TESTING THE RELEVANCE OF CONTROL OBJECTIVE FOR INFORMATION AND RELATED TECHNOLOGY (COBIT) IN THE HIGHER LEARNING INSTITUTIONS IN TANZANIA

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A DISSERTATION SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF MASTER OF BUSINESS ADMINISTRATION (FINANCE) OF THE OPEN UNIVERSITY OF TANZANIA

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CERTIFICATION

The undersigned certifies that he has read and hereby recommends for the acceptance by The Open University of Tanzania, a dissertation entitled: *"Testing the Relevance of Control Objective for Information and Related Technology (COBIT) in the Higher Learning Institutions in Tanzania"*, in partial fulfillment of the requirements for the degree of Master of Business Administration (Finance) of The Open University of Tanzania.

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Supervisor
Dr. Jim Yonazi

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Date

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DECLARATION

I, **PETRO MUGANDILA** declare that this dissertation is my own original work and that it has not been presented and will not be presented to any other university for a similar or any other degree award and where other people's works have been used, references have been provided.

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Petro Mugandila

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Date

DEDICATION

This work is dedicated to my deceased parents the Late Mr. Anthony Msiba Mhikwa and Ms. Sabina Mugandila for their support during their lifetime. I extend my sincere dedication to my loving and caring wife Teddy Mugandila and our children; Anthony, Alice, Alex, Allen and Anna. Their moral support and sacrifices they made, allowed me to successfully complete the research. I am really grateful to them all.

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ABSTRACT

There has been an increased use of ICT in the world. Together with its immense use there have also been a number of challenges faced and this has led to some people maximizing more of its benefits, whereas, others have been lagging behind. The fast movers, in this case the western countries have developed international guidelines to harmonize the implementations. Such guidelines as ICT frameworks, most specifically COBIT, have gone as far as being made international that all others must follow for proper implementation of ICT.

The question was: Can the frameworks be applicable in the non-western countries? There was, therefore, a need to conduct a research titled *Testing the Relevance of COBIT in the Higher Learning Institutions in Tanzania*. The study focused on profiling the ICT frameworks available in higher learning institutions in Tanzania, validating and ranking the components of COBIT and finally proposing measures for improving the implementation of COBIT. The study used quota sampling with a sample size of 107 respondents including academic staff, non-academic staff and students from both OUT and UDSM.

Findings indicated that there was awareness on ICT frameworks amongst respondents, although they had no idea about COBIT framework. The results from multiple regression indicated that management guidelines and audit, control and security were significant to the relevance of COBIT.

It is, therefore, recommended that the government should establish an organ to govern all ICT issues and those practicing ICT professionalism should be

registered as it is the case for other professionals like accountants who are recognized by NBAA, procurement and supplies managers are organized by NBMM. The institutions should restructure that each new recruited staff be oriented thoroughly in all aspects of ICT regardless of his/her working department and the orientation should be guided by a staff orientation operating manual.

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LIST OF ABBREVIATIONS AND ACRONYMS

ANOVA	Analysis of Variance
ACOT	The Apple Classrooms of Tomorrow
BSC	Balanced Scorecard
CF	Conceptual Framework
CMM	The Capability Maturity Model
CMMI	Capability Maturity Model Integration
CIO	Chief Information Officer
COF	Control Objective Framework
COBIT	The Control Objectives for Information and Related Technology
COSO	Committee of Sponsoring Organizations
CSFs	Critical Success Factors
DOI	Diffusion of Innovation
EFQM	European Foundation for Quality Management
HEIs	Higher Education Institutions
HP	The Hewlett-Packard
ICIF	Internal Control-Integrated Framework
ICT	Information and Communication Technology
IEMT	Institute of Educational and Management Technologies
IRMC	Information Resource Management Centre
IS	Information Systems

ISACA	Information Systems Audit and Control Association
ISO	International Organization for Standardization
IT	Information Technology
ITG	Information Technology Governance
ITGI	Information Technology Governance Institute
ITIL	The Information Technology Infrastructure Library
ITSM	Information Technology Service Management
KEM	Key Entity Management Model
KGIs	Key Goal Indicators
KPIs	Key Performance Indicators
MDAs	Ministries, Departments and Agencies
MoEVT	Ministry of Education and Vocational Training
MOF	Microsoft Operations Framework
MSP	Managing Successful Programmes
NBAA	The National Board of Accountants and Auditors
NBMM	The National Board for Materials Management
NEPAD	The New Partnership for Africa's Development
ODL	Open and Distance Learning
OGC	Office of Government Commerce
OUT	The Open University of Tanzania
PMBOK	Project Management Body of Knowledge

PRINCE	Projects In a Controlled Environment
QMS	Quality Management System
RACI	Responsible, Accountable, Consulted and Informed
RCA	Risk and Control Assessment
SIDA	Swedish International Development Agency
SIP	Session Initiation Protocol
SPSS	Statistical Package for the Social Sciences
TAM	Technology Acceptable Model
TEIL	Technology Enhanced Independent Learning
TQM	Total Quality Management
TPB	Theory of Planned Behavior
UCC	University of Dar es salaam Computing Centre
UDSM	The University of Dar es Salaam
UNESCO	The United Nations Educational, Scientific and Cultural Organization

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1.0 BACKGROUND OF THE PROBLEM

1.1. INTRODUCTION

In the era of technological advancement we have witnessed tremendous changes in information and communication technologies (ICTs) which have turned the present world into an information society and have greatly influenced our education system. ICT has become the backbone of the global society (Al-Oteawi, 2002). For example, in the Tanzanian Vision 2025, the integration of technologies most specifically in education has been mentioned as a major driving force for the realization of the Vision (Mkapa, 2005). Studies have revealed that when integrating ICT, there should be clear guidelines or frameworks to follow when targeting for positive results. Etzler (2007) commented that at providing control, measurement and documentation of IT operations and call for to meeting the desired goals of an organization's effective use of ICT frameworks; in this case, COBIT, must be used.

More, the relevance of COBIT is profoundly changing in every institution, every business and every individual (Tuller & Oblinger, 1997). Acquiring and using COBIT in higher learning institutions is one of the major trends of educational reforms today. And integrating technology in learning and teaching is impressively a very valuable asset in the process of learning appealing to many aspects of students' learning and, hence, a vital necessity for adoption in education. Many scholars in many studies are of the view that technology integration in learning is a valuable asset (Nihuka & Voogt 2012; Ayoo & Lubega 2009; Satidularn, *et al.,* 2011). One major benchmark of many research studies shows how technology integration, for

example, the use of computers, has benefited the process of education in America For instance, Jostens' (1997) nationwide survey of teachers and school superintendents in the Learning Corporation, found that 74% of the general public and 95% of educators say that computers had improved the quality of education, teaching and learning (Earle, 2002). At this juncture it is proper to argue that as far as technology integration is concerned, the use of technology and, to be more precise, the use of computers is inevitable. In this regard, the relevance of integrating technology in higher learning institutions posits to be among the necessary elements in today's educational endeavours. Governments and institutions should inevitably strive to adopt and integrate technology in their educational curricula.

In realization of the benefits of technology integration in higher learning institutions, fundamental questions arise as to whether there is a need or not for guidelines or frameworks, and as to which proven guidelines or frameworks should be used for proper implementation of technology integration. Such guidelines or frameworks include: the Control Objectives for Information for Related Technology (COBIT), the Information Technology Service Management (ITIL), the International Organization for Standardization (ISO) 17799, the Microsoft Operations Framework (MOF), the Committee of Sponsoring Organizations (COSO), the Capability Maturity Model (CMM), the Project in a Controlled Environment (PRINCE), the Managing Successful Programmes (MSP), the Project Management Body of Knowledge (PMBOK) and the Balanced Scorecard and Six Sigma (Viljoen, 2005).

The implementation of COBIT framework, which is a creation of the Information Systems Audit and Control Association (ISACA) for information technology (IT)

management and IT governance is recommended for ensuring and enhancing the quality of education (Dey *et al*., 2007). Ribeiro and Gomes (2009) also concluded in their study, that with proper implementation of the COBIT framework their institution improved significantly the quality of services, reduced the number of anomalies and provided more efficient mechanisms to manage and control their various information systems. Further, it improved the quality of attendance, reduced the execution time of tasks by about 25%, it proved more efficient in monitoring and controlling the technological infrastructure components, it reduced about 30% the number of incidents resolved and finalized by the various departments of IT and it reduced more than 10% the number of incidents reopened.

Nevertheless, various scholars have questioned and challenged the effectiveness of integrating technology into education. Integrating technology into higher learning institutions is not easy because it is still difficult for colleges to afford enough resources to meet its demands (Baron *et al.,* 2002; Baron, 2002). According to Lopez-Herrejon and Schulman (2004) the most troubling gap in higher learning institution is lack of integration and understanding of the relevance of technology. They further say that unless teachers have sufficient skills, understand how various technologies can be used as cognitive tools and are able to weave technology experiences into their daily practice, technology can never have the greatest impact on student learning. The achievement of the process itself is another major challenge that has been indicated by scholars concerning technology integration in higher learning institutions (Edyburn, 1998; Rudy, 1999; Lopez-Herrejon & Schulman, 2004). The key questions are whether lecturers in higher learning institutions have

really integrated technology in learning or not, and if they have, to what extent have they done so? Or, if not, what is the essence of the problem of not doing so?

According to Baylor and Ritchie (2002) the way in which technology is used in the classroom is a critical measure of its success. They state further that technology, in itself and of itself, does not directly change teaching or learning. Rather, the critical element is how the relevance of technology is incorporated into instruction. The researcher believes that these and other perceived challenges of technology integration, as given by various scholars, raise questions on the nature of technology integration processes in institutions and hence, the need for formatively evaluating them for optimal realization of the relevance of COBIT in higher learning institutions.

Like in many countries the world over, the wave of adopting ICT in education has made its way into the higher learning institutions in Tanzania. According to the United Republic of Tanzania Ministry of Communications and Transport (2003), there have been moves to adopt technologies in many schools, The government established an official Secondary School Computer Studies Syllabus for Forms I – IV since1996 and was issued in 1997. The use of ICT enhances effective delivery of education. Currently, this benefit is only evident in some schools and colleges in urban areas and more significantly, in higher learning institutions (Tanzania National ICT Policy of 2003). The policy further states that some of these institutions have adopted the use of ICT into their curricula though lack of programme for training teachers on computers and other multi-media utilization has been identified as a major reason for slow take up of computer studies in primary and secondary schools.

1.1.1 What is relevance?

Relevance is a cover term for whatever the user finds to be of value about the system output, whether its usefulness, its entertainment or esthetic value, or anything else (Schamber & Eisenberg, 1991). In other words they defined relevance as the user's connection in the sense that information need is expressed by how users see information helping them most effectively to make sense of their individual realities or situations. Park (1993) also defined the term relevance focusing on the user based perspective as the locus of relevance is within individuals' perceptions of information and information environment. He even went further categorizing relevance differently as: logical relevance, situation relevance, subjective relevance, objective relevance as well as physiological relevance.

The word relevance can be defined in many and varied ways depending on several factors, situations, standards or contexts and conjecture (time) where and when it applies. The standard of relevance may change with time. for example, during the early information systems, relevance held an academic standard and it was defined in terms of the relationship between the subject in the document and what the user seeks, that is, topical relevance, while in the practical world of today relevance is defined in terms of usefulness and accessibility of information or anything to the user (Schultz *et al*., 1987; Salle *et al*., 2005). For the purposes of this study relevance will be used in the sense of what is significant, that is, the usefulness and accessibility of information or material sought by the user.

1.1.2   Previous Studies Regarding the Relevance of COBIT in its Adoption

There are various perspectives of COBIT, in which practitioners within the field disagree and fail to strictly follow in their quest to improve IT governance. Although many claim to know COBIT, ITIL and ISO/IEC 17799 on a superficial level, few actually use the frameworks to support their works. However, the different priorities of IT Governance concerns between literature, practitioners, and best practice frameworks have not been fully investigated. In order to detail the distinct priorities within IT governance, a framework onto which both practitioners and theoreticians could map their concerns would be useful. Such a framework should span the entire field of IT governance, and could be used to prioritize different concerns of, for example, literature and practitioners (Yonazi, 2010; ISACA Sweden Chapter, 2004).

Examples of such issues are users' characteristics (e.g. relative familiarity with ICT) and system properties (e.g. ease of use). Other studies have explored possible IT Governance for citizens (e.g. Cap Gemini Ernest and Young, 2004). Examples of services include application for visa, tax-returns and job and work permit applications.

1.1.3   ICT Development at UDSM and OUT

ICT development at the University of Dar es salaam started in the mid-1990s and these initiatives were achieved in phases. The first phase involved mainly the pre-planning process which in turn resulted into the development of policies where ICT Policy and ICT Master Plan were developed. The ICT Policy aimed at overseeing and implementing ICT programs, systems and other countrywide network infrastructure in a view to improve the use of technology at the University. The ICT

Master Plan enabled the identification of a number of other projects such as TEIL which resulted into all University courses to be available online (Luambano & Nawe, 2004). This and other moves throughout the faculties and institutes at the University were a proof of the efforts towards putting technological integration in place in those early days at the University of Dar Es Salaam main campus.

The Open University of Tanzania, which is an open and distance learning (ODL) institution offering certificates, diplomas, degrees and postgraduate courses, was officially established in 1992 and became operational on 1st March, 1993. The university delivers its education through various means of communication such as broadcasting, telecasting, ICT, correspondence, enhanced face to face, seminars, contact programmes or the combination of any two or more of such means.

The University started using computers by less than 5% of its staff mostly secretaries. And at those times teaching and training continued to be carried out using old pedagogy with minimum interaction and participation. This was due to lack of adequate ICT facilities and the related skills (Bakari *et al*., 2008). Under the support from SIDA, OUT undertook both organisational analysis and ICT analysis which led to institutional transformation that led to developing OUT Corporate Strategic Plan, ICT Policy and ICT Master Plan that aimed at strengthening the University (capacity building) through organizational development and improvement of its services. The ICT Master Plan outlined detailed specifications of priority projects and the associated allocations of resources. The projects include: (i) Establishment/designation of IRMC and provision of internet services; (ii) End-user

training; (iii) Data Communications Infrastructure; (iv) Information Usage and Security Management; (v) Students Academic Register Management Information System; (vi) Library Management Information System; (vii) Open and On-line Distance Learning and Teaching Programmes and (viii) Examination Data Bank Management Information System. Developing OUT Corporate Strategic Plan, ICT Policy and ICT Master Plan and the implementation of the above outlined projects, have made it easier for the University to discuss, understand and adopt ICT as an agenda and an important tool and catalyst for wider and deeper university reforms (Bakari *et al*., 2008).

1.1.4   COBIT Components in Higher Learning Institutions

There has been a wide and fast growing need to employ modern technology in higher learning institutions the world over. Research has proved that there are various challenges in the use and application of ICT, especially in the context of higher learning institutions in most developing countries because of the ever increasing need for technological integration in higher their learning institutions.

Sife, *et al.* (2007) observed that despite the achievements that the higher learning institutions in Tanzania had accomplished, they still face some challenges in undertaking the ICT integration process. The challenges included lack of a system approach to learning, awareness and attitudes towards ICTs, administrative and technical support, staff development, lack of ownership, inadequate funds for transforming their higher learning institutions. This study, which was both qualitative and quantitative, aimed at determining, through interviews and documentary

analysis, the extent to which the process of technology integration in classrooms has been effective in the higher learning institution in Tanzania.

Surry *et al*., (2006) presented Ely's eight conditions for effective implementation of innovation, planning and the presence of technology plans, and the ACOT Stages of Development model. Ely's eight conditions for implementation on innovation studied and applied in this study included the following: (1) to be motivated to accept change, there must be dissatisfaction with the status quo; (2) all involved in the implementation process must have adequate skills and knowledge, along with; (3) sufficient resources and; (4) time to train, practice, and apply the innovation; (5) rewards and incentives exist; (6) participation in the decision-making process; (7) commitment from senior management and administrators, and; (8) day-to-day leadership through support, encouragement and procurement of resources by direct managers (Surry *et al*., 2006).

The ACOT Stages of development model is used to generally determine the stages of technology integration in higher learning institutions and how the learners move through as they learn the use of technology especially in the awareness, learning the process, understanding the application of the process, familiarity and confidence, adaptation to other contexts, and creative applications to new contexts (Toledo, 2005).

