ADDIS ABABA UNIVERSITY
SCHOOL OF GRADUATE STUDIES
FACULTY OF INFORMATICS
DEPARTMENT OF INFORMATION SCIENCE

ACCEPTANCE AND USE OF E-LIBRARY SERVICES IN ETHIOPIAN UNIVERSITIES: THE CASE OF ADDIS ABABA AND ADAMA UNIVERSITIES

BY

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Dedication

This Work is Dedicated to My Whole Family;

Especially to My New Born Baby,

Huzeyfa Abinew.

Acknowledgement

First and for most, I would like to thank the Almighty ALLAH. Without His support, compassion, mercifulness and goodwill, let alone conducting this study, I would not have even taken a single breath. Alhamdulillah!

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Abstract

The introduction of new information and communication technologies in libraries during the last two decades has altogether changed the concepts of libraries where library patrons need not necessarily go to the library physically since the library services and resources are no longer confined to the walls of the physical library. However, for these e-library services to be utilized effectively and efficiently, library end users must accept and use them.

This study was mainly conducted to empirically investigate the determinants of e-library end users acceptance and use in academic libraries within Ethiopian context. The study had applied the SO-UTAUT technology acceptance model which is appropriate in a library context. Cross sectional survey research method was used to capture the data. Questionnaire survey was employed to collect data from both Adama University and Addis Ababa University postgraduate students and academic staffs. SPSS and PLS graph beta testing software were used to analyze the data. Hence, Descriptive statistics and Structural Equation Modeling techniques using PLS were applied for analysis.

The study found out performance expectancy as a major determinant factor which demonstrated the most significant contribution (36.2%) on behavioral intention to use e-library services. Moreover, behavioral intention has shown to be the core determinant factor (40.2% contribution) for the actual usage behavior. Awareness has demonstrated a significant moderating effect on relevancy and facilitating condition constructs. The SO-UTAUT model has been proved to be valid in Ethiopian context, since it can explain 22.2% of the variance on behavioral intention, 29.9% of the variance on behavioral usage and 52.2% of the variance on expected benefits of e-library services in the users' acceptance and use behaviors of the services.

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Acronyms

AAU – Addis Ababa University

ACS – Academic staffs

AU – Adama University

AW - Awareness

BI – Behavioral Intentions

BU – Behavioral Usage

CD-ROM – Compact Disk – Read Only Memory

C-TAM – Combined Technology Acceptance Model

DOI – Diffusion of innovation

DOIT – Diffusion of Innovation Theory

DTPB – Decomposed Theory of Planned Behavior

EB – Expected Benefits

EE – Effort Expectancy

E-Library – Electronic Library

E-mail- Electronic mail

FC – Facilitating Conditions

HIV/AIDS – Human Immunodeficiency Virus/Acquired Immunodeficiency Syndrome

ICT - Information Communication Technology

INASP - International Network for Availability of Scientific Publications

IS - Information systems

IT – Information Technology

LAN – Local Area Network

MM – Motivational Model

MPCU – model of PC Utilization

OPAC – Online Public Access

PC – Personal Computers

PE – Performance Expectancy

PERI - Programme for the Enhancement of Research Information

PGS – Postgraduate Students

PLS – Partial Least Square

R-D – Research and Development

RE – Relevancy

SCT – Social Cognitive Theory

SEM – Structural Equation Modeling

SI – Social Influence

SO-UTAUT – Services Oriented Unified Theory of Acceptance and Use of Technology

SPSS – Statistical Package for Social Science

TAM – Technology Acceptance Model

TAM2 – Extended Technology Acceptance Model

TPB – Theory of Planned Behavior

TRA – Theory of Reasoned Action

UNESCO – United Nations Educational, Scientific and Cultural organization

UTAUT – Unified Theory of Acceptance and Use of Technology

WAN – Wide Area Network

CHAPTER ONE

INTRODUCTION

1.1 Background

The advent of new and rapidly advancing information and communication technologies made many remote applications and tasks possible these days. Specifically, the development of internet, worldwide web and telecommunication infrastructures have ensured the rapid growth and dominance of the digital era over the world.

However, the prevalence of digital divide is becoming a barrier for developing countries to benefit from information and communication technologies (ICTs) due to poor telecommunication infrastructure, illiteracy and low economic development status. Brooks et al (2005) and Cardoso et al (2007) have stated the phenomenon of digital divide as a social and technological gap that characterizes the disparities between individuals and communities that have effective access to digital and information technologies and those with very limited or no access to these technologies at all. It includes the imbalance or inequality in physical access to technologies as well as the imbalance in resources and skills needed to effectively participate as a digital citizen.

The majority of the world's population, particularly in developing countries is living far away from using and accessing information and communication technologies. More than 80% of the world's populations do not have access to information communication technologies (ICTs). Hence, most people are not living in the digital age (Rothenberg and Pal, 2005).

These days, new technologies and information systems innovated so far in the developed world, gradually diffused to Africa and other developing world. Therefore information systems innovation diffusion, adoption and efficient usage and utilization (acceptance and use) are becoming an issue for research to narrow the technological gap in underdeveloped countries. Masrom (2007) has stated this issue as, ICT adoption and diffusion has been studied in great detail lately by researchers in the information systems area at both organizational and individual levels.

1.1.1 Technology Adoption

Technology acceptance mainly deals with how people come to accept and use the introduced new technologies. Quite often people think that introducing new technologies results in service acceptance and use. However, several research findings dispute the claim, showing that there are several other factors that affect technology acceptance and use (Carlsson et al, 2006). Therefore, Technology acceptance models are used to explain how users will come to accept and use a specific technology in future.

Technology acceptance research is a constantly developing field of study, as new technologies keep evolving all the time. Two major disciplines, psychology and sociology on the one hand; and information systems on the other hand have contributed to the development of the models and theories addressing technology adoption acceptance and usage. Psychology and sociology focus on technology acceptance behavior, where as information systems focus on systems' characteristics in relation to technology acceptance (Al-Qeisi, 2009).

Kurtenbach and Thompson (1999) has stated technology adoption as, the stage in which a technology is selected for use by an individual, a group of individuals or an organization and the individuals accept the innovation as valuable and use it, So that

the technology can be exploited and used for individual, community, organizational and national development.

1.1.2 Electronic Library Services

A library is an organized collection of items which may be in the form of books, journals, videos, CD-ROM etc, along with the services required to make them available to a given user group or groups. It can also be referred to as a "place" to get information and to get help finding information. The "place" can be physical or virtual or a combination of both (Fabunmi, 2009).

Therefore, Libraries can be conceptualized as knowledge hubs or knowledge repositories that can offer and transfer knowledge so that community development can be achieved through effective and efficient utilization of the resources.

These days, Libraries of all sizes and types are embracing digital collections, although most libraries will continue to offer both print and digital collections for many years to come as hybrid. New purchases of journals, magazines, and abstracting and indexing services are heavily weighted toward digital, while digital books (e-books) are only beginning to become available in library collections (Tenopir, 2003). Moreover, one of the fastest growing and most innovative services being developed by libraries today is the digital or electronic reference service (McClure et al, 2002).

University of Cape Town (2006) stated that advances in ICT and unfolding global knowledge society are reshaping the higher education terrain internationally. Universities in sub-Saharan Africa have not yet to feel the full impact of this shift. However, there is an unambiguous understanding that harnessing ICT is to sustain economic growth and other societal benefits. African universities have important new

roles to play in enabling and accelerating ICT-lead economic development by adopting new technologies.

Therefore, the university environment in Africa is changing rapidly due to the recognition of the role that universities play as drivers of national development. Their transformation has included much investment in terms of electronic infrastructure and connectivity as well as attention to e-learning and related approaches as key tools to enhance the quality of higher education and make it more accessible. University libraries are an important part of this transformation, with the potential to become leaders and standard-bearers of what can be done with the new ICTs (Rosenberg, 2005).

