability frameworks to encourage desirable behavior in using IT. IT governance reflects broad corporate governance principles, while focusing on the management and use of IT to achieve corporate governance goals.

Van (Grembergen, 2003) also explain IT Governance as the organizational capacity exercised by the Board, executive management and IT management to control the formulation and implementation of IT strategy and in this way, ensure the fusion of business and IT.

Although the above definitions differ in some aspects, they are all mainly focused to the same issues, such as the link between business and IT. The definition of the Weill and Ross will be used as reference for the study.

2.2   IT Management versus IT governance

IT Governance is all about setting policy, direction and decision rights together with appropriate monitoring and oversight to provide assurance that the right outcomes are being achieved.

IT management however implements the policies determined by the governance body, and makes decisions targeted at realizing the policies set by the governance body. IT managers are therefore appointed by IT governors.

In other words governance determines who makes the decisions while management is the process of making and implementing the decisions (Weill, 2000). While managers

9

administrate, develop, implement, and monitor business strategies on day-to-day-basis, governors deal with overall organization policy, culture, and direction (Webb, 2006).

Governance is mostly restricted to only providing the infrastructure for making decisions, and the decision making process itself is not included. Making decisions is generally accepted to be an aspect of management, which is separated from governance. Sohal and Fitzpatrick (2002) have illustrated that in their research on governance in Australian government (see Figure 2.1). So there is a clear distinction between governance and management, suggesting that governance enables the creation of a setting in which others can manage their tasks effectively. This makes IT Governance and IT Management two separated entities.

"This does not undermine the importance and complexity of IT Management, but whereas elements of IT Management and the supply of IT services and products can be commissioned to an external provider, IT Governance is organization specific, and direction and control over IT cannot be delegated to the market" (Grembergen, 2003).
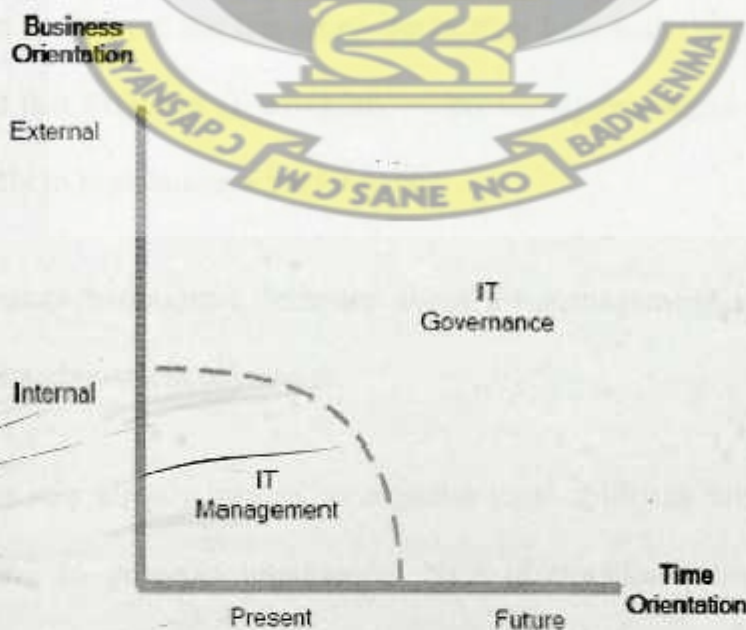
Figure 2. 1: IT Governance versus IT Management (A.S. Sohal, 2002).

10

Figure 2.1 seeks to explain that IT Management is focused on the management of present IT operations and the internal effective supply of IT products and services. IT Governance however is much broader and concentrates on performing and transforming IT to meet present and future demands of the business (internal focus) and the business' customers (external focus).

2.2.1 The Role of IT Governance

Although a few organizations have had success in this area—creating effective programs for determining IT priorities, establishing reliable procedures for oversight and defining meaningful metrics to hold IT accountable for its performance—they appear to be in the minority these days (Drogou, 2007).

According to (Melnicoff, 2005), in a study titled "Is there a smarter way to approach IT Governance?" IT governance can be less complex than many executives realize— and it is surely far too important to ignore. It further that depending on the industry, IT budgets can account for 10 percent of total revenues— or more. The same research revealed that if that money is not well spent, the impact on the bottom line, both direct and indirect, can be dramatic. And that Effective IT governance increasingly represents an investment that contributes directly to high business performance.

Good IT Governance harmonizes decisions about the management and use of IT with desired behaviors and business objectives.

IT is essential, as it is already integral to organizations' ability to fulfill their missions, and is only going to grow in importance. New information technologies bombard enterprises with new business opportunities.

IT is Expensive, as Weill (2006) explained, that to get the highest return on your IT investment, you have to make consistently better decisions regarding IT. And that's where governance fits in; some estimates suggest that only 20% percent of IT spending is visible in the budget.

IT Governance is critical to organizational learning about IT value. Effective governance creates mechanisms through which enterprises can debate potential value and formalize their learning. It also facilitates learning by formalizing exception process.

IT value depends on more than good technology. The roles of business leaders and technologists become increasingly intertwined to the extent that IT decision making necessarily becomes joint decision-making for optimal performance.

According to Milnicoff (2005) the right IT governance ensures that senior executives spend the appropriate time and effort working on the IT agenda. And that in the short term, reconsidering IT governance can be a way to save money. It also revealed that through centralization and consolidation, large organizations can save millions of dollars. The study further held the assertion that in the long term, the right IT governance structure can help focus an organization on the strategic value of information technology and ensure that controls are in place to receive maximum benefits.

Drogou (2007) held that the need for assurance about the value of information technology, the management of IT-related risks and the increased requirements for control over information are now understood as key elements of enterprise governance. The study adds that the value, risk and control of IT constitute the core of IT governance and it's the most important factors in generating business value from IT. The same study posits that IT can deliver on the longtime management paradox of leveraging and encouraging the

12

ingenuity of all the enterprise's people while ensuring compliance with the overall vision and principles.

2.3 How to Govern IT

Senior management should be knowledgeable about IT to make better decisions. IT governance is a tool to help them assess the efficiency of the IT organization towards the alignment between business and IT (Drogou, 2007).

2.3.1 Strategic alignment between business and IT

According to McKinsey (2006b) in his article "Managing IT for speed, scale and innovation", reveal that the trend over the past decade to centralize IT has cut costs, simplified vendor management, strengthened compliance with corporate standards, and improved the way organizations manage the demand for and the delivery of their IT services. Communication between business and technology leaders is often tightly structured to comply with new controls aimed at reducing waste and ensuring that everyone requesting IT services is treated equitably. When business executives grow less familiar with technology's evolving capabilities and technologists grow less familiar with the business, collaborative problem solving becomes more difficult.

In the same research work as above, McKinsey held that Isolating IT makes it harder to leverage technology that could change the business model. And that process innovations enabled by new technologies frequently help organizations leap ahead of their competitors, but when IT is constrained too tightly, no funding is available for investment, and a risk-averse culture can develop.

To create a competitive advantage, IT should help the Universities improve their speed, efficiency, or develop new learning methods rapidly. Decisions about IT investments should be based on whether they will confer an advantage in desired behavior.

To McKinsey (2006a) again, in a study entitled "Divide and Conquer: Rethinking IT Strategy" it revealed that too often, organizations design their IT strategies around what they are currently doing (existing assets, programs, and capabilities) and fail to focus on what they could be doing. The usual reason according to him is that, the starting point of the IT strategy process is improving current service levels and reducing the cost base. The alternative is for the leaders of business units and IT to base their strategies on their aspirations. Such strategies can be implemented in parallel with strategies for improving current capabilities but call for IT leaders who can work creatively with their business counterparts.

This approach works best when business unit leaders are as knowledgeable about deploying IT to win as they are about deploying capital or human resources. Raising the "IT IQ" of business leaders often delivers a significant payback. In addition, the IT leader supporting the business unit should be savvy enough about it to have insightful ideas on how IT can help it win (McKinsey, 2006b).

2.3.2 Choose the right governance model

Strategy rarely offers clear direction for development of stable IT infrastructure and business process capabilities. To best support its strategy, the organization should define an operating model. The model describes how an organization wants to thrive and grow, and provides a more stable and actionable view of the organization than strategy. The right model provides a clear road map for IT governance decision-making and a guide for

14

assigning accountability and responsibility among C-level executives, business unit executives and the chief information officer. A major goal is to ensure that senior executives spend the appropriate amount of time and effort working on setting and managing the IT agenda—but no more.