1.1.5 Combining Activities

It is implied that many of the COBIT Critical Success Factors (CSFs) may be combined to reduce the burden on the institution while still realizing the benefits. For example, CSF 4 (ensure that management and staff have a common understanding of

security requirements, vulnerabilities and threats, and they understand and accept their own security responsibilities) was combined with CSF 7 (the driver's license program) to reduce the required time commitment. It was determined early in the study that it has limited resources. This consolidation increases the support of the program at all levels. The research findings were expected to inform stakeholders of the status and trends of technology integration in higher learning institutions and the implications for the Tanzania Development Vision 2025.

IT governance is in its infancy and the area teems with potential for improvement and research opportunities. This study was one of many steps needed to allow organizations to realize the full benefits of COBIT and similar frameworks. It is hoped that the results, implications, and suggestions for future research will spark a dialog that will enhance the way practitioners handle the management aspects of their IT governance programs.

1.1.6   COBIT Components in Tanzania

The Information Age Society is one that is characterized by its ability to transfer information freely and to have access to information that would have been difficult or impossible to access previously. The evolution has allowed rapid global communications and networking that have eventually transformed the society to a modern one (UNESCO, 2000). IT Governance is required in line with formulation of policy to govern the institution on the usage of the technology and how the core business of the institutions and technology are integrated together. Formulation of policy at the organizational level enhances the usage of ICT in the organization. (UNESCO, 2000).

The Information Age Society in Tanzania has been a result of evolution of both the computer as well as the internet as they have made some changes almost in all aspects of our daily life. The implementation of ICT provides for Management Guidelines for fulfilling the role of management in supporting the use and implementation of ICT (Chachage, 2001; Masele, 2008). Furthermore, COBIT guides business and technology management functions by ensuring that IT and business goals are well integrated in realizing the value of IT in business. COBIT also functions to control, audit and secure ICT implementations especially by guaranteeing the security of information and other ICTs within and outside the organization (Van Grembergen *at al*., 2005).

IT professionals are another aspect that is of great focus (Sutinen & Vesisenaho, 2006) When implementing ICT, considerations must be made to incorporate business ideas from both IT professionals as well as non-IT professionals like accountants and lecturers . According to Dey *et al.* (2007) doing this would result into sustainable ICT projects. According to the UNESCO's World Education Report (2000), it has been noted that in developing countries, institutions are adopting ICT without a clear benchmark, on which frameworks adopted have to rely rather than relying on the final output or the results of the adopted ICT. Basically the study has tested whether the process on how technology is managed and governed significantly adheres to the COBIT guidelines or frameworks in practice.

In their study, Sutinen and Vesisenaho (2006) who focused on Western content, materials, tools and methods in the context of the local non western communities, found that the design of ICT should focus on the concept of ethno-computing. ICT

should be produced or implemented in so relevant a way that the focus should be the understanding and utilization of the recipient's community and this may lead to better implementation results.

The relevance of COBIT is a topic that has been increasingly discussed since the mid-nineties (Capanna, Graci & Gandini). The topic has inherited much from the discipline of corporate governance, but has developed into a discipline in its own right. However, between the two disciplines there is a shared view that what stands out to be missing, which seems to be the most important concern, is how they should be handled. Most authors agree on the relevance of COBIT as a top management concern of controlling its strategic impact, and the value delivered to the business (Etzler, 2007; Wessels & Loggerenberg, 2006; Van Grembergen *at al.,* 2005).

1.2. Statement of the Problem

In this era of information technology, when the world is witnessing human lives almost, if not entirely, anchored to the use of technology, it goes without saying that there is a need to test the relevance of technology which is expected to act as a bridge connecting us to this innovative trend. In the endeavour to realize the goals as stated in Vision 2025, which strongly advocates the use of ICTs which, in this case, are central in realizing competitive social and economic transformation, the vision emphasizes that ICT would only be achieved through provision of appropriate skills and capabilities, where in our case higher learning institutions could be one. There was hope that the goals would be attained if the strategies were implemented and solid plans were made for adopting and integrating ICT in education more effectively. As implied in the Vision 2025, the integration of technologies most

specifically in education is a major driving force for the realization of Vision (Mkapa, 2005). In this regard COBIT in higher learning institutions played a prominent role in fulfilling and helping to effect changes that would take us on the desired path.

Basically, testing, adopting and implementing COBIT into higher learning institution play a vital role. In view of strengthening and establishing a strong hold for implementing ICT, the Government of Tanzania has the Ministry of Higher Education, Science and Technology that had a duty to oversee and harmonize all issues relating to science and technology in higher learning institutions in Tanzania. The Government of Tanzania indirectly puts pressure on these higher learning institutions to take the charge in the transformation of the society through the use of ICT.

At this juncture, it can therefore be said that because of its capability at providing guidance in realizing IT operations of an organization especially in the control, measurement and documentation, there is a necessity to ensure that there are initiatives to monitor the adoption and the effective use of COBIT to meet the desired goals (Etzler, 2007). Testing the relevance of COBIT in higher learning institution is a necessity, given the observations of some scholars that some contents, materials, tools and methods developed and tested to be useful in the western context may not necessarily be applicable in the local non-western communities (Sutinen & Vesisenaho, 2006).

As observed by Earle (1997) in a nationwide survey in the United States, despite the general sense that the computer revolution of the last decade had a major impact in

schools, the nature of the impact seems to be limited to access and information retrieval rather than improved teaching methods or revitalized school and classroom structures. Furthermore, testing the relevance of COBIT in higher learning institutions may prevent the wasting of resources invested in acquisition, adoption, adaptation and implementation of information technology. In that context, the researcher has the perception that despite the fact that the higher learning institutions' efforts to adopt and use COBIT, the information provided about COBIT's use does not vividly indicate the details of the nature of implementation of COBIT integration into the university curricula or the presence of technology plans to guide implementation.

It was observed that there was a gap in research indicating that higher learning institutions are on the right track in implementing the requirements of the Vision 2025, hence the need to conduct a study to reveal the real situation concerning the relevance of COBIT in the higher learning institutions. This study was expected to come up with recommendations that would bring to light the viable relevance of COBIT not only at UDSM and OUT, but also in the rest of the higher learning institutions in Tanzania. As many higher learning institutions in Tanzania, for instance, the Open University of Tanzania and the University of Dar-es-Salaam, have implemented a number of IT systems for facilitating teaching and non teaching activities, the systems have been challenged for the absence of IT frameworks such as COBIT which is mostly applicable in IT governance to guide its implementations.

1.3.   Objectives of the Study

1.3.1. General Objective

The general objective of the study was to test the relevance of COBIT and recommend measures for implementing it in the context of the higher learning institutions in Tanzania

1.3.2. Specific Objectives

i.   To profile the ICT frameworks available in higher learning institutions in Tanzania;

ii. To validate the components of COBIT to the context of higher learning institutions in Tanzania;

iii. To rank the relevance of the components of COBIT in higher leaning institutions in Tanzania; and

iv. To recommend measures for improving the implementation of COBIT in higher learning institutions in Tanzania.

1.4.   The Research Questions

In order to test the relevance of COBIT in higher learning institutions in Tanzania and recommend a proper way to implement the same, the researcher considered the following questions:

i. What are the ICT frameworks available in higher learning institutions in Tanzania?

ii. How valid are the components of COBIT in the context of higher learning institutions in Tanzania?

iii. How relevant are the components of COBIT in higher learning institutions in Tanzania?

iv. What are the measures for improving the implementation of COBIT in higher learning institutions in Tanzania?

1.5.   Significance of the Study

In this era of technologically driven living, when countries, especially developing ones like Tanzania are encountering the challenges of major reforms in their educational systems, it is vital to assess and monitor the strategies used to reform the education systems through technology integration. Testing the relevance of COBIT in higher learning institutions is paramount especially at this time when the country (Tanzania) is implementing its Vision 2025. Any research of this nature is important in motivating and trying to streamline reform strategies. The findings of this study will contribute to the body of ideas and knowledge about better ways or strategies of implementing technology integration in higher learning institutions in Tanzania.

This study profiled the ICT frameworks available in the higher learning institutions in Tanzania, validated the components of COBIT to the context of higher learning institutions in Tanzania, ranked the relevance of the components of COBIT in higher leaning institution in Tanzania and, finally, respectively offered suggestions and recommended measures for improving the implementation and effective use of COBIT in higher learning institutions in Tanzania for achieving the desired goals of the Vision 2025. The researcher also used the ACOT Stages of development technology model to generally determine technology integration in higher learning

institutions and how the learners move through as they learn the use of technology especially in the awareness, the learning process, understanding the application of the process, familiarity and confidence, adaptation to other contexts and creative applications to new contexts (Toledo, 2005).

It is undeniable that higher learning institutions are the major research centers for all educational levels and the gathering places of scholars and educators. In that regard, universities should be a locus of vision of any society. Taking UDSM, which is the most well-established and renowned university in Tanzania, for instance, it is the first university and the first institution of higher learning in the country. It therefore stands at the apex of higher educational reforms in the country and mirrors the general trends of what higher learning institutions should be. In that regard, the study informs the stakeholders (university students, university staff, IT practitioners and the general public) of:

i. The relevance of COBIT as well as the status of technology availability and the accessibility for teaching and learning at the higher learning institutions;

ii. The skill level of academic staff members and their assessment of the implementation of COBIT at UDSM and OUT;

iii. How to make technology plans for teaching and learning, using COBIT technology;

iv. The nature and the effectiveness of professional development programs in technology;

v. How to make technology plans for teaching and learning using COBIT;

vi.   The study could as well bring new knowledge to the higher learning institution practitioners who want to implement COBIT in their institutions in the developing countries;

1.6.   Scope of the Study

Considering, as much as possible, the factors surrounding the requirements of this study, the researcher designed this study with the case study of two major universities- UDSM and OUT that were considered as models of well-established institutions of higher learning in Tanzania. The researcher chose to test the relevance of COBIT in higher learning institution contexts as one essential element for successful information technology integration. Within these two institutions, academic staff, students and supporting staff were all involved. The selection of respondents was purposeful or judgmental, targeting those who were willing and readily available to provide relevant information. Although COBIT is wide and has different perspectives, the study focused only on the COBIT context as applied in higher learning institutions in Tanzania.

Moreover, the study did not test the relevance of COBIT in business oriented higher learning institutions or private institutions in order to make a comparative analysis with the government organizations. The rationale of conducting this study in only two higher learning institutions was due to limitations including time and resources, which restricted the ability of the study to accommodate more than two organizations. Other contributing factors such as ease of getting data, proximity to the researcher, high student enrolment rate per year, the level of promotional use of

ICT to academic staff, students and non-academic (support) staff, and the like, determined the selection criteria.

1.7.   Limitations

No research project is without limitations: "There is no such thing as a perfect designed study" (Marshall & Rossman, 1999). The limitations of the study, that is, factors that in one way or another affected the outcome of the study include the following:

i. The researcher initially planned to visit the University of Dar es Salaam and all its constituent colleges and the Open University of Tanzania with all its regional and coordination centers in and outside Tanzania. Given the breadth of technology integration and the population, the study covered only a small portion. The researcher managed to cover only the main campuses of both universities and only OUT's regional centers in four regions, namely; Mwanza, Dar es Salaam, Iringa and Kagera. As such, the study results would not be sufficient to draw a representative picture of the relevance of COBIT in Tanzania. By being in a wider field, the researcher felt he would have obtained different results in testing the relevance of COBIT in the higher learning institutions. They could, however, give an impression of the Relevance of COBIT in Higher Learning Institutions in Tanzania.

ii. It was difficult and it took time to obtain research assistants. Twice the researcher had recruited research assistants who had agreed to help but some weeks after, they opted out saying they could not do the job. One of them was paid a large sum of money to collect data but later he withdrew. This situation

caused the process of data collection to take a longer time after the research proposal was approved;

iii. Moreover, the study did not test the relevance of COBIT in business oriented higher learning government institutions or private institutions in order to make a comparative analysis with the government organizations as it focused only on the relevance of COBIT in higher learning institutions in Tanzania using the cases of the Open University of Tanzania and the University of Dar es Salaam. The rationale of conducting this study in only two higher learning institutions was due to limitations including time and resources, which restricted the ability of the study to accommodate more than two organizations.

1.8. Delimitations

This study was designed both as a qualitative and quantitative evaluation. It focused on testing the relevance of COBIT in higher learning institution in Tanzania. Given the breadth of technology integration and the population, the study covered only a small portion. It focused only on the testing (evaluation) of implementation of COBIT into only two universities, namely, UDSM and OUT. As such, the study results would not be sufficient to draw a representative picture of the relevance of COBIT in Tanzania. They could, however, give an impression of the Relevance of COBIT in Higher Learning Institutions in Tanzania.

1.9. Summary/Structure of the Entire Thesis

This thesis is organized into five chapters. Chapter one introduced the background of the dissertation and gives the outlines of the main research problem under investigation in this study. The chapter also presented the aims and objectives of the

study and provided the rationale for carrying out this study. Chapter two dealt with the literature review and the definition of key concepts as appeared in the study. Chapter three discussed the research design and methods that were employed in conducting the study, that is, data collection and analysis. Chapter four discussed the interpretation of data and presented the results obtained. Chapter five presented the discussion of the main findings, conclusions, recommendations, limitations of the study and future work.

CHAPTER TWO

2.0 LITERATURE REVIEW

2.1. Introduction

The purpose of this study was to test the relevance of COBIT in higher learning institutions. The literature review highlights a body of knowledge and issues concerning the relevance of COBIT in higher learning institutions from different perspectives and contexts. It examines technology implementation as an essential stage in effecting technology integration. These ideas and issues put into perspective how COBIT can be viewed in the context of Tanzanian education, with specific focus on higher learning. Although some of the ideas are drawn from countries in which technology is already in an advanced stage, it may be that similar ideas apply even in less technologically advanced countries like Tanzania. This literature will help to establish a framework or guidelines for testing the relevance of COBIT in higher learning institution in Tanzania.

2.2. Definition of Key Concepts

2.2.1. COBIT

COBIT has various definitions depending on the context which have been used in defining it. Ribeiro and Gomes (2009) define COBIT as Control Objectives for Information and Technology; it is the framework that covers all activities related to Information Technologies for the IT governance. Etzler (2007) defines COBIT as the guidance which can be done within an IT organization in terms of controls, activities, measuring and documentation. Evelina *et al*. (2010) define COBIT as a control-based framework for governance of information technology created by ISACA.

COBIT consists of 34 IT processes divided into 4 overarching domains for the implementation of IT governance norms. In the researcher's point of view, and for the purpose of this study, COBIT is an IT framework that provides guidelines for the implementation of IT governance and measures the maturity level of IT governance in organizations.

2.2.2. IT Governance

Viljoen (2005) defined IT Governance as a practice where organizations standardize IT structure, policies and procedures and try to align them into organizational business objectives. In his study he indicated how African organizations and specifically higher learning institutions need to integrate IT in its processes so that the education to be provided should bring value. Bhattacharjya and Chang (2006) described IT governance as an integral part of the corporate governance which consists of the leadership and organizational structures and processes that ensure an organization's IT sustains and extends the organization's strategy and objectives.

Etzler (2007) defines 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. In the researcher's point of view, and for the purpose of this study, IT Governance is an integral part of corporate governance that comprises the leadership (the Board), executive management, IT management and organizational as well as IT structures that are standardized and aligned to the organizational business strategy and objectives for the purpose of controlling the formulation and implementation of IT strategy and sustenance, perforation and fusion of business and IT.

2.2.3. IT Governance Framework

Viljoen (2005) defines IT governance framework as a body that provides the boundaries, a set of principles and guidelines; which therefore, provides a vision to an organization. He adds that a framework provides a flexible basic structure that can be used in a specific environment. He mentions some important frameworks used for IT Governance as: COBIT, ITIL, BS1500, BS7799 and COSO.

Evelina *et al*. (2010) define IT Governance framework as a hypothetical description of a more or less complex process that aims at providing guidelines for understanding and implementing such a process. They explain further that the framework can be formed from models, principles, approaches, and visualizations. Examples of such frameworks mentioned are ITIL, ISO 9000, EFQM, CMMI and COBIT.

In the researcher's point of view, and for the purpose of this study, an IT Governance Framework is a body (of knowledge) that is made from models, approaches and visualizations, that provides the vision to an organization by hypothetically describing the process that provides the boundaries, principles and guidelines for understanding and implementing such a process.