Ethiopia is currently working hard against digital divide through establishing telecommunication infrastructure over the regions or nationally. Universities in Ethiopia have electronic library service access since 2003. Universities and colleges, research institutions, and other government bodies are currently using and participating in electronic library service provided by INASP under the PERI project (Aynalem and Womdimeneh, 2008). Thesis and Dissertation papers, and library catalogues are also available electronically in some Universities, such as Addis Ababa University. Moreover, Universities are offering e-mail and internet browsing services to their library patrons.

Adoption, adaptation, and acceptance and use of e-library services in developing countries like Ethiopia, has paramount importance in terms of cost reduction, availability, accessibility and having updated as well as recent resources.

1.1.3 Unified Theory of Acceptance and Use of Technology (UTAUT)

For the last two decades, a number of technology adoption theoretical frameworks or models have been used by different information system researchers in the area since its inception for adoption of new technologies and innovations. There are many technology acceptance theories and models developed in different disciplines so as to predict, explain, and understand individuals' acceptance and use of new information technologies. Namely, Diffusion of innovation Theory (DOIT), Social Cognitive Theory (SCT), Theory of Reasoned Action (TRA), Theory of Planned Behavior (TPB), Decomposed Theory of Planned Behavior (DTPB), Motivational Model (MM), Model of PC Utilization (MPCU), Technology Acceptance Model (TAM), and Unified Theory of Acceptance and Use of Technology (UTAUT). Each of the models has its own constructs and factors that are influential determinants of the adoption process. Moreover, each model has also its own advantages and drawbacks to select and apply one of them in technology adoption.

However, Venkatesh et al (2003) has proposed a new model called the Unified Theory of Acceptance and Use of Technology (UTAUT) by incorporating the strengths and avoiding the drawbacks of the other eight aforementioned models into the new model (UTAUT). The UTAUT model is a new robust technology adoption framework. It performs better than the other aforementioned technology adoption models. It can explain 70% of the variance in intention; individual acceptance and usage decisions in organizations. The model, UTAUT has four key constructs that determines the usage and intension behaviors of end users and moderating factors such as gender, age, experience and voluntariness to use. The four key constructs of Venkatesh et al (2003) are:

Performance Expectance which is the degree to which an individual believes that using a certain technology will help him or her to attain gains on job performance.

Effort Expectancy which is defined as the degree of ease associated with the use of technology.

Social Influence which is defined as the degree to which an individual believes that important other people believe he or she should use the new technology.

Facilitating Condition which is defined as the degree to which an individual believes that the necessary infrastructure exists to support the use of the new technology.

However, Tibenderana and Ogao (2008a & 2008b) have applied and modified the UTAUT model developed by Venkatesh et al (2003) in a library context. They developed a new model called Service-Oriented-UTAUT model (SO-UTAUT model) and tested its performance in predicting and explaining e-library patrons' acceptance and use visa verse non-acceptance and non-use behaviors.

The study of Tibenderana and Ogao (2008a & 2008b) found out that, the independent variable "effort expectancy" and the moderator variable "voluntariness" as irrelevant in e-library context. Tibenderana and Ogao (2008a & 2008b) eliminated these variables from the model and replaced the "effort expectancy" variable with "Relevance" and the "voluntariness" variable with "Awareness" which were found appropriate to the study context.

The SO-UTAUT model is a modification and improvement of the UTAUT model which is customized in two a library context (Tibenderana and Ogao, 2008a & 2008b). The model of Tibenderana and Ogao (2008b), SO-UTAUT, performs even better than the

original UTAUT in predicting end-users' acceptance and use of the new technology (e-library services). Hence, this study will apply the SO-UTAUT model to investigate the decisive determinants of e-library acceptance and use; as well as to predict and explain the acceptance and use of e-library service patrons in academic libraries within Ethiopian context. The figure below (Figure 1.1) depicts the SO-UTAUT model.

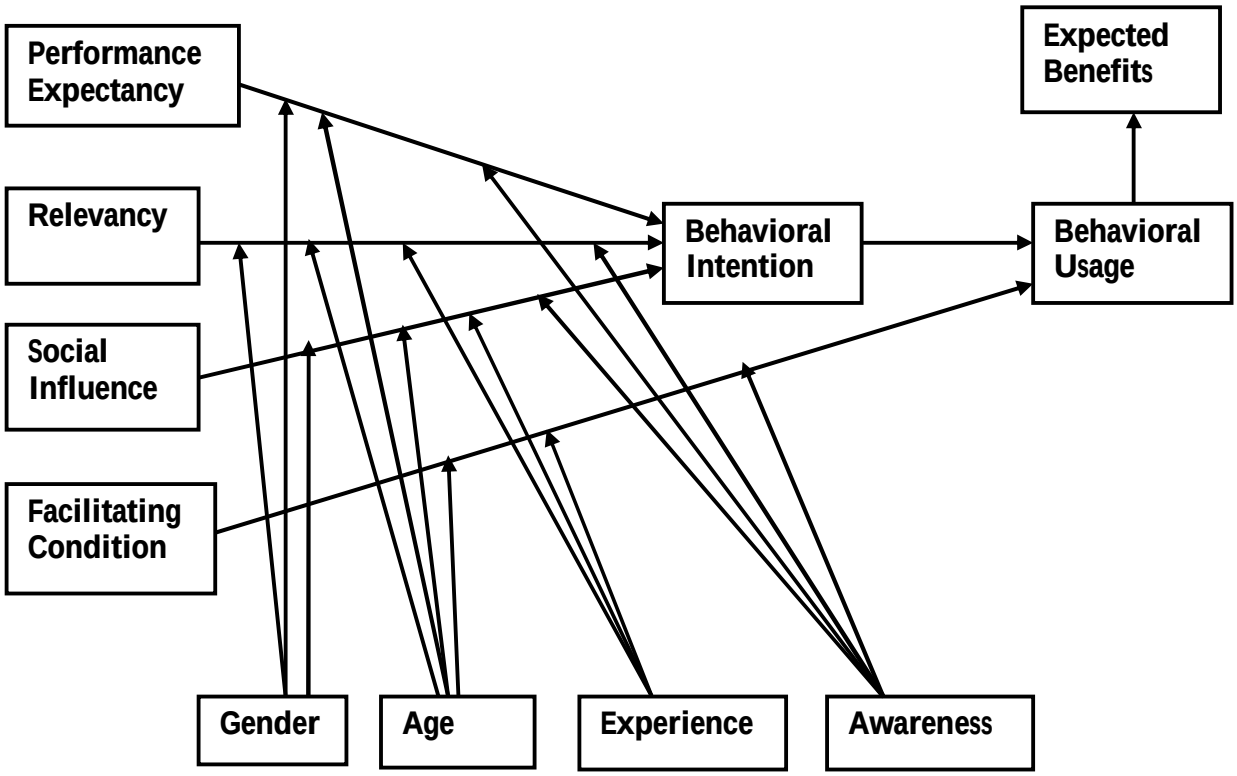

Figure 1.1: SO-UTAUT Structure Model Adopted From Tibenerana and Ogao (2008a & 2008b)

1.2. Statement of the Problem and its Justification

The expansion of higher education institutions in Ethiopia is surprisingly growing rapidly, almost ten times in quantity during the last 10 years period (Tesfaye and Kassahun , 2009). The country is also planning to open other 10 new universities in the coming five years so that the country will have more than 30 universities. The number of public higher education institutions has also grown from only two universities ten

years ago to more than 20 in 2008/2009. More are planned to be established (Ethiopian Federal Ministry of Education, 2007). The Government has also facilitated and encouraged the establishment of private institutions of higher education and there are now more than 60 such institutions (Tesfaye and Kassahun , 2009).

Ethiopian Federal Ministry of Education (2007) stated that, the number of students joining universities each year is also increasing in a very fast rate during these years. Particularly in public universities, the higher education enrolment was growing with an annual average increase of over 33% per year. In connection with these developments, shortage of libraries and library resources are becoming great challenges of universities. They are incurring huge costs of print books, journals, magazines and news papers. Moreover, the shortage of rooms, chairs and tables is also another problem.