The Weill and Ross governance model adopted in this study is based on integration and standardization criteria. They claim that an operating model is the necessary level of business process integration and standardization for delivering goods and services to customers. And that Standardization of business processes and related systems means defining exactly how a process will be executed regardless of who is performing the process or where it is completed. According to them, standardization can result to increase in throughput and efficiency. They further stipulate that Integration links the efforts of organizational units through shared data. And that the benefits of integration include efficiency, coordination, transparency, and agility.

2.4   Theoretical Review

There are a growing number of models and frameworks that address one or more aspects of IT governance. Some of them are discussed below.

2.5   COSO – Committee of Sponsoring Organizations of the Treadway Commission

The COSO committee is a US private sector initiative, formed in 1985 to identify the factors that cause fraudulent financial reporting in corporations and make recommendations to reduce these incidents. COSO is sponsored and funded by several accounting associations and institutions, such as the American Institute of certified Accountants, and the American Accounting Association.

According to Selig (2008), the COSO framework defines internal control as a process, impacted by an organization's Board of Directors, management and other personnel, designed to provide reasonable assurance regarding the achievement of objectives in the following category.

- Effectiveness and efficiency of operations
- Reliability of financial reporting
- Compliance with the applicable laws and regulations

2.6 COBIT – Control Objectives for Information and Related Technology

Developed by the IT Governance Institute (ITGI) and is affiliated organization, the Information Systems Audit and Control Association (ISACA), COBIT, provides a control framework linking thirty-four IT processes to four domains – planning and organization; acquisition and implementation; delivery and support and monitoring, all of which are related to specific IT resources and metrics.

COBIT defines high level business controls and audit objectives for the processes, linked to business objectives and supports these with detailed control objectives to provide management assurance and/or advice for improvement. The control objectives are further supported by audit guidelines, which enable auditors and managers to review specific IT processes, to help assure management where control is sufficient or to recommend change (Selig, 2008).

2.7 ITIL – IT Infrastructure Library

IT service Management and delivery is about maximizing the ability of IT to provide services that are cost effective, and meet or exceed the needs and expectations of the business to :

- Reduced the cost of operations

- Improve service quality

- Improve customer satisfaction

- Improve compliance

The ITIL framework provides an effective foundation for higher quality IT service Management, and delivery processes and disciplines(Selig, 2008).

2.8   CMMI - Capability Maturity Model® Integration

CMMI focus on the disciplines of software, systems and hardware process improvements that provide a set of practices that address productivity, performance, costs and overall customer satisfaction, and is being applies to a broader range of initiatives (software development, systems engineering, product development, etc.) (Selig, 2008).

The purpose of CMMI is to provide guidance for improving an organization's processes and its ability to manage the development, acquisition and maintenance of products and services.   CMMI provides a structure that helps an organization to assess its organizational maturity and process area capability, established priorities for improvement and guide the implementation of these improvements.

2.9   Bases for Weill and Ross model

The above models such as COBIT, focus primarily on control aspects of improving IT governance. ITIL approach IT governance in terms of IT service Management and delivery, while CMMI looks at IT governance in term of systems and software development. Their approaches to IT governance were different from the objectives of the research - to determine who made IT decisions, and how those decisions were made. Weill and Ross accountability framework precisely dealt with the fundamental decisions domain that every IT organization should consider and the groups or individuals who

have the rights and/or qualified to make inputs into those decisions domain. This was the information that informed the choice of the Weill and Ross model as most suitable for this study.

KNUST

CHAPTER THREE

METHODOLOGY

3.0 Introduction

In this chapter, a description of the Weill and Ross Accountability framework is made. The model has become the de facto standard for IT governance in a number of research projects (Weill *et al.*, 2004) and thus was used in this thesis. It further outlines steps taken to complete the research.

3.1 The Weill and Ross Framework

The Weill and Ross Framework – consist of three key components: IT Decisions domain, IT governance group and IT Implementation mechanism. Each component poses a set of questions about IT, the answers to which form major ingredients of the governance issue.

3.1.1 IT Decisions Domain

Under the first component - IT decisions domain, the first step of any IT governance is to determine the IT decisions domain. Weill and Ross identified five key areas to describe the span of IT in any organization. They are;

- IT Principles
- IT Infrastructure
- IT Architecture
- IT Application needs
- IT Prioritization and Investment

IT principles – involves high level statements on what the role of IT is to the University and these should have strategic alignment with the University's mission and objectives. IT principles main concern hinge on addressing three major questions;

- What the role of IT should be to the University,

- What desirable behaviors are required to use the IT? And

- How IT will be funded?

For example: use industry standards, acquire or develop application systems etc. High

level decisions about the role of IT concerned with how to use IT to create business value.

IT Infrastructure – involves strategies employed to provide base foundation or centrally

coordinated services for the University's IT capability; e. g., network backbone, shared

data, etc.

IT infrastructure addresses questions like;

- What infrastructure services are most critical to achieving the University's

  strategic objectives?

- What infrastructure services should be implemented enterprise-wide, and what are

  the service level requirements of those services?

- What is the plan for keeping underlying technologies up to date?

IT Architecture - is an integrated set of technical choices to guide the University in

satisfying core needs and requirements. IT architecture addresses the following questions:

- What are the core processes of the University and how are they related?

- What information drives these core processes?

- What technical capabilities need to be standardized enterprise-wide to support IT

  efficiencies and to facilitate process standardization and integration?

- What technology choices will guide the enterprise's approach to IT initiatives?

IT Application Needs – this is specifying the IT systems and services developed or

locally built used by the University

University application needs respond to the following questions:

- What IT applications with broad University implications are required?

- How can IT needs be addressed within architectural standards?

- When does an enterprise or unit need justify an exception to the standards?

IT Investment and Prioritization – determine decisions about how much and where to invest in IT including project approvals, justification techniques, and post implementation continued review of value to the organization.

IT investment and prioritization react to the following questions:

- What process enhancements are strategically most important to the University?

- Is the current IT portfolio consistent with the University's strategic objectives?

- Do actual investment practices reflect the relative importance of enterprise-wide versus college/unit investments?

3.1.2 IT Governance Groups

The second component – IT Governance group, describes the second step in designing IT governance. That is, establish what groups (or individuals) should have the rights to making IT decisions and those qualified to make inputs into IT decisions. The IT governance groups appropriate to a University setting like KNUST are:

- University Executive

- IT Leaders

- Federal

- Duopoly

- Anarchy

21

University Executive – refers to senior executives who take responsibility and are accountable for the general University performance. Typically, this group includes the vice-chancellor and the senior administration of the University. Their position would be to institute general principles on how IT will be used and managed, to approve significant IT investments, and to ensure compliance with regulatory requirements.

This group would work with the University council in areas appropriate to council responsibility.

IT Leaders - This group consists of IT professionals, managers and administrators who have specific responsibility for IT. This would include the CIO, senior administrators in Computer Centers and managers of IT units in colleges or units in the entire University. Their role would be to use their technical and business knowledge to frame technology issues for executive decision making or to establish technical architecture and infrastructure to support the University needs.

Federal – this is a committee with membership drawn from all facets of the University. The committee is a governance group responsible for drawing in the needs of the University community and articulating an overarching understanding of University directions. The value of federal groups in IT governance is to enable diverse voices, provide a forum for the expression of needs and requirements, and as a mechanism to make community recommendations or provide informed input to the decisions of others. Federal groups are key to a collaborative, diverse and mutually supportive IT capacity.

IT Duopoly - this is a partnership formed when a local unit (department, college, etc.) forms agreement with one or more of the IT Leadership groups to make decisions regarding IT within the scope of that unit's responsibilities. Duopolies are formed

frequently. The role of duopoly groups is to advance the use of IT in particular unit in a manner that is consistent with the overarching standards, architecture and infrastructure.

Anarchy - this is when end users go their own ways to take certain IT decisions. The most obvious example would be an individual researcher making decisions about deploying IT in support of a research initiative. While these decisions typically must comply with University standards and architectures, often these are individual actions with little or no oversight. This is supported where individual users require very rapid IT responses.

3.1.3 IT Implementation Mechanism

The last component of the framework marks the third step of IT governance. It deals with how the IT decisions are formed and enacted. The University must decide detailed decision responsibility and accountability and how alignment will occur. The Weill and Ross framework identifies three categories of mechanisms to specify how the decisions made will be enacted.

- Decision-making structures - deals with who is responsible and accountable. Example, committees.