2.2.4. Implementation

Rapport (1999) defines implementation in reference to the logical and physical design techniques used to realize the architecture in any specific instance. Schultz *et al*. (1987) describe implementation, for example, of a project to have a defined beginning and end together with required resources such as budget and personnel.

They went further by defining the two implementation stages of say, a project, as initial, goal setting and planning phase being the first stage and the second being an action-oriented, operational stage. In the researcher's point of view, and for the purpose of this study, implementation is the list of activities, tasks processes or actions together with the required resources such as budget, personnel, etc., needed to be followed to accomplish a plan or a project from its beginning, through its different phases to its end.

2.3. Theoretical Literature Review

2.3.1. e-Government Frameworks

In this research work the researcher identified a number of frameworks and studies from other researchers that guide the implementation of IT Governance, Such frameworks include, but not limited to: COBIT, ITIL, ISO 17799, MOF, COSO, CMM, PRINCE, MSP, PMBOK, the Balanced Scorecard, and Six Sigma. Short explanations of some of the frameworks are given in the Table 2.1 below.

Table 2. 1: e-Government Frameworks Descriptions

Framework	Description/Purpose	Reference
BSC	The Balanced Scorecard (BSC) is a theory and management approach that translates an organization's mission and strategy into a comprehensive set of performance measures that provides the framework for a strategic measurement and management system	(Kaplan, 2008).

BS15000	BS15000 is the first worldwide standard specifically aimed at IT service management. It provides guidelines on effective delivery of services to the business and its customers.	(Symons, 2006)
COBIT	This framework was designed by the e-Governance Institute as a high-level "umbrella" framework for e-Governance. It contains detailed control objectives defined in four ICT domains: a) Planning and organization, b) Acquisition and implementation, c) Delivery and support, and d) Monitoring; which is the de-facto standard for ICT service management and is organized around five areas, viz: i) Business perspective, ii) Application management, iii) infrastructure management, iv) Service delivery, and v) Service support	(Dey & Sobhan, 2007).
ISO/IEC 17799:2005	The framework provides a strong and expanded information security management	(Symons, 2006)

ITIL	IT infrastructure library (ITIL) that was initially developed and published by the British Office of Government Commerce (OGC), is the framework that is used to provide effective management and control of IT service delivery and support. The ITIL best practice framework enables managers to document, audit, and improve their IT service management processes.	(Cater-Steel & Tan, 2005; Symons, 2006)
ISO 17799	ISO 17799 is another international standard that provides standard information for implementing information security within an organization. It contains best practices for policies of information security, assignment of responsibility for information security, problem escalation and business continuity management.	(Symons, 2006)
ICIF	Internal Control-Integrated Framework (ICIF). This framework was developed by COSO (Committee of Sponsoring Organizations) aiming at improving the quality of financial reporting through business ethics, effective internal control and corporate governance.	(Viljoen, 2005)
CMM	The Capability Maturity Model (CMM) is the framework that is designed to help an organization adopt best practices in a targeted domain that are continuously improved to become more effective and predictable using Total Quality Management (TQM) which leads to organizational development happening in stages (maturity levels) that leads to changes in the organization's culture	Curtis *et al*. (2009)

MOF	Microsoft Operations Framework (MOF) is another framework that provides guidance that enables organizations to achieve mission critical system reliability, availability, supportability and manageability of IT solutions built with Microsoft products and technologies.	(Viljoen, 2005).
Six Sigma	Six Sigma for process improvement and the Balanced Scorecard for IT performance management	(Symons, 2006)

Source: Researcher (2013)

2.3.2. COBIT Components

Proper implementation of COBIT in an organization is an outcome of proper Management Guidelines; instituting Audit, Control and Security measures in an organization; proper Business and Technology Management and availability of appropriate skilled IT Professionals.

2.3.2.1. Management Guidelines

Management Guidelines has been identified as an area of concern when instituting changes in an organization. For any technology to be successfully implemented management should feel the ownership and enforce others to implement the technology rather than the same to originate from the lower level (or supporting) staff .There should be a good relationship between Management and the entire staff for the smooth operations and whenever the management shows less concerns, this may result to improper implementation of the same. Furuholt and Ørvik (2006) pointed out that poor top management engagement or support is one of the main obstacles for use of ICT in Tanzania. Management has to realize the importance of

IT in their organization such that when they develop their corporate strategic plan, the IT plan should be part of it. Implementation guidelines should also be provided so as to realize improved productivity through IT.

2.3.2.2. Business & Technology Management and IT Professionals

Whenever business and technology are not well aligned or the business goals do not conform to the deployed technology, then the technology is seen as obsolete because it will not fulfill and, therefore, deliver a sub-standard outputs or not at all and, in that case, users consider traditional means of working a more convenient one than the application of technology. Furuholt and Ørvik (2006) found that with Tanzanian institutions, the ICT centres have been managed by personnel amongst academic staff serving both ICT work as well academic roles. "There have been too few IT people, poorly organized, with no recruitment plan and no planned development for their careers and competence" (Furuholt *et al*., 2006).The research recommended appropriate resources be allocated so as to be able to accommodate all the tasks and projects demanded.

2.3.2.3. Audit, Control and Security

Audit, Control and Security is another area of concern. In any implemented system there must be a consideration to ensure security of users' information. Not only that but also implementers of the system need to do systematic audit on their systems rather than paying too much attention and dependence on complaints received from system users as their source of system audit. Sometimes users become so lenient in technology usage that, without clear audit, it might not be easy to asses this.

COBIT, as a framework, represents comprehensively the implementation of IT governance with a very strong auditing and controls perspectives. Security has also been identified as an important element as it outlines important issues to be considered when instituting security management of an organization (Symons, 2005).

2.4 Empirical Literature Review

As COBIT and other frameworks were developed in western countries, there was a need to find out whether or not such frameworks were suitable and relevant to non western countries. Cultural impact is one of the important elements in implementation of IT Governance.

In their study, Satidularn *et al*. (2011) look at how culture can impact on IT Governance at a state owned organization (XYZ), however the study found that the Thai National Culture had no direct impact on the way XYZ designed its ITG structure and processes but, rather, was influenced by organizational culture that influenced integrity and ethical behavior.

The study also found that the Thai National Culture impacted the strategy XYZ adopted to encourage its employees to follow ITG best practices. This was attributed to the common knowledge that they do not like change. To reduce resistance to change, XYZ implemented a change management strategy that gave employees opportunity to understand the importance of implementing ITG.

In their study, Wessels and Loggerenberg (2006, September) came out with three points, one, being that IT governance must be designed at corporate governance level while the processes must be defined at business unit level for better implementation

results. This is most preferable in organizations whose business units are very effective. Secondly, IT Governance must be implemented as a hybrid of a top-down and bottom-top approach. Thirdly, IT Governance must be designed at top level and implemented using a top-down approach. This is most recommended in organizations with very effective top managements. Since top management have the responsibility of corporate governance, they should initiate the process of developing an IT Governance framework and for proper implementation, business units must be included in the process to result into a well balanced IT governance framework, furthering better results.

Mathias *et al*. (2005), in their paper *Formulating and implementing an HP IT Program Strategy using COBIT and HP ITSM* , harmonized both business objectives and business strategy set upon the HP ITP program with those of COBIT guidelines aiming at formulating and implementing the HP ITP program strategy in a better way, adding value to their business. At the end they concluded that combining the COBIT framework with the HP ITSM framework provides IT management with strong solutions.

Delivering IT products and services in today's organizations is highly favored with deployment of COBIT framework due to its cost effectiveness, adherences to security issues and complying with the law in wide aspects. In management perspectives COBIT is very strong as it defines guidelines with reference to critical success factors, like key goal indicators, key performance indicators and capability maturity models (Wallhoff, 2004).

According to Wallhoff (2004), COBIT was formulated aiming at providing reviews and critical success factors in the IT-Audit communities with strong skills within audit. This is because the framework provides a set of advices for an audit or review (i.e. audit guidelines). Managing information technology in organizations has always been a question especially when taking into consideration that the technology keeps changing in a fast pace. COBIT was thereafter developed by the IT Governance Institute (ITGI) as an international framework that lists both high-level and detailed IT control objectives to manage information technology. The framework plays a role as reference that helps IT auditors to determine what they should access and guide the management on how best they should manage the information technology (Petterson, 2005)

This framework, in-terms of audit, has a broad coverage which addresses the size, structure and the limit within which the activities of the organization are carried out. The audit process is supposed to be done using a structured program and such a program should be understandable to both IT as well as non-IT personnel.

With all other components as stipulated in the conceptual framework (CF), they contribute to the best practices and growth of the framework, IT professionals are very important to spearhead the life of the framework, as they are responsible to work on ideas and test the viability or possibilities of aligning IT and business. In short, they should be competent enough to accommodate queries from the senior management on aligning the core business (organization) strategies with that of IT through provision of good solutions and approaches while advising on the limitations of IT and challenges as well (Năstase *et al*., 2009).

Many studies on ICT in public higher learning institutions, have addressed the purpose of ICT usage, rather than its relevance. Bethuel (2011) study, whose main objective was to identify the purpose of ICT usage and its sustainability in public higher learning institutions, was also referred. The study involved a sample of four public institutions using a case study that involved ICT personnel and other supporting staff .The study findings indicated that, on average, ICT is used in most public higher learning institutions in supporting the delivery of education. This study addressed the gaps by testing the relevance of ICT in higher learning institutions.

Abu-*Musa* (2009) undertook his study with the main aim to explore the importance and implementation of COBIT processes in Saudi organizations. The study involved 500 questionnaires that were distributed to organizations in Saudi Arabia. It involved banks, financial institutions and services organizations. The results of the findings revealed that majority of the respondents perceived the importance of the COBIT process and domains although the study found that processes are not adequately implemented. But the study didn't cover other organizations like those of education. But, as well, the study didn't test the relevance of COBIT. This study addressed the gaps.

Ericsson *et al*. (2010) in their study: *Process Improvement Framework Evaluation,* which aimed at discussing the characteristics, weaknesses and strengths of IT frameworks to illuminate how companies can benefit from using them in synergy, found out that COBIT is too extensive and, therefore, hard to apply in practice. They further argue that COBIT is focused on assessing IT governance status and,

therefore, it is commonly used for IT auditing purposes and not for improvement purposes. The study involved evaluating five frameworks which were ITIL, COBIT, CMMI, EFQM and ISO 9000. The selected frameworks were analyzed and their most important distinguishing constructs were identified and compared with each other. The frameworks were further classified in relation to a case study of an implementation project at a Swedish public authority which uses several of the studied frameworks.

Contrary to Ericsson *et al*. (2010) study, some astonishing results were found in Ribeiro and Gomes (2009) study, in which the implementation and use of COBIT for IT Governance in the Viana do Castelo Polytechnic Institute in Portugal found out that with the implementation of the framework (COBIT) the institution could ensure the requirements for the quality services certification and manage and control efficiently the IS and IT and the results were very positive.

The findings further revealed that the institution had improved significantly the quality of services, reduced the execution time of tasks in about 25%, monitored and controlled more efficiently the technological infrastructure, reduced 30% in the number of incidents resolved and finalized by the various informatics departments and reduced by 10% the number of reopened incidents.

The study involved six organic units or schools of the institute which included Education High School, Agrarian High School, Technology and High School Administration, Management Sciences High School, Nursing High School, Central Services and Social Services. In that study they implemented a Quality Management System (QMS) that allows ensuring the ISO 9000 certification (Ribeiro and Gomes,

2009). The QMS covers the activities of the institute Strategic Planning and Management, Education/Training and support. Through a centralized control of various services the schools information systems were linked and managed accordingly. Learning from success of COBIT in Portugal and its irreverence in Sweden with reference to the above studies, this paper was interested in investigating whether COBIT could be relevant to Tanzanian higher learning institutions' context.

2.4.1   Relevance of COBIT

Relevance can be defined as something which is significant. Schamber and Eisenberg (1991) define relevance as a cover term for whatever the user finds to be of value about the system output, whether its usefulness, its entertainment or esthetic value, or anything else. They also add that relevance is the user's connection in the sense that information need is expressed by how users see information helping them most effectively to make sense of their individual realities or situations.

Park (1993) defines the term relevance focusing on the user based perspective as the locus of relevance is within individuals' perceptions of information and information environment. He even goes further categorizing relevance differently as: logical relevance, situation relevance, subjective relevance, objective relevance as well as physiological relevance. And according to Saracevic (2007), relevance is a, if not even the, key notion in information science in general and information retrieval in particular.

In the researcher's point of view, and for the purpose of this study, relevance of an IT framework or COBIT for that matter, is the users' sense of perception of the

usefulness, entertainment, aesthetic or any other value, of a system output or information need that lies in and is expressed by the users' effective perception of reality and situation or environment.

In their paper "Implementation of COBIT Framework at Curtin University of Technology Information Services", where they discussed and presented their implementation process for COBIT in their University, Hill and Toman (2003), first used the framework as a guide to the best process, looking at it in a positive way. Since the framework was complex by itself, it took them six months to understand although during the implementation they only suggested the most important objectives to be reviewed. It was, hence, argued that although implementing COBIT seemed to be expensive it had a multiplier effect for the organization.

In the paper, Hill and Toman (Ibid) presented the relevance of COBIT as follows: First, COBIT defines CSF (Critical Success Factors). It is argued that CSF are capabilities, competences or practices which, if implemented, would result to a better matured organization. Second, COBIT provides a mechanism that one organization can benchmark its practices against other organizations. Third, COBIT provides the world's best practice in a ready-to-use form. Fourth, the framework defines a maturity model that evaluates the organization's current stand against COBT framework and fifth and last, COBIT aligns IT with business objectives.

2.5 Shortcomings of COBIT

Nonetheless, the COBIT framework has the following shortcomings as they were provided by Hill and Cyril (Ibid): First, COBIT, if used in a negative way, could be

quite destructive of an organization's confidence because not all that is contained in it is included in an average IT organization.

Second, COBIT contains a number of manuals such as executive summary, framework, control objective, audit guidelines, implementation guide and management guide which may sometimes confuse and lead to difficulty in understanding. Third, implementing COBIT may be expensive although it may be beneficial to the organization in its totality. Fourth, COBIT tells what one could do and what it should be like but it doesn't provide detailed instructions for every step of the journey. Fifth, low maturity processes are hard to review and Sixth and last, don't be constrained by the COBIT Key Performance Indicators (KPI) and Key Goal Indicators (KGI)- invent your own.

2.6 Conceptual Framework

From the literature reviewed different variables have been identified to have effects to the COBIT implementations, the variables include: *Management Guidelines; Business and Technology Manage*ment; *Audit, Control* and *Security* and *IT Professionals*.

It is under assumption that, ceteris paribus, these variables relate as follows: Management Guidelines; Business and Technology Management; Audit, Control and Security and IT Professionals influence to COBIT implementations. Therefore COBIT implementation is a dependent variable and Management Guidelines; Audit, Control and Security; Business and Technology Management and IT Professionals are independent variables. See Figure 2.1 below for detail.

```
┌─────────────────────────┐
│ Management Guidelines   │────┐
└─────────────────────────┘    │
                               │
┌─────────────────────────┐    │        ╭───────────────╮
│ Business and Technology │────┤        │    COBIT      │
│ Management              │    ├───────▶│ Implementation │
└─────────────────────────┘    │        ╰───────────────╯
                               │
┌─────────────────────────┐    │
│ Audit, Control and Security │─┤
└─────────────────────────┘    │
                               │
┌─────────────────────────┐    │
│ IT Professionals        │────┘
└─────────────────────────┘
```
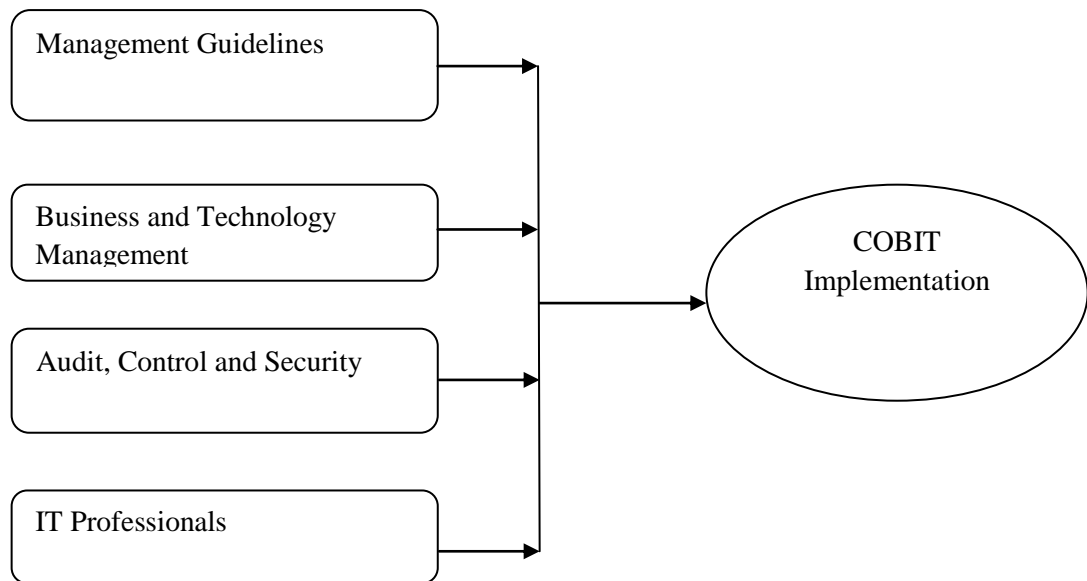
Figure 2.1: Conceptual Framework

Source: Researcher (2013)

2.6.1. Operationalization of Variables

In this study it was assumed that proper implementation of COBIT in an
organization was an outcome of proper Management Guidelines; instituting Audit,
Control and Security measures in an organization; proper Business and Technology
Management and availability of appropriate skilled IT Professionals. Therefore
COBIT implementation is a dependent variable and Management Guidelines; Audit,
Control and Security; Business and Technology Management and IT Professionals
are independent variables.