The provision of electronic databases and resources to developing countries of Africa and Asia by publishers and donors with a very significant discount (a discount of 98 %, almost free) invite and motivate universities and research institutions to use these electronic library services. Order-Muskali and Muluta (2007) citing Simons (2002) stated that electronic supply of academic publications was initiated and set up to address two key problems facing universities in developing countries. These are inadequate access to current international scientific journals and the difficulties experienced in publishing scientific output on an international scale.

Electronic libraries ensure the availability and accessibility of electronic resources at the institution's local area network, at any place outside of the physical library boundary as long as the university LAN functions. It relieves the shortages of space, chairs, tables and other resource requirements. In addition, a single electronic copy can be accessed and used by multiple users unlike the print services. Yusoff (2009) citing Deb, Kar, and

Kumar (2003) defined e-library services as a system that is accessible from anywhere via the internet, to deliver knowledge directly to their library patrons, without being confined to the contents neither of a physical library nor by being caught in a web of unorganized and unmanaged information. The emergence of e-libraries provides more opportunities for users to access varieties of information resources.

Moreover, the growth of research activities in Ethiopian research institutions and universities in line with the increasing numbers of post graduate programs and student researchers (Addis Ababa University, 2008) commence the use of e-library services. Particularly, Addis Ababa University which has the majority of postgraduate student researchers and staffs has been initiated to make available these research works and library catalogues for all academic and research institutions in the country.

However, knowledge of end-users acceptance and use of electronic library services and resources is a very essential and critical question. University administrators and library professionals should evaluate the use and utilization of e-library services, users' perceptions, attitudes towards use, behavioral intentions to use, and the determinants of end-users acceptance and use of e-library services as well. Xie (2006) stated that millions of dollars have been invested into the development of e-libraries despite they are still underutilized. Moreover, research on the e-libraries is still in its infancy stage, particularly the applicability of technology adoption model on user acceptance and use of e-library services. Hence, there is a need for a research to identify the factors that determine users' acceptance and use of e-library services using the SO-UTAUT model as a theoretical framework and investigate the effect of SO-UTAUT constructs on acceptance and usage of e-library services.

Despite the fact that technology acceptance has been studied for two decades that currently resulting in several evaluation models which have been validated in different contexts and different cultures, this study found that none of the models has been validated within electronic library service context in Ethiopia. Hence, no end users acceptance and usage levels of e-library service had been studied yet. Thus, this study had tried to further explain the issues in Ethiopian context.

Therefore, studying end-users acceptance and use of electronic library service has paramount importance to aware e-library service patrons about the benefits of using e-library services. It also helps to assist and encourage e-library patrons and influence their intention and use behaviors positively as well as to facilitate research activities. Furthermore, it enhances information system innovation, adoption and user's acceptance and use of e-library services among academic libraries of Ethiopian higher education institutions.

1.3. The Research Objectives

1.3.1 General Objective

The general objective of the research is to empirically investigate the determinants of end-users' acceptance and use of electronic library services in Ethiopian higher education institution academic libraries (Addis Ababa University and Adama University libraries).

1.3.2 Specific Objectives

In order to achieve the general objective of the research, the study has set out the following specific objectives:

- To review the literature & understand the concepts concerning acceptance and use of technologies in general and e-library services in particular.
- To assess the acceptance and use of e-library services in academic libraries of the two universities.
- To identify the determinant factors that affects the acceptance and use of e-library services in academic libraries.
- To empirically test the validity of the SO-UTAUT model in academic institutions within Ethiopian context.
- To draw conclusions and forward recommendations based on the findings.

1.4. The Research Hypothesis

In line with the research objectives and the literature in technology acceptance areas, this study has developed research hypotheses. In an attempt to investigate the determinants of end-users acceptance and use of e-library services, the study postulated the following research hypotheses based on the research model, SO-UTAUT in Ethiopian context.

Performance Expectance is the degree to which an individual believes that using e-library services will help him or her to attain gains on job performance (in teaching, learning or research activities).

Behavioral Intention is the degree to which an individual demonstrates an inclination or intention to use new technologies (in this case, e-library services).

Hypothesis1: Performance Expectancy positively affects Behavioral intention to use e-library services.

Relevancy is the extent to which an individual believes that the available e-library resources are important to his/her work (study, teaching or research).

Hypothesis2: Relevancy positively affects Behavioral intention to use e-library services.

Social Influence is the degree to which an individual believes that important other people have influenced or encouraged him or her to use e-library services.

Hypothesis3: Social Influence positively affects Behavioral intention to use e-library services.

Facilitating Condition is the degree to which an individual believes that the necessary infrastructures and supports exist in the library to support the use of e-library services.

Hypothesis4: Facilitating Conditions positively affects Usage Behaviors of e-library services end-users.

Behavioral Usage is the degree to which an individual believes that he/she is actually using the e-library services currently.

Hypothesis5: Behavioral intention to use e-library services positively affects use behavior.

Expected Benefits is the degree to which an e-library service patron believes that using e-library services helps him/her to exploit the potential advantages of e-library services and hence, increase his/her efficiency and effectiveness in teaching, research or study.

Hypothesis6: Behavioral Usage positively affects the Expected Benefits of e-library services.

Awareness is the degree to which an individual knows the existence of e-library service in the libraries.

Hypothesis7: Awareness positively moderates the SO-UTAUT model independent constructs towards their respective dependent constructs.

1.5 Scope and Limitations of the Study

Even though there are more than 20 universities in Ethiopia, due to time, budget constraints and difficulty to visit all the universities and distribute questionnaires, the scope of the research was limited to study only library patrons of two universities (Addis Ababa and Adama universities). These two universities were selected due their longer experiences and well established ICT facilities to support e-library services. Furthermore, their proximity and economic advantages on the side of the researcher was also another reason. Although there were various issues to be researched in the selected academic institutions, due to the above constraints, this research has been only confined to study acceptance and use of e-library services among postgraduate students and academic staffs.

The study has tried to apply the modified UTAUT model, SO-UTAUT, in Ethiopian context (after its inception by Tibenderana and Ogao (2008a, and 2008b) for the first time as to the knowledge of the researcher. Moreover, to the best of the researcher's knowledge, the study has applied the structural equation modeling technique using PLS graph for the first time in technology adoption within Ethiopian context.

Concerning the limitations, the study has considered only two universities' academic staffs and postgraduate students. Therefore, generalizing the study results at national level might not have sufficient ground. This is because, the study might not address and

reflect the acceptance and use behaviors of Ethiopian e-library service patrons in academic libraries. Moreover, this study has analyzed all the data collected from the two universities' communities (postgraduate students and academic staffs) altogether. However, there may be discrepancies between the two Universities, academic staffs and postgraduate students, and among the streams or faculties that may significantly influence the study results.

1.6 Significance of the Study

The purpose of this research was to assist users of e-libraries to use the services and policy makers of ICTs to design strategies at national and institutional levels in general. Therefore, the findings from this research will be beneficial not only to individual academic library patrons, universities and the ministry of education, but also to the nation as a whole. The study results can be used as a guiding benchmark even though generalizing the study results at national level is deficient. Hence, the study can offer benefits at three levels; individual, institutional and national levels,

Individual Level

The use of e-library services by academicians will improve their performance through effective and efficient utilization of their time and resources in teaching, learning and research activities. If the Universities utilized the findings from this research by planning strategies to support e-library service usage, it is expected that end users will use the service more in their work and will be more effective, efficient and productive. Therefore, the quality of their working life will be better, consequently helping the universities to achieve their educational strategies and goals of quality, efficiency, and cost effectiveness as well.

Institutional Level

The findings from this research should help Universities to plan their strategies so as to support and motivate the library patrons to use the service more in their work and become more competitive with other similar institutions. Therefore, Universities can achieve the benefits from using e-library services in the teaching and learning processes to:

- Improve the quality of teaching and learning
- Widen access to education and training
- Respond to the “technological imperatives”
- Reduce the costs of education
- Improve the cost-effectiveness of education
- Improve the quality and standard of the universities through ensuring quality education and research.