- Alignment Processes – is ensuring that decisions made are effectively implemented to meet desired outcome. Examples include IT investment and evaluation processes and service-level agreements.

- Communication Approaches – deal with how information will be disseminated throughout the University. Examples include meetings and announcements.

3.2   Accountability Framework

By combining the IT Decisions Domain with the IT Governance Groups an "accountability framework" or matrix is formed. The framework illustrates what groups are responsible for what kind of decisions or inputs. Table 3.1 below shows the original Accountability framework by Weill and Ross. This study adopted the model and made some modifications (see table 3.2). While Weill and Ross mention Business monarchy and IT monarchy, this study talks about University Executives and IT Leaders. Furthermore, the modified model excluded the Feudal group. This was done because of was not applicable in the study area. However, the Federal, Duopoly and Anarchy groups were maintained.

Table 3. 1: Sample IT Governance Accountability Framework

Governance Archetype	Decision Domain									
	IT Principles		IT Architecture		IT Infrastructure Strategies		Business Application Needs		IT Investment	
	Input	Decision	Input	Decision	Input	Decision	Input	Decision	Input	Decision
Business Monarchy										
IT Monarchy										
Feudal										
Federal										
Duopoly										

25

Table 3. 2: Modified IT Governance Accountability Framework

IT DECISIONS DOMAIN										
	IT Principles		IT Infrastructure		IT Architecture		IT Applications Needs		IT Investment And prioritization	
IT GOVERNANCE GROUP	Input Rights	Decision Rights	Input Rights	Decision Rights	Input Rights	Decision Rights	Input Rights	Decision Rights	Input Rights	Decision Rights
University Executives										
IT Leaders|										
Federal										
Duopoly										
Anarchy										

Source: 2003 Massachusetts Institute of Technology, Sloan Center for Information Systems Research [Weill 2004]. Modified

26

The descriptions made in the IT Decisions Domain; IT principles, IT Infrastructure, IT Architecture, IT Enterprise Application needs, and IT Investment and Prioritization, all of which affect the University community were explored and enabled the researcher to identify whether and what IT decisions were made in KNUST. The researcher was guided by the IT Governance Groups to identify the individuals and/or groups who decided on or had input to IT decisions, and whether those people took responsibility or were held accountable for the IT decisions they took.

3.3 Study Area

1. The University's establishment was based on scientific and technological foundations, to provide scientific and technological solutions for the country and Africa in general. This provided the researcher with a reason to want to know how, as a scientific institution, it ought to plan and govern its IT.

2. Many donor communities, from within Ghana and overseas, have vested interests in IT activities, and support the University. This research is, therefore, of great interest to donors, as it will enable them to know how well their donations are utilized.

3. The study would provide baseline information on IT Governance in KNUST since it is the first of its kind to be undertaken in the University.

3.4 Historical perspective

KNUST was founded in 1941 to provide higher education with special reference to science and technology and to act as a catalyst for the technological development of the country. The University has a student population of 24,000 and academic staff of 700 distributed among six colleges; College Agriculture and Natural Resources, College of

Architecture and Planning, College of Art and Social Sciences, College of Engineering, College of Health Sciences, and College of Science.

The University Information Technology Services (UITS) unit is led by the IT consultant who reports jointly to the Vice-Chancellor and the Pro Vice-Chancellor. The UITS' mandate includes to;

- Accelerate the expansion and modernization of ICT facilities in the University.
- Institutionalize the culture of use of ICT in the University.

3.5   Sampling selection and survey population

The study population covered all senior executive of the University including the Vice-Chancellor, the Pro Vice-Chancellor, Registrar, Finance officer, and the six provosts. Others were the University of Librarian, Internal Auditor, three IT consultants, etcetera. In all they constitute a sample size of twenty-five. This category was chosen because they take the day to day policy decisions and for that matter IT decisions in the University. Another category was IT Leaders. The reason for choosing the IT leaders was because they had the first hand information about IT matters in the various units and they dealt directly with the University executives on matters to deal with IT decisions in their units.

3.6   Survey Design

The survey design was self administered questionnaire. It was divided into two sections, and contained a total of twelve questions. A self administered questionnaire was the most appropriate method as IT governance was relatively new to respondents and they needed to understand the questions before completing the questionnaire. Instances where respondents said they did not have time, the researcher still elicited information by deliberately engaging them in face to face interview and made sure the dialogue went

28

along the same line as the questionnaire. The questionnaire was designed to ensure there was no ambiguity about what was being asked. (See APPENDIX 1).

3.7 Data collection

Data collected was mainly from primary sources. As mentioned, the self-administered questionnaire method was used to elicit information from relevant individuals, among the University executives, IT leaders and some directors. The approach ensured that all questions were answered and responses received. It also saved time, reduced call backs and questionnaire mortality rate.

Purposeful sampling technique was used. This was adopted because the study focused or targeted some groups in the University. Hence it was a suitable technique for the work.

Though there were other techniques available such as the simple random sampling, cluster sampling, etcetera, they were all less suitable for the study. The simple random sample technique was too simple to acquire the desired results. The purposeful random technique used for the study also had the demerit of being biased; nevertheless, it was much suitable for the work since the study had a target.

3.8 Notes on completing the survey

-IT governance knowledge questionnaire
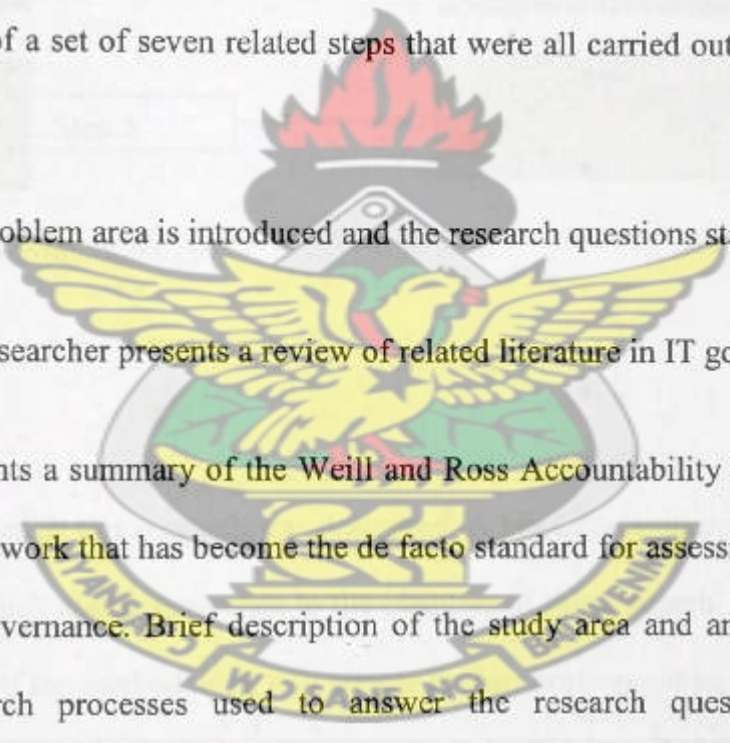
Section A questions were general questions regarding the respondents understanding of IT governance. These were the first questions in the questionnaire which intended to focus the respondent.

Respondents were asked five questions about their level of involvement in participating in IT decisions in KNUST in terms of IT Principles, IT Architecture, IT Infrastructure, IT Application needs and IT Investment and Prioritization. These questions sought to know whether respondents were part of IT decision- making, so that the researcher could infer whether management had left IT in the hands of IT professionals or they considered IT as one of the functional units of the University.

3.9   Research Steps

The thesis consists of a set of seven related steps that were all carried out to conduct the research.

Step 1:   the problem area is introduced and the research questions stated.

Step 2:   the researcher presents a review of related literature in IT governance.

Step 3:   presents a summary of the Weill and Ross Accountability framework; the framework that has become the de facto standard for assessing institutional IT governance. Brief description of the study area and an outline of the research processes used to answer the research questions are also explained.

Step 4:   the Weill and Ross framework is used to assess KNUST current IT governance. Results are analysed and discussions are made.

Step 5:   summary of findings and policy recommendations are made and finally, concluding remarks about the study are given.

The research steps described in section 2.1 is represented in figure 2.1.