CHAPTER THREE

3.0 RESEARCH METHODOLOGY

3.1. Introduction

This chapter explains the various research methods that were used in order to satisfy the objectives of the research. The chapter provides an overview of different research philosophies and approaches, designs and their purposes, primary and secondary data and the methods of collecting that data. Justification was also given to the data collection for the purpose of this research work.

3.2. Research Approach

The researcher used a quantitative approach. This approach transformed observations, reports and recordings into numerical data and quantifiable numbers. Later the data was analysed for making comparisons and correlations to get the results. When it came into statistics it was easier to control in case of large numbers. Quantitative research comprises of large scale research containing large numbers and quantities and its analysis to relate various factors to each other (Adam & Kamuzora, 2004).

3.3. Research Design

In this study descriptive research design was used. Descriptive research design is a type of research that is primarily concerned with describing the nature or conditions and degree in detail of the present situation. The descriptive research design was observed to be relevant because it enables the researcher to define clearly what one wants to measure and to find adequate methods for measuring it along with a clear

cut definition of population one wants to study (The Open University of Tanzania, 2010). Moreover, this study also applied both qualitative and quantitative research approaches in gathering direct opinions of respondents on COBIT. Qualitative research designs enabled the researcher to give a complete, detailed description of observed phenomenon, while quantitative research designs enabled him to construct statistical models in an attempt to explain what was observed.

3.4. Population of the Study

The population of this study comprised of staff and students from the University of Dar Es Salaam and The Open University of Tanzania.

3.5. Sample and Sampling Procedures

The sample size of this study included 150 respondents who were given questionnaires, although only 107 respondents returned their questionnaires dully filled. This sample size was selected due to the fact that public service is homogeneous, which requires a relatively small sample in order to make a meaningful analysis for generalisation.

This sample size was selected from two Universities namely UDSM and OUT staff, out of whom, 66 respondents were administrative officials and lecturers including the Heads of Departments and units, 36 were technical officials and students and the remaining 30 were supporting staff.

In this study non probability technique was used in which convenience and purposive or judgmental sampling techniques were used to obtain the sample. Purposive sampling techniques enabled the researcher to select a sample on the basis of his

knowledge and judgment about the population and its elements as well as the purpose of the study. The researcher applied this sampling technique to select individuals with required information and in case of administrative officials and lecturers; the convenience sampling technique enabled the researcher to select respondents who were available and willing to respond. This method was used to select heads of departments/directors, academic and non-academic staff as well as students.

Table 3.1: Sample Distribution Table

CATEGORY	OUT		UDSM	
	Frequency	**%**	**Frequency**	**%**
Academic staff	20	100	-	-
Non-Academic staff	34	89.5	4	10.5
Students	28	57.14	21	42.86
Total	**82**		**25**	

Source: Survey Data June 2013

A sample size of 150 was preferred due to both time and resources constraints, but also it was the researcher's expectation that the sample was representative enough to give a generic picture of the relevance of COBIT in higher learning institutions in Tanzania.

3.6. Data and Data Collection Methods

The methods of data collection used in this study included distribution of semi structured questionnaires, documentary review or analysis, focused group discussion and observations. The methods of data collection used are discussed in detail below.

3.6.1. Semi-structured Questionnaires

These were applied to the Heads of Departments/Directors and academic staff and a few other non-academic staff and students. These were used because the researcher believed they possess the required information concerning COBIT, processes, procedures and policies in the higher learning institutions. Most of these respondents showed positive attitudes towards the questionnaires and gave relevant information required by the researcher.

3.6.2. Documentary Review

The documents were reviewed so that the researcher builds an in-depth understanding of COBIT. Theoretical and implementation perspective of COBIT were also studied together with challenges associated with its implementation especially on African experience. These documents were reviewed because the researcher believed they contained the relevant information for the study.

3.7. Data analysis and Presentation

The study was both qualitative and quantitative. The results were presented by assigning them numerical values and mathematical treatment which helped in evaluating the results. The analysis of data was conducted in terms of mathematical terms involving the production of tables, charts, graphs, figures and diagrams. In this case, Statistical Package for Social Sciences (SPSS) version 18 was used to analyze quantitative data, while qualitative information was descriptively analyzed and a major summary report was accomplished together with some direct quotations from respondents.

3.7.1. Regression Analysis

Regression analysis was used to test the quantitative data, focusing mainly on how the variables affecting COBIT can be used to forecast the relevance of it. The analysis however, was not only enough for the researcher to draw conclusions but, rather, the differences were taken as preliminary. This study intended to create a model to be used for predicting the relevance of COBIT in the higher learning institutions through the mentioned variables, i.e. Management Guidelines; Business and Management Technology; Audit, Control and Security and IT Professionals. The developed model can, therefore, be used by any institution intending to improve the variables that contribute to the best practices of COBIT and be able to measure its relevance at a particular time. Multiple regressions was the best model that was deployed in this study, find Equation 1 below for details.

Equation 3.1: Multiple Regressions

$$Y = a + b_1X_1 + b_2X_2 + b_3X_3 + b_4X_4 + \epsilon$$

Where;

a, b_1, b_2, b_3, b_4 are constants

Y = Relevance of COBIT in Higher Learning Institutions in Tanzania

X_1 = Management Guidelines

X_2 = Business and Management Technology

X_3 = Audit, Control and Security

X_4 = IT Professionals

$\mathcal{E}$ = The error term (It can be thought of as all the causes of **Y** that are not explicitly measured and are not directly included in the model or equation)

Source: Researcher (2013)

The assumptions about the multiple regression model (i.e. Equation 1 above) are as follows:

First, the error term $\mathcal{E}$ is a random variable with expected value of zero; $\mathbf{E(\mathcal{E}) = 0}$.

This means that for the given values of the independent variables, the expected value of the dependent value is:

$$\mathbf{E(Y) = a + b_1X_1 + b_2X_2 + b_3X_3 + b_4X_4}$$

There is therefore a linear relationship between the independent and dependent variables.

Second, the values of $\mathcal{E}$ are independent meaning that the size of the error for a particular set of values for the independent variables is not related to the size of the error for another set of values for the independent variables;

Third, the variance of $\mathcal{E}$ is denoted by $\mathbf{\sigma^2}$ and it is the same for all values of the independent variables. The variance of **Y** equals $\mathbf{\sigma^2}$ and it is the same for all values of the independent variables;

Fourth, the error $\mathcal{E}$ is normally a distributed random variable reflecting the deviation between the value of **Y** and the expected value of **Y.** This means that the dependent variable is also a normally distributed random variable (Osborne & Waters, 2002)

3.8. Research Clearance

Research clearance to carry out this study was obtained from The Open University of Tanzania. The research clearance helped the researcher/research assistants to obtain permission for conducting research in the areas of study.

A consideration was guaranteed in this study ensuring that respondents' protection from psychological, physical and social risks were communicated and instituted. The study was conducted under informed consent of the informants by informing them the purpose of the study to influence their choice to participate. Moreover the researcher observed the right to privacy of the respondents by holding them responsible for security and storage of personal identification information and the control of its access by authorized individuals. Despite the official permission to conduct the research, the institutional privacy and confidentiality was also maintained. Apart from written explanations about the intention and the purpose of the study, the researcher also explained the same verbally. The instruments used for the data collection was tested for validity and reliability before going for the field research.

CHAPTER FOUR

4.0 DATA INTERPRETATION AND FINDINGS

4.1.   General Information

The study on the relevance of COBIT in higher learning institution involved two higher learning institutions namely University of Dar es Salaam and The Open University of Tanzania. The respondents involved in this study from University of Dar es Salaam were all based in Dar es Salaam, or simply were residing in Dar es Salaam. While those from The Open University of Tanzania, due to its nature of operations of having a number of regional centres across the country and coordination centres abroad, only Mwanza, Kagera and Iringa regions were involved in this study. For in depth findings of this study, academic staff, non-academic staff and students were involved. The involvement of these groups aimed at finding their perception on how they understand COBIT.

The quantitative data were analyzed using a statistical package known as SPSS version 18. The results show descriptive and other inferential statistics. Furthermore the results were presented in tabular as well as graphical forms. The details of the respondents who were involved in the survey, with their working role, were given in Table 3.1

4.1.1. Academic staff (Sample Composition)

4.1.1.1.   Working Positions and Education Level

For the academic and non-academic staff, the respondents especially came from different faculties ranging from Faculty of Education, Faculty of Art and Social Science, Directorate of Communication and Marketing, Faculty of Science,

Technology and Environmental Studies, Library, Faculty of Business Management, Directorate of Institute of Educational and Management Technologies, Directorate of Examination Syndicate, Institute of Continuing Education, University Computing Centre to the Directorate of Planning and Development. Table 4.1 summarizes the working positions together with the education level for the academic staff respondents.

Table 4.1: Working Position and Education Level for Academic Staff

Education Level	Working Position	No. of Respondents	Percentage (%)
PhD	Lecturer or Senior Lecturer	4	20
Masters Level	Lecturer	2	10
	Assistant Lecturer	7	35
Bachelor 's Degree	Assistant Lecturer	1	5
	Tutorial Assistant	6	30

Source: Survey Data June 2013

4.1.1.2.   Mode of Employment

The study revealed that 85 % of the academic staff interviewed are working in the institution on full time basis which, therefore, indicates that they are part of the institution process, while the rest 15% are working on either contract or part –time basis . Table 4.2 summarizes the employment status of academic staff.

Table 4.2: Employment Status for the Academic Staff

Category	Frequency	Percent
Contract	2	10.0
Full time	17	85.0
Part time	1	5.0
Total	**20**	**100.0**

Source: Survey Data June 2013

The study as well worked on the time duration or working tenure with the institution. The study found that the duration for academic staff who stayed longest with the institution was 15 years while the shortest duration was 1 year. On average, the stay for the staff was 5 years. In addition to that this shows that they have been part of all the implementation of ICT within the institution since its introduction.

4.1.1.3. Computer Literacy Level

Findings at the Open University of Tanzania indicated that the academic staffs were well equipped with computer skills, which were also an indication, that the University ensures that it employs staff with equitable computer skills or it had a good plan to equip its academic staff or employees with computer skills, See Table 4.3 for details.

Table 4.3: Computer Literacy Level for Academic Staff

Self rating	Frequency	Percent
Good	11	55.0
Very Good	9	45.0
Total	20	100.0

Source: Survey Data June 2013

4.1.2. Non –Academic Staff

The non-academic staff group comprises respondents working as support staff to the core university functions of providing education. The support functions comprise of a number of departments such finance, human resources management and administration, communication and marketing and information and communication technology and the like.

This group has been very significant in this study since they were the ones who were technical implementers of ICT products and services. In this group it was most likely to find staffs who are systems administrators, computer technicians, system developers, ICT technologists, ICT instructors, software, network engineers and system analysts.

Table 4.4: Working Positions and Education Level for Non Academic Staff

Education Level	Grouping of staff			
	IT staff		Non-IT staff	
	No. of Respondents	Percentage (%)	No. of Respondents	Percentage (%)
Masters Level	5	13.16	1	2.63
Bachelor Degree	19	50.00	5	13.16
Diploma Level	4	10.53	2	5.26
Certificate	1	2.63	1	2.63
Total	**29**	**76.32**	**9**	**23.68**

Source: Survey Data, June 2013

Table 4.4 shows that 76.32 % of non-academic staff respondents are from the IT field leaving only 23.68% in the non- IT field. This indicates that the research was IT related. In short the researcher wanted to get inner feelings from the staff of the same field.

4.1.2.1.   Mode of Employment for Non-Academic Staff

Table 4.5 shows that 71.1 % of non-academic staff have been employed on full time basis while the rest 28.9 % are working with the institutions on part-time basis. This indicates that most non-academic staff respondents were fully attached to their work and, thus they commit more hours in their work with a sense of ownership

or belongingness to the institutions. It can, therefore, be inferred that their responses reveal their usual work practices as compared to those working on part-time basis.

Table 4.5: Mode of Employment for Non-Academic Staff

Working Tenure	Frequency	Percent
Full time	27	71.1
Part time	11	28.9
Total	38	100.0

Source: Survey Data, June, 2013

4.1.2.2. Working Tenure for Non-Academic Staff

For the supporting staff, the longest duration the respondents stayed with the institution was 11 years while the average staff stay was about 4 years and the minimum staff stay was found to be 2 months. In comparison with the academic staff, the study shows that non-academic staff have stayed for a shorter duration within the institutions compared to the academic staff.

Findings indicated that the non-academic staffs were well equipped with computer skills. This confirmed what the researcher wanted: to get people who are at least well knowledgeable with computers, figure 4.1 below gives the details.
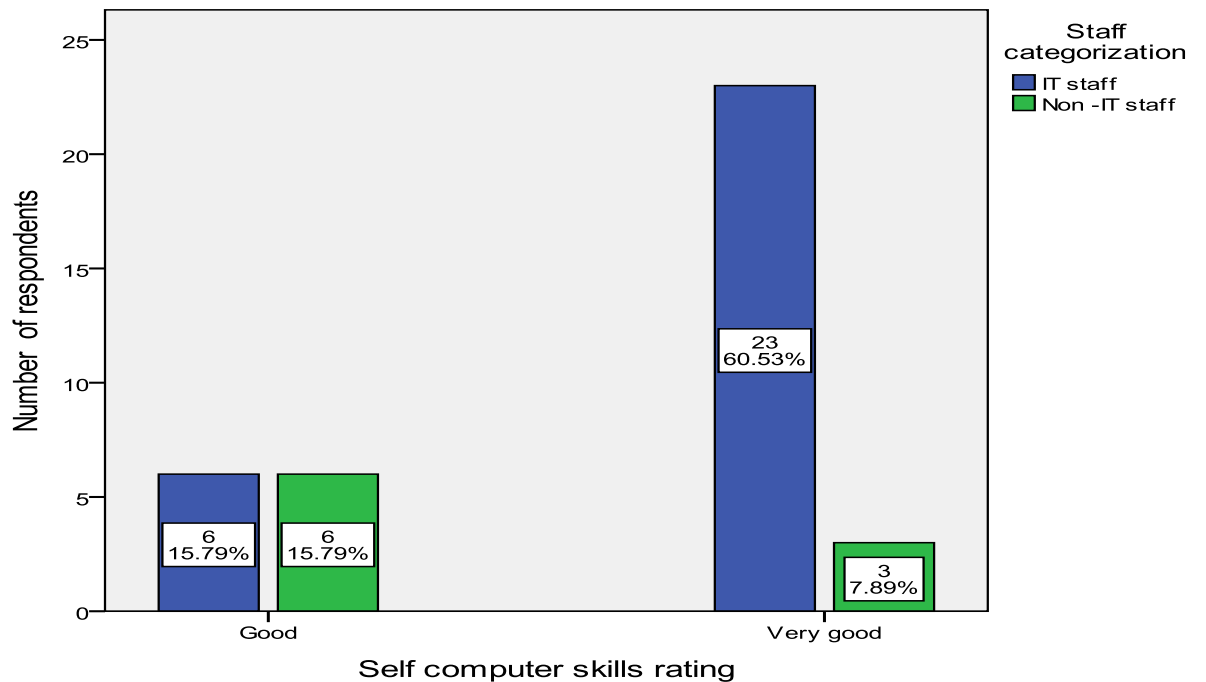
Figure 4.1: Computer Skills Rating

Source: Survey Data, June 2013

4.1.3. Students

Another group that was involved in this study was students. Students were involved purposefully because a university or an institution is always established to serve students. They are the ones who are the users of the ICT systems in various ways ranging from accessing the online library, accessing the examination results, direct communication with lecturers, directorate of students and fellow students, search for various materials, examination registration, academic year registration, preparing and editing reports and documents. Systems use depends on their stability, reliability, security and suitability. This, therefore, impacts the delivery of the courses. Find below Table 4.6 for details.