National Level

Policy makers at national level can use the research result so as to design ICT policies and strategies in educational institutions. The Ministry of education can use the research results to encourage and support the use of e-library services in all academic institutions and reduce the cost of buying printed books, journal articles and other educational resources/materials via establishing ICT facilities. Moreover, library space requirements and the availability and accessibility limitations of educational resources will not be an issue to deal with; hence, the cost of constructing huge buildings will also be reduced or eliminated. Above all, the use of e-library services among all academic institutions will help the nation to improve the quality and standard of education through providing recent publications in a cost effective way.

In general, the study can help policy makers, library professionals and University administrators to ensure successful acceptance and use of e-library services by end users and improve the services as well through promoting the envisaged benefits of the e-library services and assisting users. Hence, the study can facilitate the adoption process of e-library services in the context of Ethiopia. Furthermore, the research output can be used as a contribution for other researchers in the area of technology adoption in general and electronic library services in particular.

1.7 Organization of the Thesis

The thesis is organized in such a way that coherence or consistency, readability and understandability of the thesis is met and ensured. Hence, chapter one presents background, statement of the problem and its justifications, objectives, hypothesis and significance of the study. Chapter two has tried to address the review of related literatures about electronic or digital libraries, technology adoption or acceptance concepts, frameworks and theories of technology adoption and comparisons of the prominent models in relation to the study. Chapter three is dedicated to present the research design and methodology of the study (sampling techniques, data collection procedures, pilot study, reliability and validity analysis of the instrument and the data analysis tools used in the study). Chapter four is mainly devoted to present the analysis and interpretations of demographic and descriptive statistics, hypothesis testing and analysis of the major findings. The last chapter, chapter five highlights and presents the major findings of the study (the conclusions of the major findings). Moreover, recommendations have been forwarded based on those major findings.

CHAPTER TWO

REVIEW OF THE LITERATURE AND THEORETICAL FRAMEWORKS

2. 1 Introduction

This chapter presents the basic concepts, benefits and services of electronic libraries (the terms electronic or e-library and digital library are used interchangeably in this study). Moreover, the theoretical frameworks and prominent models developed so far in different disciplines and then used in predicting, explaining, and understanding individuals' acceptance and adoption of new products or technologies are also discussed in detail.

2.2 Information Communication Technologies (ICTs) and Libraries

These days, ICT plays significant roles in the lives of individuals, societies, organizations or institutions in all sectors of an economic system. The rapid development of information and communication technologies, especially in universities and colleges has got significant emphasis and hence used as a tool to enhance academic and research works (Rosenberg, 2005). University libraries are the once that has been faced with multiple problems of redundant and tiresome activities on the side of librarians, the problems of storage space, chairs, tables, rooms, high cost of printed materials and administration on the institution's perspective and the problems of availability, accessibility and usability on users perspective. For these problems of academic libraries, provision of electronic library services (ICT support) could be the solution to improve the current situations of university libraries.

Rosenberg (2005) has explained that the university environment in Africa is changing with vital recognition of the role that universities play as drivers of national

development through the integration of ICTs. African universities are transforming to the new era of information and communication technologies and becoming potential leaders and standard bearers of what can be done with the new technologies. The change in the Libraries' environment in connection with investments in terms of electronic infrastructure and connectivity as well as attention to e-learning and related approaches as key tools to enhance the quality of higher education and make it more accessible is an important part of this transformation. Rosenberg (2005) added that an adequate ICT infrastructure with a sufficient number of networked and Internet-connected workstations is indispensable for a library so as to offer effective access to electronic resources and develop efficient electronic services.

Developing countries which have not reached the stage of sustainable economic development should find ways to have better ICT access for their citizens so as to utilize the new technologies and compete with the developed nations. Integrating university libraries with ICTs so as to enhance their services and making them usable and accessible to all users could be an important strategy. The strategy could be making new information and knowledge repositories accessible to all citizens through using new technologies in such a way that users can accept and use it. Abdu (2009) stated that ICT can facilitate efficient access and utilization of information products and services only if it is appropriately adopted in a nation's context and hence well accepted by end-users.

2.2.1 Basic Concepts and Developments of Digital Libraries

Depending on the type of resource formats they contain, libraries can be classified as traditional print based, and electronic libraries. However, the trend is moving towards hybrid libraries which contain both traditional print materials and digital or e-resources

as well. According to Tenopir (2003), Libraries of all sizes and types are embracing digital collections and resources. Thus, most libraries will continue to offer both print and digital collections for many years to come (as hybrid libraries). However, new digital purchases are outweighing the print material purchases leading to the domination of digital or e-resources (creating digital or e-libraries).

Electronic or digital libraries are those libraries that contain and uphold library resources in electronic format, and make available and accessible to all users who seek information without time, space and place limitations within the institution's network (intranets) or the Internet. Rosenberg (2005) defined the term digital library as a library where some or all of the holdings are available in electronic form, and the services of the library are also made available electronically, frequently over the intranet as well as the internet so that users can access them remotely.

However, according to Magnussen (2003), there is no universally agreed terminology and common definition for digital library. Digital library may also be called; the library without walls, virtual library, electronic library, e-library, desktop library, online library, future library, library of the future, logical library, networked library, hybrid library, gateway library, extended library or information superhighway. Of these many terms, digital library, virtual library, hybrid library and electronic (or e-) library are the most common once. Thus, this study may also use the terms e-library, electronic library and digital library interchangeably.

The definitions for a digital library can be seen from two different angles; both in a narrower and a broader perspectives. Magnussen (2003) citing Covi and Kling (1996), Lesk (1997), and Stratigos and Strouse (2001), have put in a narrower sense as; a digital library is construed as a mainly, if not wholly, digital entity. Moreover, Magnussen

(2003) citing Crawford (1995), Waters (1998) and Borgman (2000) added the broader sense definition of a digital library as; it is a hybrid of traditional library services and new electronic sources and methods.

Magnussen (2003) has also put the broader sense definition of Gapen (1993) as a base for his research as follows:

> *"…the concept of remote access to the contents and services of libraries and other information resources, combining an on-site collection of current and heavily used materials in both print and electronic form, with an electronic network which provides access to, and delivery from, external worldwide library and commercial information and knowledge sources. In essence, the user is provided the effect of a library which is a synergy created by bringing together technologically the resources of many, many libraries and information services."*

Digital libraries are not developed over night; rather they are evolved through time. Saffady, S. and William, B. (1995) noted that, although the development of digital libraries seems a revolutionary phenomenon, the concepts and technologies involved are more accurately described as an evolutionary, as it has been evolving since the 1960s when libraries began to integrate emerging information technologies.

Saracevic (2009) has explained that digital libraries emerged in the mid 1990's. However, Long before the emergence of digital libraries in the mid-1990s, Licklider (1915–1990, U.S. computer scientist) had put in a prescient 1965 book entitled Libraries of the Future, and predicted many of the features of the present digital libraries, with some still to come (Saracevic, 2009 citing Licklider, 1965). Saracevic (2009) has also added that Licklider was a technology enthusiast who formulated his own vision of

library in a technological context and foresaw the handling of the contents in cognitive, semantic, and interactive ways.

Bush (1945) observed two problems emerged at the end of the Second World War. The first was: How to make the huge volume of war time reports and research findings public and accessible?, and the second: What new challenge to set for the scientists who would be finishing their war related works? In his article "As We May Think", Bush (1945) stated that he developed a mechanical system called Memex, as a solution for both problems to manage and process the growing body of scientific, technical and scholarly information and knowledge. Hence, Bush's work has put the idea of digital document management (which seems the today's e-library services) 60 years ago.

Licklider, after being recruited as the Council on Library Resources in 1956 had tried to address the question how could technology help libraries to gather, index, organize, store and make accessible the growing body of recorded information in spite of the intellectual explosion of the 20th Century (Hauben, 2007).