Introduction	Step 1		Chapter 1 [Exploring problem area]
Literature Review	Step 2		Chapter 2 [Presentation of applicable model]
Methodology	Step 3		Chapter 3 [Research approach]
Results & Discussions	Step 4		Chapter 4 [Assessment of KNUST & proposal model]
Conclusion & Recommendations	Step 5		Chapter 5 [Conclusion and policy and Recommendations]
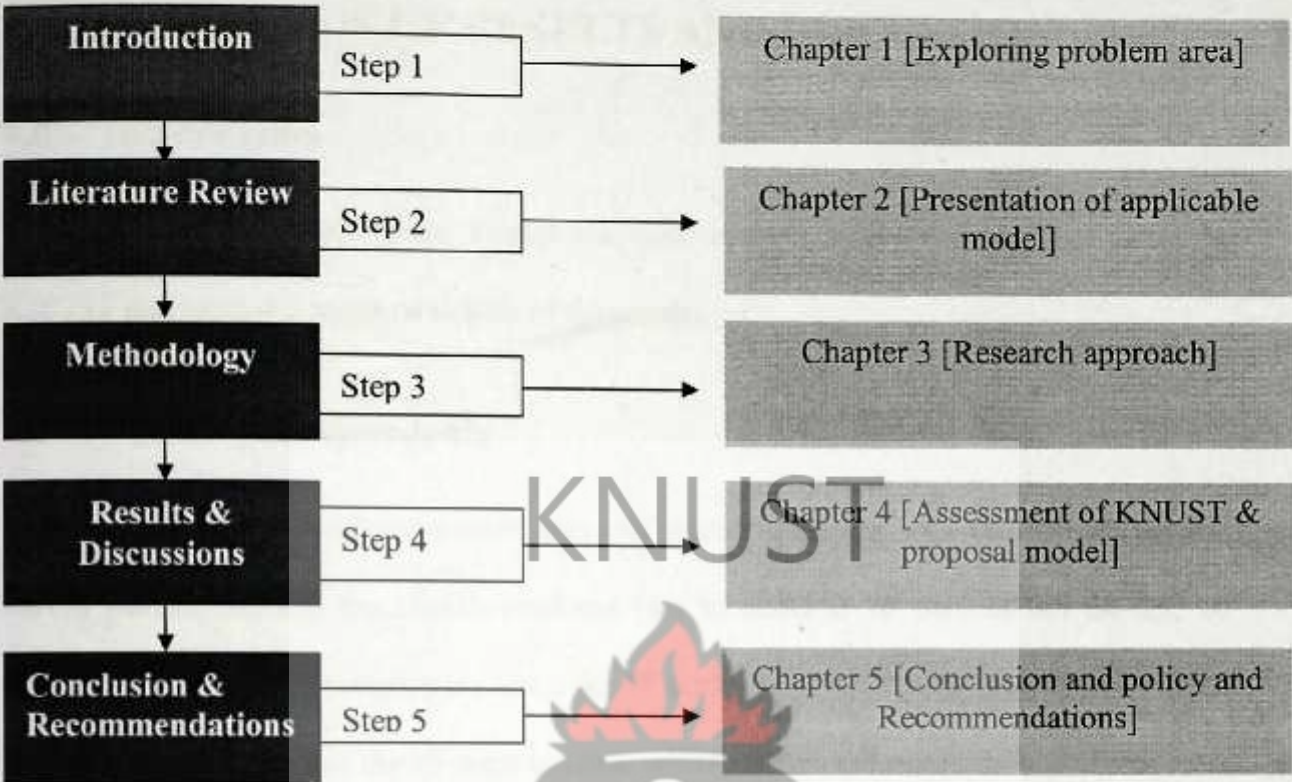
Figure 2. 2: Research Methodology

3.10 Summary

The methodology used in this research was described. A brief description of the stages of the methodology, which also corresponds to the chapters of this research, was given. The details of the stages of the methodology will appear in their corresponding and subsequent chapters.

CHAPTER FOUR

ANALYSIS OF RESULTS AND DISCUSSIONS

4.0   Introduction

As mentioned, Weill and Ross framework was used to assess the IT governance in KNUST and table 4.2 contains details of the results.

4.1   Profile of Respondents

In total, 19 out of 24 questionnaires sent out were completed and returned during the survey period, making the overall response rate to stand at 76 percent. Of the 19, 10 constituting about 43 percent were from the IT leaders and 9 (i.e. 47 percent) were from the executives. Also 3 of the 19 were women, while the rest were men.

4.2   KNUST Current State of IT Governance

For the University as a whole, the researcher studied both who held decision rights and input rights for each of the five decisions domains. Figure 4.1 shows summary of the results. The numbers in the cells show the percentages respondents attributed to the various decision domain with respect to those who take them.

Table 4. 1: Perception of KNUST staff on how IT is Govern in KNUST?

		IT Decisions Domain								
		IT Principles		IT Infrastructure		IT Architecture		IT Application Needs		IT Investment and prioritization	
		Input Rights	Decision Rights	Input Rights	Decision Rights	Input Rights	Decision Rights	Input Rights	Decision Rights	Input Rights	Decision Rights
IT GOVERNANCE GROUP	University Executives	74	100	47	79	21	58	53	74	68	90
	IT Leaders	90	32	100	53	95	58	90	47	74	32
	Federal	5	5	21	5	5	5	21	11	26	5
	Duopoly	16	11	11	16	16	16	21	20	11	11
	Anarchy	26	5	5	0	0	0	5	0	5	5

The numbers in each cell are percentages of respondents on how IT is governed in KNUST.

33

4.2.1 IT Principles: The IT governance group that had input rights and decision rights in IT principle decisions was examined in question 2.1. Seventy four percent (14/19) of the respondents said the University Executives (UE) had input rights to IT Principles, while hundred percent (19/19) said UE had decision rights in determining the IT Principles of the University. Ninety percent (17/19) of respondents said IT leaders had input rights to IT Principles and 6 out of 19 constituting 32 percent said IT leaders had decision rights to the IT Principles in the University. Of the total respondents, only 1 (5 percent) said Federal group had input rights to IT Principle decisions and the same response was for the decision rights. About 16 percent (3/19) of the respondent said Duopoly group had input rights to IT Principle decisions, whilst about 11 percent (2/19) of the respondents said this same group had decision rights. Finally, about 26 percent (5/19) said the Anarchy group had input rights and only about 4 percent (1/19) said this group had decision rights. The breakdown of the results is summarized in table 4.1.

4.2.2 IT Infrastructure: question 2.2, sought to survey the views of respondents on how IT Infrastructure is governed in KNUST. Of the 19 respondents, about 47 percent (9/19) said the University Executives group had input rights to IT infrastructure and 79 percent (14/19) said the same group had decision rights. All of the respondents (100 percent) agreed that IT Leaders had input rights in the IT Infrastructure domain of the University. However, only about half, 53 percent gave the decision rights to IT leaders. In addition, about 21 percent (4/19) said the Federal group had input rights to IT Infrastructure, whilst only about 5 percent (1/19) agreed that the Anarchy group had decision rights in IT Infrastructure decisions. The results further revealed that about 11 percent (2/19) said the input rights was by the Duopoly group, whilst about 16 percent (3/19) said the Duopoly group had decision rights. The study again indicated that about 5

percent (1/19) of the respondents held the view that Anarchy group had input rights but no response was given for this group on decision rights.

4.2.3 IT Architecture: in response to question 2.3 as to who had input and decision rights in IT Architecture, about 58 percent of the respondents agreed that both UE and IT Leaders had input rights whilst 21 percent and 95 percent of the respondents gave decision rights on IT Architecture to UE and IT Leaders respectively as shown in table 4.1. About 5 percent of respondents said the Federal group had both input and decision rights to IT Architecture decision domain. Furthermore, about 16 percent of the respondents agreed that the Duopoly group had both input and decision rights. There was however no response recorded for the Anarchy group in both input and decision rights.

4.2.4 IT Application Needs: Response to question 2.4 which sought to find the view of respondents on how IT Application needs are in KNUST showed that about 43 percent of them feels that UE had input rights to IT Application needs whilst about 74 percent (14/19) feels UE had decision rights. Another 17, representing 90 percent of the respondents said the IT Leaders had input rights to IT Application needs, while 9 respondents representing 47 percent said the IT Leaders had decision rights to the same IT decision domain. The results again showed that 21 percent (4/19) said the Federal group had input rights, while 2 out of 19 (11 percent) said the Federal group had decision rights in terms of the IT Application needs of the University. About 21 percent said the Duopoly group had input rights and only 16 percent they had decision rights. Whilst 5 percent agreed that the Anarchy group had input rights no response was recorded for the decision rights. This is as shown in table 4.1.