Table 4.6: Students Compositions

Institution	Frequency	Percent
OUT	28	57.14
UDSM	21	42.86
Total	**49**	**100.0**

Source: Survey Data, June 2013

4.1.3.1.   Computer Literacy

The study indicates that almost 80% of the students involved in the study have ICT related courses in their university programs they study . A few of them, about 20%, don't have such ICT related courses in their programs. For those with ICT related courses the courses which they are pursuing are Introduction to computer studies and IT, Introduction to Microcomputer, Information System Management, ICT in Business Management, Cisco Networking Courses, Database, Networking and Computer Programming. See the findings in Figure 4.4 below for details.
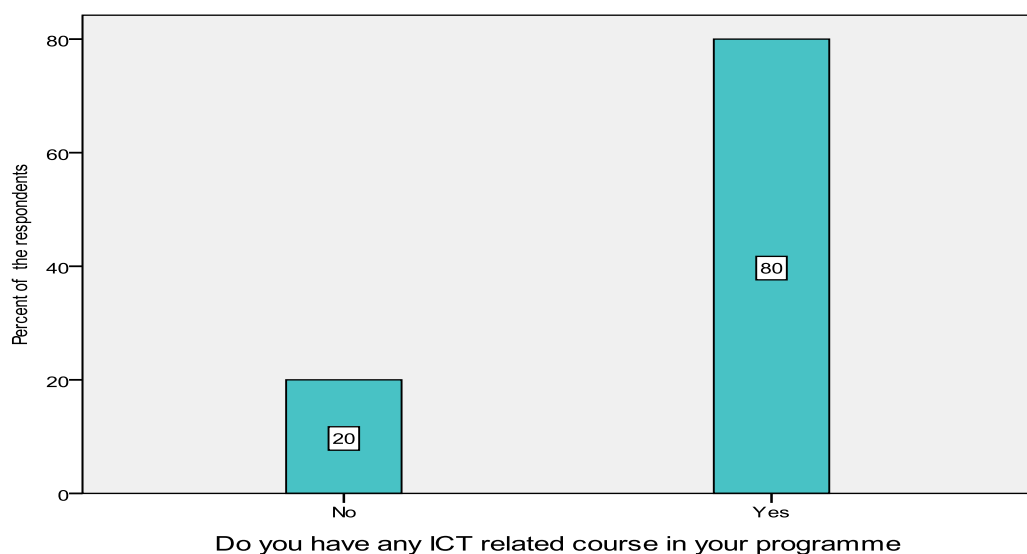
Figure 4.1: Availability of ICT Courses in Students' Program

Source: Survey Data, June 2013

According to the figure 4.4 and review of various documents by the researcher within the higher learning institutions, the study indicated that ICT courses available in the university programs were relevant in different areas such as: First, allowing them to create documents, Second, to assist them to create assignments from various documents and reports using the word processors application,

Third, searching the information, especially relating to their courses, using the internet; Fourth, helping students when they go back to their work where they can apply the skills; Fifth, helping them in today's business world and; Sixth, the knowledge is vital in professional development especially in database, networking and programming fields.

4.1.3.2. Students Self Rating on Computer Skills

About 80% of the students (39 students) rated themselves as very good in computer skills while 20% (which 10 students) rated themselves as good in computer skills . Figure 4.5 summarizes the ratings of students' computer skills.
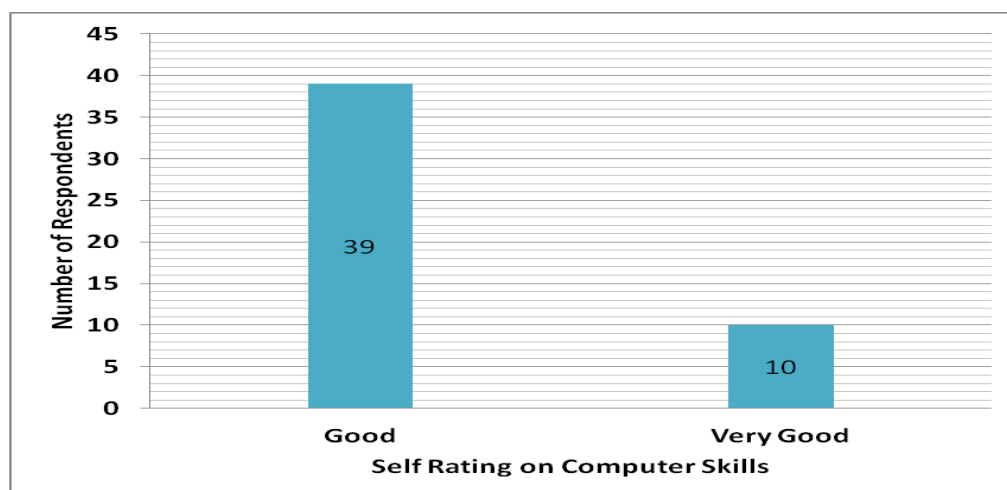
Figure 4.3: Students Computing Skills Self Rating

Source: Survey Data June 2013

4.2.   ICT Application

In the first part of this chapter, which described the way both groups were involved in the study and how they rated themselves in computer skills, the study revealed that almost all the groups of respondents (i.e. academic, non-academic and students)   rated themselves as very good in computer skills. This part focused on the findings on how each   group applied ICT.

4.2.1. Academic Staff

The study revealed that academic staff applied ICT in their daily activities relating to teaching, course delivery and when accessing the materials.   About 54.67% strongly agreed to have been applying   ICT while as few as 10% indicated to have not been using ICT at all as indicated in Table 4.7 .

Table 4.7: The Use of Computer in Daily Work for Academic Staff

Area of Application/Response	Strongly Agree	Agree	Not sure	Disagree	I do not Know	Total
Creating Documents	65%	35%	0%	0%	0%	100%
Accessing systems like Moodle ,ARIS/SARIS, KOHA,	40%	0%	5%	50%	5%	100%
Effective use of electronic communication	75%	25%	0%	0%	0%	100%
Spreadsheet	60%	40%	0%	0%	0%	100%
Specialized package (CAD, SPSS)	25%	25%	35%	10%	5%	100%
Course Preparation	63%	32%	5%	0%	0%	100%
Average	**54.67%**	**26.17%**	**7.5%**	**10%**	**1.66%**	**100%**

Source: Survey Data, June, 2013

About 50 percent of the academic staff interviewed agreed that The Open University of Tanzania has enforcement rule for staff to use some ICT services or

systems. Some of the ICT areas enforced for use include: SARIS, Moodle, File Tracking System, staff e-mails system, e-learning system and student e-mails.

4.2.2. Non-Academic Staff

Non-academic staff applied ICT in their daily activities relating to supporting products and services of the university. About 60.75% strongly agreed to have been applying ICT in their daily working while as few as 10% disagreed to use ICT as indicated in Table 4.8 and Table 4.9.

Table 4.8: Use of a Computer in Daily Work for Non-academic Staff

Area of Application/Response	Strongly Agree	Agree	Not sure	Disagree	I don't know	Total
Creating Documents	92%	8%	0%	0%	0%	**100%**
Accessing system like Moddle ,ARIS	43%	37%	3%	14%	3%	**100%**
Effective use of electronic communication	78%	16%	0%	4%	3%	**100%**
Specialized package (CAD, SPSS)	30%	31%	13%	22%	5%	**100%**
Total	**60.75%**	**23%**	**4%**	**10%**	**2.7%**	**100%**

Source: Survey Data, June 2013

Table 4.9: Organization's Enforcement on Non-academic Staff to Use of ICT Applications

Response	Frequency	Percent
No	15	39.5%
Yes	21	55.3%
No response	2	5.3%
Total	**38**	**100.0%**

Source: Survey Data June 2013

56

About 55.5 % of non-academic staff agreed that The Open University of Tanzania has enforcement rules for the staff to use some ICT services or systems. The services include: SARIS, File Tracking System and staff e-mail system.

4.3. Awareness on ICT Platforms

4.3.1. Academic Staff

The survey found that the majority of respondents involved in the survey were aware of the ICT frameworks available, which was evidenced by the few responses from both academic and non-academic staff. From those few who responded to this question, less than 50 % of academic staff agreed to have been aware of some ICT frameworks as illustrated in Table 4.10. On the other hand, only 30 % of the academic staff, showed they were aware of the ICT frameworks, the relevance of which, the researcher was trying to investigate. Other frameworks which staffs were aware of include: ITIL, ISO 17799, ISO/IEC 17799:2005 and BSC, But they had no idea about other frameworks.

Table 4.10: Awareness of Academic Staff on ICT Platform

		Responses	
	Framework	**N**	**Percent**
$Qn11[a]	COBIT	3	30.0%
	ITIL	3	30.0%
	ISO 17799	2	20.0%
	ISO/IEC 17799:2005	1	10.0%
	BSC	1	10.0%
Total		**10**	**100.0%**

Source: Survey Data June 2013

4.3.2. Non-academic Staff

In the case of non-academic staff, the responses were quite different from those of the academic staff. This may be attributed to the fact that these staff were just supporting staff and most of them (i.e. 85.7%) were IT professionals - which increased their awareness and the survey evidenced that, under this group, about 61.9 % of the staff were aware of COBIT framework. Furthermore, this group (i.e. non-academic staff) indicated also that they were at least aware of other ICT frameworks, as it is revealed from Table 4.10.

Table 4.10: Awareness of Non-Academic Staff on ICT Platform

Frameworks			Grouping of staff		Total
			IT staff	Non-IT staff	
$Qn11staffnon[a]	COBIT	Count	10	3	13
		% of Total	47.6%	14.3%	61.9%
	ITIL	Count	7	0	7
		% of Total	33.3%	.0%	33.3%
	ISO 17799	Count	10	0	10
		% of Total	47.6%	.0%	47.6%
	ICIF	Count	1	0	1
		% of Total	4.8%	.0%	4.8%
	CMM	Count	1	1	2
		% of Total	4.8%	4.8%	9.5%
	MOF	Count	1	0	1
		% of Total	4.8%	.0%	4.8%
	BS15000	Count	3	1	4
		% of Total	14.3%	4.8%	19.0%
	ISO/IEC 17799:2005	Count	9	0	9
		% of Total	42.9%	.0%	42.9%
	BSC	Count	6	2	8
		% of Total	28.6%	9.5%	38.1%
	Six Sigma	Count	3	0	3
		% of Total	14.3%	.0%	14.3%

Total	Count	18	3	21
	% of Total	85.7%	14.3%	100.0%

Source: Survey Data, June 2013

4.4. Importance of ICT Framework

4.4.1. Academic Staff

The respondents were asked to state 'yes' or 'no' against the 13 reasons that stated as to why the ICT frameworks were/are essential in an organization. These reasons were: First, the framework was assumed as the key to the ICT development , and this allows the staff to cope with the technology demands in their daily works; Second, the framework provides a guide for embedding ICT in curriculum and assessment across curriculum subjects , which enhances knowing step by step the procedures and principles to follow when developing, implementing and aligning ICT in organization; Third, ICT framework is necessary for an organization seeking to implement ICT systems; Fourth, the ICT framework maintains high quality information to support business decisions; Fifth, ICT framework adheres to international standards as it maintains standardization of processes in an organization;

Sixth, ICT is the only quickest and reliable approach for ICT deployment to its fullest requirement; Seventh, ICT Framework guides implementation through policies given/explained in it; Eighth, for universal use, quality and standard are necessary, Nineth, it will enable students and staff to utilize fully the frameworks and also make easy implementation of it; Tenth, the framework provides guidance to organizations on how to use IT as a tool to business change, transformation and growth; Eleventh, to properly manage and control the use of ICT and related

resources; Twelfth, tt guides users to choose timing and objective control and Thirtieth, it helps to deliver students services such as communication;

Concerning the importance of ICT frameworks, the study found that academic staff agreed that ICT frameworks are very important whenever an organization seeks to implement an ICT system. About 85% of interviewed academic staff saw the importance of having ICT frameworks whenever an organization wanted to implement any ICT system , while only 15 % of them disagreed that an ICT framework might be important to an organization implementing an ICT system. Table 4.11 gives the summary of the necessity of ICT frameworks as rated by academic staff.

Table 4.11: Ratings on Importance of ICT Frameworks from Academic Staff

Response	Frequency	Percent
No	3	15.0
Yes	17	85.0
Total	**20**	**100.0**

Source: Survey Data, June 2013

4.4.2. Non-academic Staff

In the case of non-academic staff, 92%   of the respondents   agreed   that   ICT framework was very important in ICT system implementation while only 7.9 % did not   consider ICT framework as an important element in ICT system implementation. This disagreement was attributed to the non-IT personnel who were also involved in this group. Figure 4.6   presents   the   summary   on   the   ICT framework's necessity on ICT implementation for the non-academic staff.
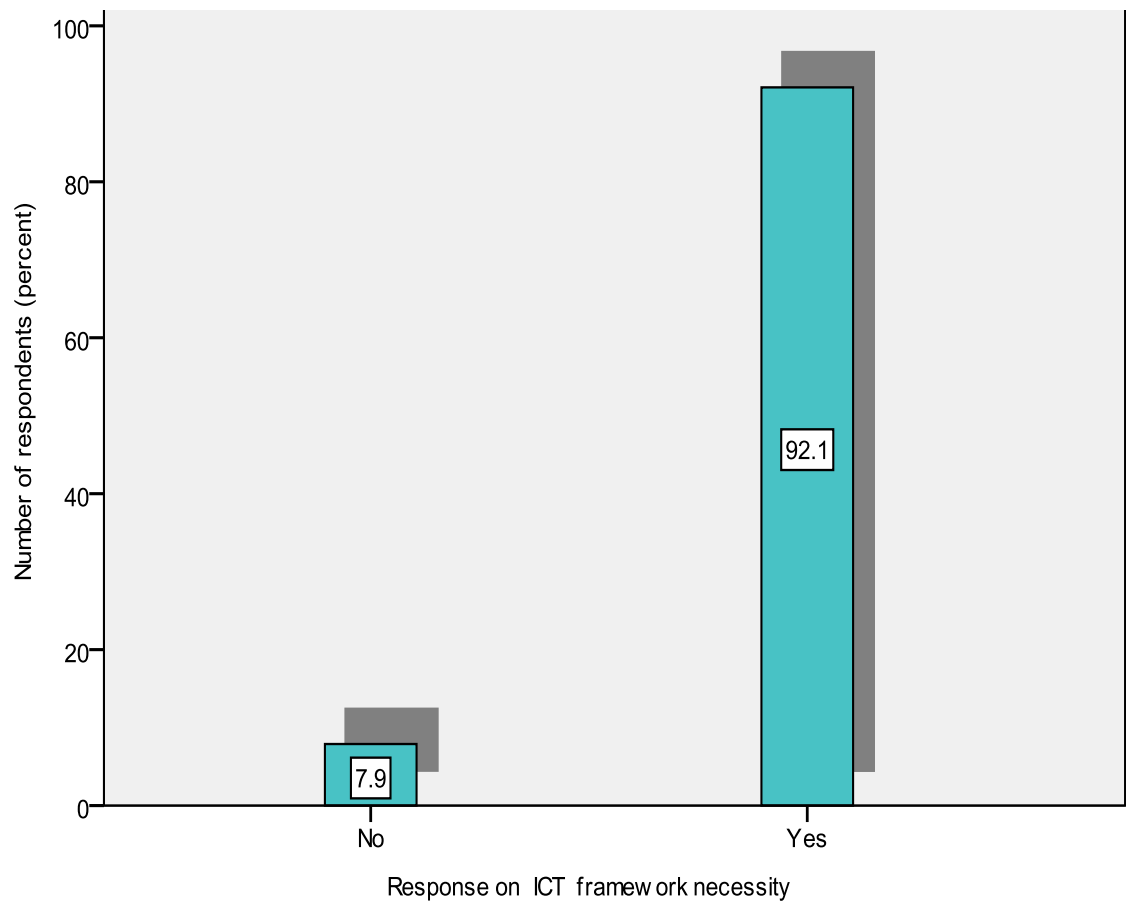
Figure 4.6: Necessity of ICT Framework to Non-academic Staff

Source: Survey Data, June 2013

The non-academic staff gave the following reasons as to why the ICT frameworks are necessary in the ICT systems implementation: i) Controlling the use of ICT system – the way how people utilize the facilities, securities and rights of accessing the information; ii) Assessing utilization – that is, it allows the organization to asses itself how it has implemented the system, conducts audit and knows its position as far as ICT utilization is concerned,

iv) Future use meaning - that is, it is easy for a new recruited staff to learn and adapt the utilization of the ICT framework and, v) Manage well students affairs meaning that the framework may serve well for both academic staff as well as non-academic staff to handle well student affairs ranging from class works, library, payment, etc.