Moreover, Hauben (2007) discussed the human-machine-knowledge systems in connection with Bush's Memex system; Kemeny's National Research Library and Licklider's Procognitive System that still serve as a base for digital library development and research. Bush, Kemeny and Licklider were technology enthusiasts who predicted the essence of a library and its knowledge contents that need not be located in books or buildings rather they conceptualized libraries as making the body of knowledge more useful and accessible irrespective of place and space. All the above works and trials have significantly contributed to the current status of digital or e-libraries.

2.2.2 Benefits of Digital Libraries and their Major Services

Digital libraries are advantageous for easily and rapidly accessing books, archives and images of various types over traditional libraries that are limited by storage space. Digital libraries have the potential to store much more information, simply because digital information requires very little physical space to contain it (Lesk, 1995). Moreover, the cost of maintaining a digital library is much lower than that of a traditional library. Digital libraries are also better to adopt and integrate new technologies easily. They also increase availability and accessibility to individuals who may not be traditional patrons of a library, due to geographic location or organizational affiliation (Wikipedia and Lesk, 1995).

Moreover, Lee, Dahlan, Ramayah, Karia, and Asaari (2005) citing Arms (2000) has stated that, the fundamental reasons for building digital libraries is the belief that it provides better delivery of information than was possible in the past. According to Lee et al (2005) and Lesk (1995) the major advantages of digital or e-libraries over traditional libraries are the following:

- Digital libraries bring the libraries closer to the users: Information are brought to the users, either at home or work, making it more accessible, and increases its usage. There is no physical boundary, so that users of a digital library service need not to go to the library physically. Rather, people from all over the world can gain access to the same information, as long as the institution's network or Internet connection is available.
- Computer technology is used for searching and browsing: Computer systems are better than manual methods for finding information. It is useful for

reference work that involves repeated leaps from one source of information to another.

- Information can be shared: Placing digital information on a network makes it available to everyone. Many digital libraries are maintained at a single central site. This is a vast improvement over expensive physical duplication of little used materials/resources, or the inconvenience of unique resource that is inaccessible without traveling to the location where it is stored.
- Information is always available: The doors of digital libraries will never be closed. Usage of digital library collections can be done at hours when the library buildings are closed. Materials or resources are never checked-out, missed-shelve, or stolen. In traditional libraries, information is much more likely to be available whenever and wherever the user needs it.
- New forms of information become possible: A database may be the best way to record and disseminate information. Whereas conventional libraries are printed on paper, yet print is not always the best way to record and disseminate information.
- Added value: Certain characteristics of objects, primarily the quality of images, may be improved. Digitization can enhance legibility and remove visible flaws such as stains and discoloration.

Digital libraries offer significant potential services to the users. Frumkin (2004) proposed the major services that are well tested and offered by digital libraries. The services cover a gamut of needs addressing issues within both the digital library and the traditional library community as well. These are the following:

- Interoperation service: digital libraries offer primary service for discovering and coordinating access to all other services made available on the network; which

mean providing additional information to the user so as to make access to collections and services quickly and easily.

- Searching service: digital libraries offer standard searching mechanisms that are compatible to digital repositories and collections. So that users can search from the library collection easily and quickly.
- Alerting service: digital libraries gather information about an individual's learning needs and interests and saved as one (or more) user profiles on a regular basis; and then inform the sets of newly available contents. This service will proactively alert learners, scholars, and educators about the existence of new materials in the library collection and make the process of finding and getting information from digital libraries easier and more transparent.
- Browsing service: digital libraries offer end users with the ability to find resources similar to known items within the library. Browsing service allows users to choose an item of interest and then prompt the system to find other similar items. The system will then return a list of metadata values used to describe the item of interest, asking the user to select the qualities they prefer for browsing.
- Conversion service: This service will function solely to automate the conversion of data between different formats used by the library network. This service would have an associated protocol simply specifying a particular conversion among those registered on the server. Such an ad hoc conversion of scripts would specify unambiguously an incoming format stream and a desired response stream of the library collection. It also offers the cataloging and path finding test bed services.
- Cataloging service: digital libraries offer cataloging services by providing a convenient and automated means of generating, transmitting, and editing

cataloging records for library collections or resources. The associated Web interface of digital libraries enable catalogers to edit the temporary repositories of records created by this service; and applies classification to trees of records in such repositories, using the Catalogers Desktop software from the Library.

- Path finding service: This service will provide a means of generating, transmitting, and editing standardized pathfinders for digital library resources. Pathfinders are library guides created by subject experts for learners who seek to use library resources for specialized topic research. The service will specify a variety of interchangeable encoding formats for pathfinders, and enable the automated conversion from one format to another via the conversion service. This will enable libraries to collaboratively share pathfinders interchangeably, without imposing a unified format for all pathfinders on all participating institutions. The path finding service will be important for building up a body of reference and training materials/resources for library end users seeking to use digital or e-library resources.

2.2.3 Utilization and Evaluation of Digital Libraries

Electronic or Digital libraries have been studied in different corners of the world since their inception during the 1990's. The utilization of electronic or digital library services has been evaluated all over the world and revealed as poor or underutilized particularly in developing countries. The problem is even very serious in Africa though African academic and research institutions have access to some of the electronic resources or databases provided by donors. Among these, Programme for the Enhancement of Research Information (PERI) resources offered by the International Network for Availability of Scientific Publications (INASP) are the major once. Studies conducted by different researchers in different counties of Africa (Manda, 2008) in

Tanzania, (Kiondo, 2008) at Dare-Salaam University library in Tanzania, (Aynalem and Wondimeneh, 2008) in Ethiopia, and (Musoke and Kinengyere, 2008) in Ugandan academic libraries exposed this fact. These studies were conducted under the initiation and support of INASP which revealed underutilization of electronic library resources in all surveyed countries. In particular, the study conducted by Aynalem and Wondimeneh (2008), with the initiation and support of INASP has shown poor utilization of the electronic resources by academic staffs, librarians and postgraduate students of Ethiopian Universities' libraries. The above reports are one of the main reasons that initiated this research work to be conducted.

Moreover, during the last decades, the growth rate of student enrolments in higher education in sub-Saharan Africa was among the highest in the world (UNESCO, 2003). For instance, in Ethiopia, the higher education enrolment has been growing in an alarming rate with an annual average increase of over 33% per year (Ethiopian Federal Ministry of Education, 2007). Nevertheless, in spite of this rapid increase in enrolments, the gross enrolment ratios gap between sub-Saharan Africa and that of developed countries has continued to be widening (UNESCO, 2003).

The prevailing under utilization of the electronic resources by academic staffs, librarians and postgraduate students of Ethiopian Universities' libraries has limited the quality of research and higher education teaching learning activities. According to UNESCO (2003), various indicators clearly depict that the number of researchers employed in research and development (R-D) activities as well as the number of publications and patents in sub-Saharan Africa remains the least developed in the area of research in the world. This is mainly because; shortage of the resources allocated to higher education in sub-Saharan Africa has led to a significant deterioration of academic infrastructures. Among others, shortage of laboratories, teaching materials, books and journal articles in

libraries which further decline the quality of education and research are the main once. These low qualities of research and development (R-D) as well as teaching and learning activities because of resource constraints were also another core reasons that initiated this research work to be undertaken.

2.3 Technology Adoption

Adoption and diffusion are two distinct but interrelated concepts. Adoption commonly refers to the decision to use a new technology or practice by organizations and individuals on a regular basis. Diffusion often refers to the spatial and temporal spread of the new technology among organizations or individuals. Kripanont (2007) citing Rogers (1983) has made distinction between the two terms and defined diffusion as an aggregate adoption, the process by which a technology is communicated through certain channels over time among the members of a social system. In contrast adoption has been defined as the use or non-use of a new technology by individual users at a given period of time. It was also further explained that the innovation adoption decision process as a mental process from the first knowledge of an innovation to the decision whether to adopt or reject it and takes place within the mind of an individual while innovation diffusion process occurs among the units in a social system or within a nation.