4.2.5 IT Investment and Prioritization: respondents were asked in question 2.5 as to their views on who has input and decision rights in terms of IT Investments and

prioritization. The results revealed that about 68 percent said the UE had input rights to making IT Investment and Prioritization decisions whilst 90 percent said UE had decision rights. Another 74 percent (14/19) said IT Leaders had input rights whilst about 32 percent (6/19) said the IT Leaders had decision rights. Again of the total number of respondents, about 26 percent (5/19) said the Federal group had input rights but only about 5 percent said the group had decision rights. For the Duopoly and Anarchy groups 11 percent and 5 percent said they have both input and decision rights respectively in IT Investment and prioritization.

4.3   Comparing KNUST IT Governance with Industry Standards

4.3.1 IT Principles: IT Principles is about defining the strategic role that IT plays in a unit of an organization. In the case of KNUST which operates the collegian system with supporting service units, IT principles of each unit differs according to their business operations. Example, college of Architecture and the University health service operates on different IT principles based on their core businesses. Therefore, decisions on inputs as to the IT principles of the units should emanate from the unit rather than a centralized authority. The results of the present study however showed that much of the input and decision rights are held by the University executives and IT leaders, as shown in table 4.1. This is in sharp contrast to the findings of Weill (2004) in which top overall IT governance used the duopoly model which is two party arrangements where decisions represent agreements between IT leaders and one business units. Therefore inputs and decision rights on IT principles should be based on duopoly model in KNUST.   The findings that KNUST IT Leaders contribute 90 percent in IT principles is on the higher side, since according to Weill (2004), IT leaders' contribution was only about 18 percent among the 256 studied firms. Inference can therefore be made that from the above; KNUST's IT principle decisions are not in line with industry standard.

4.3.2 IT Infrastructure: In the area of IT infrastructure, the results showed that the University Executives had 47 percent input rights and 79 percent decision rights. Even though the IT Leaders had 100 percent input rights, they had only 53 percent decision rights. This is in contrast to best practices where IT infrastructure strategic decisions are often made by the IT professionals only. In a study by (Weill, 2004), about 60 percent of the enterprises studied use IT Leaders to make IT Infrastructure decisions. Their findings further stated that in many enterprises, significant input comes from federal and duopoly arrangements. This was however not the case in KNUST where majority of the input rather came from IT leaders. The deduction made by this study then is that KNUST ways of making IT infrastructure decisions is below industry standards.

4.3.3 IT Architecture: From the results of the present study, both University Executives and IT Leaders had equal input rights of 48 percent, but IT Leaders contribute significantly, that is, 95 percent to decision rights in IT Architecture decisions. This high percentage is in line with popular practice, since the IT architecture is about defining technical integration and standardization of technical requirements and thus viewed as a technical rather than a strategic issue. The findings therefore suggest that IT governance with respect to architecture conforms to top level performers as indicated by Weill (2004). It can also be inferred that senior executives in KNUST feel confident that the IT professionals can translate KNUST business principles into architecture. IT professionals in organizations are known to be comfortable taking responsibility for IT architecture decisions. In a study among 256 enterprises it was found that over 70 percent of the enterprises rely on IT Leaders to make IT architecture decisions (Weill, 2004). It therefore revealed that from the discussion above that KNUST IT architecture decisions are in line or in conformity with best practices. (see figure 4.1)

4.3.4 IT Application Needs: basically KNUST as an institution is divided into academic, administrative and services units and therefore have different business application needs. It is therefore expected that each unit have greater input rights to their business application needs. The results of the study showed that the University Executives had 53 percent input rights and 74 percent decision rights. The IT Leaders had a whopping 90 percent input rights and a fairly 47 percent decision rights. This contrasts with popular best practice, where according to Weill, top performing enterprises and institutions make business application needs decisions based on the federal model. Inference from the findings is that KNUST IT application needs decisions fall below industry standards. (see figure 4.1)

4.3.5 IT Investment and prioritization: the results show that KNUST IT investment and prioritization decisions are largely in the hands of the University Executives with 68 percent input rights and 90 percent decision rights. This reflects the growing awareness that these decisions involve business tradeoffs and the business decision makers realize they need to determine which businesses will receive IT support and which will not (Weill, 2004). While the IT professionals think that they should be allowed to make IT investment and prioritization decisions; the University executives think otherwise, and limit the IT professionals' decision rights to 32 percent as per the results. But the IT Leaders still have significant input rights of 74 percent. The input rights seem to be on the high side, but this is understandable as the University Executives are still not very well informed about IT issues. They will have to continue to partner with the IT Leaders for the IT Investment and Prioritization decisions. The current practice as per the findings of this study is still in line with industry practice, as according to Weill (2004). See figure 4.1.
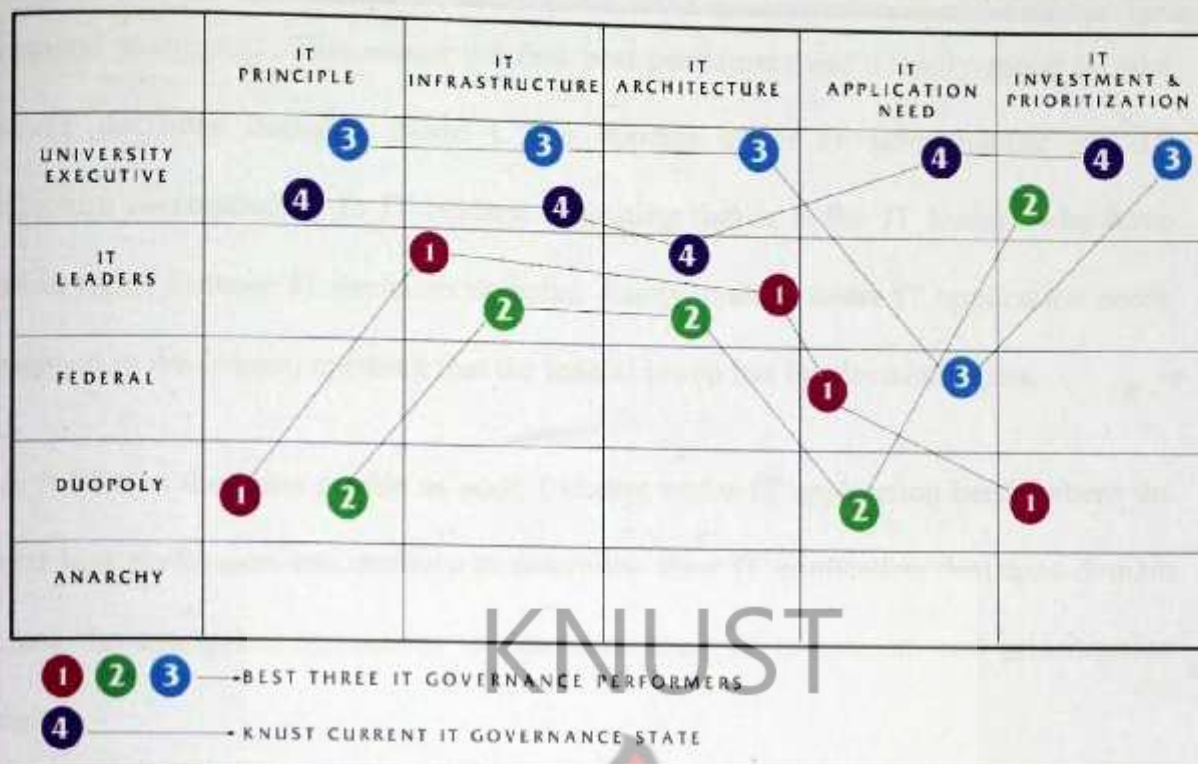
Figure 4. 1: Comparing KNUST current IT governance with three top performers.

Figure 4.1 depicts a visual comparison of the current IT governance state of KNUST with the IT governance states of the first three best performers according to Weill (2004). Nodes 1, 2, and 3 represent the first, second and third best performers profiles as arranged by Weill (2004).The researcher uses node 4 to represent IT governance profile of KNUST and offers a step by step explanation to the visual profile below.

Node 4 appearing under IT principle, IT infrastructure, IT application needs and IT investments and prioritization correspond to University executives. This means the study revealed that in KNUST it is the University executives who have the decision rights in those IT decisions domains. Node 4 under IT architecture corresponds to IT leaders. This means that in KNUST it is the IT leaders who have the decision rights in IT architecture decision domain.