4.5. Information on the International Standards Implemented

4.5.1. Non-academic Staff

Though they know the importance of using the ICT framework in any ICT system implementation , still they don't know the ICT frameworks which have been implemented in their institutions and this was evidenced by the study as only 18.4 % declared to know the framework used while the rest didn't know. This was also a problem as the IT staff who are implementers of the ICTs in their institutions did not have significant understanding of international ICT standards implemented in their institutions see Table 4.12 and Table 4.13 for the results.

Table 4.12: Working Tenure of Non-academic Staff

Response	Frequency	Percent
No	21	55.3
Yes	7	18.4
No response	10	26.3
Total	**28**	**100.0**

Source: Survey Data, June 2013

Table 4.13: The Standards Used In the Institutions

INSTITUTION	STANDARD
UDSM	ISO
OUT	H232 and SIP
	Protocol for Policy and Regulatory Framework for NEPAD ICT Broadband Infrastructure Network.
	UNESCO ICT Competency Framework for teachers
	Cisco Standards
	ISO 1400 used for providing auditing standard for management system standards.

Source: Survey Data, June 2013

4.5.2. Academic Staff

In the case of academic staff, only 11.1% of the respondents agreed to be aware of the international standards implemented in their organization while about 88.9% of them were not aware of the international standards implemented in their institutions. Figure 4.7 summarizes the results.
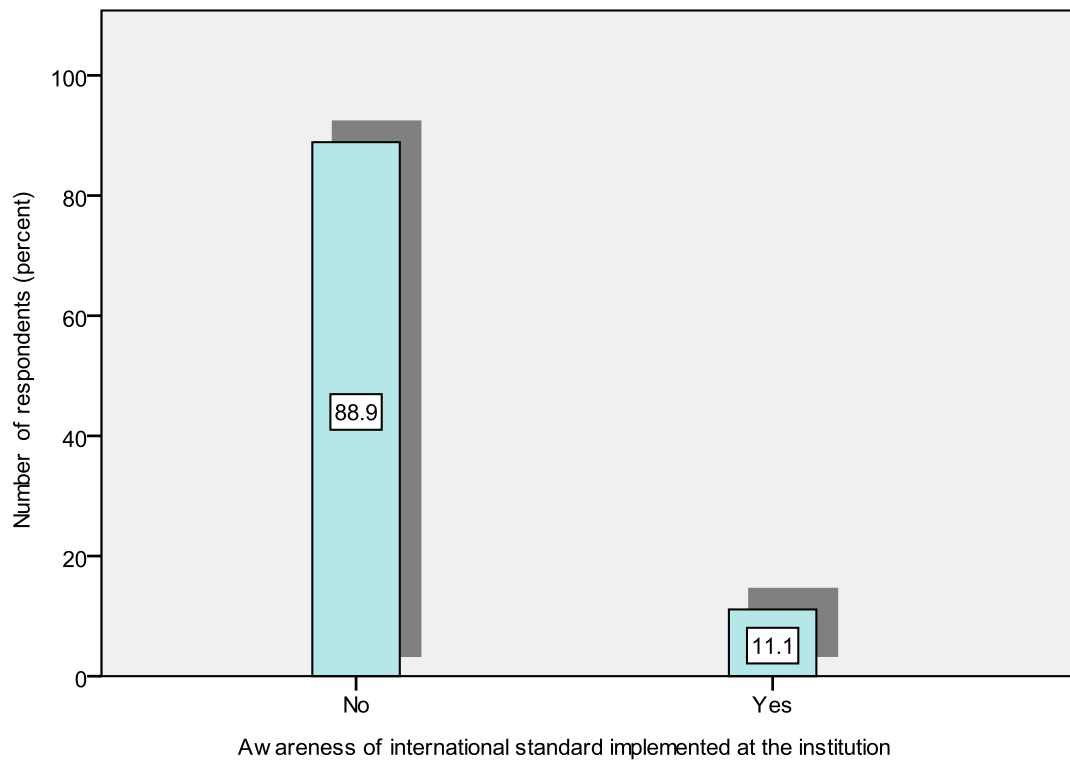
Figure 4.5: Awareness of International Standards Implemented at the Institution

Source: Survey Data, June 2013

From Figure 4.7, a small number of percentages can be viewed whereby respondents mentioned other things which are not even standards, like Web designing.

4.6.   ICT Implementation Rating at the University

4.6.1. Academic Staff

In the academic staff rating on the ICT Framework implementation, about 35% of the respondents agreed that their organization implement ICT Frameworks while about 5% disagreed on the implementation of the framework components. This indicated that even though the staffs were not aware of the framework(s) but yet they

agree that their institution still implements some components of ICT Frameworks. See Figure 4.8 below.
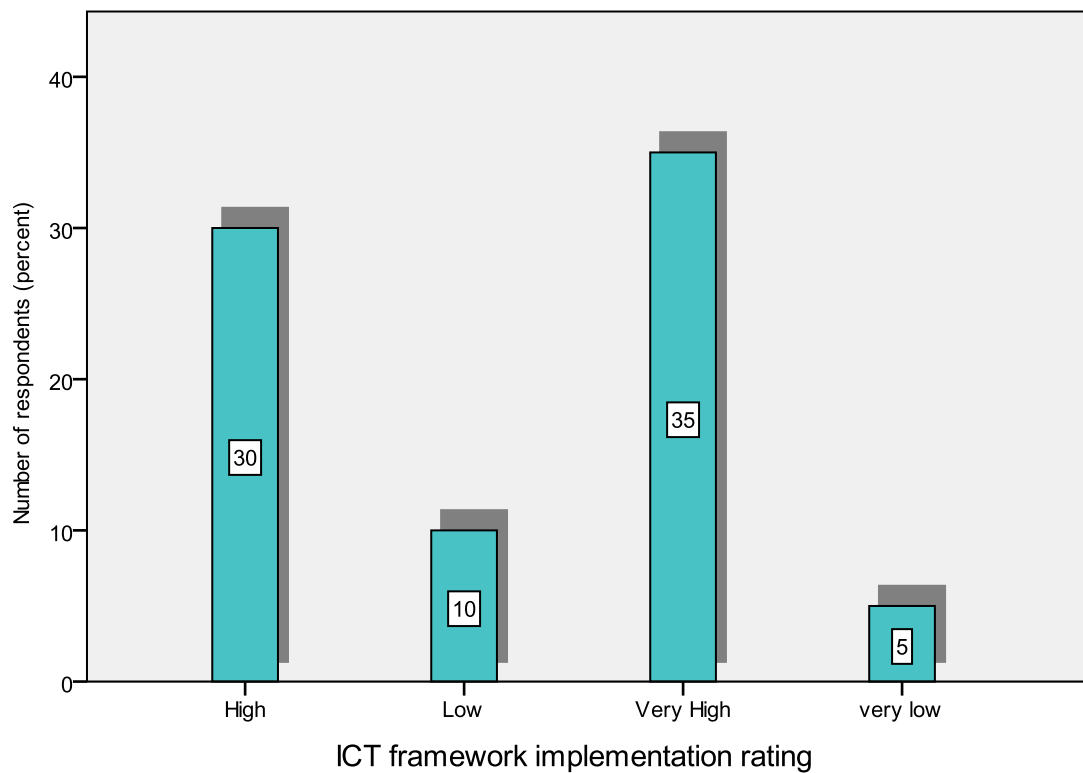
Figure 4.6: ICT Frameworks Implementation Rating for Academic Staff

Source: Survey Data, June 2013

4.6.2. Non-academic Staff

In the non-academic staff rating on the ICT Framework implementation in their institution only 10.5% of the respondents agreed strongly that their institutions implemented components of ICT frameworks; 47.4% agreed while 5.3% strongly disagreed and about 26.3% disagreed that the institution implemented components of ICT framework. In summary, it indicates that about 57.9% (agree and strongly agree) indicated positivism, that is, their institution integrates ICT framework while the

remaining 42.1% (disagree and strongly disagree) that their institution integrates ICT

framework. Figure 4.9 summarizes the results
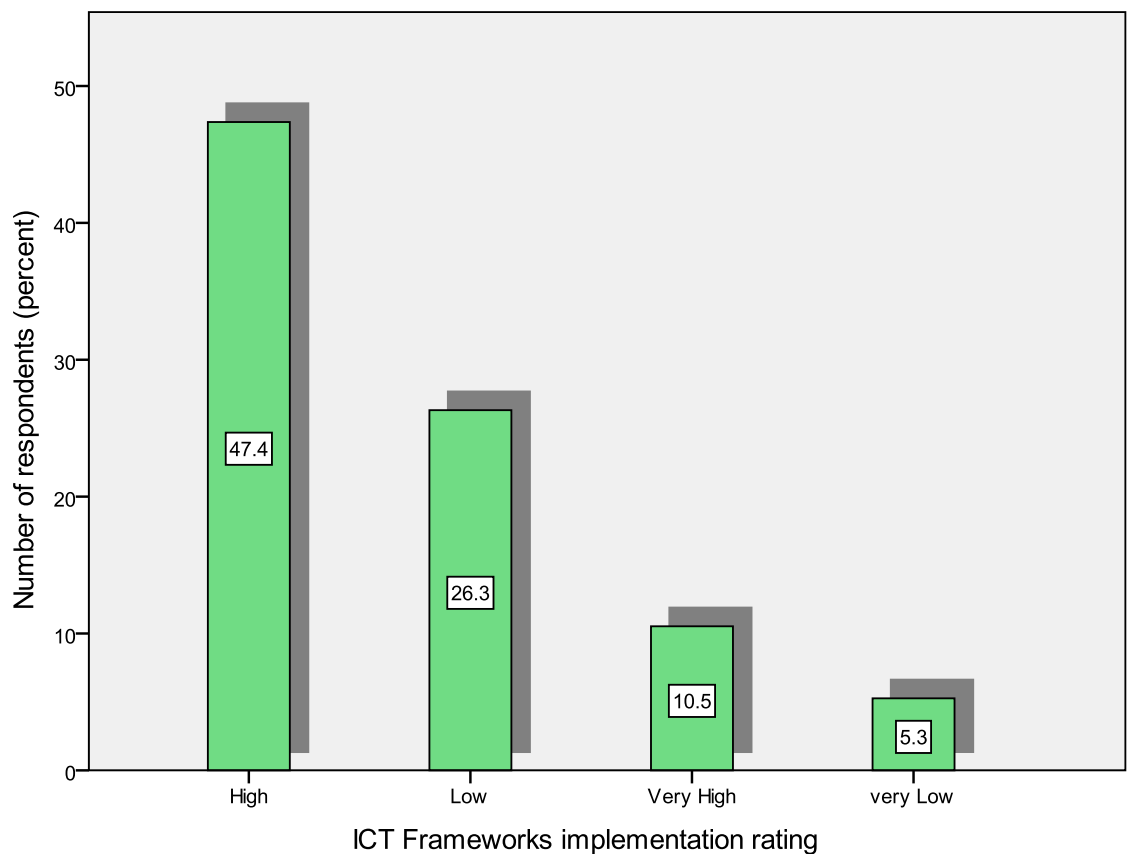
Figure 4.7: ICT Framework Implementation for Non-academic Staff

Source: Survey Data, June 2013

4.7. Student Perception on Provision of Technical Skills on ICT Implementation in Higher Learning Institutions

As stated earlier the study involved three groups, two of which were academic

staff and non-academic staff who are employees of the studied institutions. These

two groups are simply owners of any ICT implementations in their institutions. The

third group of the respondents constituted students who, in this case, are the users of

any ICT service implemented by the institutions. The question whether the students

use the services or not depended much on the enforcement laid-down by the institutions and the way the students themselves perceived it.

In this study 51.00% of the students said the university doesn't provide technical skills to the required level, while only 42.86% of them said the university provides required ICT technical skills. The low response on this might have been contributed by the fact that a large number of students who need support don't match with the available ICT infrastructure of the institutions. Table 4.14 gives the summary of the findings.

Table 4.14: Provision of Required ICT Technical Skills to Students

Response	Frequency	Percent
No	25	51.00
Yes	21	42.86
No response	4	6.14
Total	**49**	**100**

Source: Survey Data, June 2013

4.7.1. Enforcement on Use of Online Systems to Students

The institutions have been enforcing students to use available online systems like Student Registration System, Students' e-mail System, Moodle, etc. The responses are still low for both institutions under this study. The ICT literacy level amongst students differs as some join the universities without having basic knowledge on ICT, which forces them to acquire the services from elsewhere. For example, you can find a student unable to register him/herself online so, instead, he/she seeks assistance from a fellow student or from an internet café attendant. Systems which have been mentioned to have been enforced by the institutions include: Student Registration System, Students' e-mail System and Moodle (Online

Learning Management System). Figure 4.10 below, gives the summary on the responses.
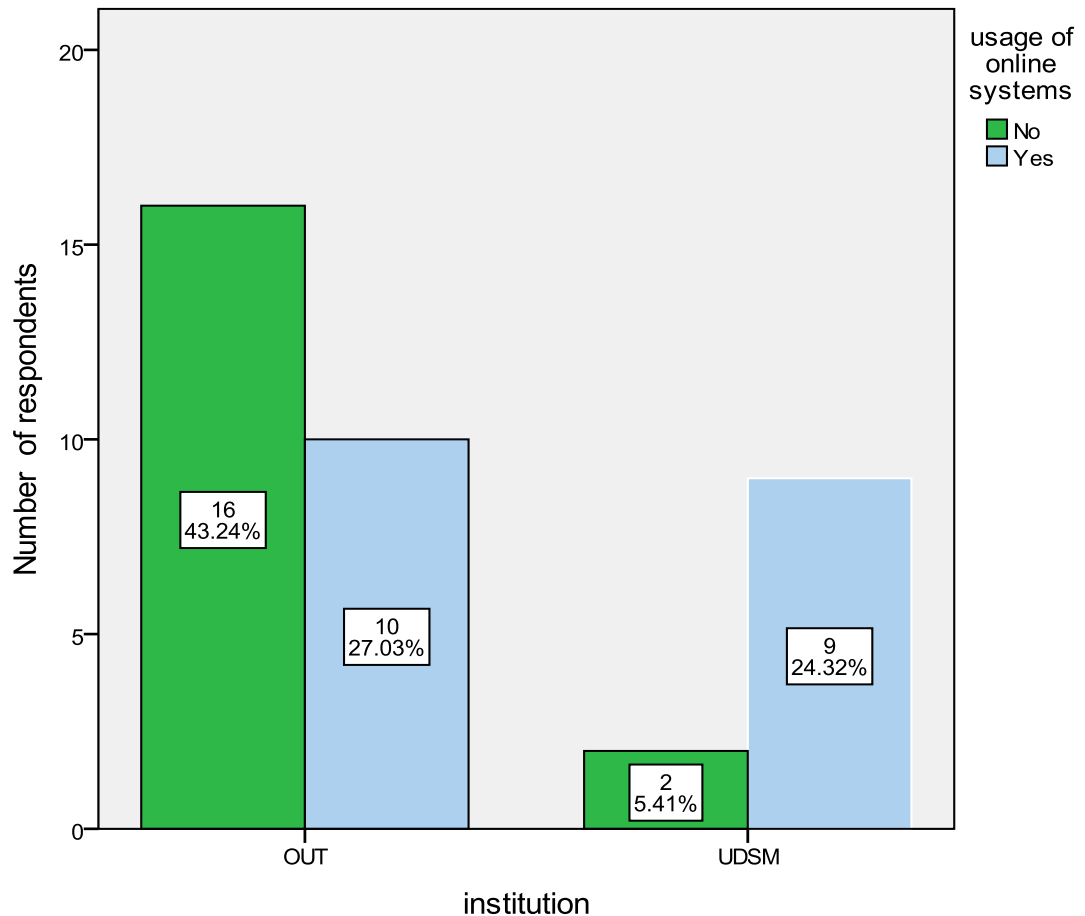
Figure 4.8: Enforcement on Use of Online Systems from Students

Source: Survey Data, June 2013

4.7.2. COBIT Components Ratings by Students

Concerning the components of COBIT, the students perceived the Management Guidelines as the first among all other components with weight score mean of 4.1310 (with 0 to 5 scale). Under this, Management Guidelines have been attributed to factors such as: the university forces students to use online systems to access university services such as preparing for exams or tests; the university

provides free internet access at the university for students. The second component was Business and Technology Management with the weighted mean score of 4.0895, having the following attributes: There are proper strategies of the university management to equip students with affordable ICT resources to be used during studies. Table 4.15 below reveals the summary of the findings.