More clearly, Kurtenbach & Thompson (1999) has defined and explained technology adoption as the stage in which a technology is selected for use by an individual, a group of individuals or societies, organizations or institutions, and then the individuals or organizations accept the innovation or technology as valuable to their work and hence use it.

Swanson (1994) recommended that information systems innovation adoption among organizations can be categorized into three distinct types: 1) innovations that occur within the information systems function (Type I), 2) innovations that occur at the individual user or work group level (Type II) and 3) innovations that occur at the organizational or institutional level (Type III). However, this research focused on studying the second category, individual or user level technology adoption. This is because users' acceptance of new information technologies is the core determinant factor of the actual usage of the new technology (Min and Qu, 2008).

According to many information system researches, for a new technology (electronic or digital library services in this case) to be used, it needs to be accepted first by the users. Users' acceptance and usage of information technology products and services is fundamental for the success of enterprises or institutions implementing new technologies. In short, end-users acceptance is a precondition for the use of a new technology (Min and Qu, 2008), Zhou (2008) and Tibenderana and Ogao (2008b). Besides understanding the adoption decisions of new technology users, it is crucial to better understand the post adoption variations in usage and values (Zhu et al, 2006). Therefore this study has focused on empirically validating and investigating determinant factors of electronic library service end-users' acceptance and use visa verse none acceptance and none use behaviors in the context of Ethiopian universities.

Regarding users' acceptance and use of digital or electronic library services, numerous studies have been conducted in different corners of the world. Lee et al (2005), using the TAM framework, has studied the impact of interface characteristics on perceived ease of use of digital libraries and tried to answer whether there is a significant relationship between interface characteristics and perceived ease of use of digital libraries. Their findings have shown that interface characteristics to a certain extent have impact on

students' perceived usefulness and perceived ease of using digital libraries. Moreover, terminology has also shown an impact on the perceived ease of using digital libraries.

Hong, Thong & Tam (2002) stated that Universities and colleges have invested huge sum of money on building useable digital libraries. However, research has shown that digital libraries are underutilized (Hong, et al, 2002). Their study exposed that perceived usefulness and perceived ease of use are determinants of user acceptance of digital libraries. Interface characteristics and individual differences affect perceived ease of use while organizational context influence both perceived ease of use and perceived usefulness of digital libraries.

In another work, Hong, Thong, Wong, and Tam (2002) empirically studied the Determinants of User Acceptance of Digital Libraries using the TAM model through critical Examination of two external variables (Individual Differences and System Characteristics). Their study disclosed that, the two external variables (individual differences and system characteristics) were important determinants of perceived ease of use of the digital library services. Moreover, Perceived ease of use and perceived usefulness were found to be significant antecedents of the intention to use a digital library. One external variable which is content based system characteristics, relevance, has found to have a greater effect on perceived usefulness of a digital library than the interface-based system features. Hong et al (2002) focused their study on users (user centered) rather than technological developments indicating that users' acceptance is an important determinant precondition for the actual usage of developing technologies.

Ramayah & Bushra (2004) studied the role of self-efficacy in electronic library usage among students of public universities in Malaysia by applying an external variable, self-efficacy, on the TAM model constructs (perceived ease of use and perceived

usefulness). Their study investigated the influence of self-efficacy on e-library usage and disclosed that self-efficacy had a significant direct impact on perceived usefulness and perceived ease of use when predicting e-library usage. Moreover, self-efficacy, perceived ease of use and perceived usefulness have had direct significant impact on electronic library usage. Their study also indicated that perceived ease of use fully mediates self-efficacy when explaining electronic library usage and perceived usefulness fully mediates perceived ease of use when predicting electronic library usage.

Lee et al (2005), Hong, Thong, & Tam (2002), Hong, Thong, Wong, and Tam, (2002) and Ramayah & Bushra (2004) have studied electronic library users' acceptance and use of e-library services using the TAM model and augmented TAM with other external variables in non African cultural contexts and settings. These studies also exposed the influence of the TAM constructs (perceived ease of use and perceived usefulness) on electronic library usage. Furthermore, these studies revealed the influences of other external variables on perceived ease of use and perceived usefulness.

However, Tibenderana and Ogao (2008b) have studied Information Communication technology acceptance and Use among University Communities in Uganda, with special emphasis on hybrid or electronic Library Services End-Users using a new robust model, the Unified Theory of Acceptance and Use of Technology (UTAUT). Their study extended and modified Venketesh's (2003) UTAUT model to investigate end-users acceptance and use of electronic library services in the context of Uganda. Tibenderana and Ogao (2008b) revealed that end-users had relatively high inclination to behavioral intention to accept and use electronic library services and relatively significant lower usage behaviors of the electronic library services while moderately expect the benefits of electronic library services. The dependent variables or constructs; behavioral

intention, use behavior and expected benefits indicated positive inclination towards the acceptance and usage of electronic library services. Furthermore, the path coefficients for all the constructs except performance expectancy indicate that end-users in that study had a positive inclination towards acceptance and usage of electronic library services where performance expectancy demonstrates a negative effect on behavioral intention to use electronic library services. This is quite different from Venkatesh et al. (2003), whose findings show performance expectancy construct one of the strongest contribution to behavior intention to use a technology. Social influence demonstrates higher contribution to behavioral intention while relevancy and performance expectancy demonstrate lower contribution to behavioral intention to use electronic library services.

In another work, Tibenderana and Ogao (2008a) have studied the acceptance and Use of e-library services in Ugandan Universities and found out that the path coefficients for all the independent constructs were negative to show a negative relationship with the dependent variables. In spite of its negative path coefficients, the overall performance of model, SO-UTAUT model, showed good prediction power. In this work, Tibenderana and Ogao (2008a) model predicts about 11% on BI, 41% on BU and 81% on EB of the variance in users' behavior to accept and use the e-library services.

In general, information system studies disclosed that users acceptance of new technologies differ from country to country due to the fact that factors of adoption differ from nation to nation and the diverse nature of the nations' own culture (Yang and Lee, 2007). Zhu et al (2006) citing Currie (2004) added that adopters differ significantly in terms of value creation from new information technologies (electronic libraries in this case). Using UTAUT as a theoretical framework, Yang and Lee (2007) revealed this fact in that performance expectancy and social influence are critical factors

of adoption of ICT in Korea while these same factors are not critical factors in US, another country having its own distinct cultural settings and contexts. Therefore, studying technology acceptance and use behaviors of new technology users is vital for successful adoption as well as to find out the key determinants of acceptance and use of new technologies in different contexts since the factors are correlated to different cultures and norms of nations.

2.3.1 Technology Acceptance Theories and Frameworks

Advances in the new information and communication technologies and changes in the global environment have made it increasingly difficult for individual user or organizations to make decisions regarding information technology adoption. Various technology acceptance theories and models have been proposed by researchers in the area of technology adoption in connection with the rapid advancements of ICTs and the ever-increasing use of the services offered by these new technologies.

Currently, there are many technology acceptance theories and models developed in different disciplines (psychology, sociology and information systems) and used in predicting, explaining, and understanding individuals' acceptance and adoption of new information technology products and services. These models have been evolved over the years and came as a result of persistent efforts of the models' validation and extension that took place during the period each was presented. For example, Psychology contributed the Theory of Reasoned Action, TRA (Ajzen and Fishbein, 1980), which was extended to the Theory of Planned Behaviour, TPB (Ajzen, 1985), which also had an extension, the Decomposed Theory of Planned Behaviour, DTPB (Taylor and Todd, 1995); Information Systems contributed the Technology Acceptance Model, TAM (Davis, 1986), which is an extension of Theory of Reasoned Action; yet also

has an extension TAM2 (Venkatesh and Davis, 2000) and the Unified Theory of Acceptance and Use of Technology, UTAUT (Venkatesh et al., 2003), which is an aggregation of other aforementioned models including the Rogers' Diffusion of innovations, DOI (1983), Bandura's Social Cognitive Theory, SCT (1989), Deci & Ryan's Motivational Model, MM (1985), and Triadis's Model of PC Utilization, MPCU (1979) (Al-Qeisi, 2009).