Node 1 is found under IT principle and IT investment and prioritization and both correspond to duopoly. This means the first best performers use duopoly group to take those IT decisions domains. Node 1 also appears under IT infrastructure and IT architecture corresponding to IT leaders, indicating that it is the IT leaders who have decision rights in those IT decisions domains. Lastly, node 1 under IT application needs correspond to the federal, meaning that the federal group has the decision rights.

Node 2 follows the same profile as node 1 except under IT application needs where the second best performers use duopoly to determine their IT application decisions domain and use the enterprises executives to determine their IT investment and prioritization domain.

Node 3 under IT principle, IT infrastructure, IT architecture and IT investment and prioritization correspond to enterprise executives, showing that in the third best performers' category, it is the executives that have the decision rights. Whilst it is the federal group that has the decision rights in the case of IT application needs.

4.5 Assumptions of the comparison

The assumption behind the comparison here is that the University uses the same components of IT as organizations in the industry. The five components of IT are all the hardware with relevant basic software and application software, datasets, procedures and persons involve in the control/support of the system or business processes. Each organization should therefore strive to achieve good governance.

4.6 Proposed IT governance model for KNUST

This section addresses the third research question, *how should IT be governed in KNUST?* Weill and Ross IT Governance model will be modified for KNUST.

The researcher recognized that KNUST needed IT governance framework that would be in conformity with popular best practices and that will fit with KNUST context. The new framework should have among others, the responsibility to understand the value and impact of IT decisions and be communicative to the University as a whole. The IT governance model proposed by the researcher is represented in table 4.1 below.

Table 4. 2: KNUST Proposed IT Governance framework

IT GOVERNANCE GROUP	IT DECISIONS DOMAIN									
	IT Principles		IT Infrastructure		IT Architecture		IT Applications		IT Investment and Prioritization	
	Input Rights	Decision Rights	Input Rights	Decision Rights	Input Rights	Decision Rights	Input Rights	Decision Rights	Input Rights	Decision Rights
University Executives										▆
IT Leaders										
Federal		▆		▆		▆		▆		
Duopoly	▆		▆		▆		▆		▆	
Anarchy										

▆ = decision rights responsibility, ▆ = input rights to decisions

42

4.6.1 Explanation of the proposed model

The proposed model suggests that KNUST should use Duopoly model for both the input rights and decision rights to determine the University's IT Principle. The reason is that since the University uses the collegian system, each college or unit will be allowed to set their IT principles in collaboration with the IT department in line with the business operations of the unit. By this, the units will define the IT Principles to suite their business processes. (Refer to table 4.1).

The proposed model also suggest that the University uses the Federal model for input rights and IT Leaders for decisions rights for both IT Infrastructure and IT Architecture decisions. This is in view of the technicalities required to make informed decisions in these areas. This is shown in table 4.1.

The proposed model further suggests that KNUST uses duopoly for IT application needs. This is because the University is decentralized into the collegian systems with few synergics. Therefore using duopoly will work well since there is less need to coordinate across business units. (See table 4.1)

The proposed model finally suggests that the University Executives have to uphold a balance between sustaining the University's goals and controlling budget. Decision rights for IT Investments and prioritization must therefore be tightly held as it is now by the University Executives with minimal input rights from the IT Leaders as shown in table 4.1.

	IT PRINCIPLE	IT INFRASTRUCTURE	IT ARCHITECTURE	IT APPLICATION NEED	IT INVESTMENT & PRIORITIZATION
UNIVERSITY EXECUTIVE					✔
IT LEADERS		✔	✔		
FEDERAL					
DUOPOLY	✔			✔	
ANARCHY					

KNUST

✔ ──────▶ PROPOSED IT GOVERNANCE FOR KNUST
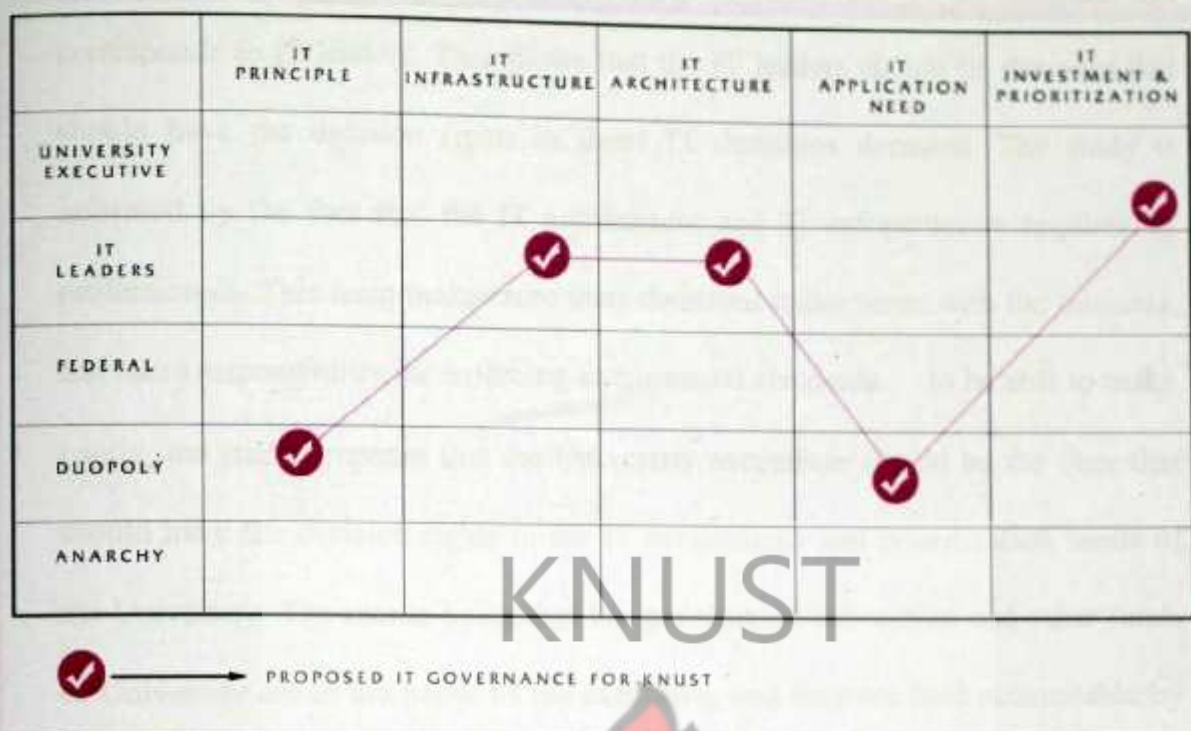
Figure 4. 2: Profile of proposed IT governance model for KNUST

In figure 4.2, the study gives a step by step profile of the proposed IT governance model suggested for KNUST.

- The study chooses to use the correct (√) sign for no particular reason than to indicate that he believes it's the best form of IT governance for KNUST.

- The correct sign under IT principle and IT application needs correspond to duopoly. Here the researcher is proposing that in KNUST it should be the duopoly group who should have the decision rights in IT principle and IT application needs decisions domains. The choice of this group is informed by the fact that in the words of Weill (2004), it enables joint decision making between the business leaders and IT professionals, but remain focused on the specific and often local issues facing the business leaders. Besides, the use of the duopoly to make the two decisions conforms to what is practice by top IT governance performers.

- The correct sign again appears under IT infrastructure and IT architecture and corresponds to IT leaders. This shows that the IT leaders should be the ones that should have the decision rights in those IT decisions domains. The study is informed by the fact that the IT architecture and IT infrastructure requires IT professionals. This team makes sure their decisions make sense with the business, and takes responsibility for enforcing architectural standards.   to be able to make

- Lastly, the study proposes that the University executives should be the ones that should have the decision rights in the IT investments and prioritization needs of the University. The reason being that the government subvention and other funds of University are in the hands of the executive, and they are held accountable by the government of Ghana its use. It is therefore prudent that they be critical and controls every IT investment to conform to the desirable behavior of probity and accountability.

- According to Weill (2004), many factors explain why federal models are not effective for decision making, including slower speed and tendency to overly compromise and trade away effectiveness. He contend that Federal decision making often takes longer as more people and stages are involved, and there is less agreement on the objectives for the decision. He concluded by observing that the poorer governance-performing enterprises use federal arrangements for their decision making. This account for why the study did not use the federal group for any of the five decision areas.