Table 4.15: Summary of COBIT Ratings by Students

N = 43

COBIT Component	Mean	Std. Deviation
Management Guidelines	4.1310	0.53665
Business and Technology Management	4.0895	0.76927
Audit ,Control and Security	3.4829	0.85566
IT Professionals	3.5526	0.95633

Source: Survey Data, June 2013

4.8.   COBIT Component Rating

4.8.1. Reliability Analysis

The reliability analysis was done, prior to analysis using other statistical tests as proposed by the researcher in the proposal. This analysis was done using all components of COBIT as explained in the literature review, namely, Management Guidelines; Business and Technology Management; Audit, Control and Security and IT Professionals. The results showed that there was consistency in the responses to the questions by the respondents since the higher the coefficient the higher the consistency. For further analysis the coefficient should be greater or equal to ($\geq$) 0.7. Table 4.16 summarizes the Coefficients of Cronbach's Alpha.

Table 4.16: Reliability Tests to Academic and Non-Academic Staff

COBIT Component	Cronbach's Alpha Coefficients	
	Academic Staff	Non-Academic Staff
Management Guidelines	0.721	0.899
Business and Technology Management	0.868	0.867
Audit, Control and Security	0.723	0.703
IT Professionals	0.699	0.785

Source: Survey Data, June 2013

4.8.2. Descriptive Analysis

The Likert scale was used and its range was from 0 to 5; 0 being the lowest score and 5 being the highest score. Under the COBIT components used there were several attributes with different scores. The weighted score mean for each component was calculated and the results revealed that Management guidelines from academic staff read the highest with a mean value of 4.1429. Next to it was the IT professionals, with a mean score of 3.6842. The Audit, control and security was the lowest with its weighting score of 3.2794.

In comparison with non-academic staff, Management guidelines recorded the highest with mean score of 4.1521, followed by IT Professionals with mean score of 3.8636. The higher the mean the higher the consistency on respondents' perception about the COBIT components. In the case of standard deviation: a higher standard deviation shows a diverse or inconsistency on the understanding about the COBIT components. The Table 4.17 below shows a summarized weighted score for the components.

Table 4.17: Descriptive Analysis Test

COBIT Component	Academic staff (N = 20)		Non Academic staff (N = 38)	
	Mean	Std. Deviation	Mean	Std. Deviation
Management Guidelines	4.1521	0.71897	4.1429	0.59476
Business and Technology Management	3.8047	0.68755	3.3026	0.89104
Audit, Control and Security	3.9773	1.27608	3.2794	0.58718
IT Professional	3.8636	0.88849	3.6842	0.50649

Source: Survey Data, June 2013

4.8.3. Descriptive Analysis

From Figure 4.11 and Table 4.18, it is indicated that, on average, academic staff rated the highest (72.50%) on Management Guidelines as opposed to non-academic staff (42.86%). In Business and Technology Management non-academic staff rated the highest on this component (68.75%) as opposed to academic staff (50.63%). in the IT Professionals components, there were interesting results, whereby, both academic and non-academmic staff rated above average although non-academic staff rated higher (66.18%) as opposed to academic staff (53.18%). This showed that IT Professionals were important resource in devering university services. In Audit, Control and Security non-academic staff rated the highest on this component (66.25%) as opposed to academic staff (40.63%)

In observing the results it is clearly seen that non-academic staff ranked Business and Technology Management the highest, whereas Audit, Control and Security and IT Professionals were all rated almost similar and above average. The last in the rating from non-academic staff was the Management Guidelines. These results may

mean that in these institutions the management Guidelines are already in place but the rest three, i.e. Business and Technology Management; Audit, Control and Security and IT Professionals, are missing.

In the case of academic staff, it is clearly seen that the most rated in this category is Management Guidelines, followed by IT Professionals and Business and Management that were rated almost similar: Audit, Control and Security was rated the lowest.
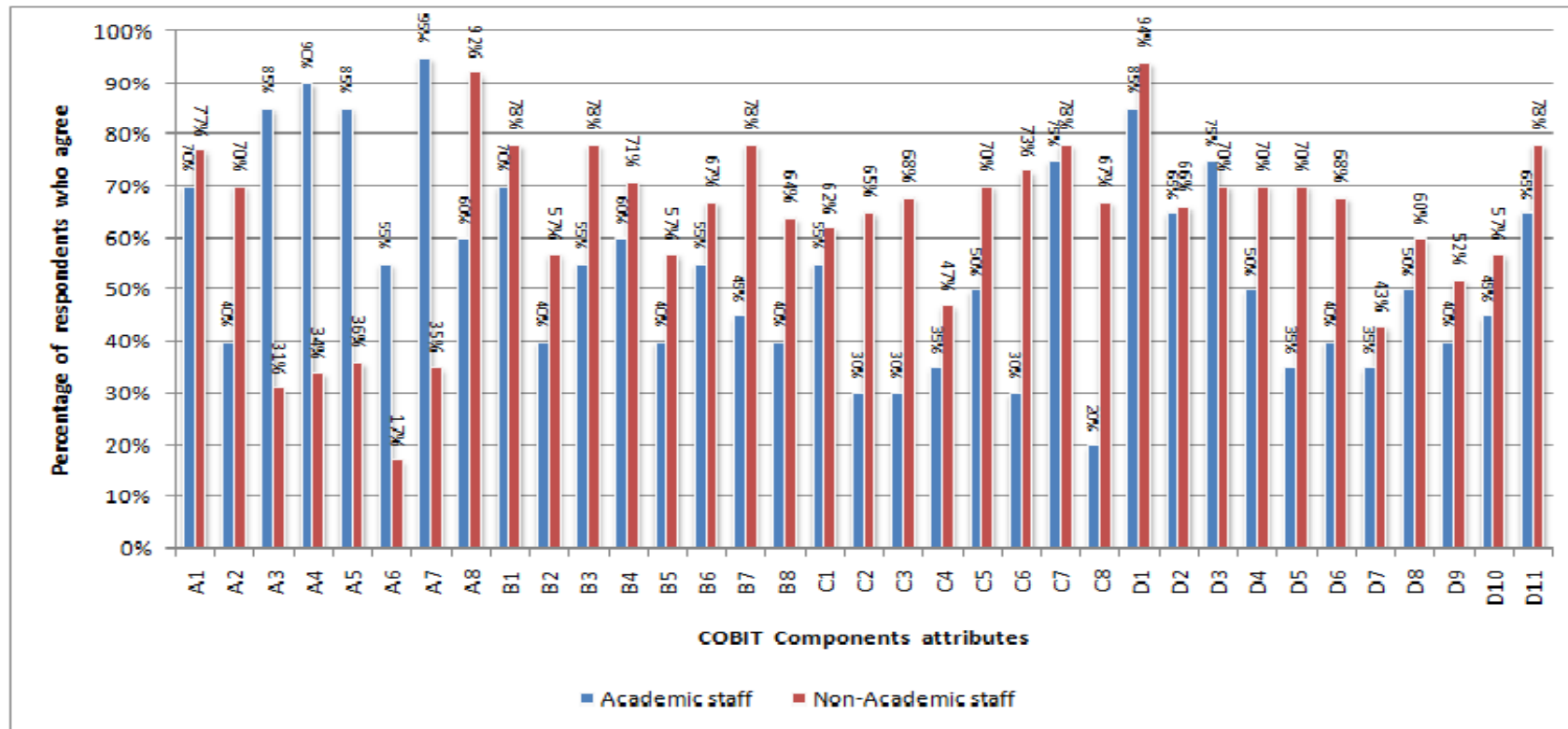
Figure 4.8: Comparison of Academic and Non-Academic Staff on COBIT Components Attributes

Source: Survey Data, June 2013

Table 4.18: Key to COBIT Components' Attributes

Code	Descriptions of The Code
A1	University ICT implementations are integrated in organizational strategic plans
A2	Online systems are adequately tested before they are been applied
A3	Management encourages/enforces the use of ICT in its business process
A4	ICT is an important tool in delivering university products and services
A5	ICT is a very important tool to deliver student services
A6	There is a proper plan to dispose ICT resources at the university
A7	The university enforces the use of online (ICT) systems to deliver university products and services
A8	The university make available all ICT plans and guidelines to staff
B1	Policies are available to guide ICT usage
B2	ICT policies are updated regularly
B3	Has updated websites with all needed information
B4	All IT systems guidelines are well documented
B5	IT systems implementation is done according to pre-outlines plans
B6	Staff managing the online systems are experienced and are technically equipped with required skills (or certified)
B7	There are adequate ICT resources for use by staff at the university
B8	There are proper strategies of the university management to equip staff with affordable ICT resources
C1	University systems are regularly updated
C2	ICT security policies and implementation strategies are in place and operational
C3	University systems used are officially registered either locally or internationally
C4	Online systems backups are regularly effected
C5	Security and management of university systems is done by internal staff
C6	All university internal online systems are secured
C7	University staff are provided with secured login details for accessing university online systems

C8	Only university staff can access university ICT resources or online systems
D1	IT professionals are important resources in delivering university services
D2	Most online services are developed in-house
D3	Most online services are managed by internal staff
D4	IT Professionals update technical skills regularly
D5	IT Professionals are always involved in the process of procuring ICT's infrastructure and other systems
D6	Recruitment of IT Professionals is always done by professionals
D7	IT professionals are treated as rare and special and are highly remunerated
D8	Overtime and other special incentives are provided to IT Professionals
D9	Succession plan for IT professionals is always a priority
D10	IT professionals are always represented in the university strategic plan
D11	The university has got competent ICT professionals who are willing to support staff

Source: Survey Data, June 2013

4.8.4. Multiple Regressions

Multiple regressions were used to determine the correlation between the COBIT components and the rating of the ICT implementation in the Higher Learrning Institutions in Tanzania.The components that were identified by the researcher . with the coefficient of correllation in each component as indicated in the brackets, were Management Guidelines (0.008); Business and Technology Management (0.000) ; Audit , Control and Security (0.032) and IT Professionals (0.433).

These results show that the relationship between the rating of the ICT frameworks implementation was significant as follows: Management Guidelines and,Audit, Control and Security were significant as their P values were less than 0.05. IT Professionals and Business and Technology Management component therefore did not have a significant relationship with ICT framework implementation.

The multiple regression between the Relevance of COBIT implementation in the Higher Learning Institutions in Tanzania and its components, namely, Management Guidelines; Business and Technology Management; Audit, Control and Security and IT Professionals. The study shows that these variables which are predictors are able to predict the relevance of COBIT in the higher learning institution by 31.4 % as found from the regression analysis. The Table 4.19 shows the summary of multiple regressions analysis.

Table 4.19: Multiple Regressions

Model Summary					
Model		**R**	**R Square**	**Adjusted R Square**	**Std. Error of the Estimate**
Dimension0	1	0.561[a]	0.314	0.226	0.41102
a. Predictors: (Constant), IT Professionals; Audit, Control and Security; Management Guidelines; Business and Technology Management					

Source: Survey Data, June 2013

The results from regression analysis show that Management Guidelines and Audit, Control and Security are good predictors of the relevenace of COBIT in the Higher learning institution in Tanzania as their *P values are less than 0.05* or simply they can significantl predict it while IT Professionals and Business

Management are not significant predictors of the Relevance of COBIT in the Higher Learning Institutions in Tanzania. Table 4.20 shows the coefficients from multiple regression analysis.

Table 4.20: Coefficient Testing

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	0.968	0.429	0	2.255	0.031
	Management Guidelines	0.412	0.128	0.635	3.213	0.003
	Business and Technology Management	-0.056	0.126	-0.094	-0.442	0.662
	Audit, Control and Security	0.067	0.069	0.182	0.971	0.339
	IT Professionals	-0.269	0.124	-0.436	-2.174	0.037

a. Dependent Variable: Testing Relevance of COBIT in the Higher Learning Institutions

Source: Survey Data, June 2013

The model equation used for prediction of Relevance of COBIT in higher Learning institutions is Equation 4.1 as shown below.

Equation 4.1: Prediction Model Equation

$$Y = 0.968 + 0.412\beta_1 - 0.056\beta_2 + 0.067\beta_3 - 0.269\beta_4 + \mathsf{C}$$

Key :

Y = Relevance of COBIT in Higher Learning Institutions inTanzania

β_1 = Management Guidelines

$\boldsymbol{\beta_2}$ = Business and Technology Management

$\boldsymbol{\beta_3}$ = Audit, Control and Security

$\boldsymbol{\beta_4}$ = IT Professionals

$\mathcal{E}$ = The error term

Source: Survey Data, June 2013

4.9. General Comments

The study, through open ended questions ,analyzed how the groups involved in the study as well as their future expectations and remedies are to be done by the Insitutions in improving the relevenace of COBIT. Table 4.21 shows the summary of it as per the groups involved.

Table 4.21: General Comments for Academic, Non-Academic and Students

Academic staff	Non-Academic staff	Students
• Many didn't come up with reliable comments though ,about 4 respondents commented that COBIT could be an important tool to the human resources department; • COBIT might be uselful tool to facilitate migration to electronic documentation.	• Higher learning insitutions should invest on research and development not forgeting trainings on ICT awareness; • Any system should be tested before its implementation and all users should be trained before enforcing them to use the system(s); • Facilitate the improvement of ICT infrastructure like internet, etc. • A need for more professionals to meet the needs of emerging technology; • More use of online systems to meet students' needs.	• Most students commented that institutions should increase the number of computer Laboratories and imporove internet reliability.

Source: Survey Data, June 2013

CHAPTER FIVE

5.0 CONCLUSION AND RECOMMENDATIONS

5.1. Summary of The Main Findings

Concerning the components of COBIT, the students perceived the Management Guidelines as the first among all other components with a weighted mean score of 4.1310 (with 0 to 5 scale). Under this, Management Guidelines have been attributed to factors such as: the university forces students to use online systems to access university services such as preparing for exams or tests; the university provides free internet access at the university for students. The second component was Business and Technology Management with the weighted mean score of 4.0895, having the following attributes: There are proper strategies of the university management to equip students with affordable ICT resources to be used during studies.

The results from regression analysis shows that Management Guidelines , Audit, Control and Security are good predictors of the relevance of COBIT in the Higher learning institutions in Tanzania due to (*P values <0.05*) or simply can significantly predict it while IT Professionals and Business Management are not significant predictors of the Relevance of COBIT in the Higher Learning Institutions in Tanzania. Table 4.20 shows the coefficients from multiple regression analysis.

In the IT Professionals components, there were interesting results, whereby, both academic and non-academic staff rated above average although non-academic staff rated higher (66.18%) as opposed to academic staff (53.18%). This showed that IT

professionals were an important resource in delivering university services. In Audit, Control and Security non-academic staff rated the highest on this component (66.25%) as opposed to academic staff (40.63%)

In observing the results it can clearly be seen that non-academic staff ranked Business and Technology Management the highest, whereas Audit, Control and Security and IT Professionals were all rated almost similar and above average. The last in the rating from non-academic staff was the Management Guidelines. These results may mean that in these institutions the Management Guidelines are already in place but missing are the rest three, i.e. Business and Technology Management; Audit, Control and Security and IT Professionals.