These theories and models have their own concepts (philosophical assumptions) and different constructs or elements that each theory bases on. These theories are also criticized for their limitations in predicting, explaining, and understanding individuals' acceptance and adoption of new technologies. In view of that, this study has discussed these theories and models in brief as follows:

Diffusion of Innovation Theory (DOIT)

The term diffusion has been used since the 1940's by sociologists and anthropologists in Europe for the first time. The proliferation of Diffusion of Innovation Theory has been used since the 1950's in USA and during the 1960's it has been propagated to the developing nations such as Latin America, Africa, and Asia as well to describe the innovation-decision process. Since then, diffusion of innovation theory has been used in different disciplines such as early sociology, rural sociology, education, public health/medical sociology, communications, marketing, geography, and general sociology (Al-Qeisi, 2009, citing Rogers, 2003).

Arnoldine (2006) stated that the preeminent innovation diffusion model was developed by Rogers (1983) to explain the processes and mechanisms how an innovation diffuses through a society. Moreover, the theory has been used extensively to explain the acceptance and rejection of new technology innovations within an organization or a

society at large. The theory tries to explain the innovation decision process, factors determining the rate of adoption, and categories of adopters. It helps in predicting the likelihood rate of adoption of an innovation. Al-Qeisi (2009) citing Rogers (2003) pointed out that the rate of technology adoption according to the diffusion of innovation theory is determined by the characteristics or attributes of an innovation such as relative advantage, compatibility, complexity, trainability, and observability.

The theory, DOIT has three core constructs that determine users adoption behavior, namely, the innovation itself which is defined as something that is new in the eyes of the adopter, the adopter which is defined as the person performing the actual adoption of a specific innovation and the social Networks which connects the adopter and the innovation through communication channels (Conklin, 2006).

However, the DOIT has been criticized for its limitations by information system researchers. It has been argued that the theory does not provide evidence on how attitude evolves into accept/reject decisions, and how innovation characteristics fit into this process (Kripanont, 2007 citing Karahanna et al, 1999 and Chen et al, 2002). Moreover, this theory did not fully explain the roles of innovation attributes in forming attitudes (negative or positive) for rejection decisions to happen at any stage in the decision process. It is even unrealistic to expect the formation of both positive and negative attitudes in one model with respect to innovation attributes, stages of adoption and categories of adopters.

Theory of Reasoned Action (TRA)

The theory of reasoned action is the oldest model developed in the field of social psychology and was used to explain technology acceptance during the period 1918-1970 when scientists were trying to explain individuals' behavior through the impact of

attitude. Fishbein and Ajzen (1980) have developed a behavioral theory and model, Theory of Reasoned Action (TRA) in 1980, a theory that could predict, explain, and influence human behavior. Since then, many researchers have proven its success in predicting and explaining human behavior across a wide variety of domains including research in technology adoption and acceptance areas (Sandberg and Wahlberg, 2006).

The theory of reasoned action has established its foundation in the doctrine of social psychology on the assumption that individuals are rational and will make systematic use of the information available to them to take action. Individuals consider the implications of their actions before they decide to engage or not engage in a given behavior (Ajzen & Fishbein, 1980).

According to this theory the main predictor of behavior is behavioral intention which is the most important determinant of an individual's behavior and, defined as the cognitive representation of a person's readiness to perform a given behavior. Furthermore, the theory comprises of two core constructs or main determinants of individual's intention to perform a behavior. The first is Attitude towards performance of the behavior which is defined as the previous attitude of a person toward performing that behavior, and the second is Subjective norm, which is defined as the social pressure exerted on the person or the decision maker to perform the behavior (Kripanont, 2007). The theory has been proven by many researchers to show good prediction of human behavior (Lin, 2005).

Despite its strengths, the theory of reasoned action has been criticized for its basic limitations. The limitation of the theory stems from the assumption that, the theory only applies to behavior that is consciously thought out in advance. The theory cannot explain irrational decisions, habitual actions or any behavior that is not consciously

considered. Moreover, in order for the theory to predict a specific behavior, attitude and intention must agree on action, target, context, time frame and specificity (the problem of correspondence). It is also limited by its reliance on self reported information to determine the subjects' attitude (Abdulhafez and Gururajan, 2008).

Social Cognitive Theory (SCT)

The social cognitive theory (SCT) is the social foundations of thoughts and actions. The SCT stemmed from the social learning theory which was launched in 1941 by Miller and Dollard when they introduced the principle of learning through "Models" in their publication, entitled Social Learning and Imitation. Bandura has contributed a lot for the development of the cognitive social learning theory. In 1986 he developed the SCT from social learning theory and introduced several other important concepts such as reciprocal determinants, self efficacy, and the idea that a significant temporal variation in time lapse could occur between cause and effect (Al-Qeisi, 2009).

SCT explains and suggests its theoretical perspectives of human functioning as product of dynamic interplay of personal behavior and environmental influences. Moreover, the theory emphasis that cognition plays a critical role in people's capability to construct reality; self regulate, encode information and perform behaviors (Kripanont, 2007). The SCT has also incorporated outcome expectation, personal self-efficacy, affect and anxiety as key determinant factors of behavior (Manzari, 2008).

SCT encompasses a large set of factors that operate as regulators and motivators of established cognitive, social, and behavioral skills. Among these key factors, Reciprocal Determinism states human behavior as the result of a triadic, dynamic, and reciprocal interaction of environment, personal factors, and behavior. Vicarious Capacity,

Forethought, Self-Regulatory Capability, and Self-Reflective Capability are also other key factors.

The theory has tied the adoption decisions to incentive motivators where incentive motivators take three forms, material, social, and self-evaluative. Moreover, Bandura has tied SCT with DOIT and further advocated that the interactions among psychological determinants of the adoption behavior, the attributes of innovations that might hinder or enhance adoption and the network structures that provide the social pathway of influence can best explain and demonstrate the DOIT in connection with SCT (Bandura, 2001, cited in Al-Qeisi, 2009).

Technology Acceptance Model (TAM)

The Technology Acceptance Model (TAM) is an extension and adaptation of Ajzen and Fishbein's TRA. TAM was developed by Davis in 1989 with the aspiration of providing an explanation of the determinants of computer acceptance by tracing the impact of external factors on internal beliefs, attitudes and intentions (Sandberg and Wahlberg, 2006). TAM is an information system theory that models how users come to accept and use a technology. The model suggests that when users are presented with a new technology, a number of factors, particularly perceived usefulness and perceived ease of use, influence their decision about how and when to use the new technology (Davis, 1989). Similarly, Conklin (2006) explained that TAM was developed to predict the acceptance and usage of information technology in work environments.

TAM has two key constructs or essential elements in determining user attitude towards using new technologies, namely, perceived usefulness which is defined as the degree to which a person believes that using a particular technology will enhance his or her job

performance and perceived ease of use which is as the degree to which a person believes that using a particular technology will be free of effort (Davis, 1989).

The TAM model is the most well-known and widely accepted and cited model in the area of technology acceptance and adoption studies (Hong, et al, 2002; Lin, 2005; Conklin, 2006; and Kripanont, 2007). Similarly, Sandberg and Wahlberg (2006) added that TAM is a widely accepted IT acceptance model that can be used in very different settings and contexts, such as online games, Internet utilization behavior, online shopping, online learning, Internet banking and electronic libraries.

However, the TAM model has been criticized for its limitations. According to Al-Qeisi (2009), the most commonly reported limitation of TAM is the measurement of usage by relying on respondents' self-reporting and assuming that self-reported usage reflects actual usage. Moreover, Generalization from sample respondents taken from professional users and university community is very difficult and unfair. Another drawback is limited guidance, where the core of TAM model development is failed to receive the appropriate attention. TAM does not provide feedback about aspects of improvement that might enhance adoption such as flexibility, integration, completeness of information, and information currency (Venkatesh et al., 2003 and Al-Qeisi, 2009). The model is also criticized for its explanatory power and the inconsistent relationships and patterns among constructs too (Al-Qeisi, 2009).