- The study does not also encourage the use of the anarchy group for any of the five IT decisions in the proposed model because with such a style, there will be no standards in any IT decisions. This can be problematic as IT professionals will find it difficult troubleshooting the systems.   It will also be costly and time

45

consuming as the University will have to deal with multiple vendors with compatibility issues.

4.6.2 Critical Success Factors for the Proposed Model

Effective IT governance is built on three critical pillars. These critical pillars include: leadership, organization and decision rights, flexible and scalable processes, and the use of enabling technology (Selig, 2008). In particular, for the proposed model to work effectively, the following critical factors should be considered.

- There should be high level involvement of the University executive council (EC) on IT governance issues as they ultimately set the strategic direction for the university.

- There should be senior management commitment with IT steering committees. Roles and responsibilities should be well defined with respect to each of the IT governance components and processes, including the steering and review hierarchies for investment authorizations, resolution of issues and formal periodic reviews.

- The executive council should set up an IT Governance Committee (ITGC) with membership from faculty, administration and students, who will partner with the IT professionals to implement the proposed IT governance model.

- There should be training for the ITGC, so that members can understand the IT Governance Model and their role in the process. They must be interested in the topic and dedicated to ensuring that the use of IT within KNUST is consistent with campus policies, standards, guidelines, and procedures as they relate to University-wide solutions.

- Processes should be flexible, scalable and consistently applied, with common sense.

4.7   Summary

The chapter outlined the results as it was in the field and judged the results against the best industry performers where some IT governance gaps were detected. The study patched the gaps by proposing a clearly defined framework for KNUST. The study continues below with concluding remarks and some policy recommendations for the way forward.

CHAPTER FIVE

CONCLUSION AND POLICY RECOMMENDATIONS

5.0 Introduction

Based on the analysis above in chapter 4, the following are summary of the findings of the study.

5.1 Summary of findings

As mentioned before the study adopted Weill and Ross model of IT governance and resulted in the following findings;

i. The university executives made KNUST's IT principle decisions; this was not in line with industry standard.

ii. The university executives made KNUST's IT infrastructure decisions, this fell out of industry best practices.

iii. The IT leaders made KNUST's IT architecture decisions; this was in line with industry performance.

iv. The university executives made KNUST's IT application needs decisions; this method fell below industry standards.

v. The university executives again are the ones who made IT Investment and Prioritization decisions; this was in line with industry practice.

5.2 Recommendations

IT Governance must aim for IT principles that should define desirable behavior for both IT professionals and IT users in the University. In support of this the following recommendations are made:

- The proposed model in this study should be implemented as this will go a long way to reduce cost, enhance efficiency, and align IT with the University's objectives.

- IT Principle decisions should be made jointly between the University executives and the IT leaders-duopoly, since that will help set the way IT should be use to much with the strategic direction of the University.

- It was revealed that the University executives decided on IT Infrastructure decisions. This is not good and should be avoided. The IT leaders should be made to decide on the type of Infrastructure to use, since they are technically good to do so.

- On IT Architecture, the findings revealed that IT Leaders made the decisions. This is good and should be encouraged.

- The University executives again played predominant role in making IT Application needs decisions. This is unhealthy and should be avoided. It is recommended that IT Applications needs should be jointly taken with all the interest groups so that in the end, users of the applications cad specify what they want and how they was them.

- The study revealed that the University executives determined the IT Investment and Prioritization decisions. This is absolutely in the right direction and should be encouraged. Since they hold the University purse and are held accountable, they should control the cash flow.

5.3   Conclusion

In this study the IT governance of KNUST was examined and compared with industry standards using the Weill and Ross model. The results showed that there were some differences between KNUST and industry best practices. KNUST was using University

Executives to make IT principle decisions, IT Infrastructure decisions, IT Application needs and IT Investment and Prioritization decisions. The University however used IT Leaders in making IT architectural decisions.

As compared to the best practices (Weill and Ross model), the current IT governance situation in KNUST was below the desired level as the first best (as ranked by Weill, 2004) IT government performers used the Duopoly group in making IT Principle decisions, IT Leaders in making both IT Infrastructure and Architecture decisions and Federal or Duopoly in making IT Application needs, and the University Executives in making IT Investment and Prioritization decisions.

The use of the University Executives in defining IT Principles and IT infrastructure corresponds to the third best performers according to Weill's rankings. The use of University Executives to decide on IT Application needs even fell short of the last (i.e. third) performers' level. However, use of the University Executives for IT Investment and prioritization decisions was in conformity with the second and third best practice.

After identifying the gap that existed between KNUST and the industry best practices, the study proposed a framework of IT governance for KNUST. The researcher believes that when the proposed framework is adopted, KNUST will enormously optimize the use of its resources and the use of IT in the University will be desirable enough to meet the best of industry standard.

REFERENCES

A.S. Sohal, PF (2002) IT governance and management in large Australian organizations. *International Journal of Production Economics*(75): 94-112.

Abu-Musa, A, A. (2002) Computer Crimes: How can you protect your computerised accounting information system? *Journal of American Academy of Business* **Vol. 2**(No. 1): 91-101.

Bird, F (2001) Good governance: A Philosophical discussion of the responsibilities and practices of organizational governors. *Canadian Journal of Administrative Studies*: 298-312.

Brown, EA, Grant, G.G. (2005) Framing the frameworks: A review of IT governance research. *Communications of the Association for Information Systems* **Vol. 15**: 696-712.

Cockcroft, S (2002) Gaps between policy and practice in the protection of data privacy. *JITTA: Journal of Information Technology Theory and Application* **Vol. 4**(No. 3): 1.

Davies, A, Elvin, R. & Ward, J. . . (1999) Managing IT enabled change - a new approach. In: *Management Focus* Vol. 12. Cranfield: School of Management Magazine.

Drogou, E IT Governance at a Financial Institution. Master Thesis, 2007.

Etzler, J IT governance According to COBIT

KTH, Stockholm, Sweden, 2007.

Gartner-Group (2003) IT Spending: How do you stack up? Vol. 2009: Gartner Group.

Grembergen, H, Guldentops E., (2003) Strategy for Information Technology Governance.

Grembergen, VW, Haes D.S. , Guldentops, E. (2004) Structures, Processes and Relational Mechanisms for IT Governance. In: *Strategies for Information Technology Governance*, In Grembergen, V.W. (Ed.) edn: Idea Group Publishing.

Guldentops, E (2004a) Governing Information Technology through COBIT. In: *Strategies for Information Technology Governance*, In Grembergen, V.W. (Ed.) edn: Idea Group Publishing.

Guldentops, E, . ,, Strategies for Information Technology Governance, (2004b) Governing Information Technology through COBIT, In Grembergen, V.W. (Ed.) edn: Idea Group Publishing. —

(2008) Analysing the Relationship Between IT Governance and Business/IT Alignment Maturity. *Proceedings of the 41st Hawaii International Conference on System Sciences*; Hawaii

ITGI (2007) Vol. 2009: IT Governance Instititute.

ITGI (2006) *IT Governance Global Status Report - 2006.* IT Governance Institute.

(2008) A Study of the Causal Relationship between IT Governance Inhibitors and Its Success in Korea Enterprises. *Proceedings of the 41st Hawaii International Conference on System Sciences.*

Luftman, JB, T (1999) Achieving and sustaining business-IT alignment. *California Management Review* 42(1): 109-122.

Marshall, P, McKay, J (2004) Strategic IT Planning, Evaluation and Benefits Management: the basis for Effective IT Governance. *Australasian Journal of Information Systems* **Vol. 11**(No. 2): 14-26.

McKinsey (2006a) Divide and Conquer: Rethinking IT Strategy.

McKinsey (2006b) Managing IT for speed, scale and innovation

Melnicoff, RM (2005) Is there a smarter way to approach IT Governance? *Accenture Research and Insights.*

Peppard, Jl, 11(3):, (2001) Bridging the gap between the IS organization and the rest of the business: plotting a route. *Information Systems Journal* **11**(3): 249-270.

Peppard, JW (1999) Mind the gap: diagnosing the relationship between the IT organisation and the rest of the business. *Journal of Strategic Information Systems* **8**(1): 29-60.

Peppard, JW, J. (2004) Beyond strategic information systems: towards an IS capability. *Journal of Strategic Information Systems* **13**(2): 167-194.

Porter, MM, V. (1985) How information gives you competitive advantage. *Harvard Business Review* **63**(4): 149-160.

Ross, JW, Mathis Beath, C. & Goodhue, D.L. (1996) Develop long-term competitiveness through IT assets. *Sloan Management Review* **38**(1): 31-42.