In the case of Academic staff, it is clearly seen that the most rated in this category was Management Guidelines, followed by IT Professionals and Business and Management that were rated almost similar: Audit, Control and Security was rated the lowest.

5.2. Evaluation of the Objectives of the Study

The general objective of the study was to test the relevance of COBIT and recommend measures for implementing it in the context of the higher learning institutions in Tanzania. Specifically the study aimed at profiling the ICT frameworks in the higher learning institutions in Tanzania, validating the components of COBIT to the context of higher learning institutions in Tanzania, ranking the relevance of the components of COBIT in higher leaning institutions in

Tanzanian and proposing measures for improving the implementation of COBIT in the higher learning institutions in Tanzania.

5.2.1. To establish the ICT frameworks available in higher learning institutions in Tanzania

The study found that current ICT frameworks which are basically practiced at the higher learning institutions under study are only ISO and Cisco standards.

5.2.2. To validate the components of COBIT to the context of higher learning institutions in Tanzania.

The study found that Management Guidelines and Audit, Control and Security were significant predictors of the relevance of COBIT in the higher learning institutions in Tanzania. This was due to the fact that P values of the predictors were less than 0.05 (*P values < 0.05*). IT Professionals and Business Management were not significant predictors of the Relevance of COBIT in the Higher Learning Institutions in Tanzania. The study showed that those variables which were predictors, were able to predict the relevance of COBIT in the higher learning institutions in Tanzania by 31.4% as it was found in the regression analysis.

5.2.3. T o rank the relevance of the components of COBIT in higher learning institutions in Tanzania

The study also found that the management guideline ranked the first followed by Audit control and security ,IT professional studies and lastly followed by the business and technology management. Multiple regressions were used to determine

the correlation between the COBIT components and the rating of the ICT implementation in the Higher learrning institutions in Tanzania. The coefficient of correlation after analysis indicated that management guidelines and audit, control and security components showed significant relationship with the relavance of COBIT in higher learning institutions in Tanzania. IT professionals and business and technology management components, therefore, had no significant relationship with the COBIT framework implementation.

5.2.4. To recommend measures for improving the implementation of COBIT in higher learning institutions in Tanzania.

The institutions need to focus and align their businesses with technology. As well, the capacity building seems to be required especially for IT professionals. Not only that, but also the human resources department should thoroughly orient (new and existing) staff on the available ICT resources and should enforce them to use ICT at their work.

5.3. Conclusion

There has been an increased use of ICT in the world. Together with its immense use there have also been a number of challenges faced and this has led to some people maximizing more of its benefits, whereas, others have been lagging behind. The fast movers, in this case the western countries have developed international guidelines to harmonize the implementations. Such guidelines as ICT frameworks have gone as far as been made international that all others must follow for proper implementation of the same. The motive behind this research has been the fact that these ICT frameworks, most specifically COBIT, were developed in the western countries

based on the western context. The question was: Can the frameworks be applicable in the non-western countries or institutions? There was therefore a need to conduct a research on the Relevance of COBIT in the Higher Learning Institutions in Tanzania.

The study was conducted in two universities, namely, the University of Dar es Salaam and The Open University of Tanzania. These two universities were selected due to some reasons such as: the fact that on average they are the leading institutions in terms of students' enrolment rates; good track record on the promotion and use of ICT; geographical coverage and easy of getting data.

The sample collected in the study was about 107. This included academic staff, non-academic staff and students; academic staff and non-academic staff being insiders of the institutions, and students being the users of the institutions' services. Purposively students were included in this study to see how they perceived the ICT services offered to them by the universities.

 Data were collected using questionnaires with a supplement of physical observations done by the researcher who had an average of more than 5 years working experience with both of the institutions involved in the study. Previously the researcher worked with the University of Dar es salaam Computing Centre (UCC) at the University of Dar es Salaam and at the time of conducting this research the researcher was a staff working at The Institute of Educational and Management Technologies (IEMT) of The Open University of Tanzania.

Data were analyzed using SPSS and the results, both descriptive and inferential, were further represented in both tabular and graphical forms. The study found

that applications of ICT in the institutions was good as about 54.6% of the respondents agreed to have been applying it. Moreover, with respect to computer skills 80% amongst the respondents rated themselves as having good computer skills. Awareness about the ICT frameworks in general was good as 61.9% of the respondents were aware of the ICT frameworks, although they did not know ICT framework(s) implemented in their institutions .

With all the positive perceptions the respondents showed about the importance of ICT, still there was no formal procedures and documentations on the whole process of ICT frameworks implementation. On the basis of COBIT components, namely, management guidelines, business and technology management, audit, control and security and IT professionals, the results showed a positive significant correlation as their P- values were less than 0.05. The ranking of COBIT components was as: management guidelines ranked number one, followed by IT professionals, audit, control and business and technology management.

The results from multiple regressions showed that management guidelines and audit, control and security were the significant predictors of the relevance of COBIT in the higher learning institutions in Tanzania.

5.4. Recommendations

Despite the respondents having basic skills, especially the students and non-academic staff, they are over ambitious about the importance of ICT. Management Guidelines, being one of the COBIT components reviewed in this study had a significant contribution to the Relevance of COBIT. This showed that Management was in a good track towards processes on ICT implementation. What missed in general were

the Business and Technology Management and IT professionals. The institutions should put more efforts on capacity building in both areas of IT professionalism and management cadre especially at integrating business and technology. Through the findings, it was recommended that there was a need for the government to establish an organ to govern and spearhead all issues relating to ICT implementation. It was further recommended that those individuals practicing IT profession need to be registered as it was the case with other professionals like Accountants who are registered under NBAA and procurement and supplies management are registered under NBMM. The institutions should restructure the new staff orientation role, whereby, each staff should be oriented thoroughly in all aspects of ICT, regardless of his/her working department and the orientation should be guided by a staff orientation operating manual.

5.5. Knowledge Contribution of the Study

As it was expected, the study will contribute immensely to the body of ideas and knowledge in the following ways:

First, inform the stakeholders on the relevance of COBIT as well as the status of technology availability and the accessibility for teaching and learning at the higher learning institutions;

Second, to improve the skill level of university staff, students and the general on the implementation of COBIT at UDSM and OUT;

Third, to throw light on how to make technology plans for teaching and learning, using COBIT technology;

Fourth, inform the stakeholders on the nature and the effectiveness of professional development programs in technology;

Fifth and last, to bring new knowledge to the higher learning institutions' practitioners who want to implement COBIT in their institutions in the developing countries.

5.6. Areas for Further Research

At this era of technological advancement, technology has been singled as a driving force for realization of the same. Therefore, studies on ICT frameworks such as COBIT should be accorded particular attention and importance if, at all, the nation aims at taking full advantage. This study was expected to open frontiers for further researches or studies as follows:

First, as the study covered only a small portion involving two public universities, one could do the same study to include more universities or select other private universities;

Second, as this study did not focus on business oriented higher learning institutions or private institutions in order to make a comparative analysis with the government institutions; one could opt to focus on that area;

Third, one could test the relevance of COBIT on other businesses apart from academic institutions;

Fourth, other studies could focus on how the COBIT framework can be applied in the facilitation of Open and Distance Learning (ODL);

Fifth, there may also be a research on testing the maturity levels of an institution or institutions using the COBIT framework;

Sixth, one could also test the relevance of COBIT at a national level - a part that was not a focus of this study and,

Seventh and last, one can conduct a study to test which frameworks amongst the available frameworks (e.g. ITIL, COBIT, ISO/IEC 17799, CMM, MOF, BSC, ICIF, etc.) is most suitable to the Tanzanian context(s).

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APPENDICES

APPENDIX I: INTERVIEW GUIDE FOR UNIVERSITY STAFF

Instructions

Please tick your appropriate response in the box against.

Bio-data

1. Name of your institution……………………………………………………..

2. Name of your Faculty/Centre/Directorate/Institute……………………………

3. What is your highest level of education?

PhD	
Masters	
Bachelors	
Diploma	
Certificate	
Other, please mention.........	

4. What is your current position?

Tutorial assistant	
Assistant lecturer	
Lecturer	
Senior lecturer	
Researcher	
Professor	
Others (please mention).............................	

5. How long (in years) have you been working with your current job/position_____

6. What are your terms of tenure/ employment/ mode of work?

Full-Time	
Part-Time	
Temporary	
Other (Specify)………………	

7. How do you rate your computer skills?

Very good	
Good	
Poor	
Very poor	

8. How do you use a computer in your daily work? (Tick the box that best explains

your opinion on each of the statements)

	Strongly agree	Agree	Not sure	Disagree	Strongly disagree	I do not know
Can use to type and format documents like letters						
Can use it in education purposes like in Moodle, SARIS/ARIS,						
Can use it to communicate (with students and staff) through e-mail						
Can use it to easily compute, compile and keep student records						
Can use specialized packages like Accounting Package or SSPS or AutoCAD, etc						
Can use it to access and prepare academic materials easily						
Other (specify)………..						

9. Do you have any ICT technical skills /expertise?

Yes	No

If **Yes**, please

mention_____

10. In your daily activities are there any application/ system which your institution forces you to use?

Yes	No

If **Yes**, please mention_____

11. Are you aware of which of the following frameworks that guide implementation of ICT? (please tick all that apply)

COBIT	
ITIL	
ISO 17799	
ICIF	
CMM	
MOF	
BS15000	
ISO/IEC 17799:2005	
BSC	
Six Sigma	
Other (Specify)………………	

12. Do you think ICT Frameworks is necessary whenever an organisation seeks to implement ICT system?

Yes	No

If **Yes/No**, please explain_____

_____

13. Do you know any international standards or protocols that guide the systems or programs implemented in your university or organisation?

If **Yes**, please mention_____

14. How do you rate the ICT Frameworks implementation in your university or organisation?

Very high	
High	
Low	
Very low	

15. How do you rate the following COBIT components in implementation of ICT Frameworks in your university or organisation? (Tick the box that best explains your opinion on each of the statements)

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S/N	Validity Level	Strongly agree	Agree	Not sure	Disagree	Strongly disagree	I do not know
A.	**Management Guidelines**						
1.	University ICT implementations are integrated in organisational strategic plans						
2.	Online systems are adequately tested before they are been applied						

3.	Management encourages/enforces the use of ICT in its business process						
4.	ICT is an important tool in delivering university products and services						
5.	ICT is a very important tool to deliver student services						
6.	There is a proper plan to dispose ICT resources at the university						
7.	The university enforces the use of online (ICT) systems to deliver university products and services						
B.	**Business and Technology Management**						
i.	Policies are available to guide ICT usage						
ii.	ICT policies are updated regularly						
iii.	Has updated websites with all needed information						
iv.	All IT systems guidelines are well documented						

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v.	IT systems implementation is done according to pre-outlines plans						
vi.	Staff managing the online systems are experienced and are technically equipped with required skills (or certified)						
vii.	There are adequate ICT resources for use by staff at the university						
viii.	There are proper strategies of the university management to equip staff with affordable ICT resources						
C.	**Audit, Control and Security**						
i.	University systems are regularly updated						
ii.	ICT security policies and implementation strategies are in place and operational						
iii.	University systems used are officially registered either locally or internationally						
iv.	Online systems backups are regularly effected						

v.	Security and management of university systems is done by internal staff						
vi.	All university internal online systems are secured						
vii.	University staff are provided with secured login details for accessing university online systems						
viii.	Only university staff can access university ICT resources or online systems						
D.	**IT Professionals**						
i.	IT professionals are important resources in delivering university services						
ii.	Most online services are developed in-house						
iii.	Most online services are managed by internal staff						
iv.	IT Professionals update technical skills regularly						
v.	IT Professionals are always involved in the process of procuring ICT's infrastructure and other systems						

vi.	Recruitment of IT Professionals is always done by professionals						
vii.	IT professionals are treated as rare and special and are highly remunerated						
viii.	Overtime and other special incentives are provided to IT Professionals						
ix.	Succession plan for IT professionals is always a priority						
x.	IT professionals are always represented in the university strategic plan						
xi.	The university has got competent ICT professionals who are willing to support staff						

16. Kindly provide any relevant information on **Testing The Relevance of Control Objective for Information and Related Technology (COBIT) In The Higher Learning Institutions In Tanzania**

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APPENDIX 2:   INTERVIEW GUIDE FOR UNIVERSITY

STUDENTS

Instructions

Please tick your appropriate response in the box against.

Bio-data

1. What is the name of your

   institution………………………………………………………….

2. What is the name of your

   Faculty/Centre/Directorate/Institute……………………………

3. What is your course of study?

   _____

4. Do you have any ICT related course in your programme?

Yes	No

   If **Yes,**

   What is the name of the course?

   _____

   Do you find it relevant, why?

   _____

5. How do you rate your computer skills?

Very Good	
Good	
Poor	
Very Good	

6. How do you use a computer in your daily work? (Tick the box that best explains
your opinion on each of the statements)

S/N	Validity Level	Strongly agree	Agree	Not sure	Disagree	Strongly disagree	I do not know
A.	**Management Guidelines**						
i.	The university provides ICT guidelines to students to use while attending their studies						
ii.	The university enforces students to use online systems to access university services such as preparing for exams or tests						
iii.	The university enforces students to use online system to access exam or test results online						
iv.	The university encourages the use of online systems to communicate with lecturers						
v.	The university provides free internet access at the university for students						
vi.	I cannot manage to study at this university without having access to online systems or ICT resources						
B.	**Business and Technology**						

	Management						
i.	Can use online system to register your course/module online						
ii.	Can use online system to access materials or notes online						
iii.	I like the online systems available at the university						
iv.	There are adequate ICT resources for use by students at anytime a student wants to use them						
v.	There are proper strategies of the university management to equip students with affordable ICT resources to be used during studies						
C.	Audit, Control and Security						
i.	The students are provided with secured login details for accessing university online systems						
ii.	The online systems used in study are secured (without unauthorized access)						
iii.	The university have got measures to control the improper use of ICT resources at the university						
iv.	There is a control of						

	external ICT resources that a student wants to enter with them at the university campus					
v.	Always codes or numbers of ICT resources are recorded whenever entering the university campus					
vi.	Only students of the university can access ICT resources or online systems (non-students are denied access to the ICT resources or online systems)					
D.	**IT Professionals**					
i.	The university provides enough support to students using ICT services (during course of study)					
ii.	Adequate training is provided by the university on how to use the available online systems					
iii.	The university has got competent ICT professionals who are willing to support students					
iv.	Through my learning at this university I have acquired knowledge and skills such that I can use other specialized packages					

	such as Accounting Package or SSPS or AutoCAD, etc						
v.	The online systems used in my university are user friendly						
vi.	I always need assistance when accessing ICT services in my programme						

7. The university provides required ICT technical skills while at the university?

Yes	No

If **Yes**, please
mention_____

8. In your daily school activities are there any application/ system which your

institution enforces you to use?

Yes	No

If **Yes**, please
mention_____

9. Kindly provide any relevant information on **Testing The Relevance of Control**

Objective for Information and Related Technology (COBIT) In The Higher

Learning Institutions In Tanzania

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THE OPEN UNIVERSITY OF TANZANIA

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TO WHOM IT MAY CONCERN

Dear Sir/Madam,

RE: INTRODUCTION OF MR. PETRO MUGANDILA (REG No. HD/B/672/T.07)

The purpose of this communication is to introduce to you Mr. Petro Mugandila, a student in our Faculty of Business Management of the Open University of Tanzania pursuing Master of Business Administration (MBA)

Currently he has completed the course work part and is supposed to conduct a research in partial fulfillment of the requirements for the stated MPM degree programme. He is researching on **"TESTING THE RELEVANCE OF CONTROL OBJECTIVE FOR INFORMATION AND RELATED TECHNOLOGY (COBIT) IN THE HIGHER LEARNING INSTITUTIONS IN TANZANIA".**

I humbly request your office to allow him access to your office for the purpose of data collection, interviews and any other resourceful materials he may need.

I thank you in advance for your continued support and sincerely hope that you will accord him the necessary cooperation.

Yours sincerely,
THE OPEN UNIVERSITY OF TANZANIA

Mr. Mato Magobe
COORDINATOR – MASTERS PROGRAMME

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