Selig, GJ (2008) *Implementing IT Governance: Apractical Guide to Global Best Practices in IT Management* First Edition edn. Van Haren publishing.

Tallon, PP, Kraemer, K.L. & Gurbaxani, V. (2000) Executives' perceptions of the business value of information technology: a process-oriented approach. *Journal of Management Information Systems* **16**(4): 145-173.

Ward, JE, R. (1999) A new framework for managing IT-enabled business change. *Information Systems Journal* **9**: 197-221.

Ward, JP, J. (2002) *Strategic Planning for Information Systems*. John Wiley & Sons: Chichester, West Sussex.

(2006) Attempting to Define IT Governance: Wisdom or Folly? *Hawaii 39th International Conference on System Sciences*; Hawaii.

Weill, Ross, (2006) *Enterprise Architecture as Strategy: Creating a Foundation for Execution*. Harvard Business School.

Weill, P (2004) *Don't Just Lead, Govern: How Top-Performance Firms Govern IT*.

Weill, P, Ross, J (2004) *IT Governance*. Harvard Bussiness School Press: Boston, MA.

Weill, P, Ross, J.W., (2000) *IT Governance - How Top Performers Manage IT Decision Rights for Superior Results*. Harvard Business School Press.

(2008) Determinants of CIO Compensation Structure and Its Impact on Firm Performance. *Proceedings of the 41st Hawaii International Conference on System Sciences*; Hawaii

KNUST

APPENDIX

KNUST IT Governance Assessment

Executive Questionnaire

April, 2009

Thank you for participating in this study of IT governance in KNUST, being conducted by A. S. Gaddafi of KNUST ICT Centre. I am researching into IT governance, primarily in determining who has the input rights and/or decision rights in IT decisions in the University. Completing this survey should take a **few minutes.**

The study follows the definition of IT governance developed by MIT researchers Peter Weill and Jeanne Ross, who define IT governance as "specifying the decision rights and accountability framework to encourage desirable behavior in using IT." In particular, I am interested in how institutions such as KNUST make high-level decisions about the use of IT, who makes those decisions, and how effective respondents think IT governance is in helping institutions achieve key objectives.

I appreciate your time and participation. If you have any questions or concerns, please e-mail gaddafi.ict@knust.edu.gh or asgaddafi@yahoo.co.uk .

Once again, thank you for your input!
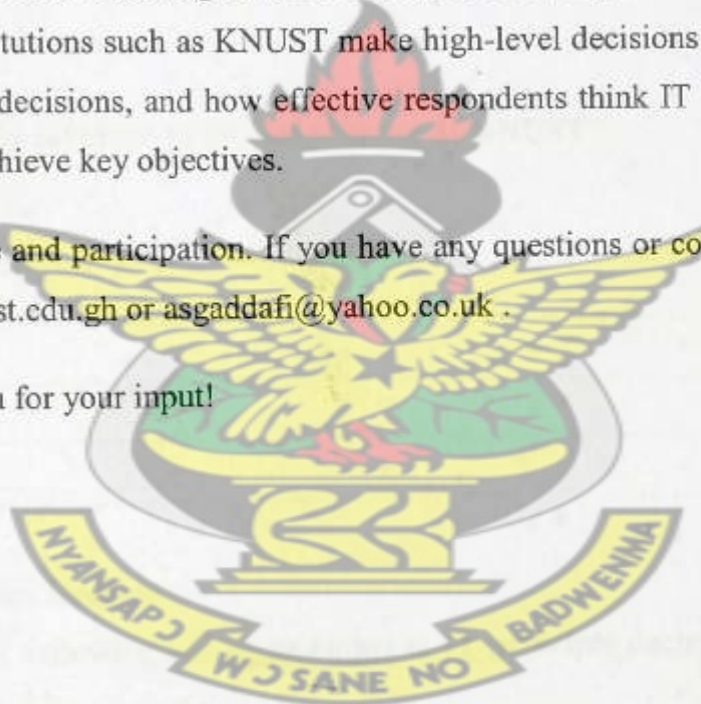
KNUST IT Governance Assessment

Executive Questionnaire

Please Specify your position:...

Section 1:

Please tick ( ) where appropriate

1.1 Can you accurately describe IT Governance in KNUST?

    ( ) Yes ( ) No

    If yes, what do you understand by IT governance?

    ....
    ....
    ....
    ....

1.2 Are you personally involved in IT Governance at KNUST?

    ( ) yes ( ) No ( )

    If yes, what is your level of involvement?

    ....
    ....
    ....
    ....

Section 2: IT Decisions Domain

2.1a. Who among the following has <u>input rights</u> to IT principle decisions in KNUST?

University Executives ☐

IT Leaders ☐

Federal ☐

Duopoly ☐

Anarchy ☐

If other specify...

2.1b Who among the following has <u>decision rights</u> to IT Principle decisions in KNUST?

University Executives ☐

IT Leaders ☐
Federal ☐
Duopoly ☐
Anarchy ☐

If other specify..

2.2a. Who among the following has <u>input rights</u> in determining the University's IT Application needs?

University Executives ☐
IT Leaders ☐
Federal ☐
Duopoly ☐
Anarchy ☐

If other specify..

2.2b. Who among the following has <u>decision rights</u> in determining the University's IT Application needs?

University Executives ☐
IT Leaders ☐
Federal ☐
Duopoly ☐
Anarchy ☐

If other specify..

2.3a. Who among the following has <u>input rights</u> in determining the IT Infrastructure (i.e. physical IT components) in KNUST?

University Executives ☐
IT Leaders ☐
Federal ☐
Duopoly ☐
Anarchy ☑

If other specify..

2.3b. Who among the following has <u>decision rights</u> in determining the IT Infrastructure (i.e. physical IT components) in KNUST?

University Executives ☐

IT Leaders ☐

Federal ☐

Duopoly ☐

Anarchy ☐

If other specify...

2.4a. Who has <u>input rights</u> in determining IT Architecture (i.e., level of access to data) in KNUST?

University Executives ☐

IT Leaders ☐

Federal ☐

Duopoly ☐

Anarchy ☐

If other specify...

2.4b. Who has <u>decision rights</u> of IT Architecture (i.e., level of access to data) in KNUST?

University Executives ☐

IT Leaders ☐

Federal ☐

Duopoly ☐

Anarchy ☐

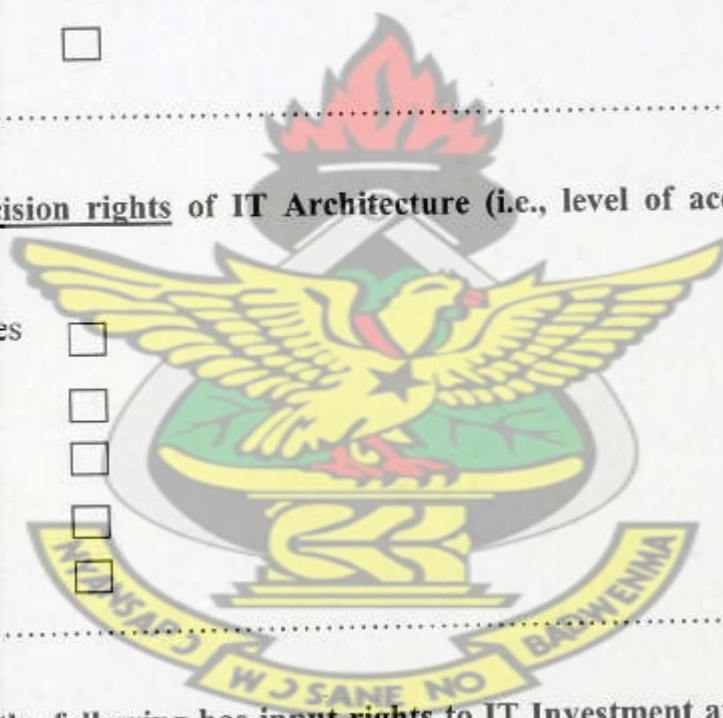If other specify...

2.5a. Who among the following has <u>input rights</u> to IT Investment and Prioritization of KNUST?

University Executives ☐

IT Leaders ☐

Federal ☐

Duopoly ☐

Anarchy ☐

If other specify...

2.5b. Who among the following has <u>decision rights</u> to IT Investment and Prioritization of KNUST?

University Executives ☐

IT Leaders ☐

Federal ☐

Duopoly ☐

Anarchy ☐

If other specify...