Extension of the Technology Acceptance Model (TAM2)

Because of the limitations of the original TAM model, Venkatesh and Davis (2000) proposed the extended technology acceptance model called TAM2. TAM2 is an extension of the original TAM model first introduced in management science in order to

explain perceived usefulness and usage intentions in terms of social influence and cognitive instrumental processes.

The model, TAM2 includes additional key determinants of perceived usefulness and usage intention constructs of the original TAM which are meant to explain the changes in technology acceptance over time as individuals gain experience in using the targeted technology. TAM2 incorporates additional theoretical constructs covering social influence processes (subjective norm, voluntariness, and image) and cognitive instrumental processes (job relevance, output quality, result demonstrability, and perceived ease of use) (Al-Qeisi, 2009). Similarly, Kripanont (2007) explained that TAM2 is developed to address two major objectives; (1) to include additional key determinants of TAM that explain perceived usefulness and usage intensions in terms of social influence and cognitive instrumental processes and (2) to understand how the effects of these determinants change with increasing user experience over time with the target system. Moreover, Al-Qeisi, (2009) and Kripanont (2007) added that better understanding of the determinants of perceived usefulness would enable researchers to design organizational interventions that would increase user acceptance and usage of new technologies.

The model was tested during pre-implementation and post-implementation and the results have shown that TAM2 was supported for its assumptions. The model, TAM2 performs better in predicting user acceptance of new technologies. The TAM2 model constructs significantly influenced the user acceptance (Kripanont, 2007).

Theory of Planned Behavior (TPB)

As an extension of TRA due to its limitations in predicting behavior, Ajzen (1985) has proposed the theory of planned behavior (TPB), in order to incorporate behaviors over

which people have incomplete volitional control. The same to that of the original TRA, the central factor of the TPB is the individual's intention to perform a given behavior (Al-Qeisi, 2009; Lin, 2005; and Kripanont, 2007).

The TPB differs from the TRA in that the former incorporates an additional construct, perceived behavior control (PBC), on the latter in order to account for situations where an individual lacks the control or resources necessary for carrying out the targeted behavior freely (Al-Qeisi, 2009, citing Ajzen, 1991).

TPB deals with the antecedents of the three key constructs of intention (attitude, subjective norms and perceived behavioral control) in order to explain and predict behavior since intention is the best predictor of behavior. The theory hypothesizes that behavior is a function of salient beliefs relevant to that behavior where that beliefs are considered as the prevailing determinants of a person's intentions and actions. These antecedents or salient beliefs are behavioral beliefs that influence attitude towards behavior, normative beliefs that influence prevailing subjective norms and control beliefs that influence the power of the perceived behavioral control. Moreover, Actual behavioral control is also another salient construct of TPB that may have a direct effect on behavior and perceived behavioral control (Ajzen 1991 cited in Al-Qeisi, 2009, and Kripanont, 2007).

TPB has been criticized for its drawbacks in that the theory did not address the variables habit, perceived moral obligation and self identity that may predict intentions and behavior (Eagly & Chaiken, 1993 cited in Al-Qeisi, 2009). Another limitation of TPB is that the theory basically describes the attributes of adoption at an individual unit of analysis rather than at the organizational level (Abdulhafez and Gururajan, 2008).

Decomposed Theory of Planned Behavior (DTPB)

As an extension to theory of planned behavior, which was an improvement of theory of reasoned action, Taylor and Todd have proposed Decomposed Theory of Planned Behavior (DTPB) in 1995 by decomposing the constructs of TPB into detailed components and including other constructs from the DOIT as well (Al-Qeisi, 2009). The DTPB decomposes the three key constructs of intension in the TPB into sub-constructs or variables. Accordingly, attitude is decomposed into Perceived Usefulness, Compatibility, and Perceived Ease of Use while subjective norm is decomposed into Peer Influence and Supervisor's Influence. Perceived behavioral control is decomposed Self Efficacy and Resource Facilitating Conditions and Technology Facilitating Conditions (Al-Qeisi, 2009).

DTPB indicated better predictive power relative to TAM and TPB model because of inclusion of a variety of theoretically-based belief construct such as decomposing subjective norm into peer and supervisor influence and the inclusion of efficacy and resource factors for Perceived behavioral control. The other reason is that it was uncommon to measures of common constructs in the three models in the same fashion in previous studies (Taylor & Todd, 1995a, cited in Al-Qeisi, 2009). In this regard its performance is not well tested and validated.

Motivational Model

According to Al-Qeisi (2009) citing Vallerand (2000) expanded Self-Determination Theory into the Hierarchical Model of Motivation. The model has been developed as a result of many researches in psychology to explain human behavior. The model was adapted to technology adoption research by Davis and his colleagues in 1992 to explain users' acceptance of technologies. It defines motivation along the same continuum as

self-determination theory while motivation operated at three levels, the global (personal) level, the contextual (domain) level, and the situational (state) level.

Motivational model has two core constructs. The first is extrinsic motivation that assumes the use of technology in work will be supported by expected or anticipated reward (e.g., raise or bonus) provided that the technology is perceived as useful in achieving these goals. The second is intrinsic motivation assumes that, the perceived enjoyment of using the new technology regardless of the performance outcomes achieved (Manzari, 2008).

Combined TAM and TPB (C-TAM-TPB)

C-TAM-TPB model combines the predictors of TPB with perceived usefulness from TAM to provide a hybrid model (Taylor and Todd, 1995 cited in Lin et al, 2002). The TAM and the TPB models are the two prevalent theories for explaining an individual's technology acceptance/adoption decision which are adapted from TRA. The model is developed on the assumption to integrate the strengths and augment the limitations of both earlier theories, TAM and TPB. TAM and TPB are largely compatible and their respective explanatory or predictive power may be augmented by including relevant constructs from other theories or models through sharing the common attitude-intention-behavior threads.

Moreover, Lin et al (2002) explained the views and suggestions of many literatures in supporting the idea of combining different models to obtain better results. Accordingly, Lin et al (2002) stated that, adequately integrating the constructs from different theories or models may provide a more detailed explanation to individual technology acceptance decision-making in various organizations or implementation settings.

Kripanont (2007) citing Taylor and Todd (1995) stated that two factors; subjective norm and perceived behavioral control are added to the TAM model from the TPB model in order to provide a more complete test of the important determinants of IT usage. Hence, a new hybrid model, called C-TAM-TPB has been developed from the two models that have better predictive utility in IT usage research and wider use in social psychology.

Model of PC Utilization (MPCU)

The model of PC utilization (MPCU) was developed, due to lack of consensus or synthesis among different disciplines in describing the relationship of attitude, values, and other acquired behavioral dispositions to act or behave. The model describes the mechanisms how behavior occurs and the variables that induced human behavior (Triandis, 1979 cited in Al-Qeisi, 2009).

MPCU has been proven as the best model used to understand and explain computer usage behaviors in a voluntary environment. The MPCU is used to characterize models so as to predict information technology utilization behaviors adapted for personal computing. The model comprises of five key constructs such as job fit complexity, long-term consequences, affect towards use, social factors and facilitating conditions as key constructs. Furthermore, the characteristics of the model make it appropriate to predict individual's acceptance and use of technologies available for use (Manzari, 2008).

Unified Theory of Acceptance and Use of Technology (UTAUT)

Unified Theory of Acceptance and Use of Technology (UTAUT) model was developed by Venkatesh et al (2003). Venkatesh and his colleagues noticed that IS or IT researchers were confronted with a choice among a multitude of models and were

bound to choose constructs across models or choose a favored model and largely ignore the contributions from alternative models.

After an empirical review and an in-depth analysis and synthesis of the eight prominent models, Venkatesh et al (2003) have formulated the UTAUT model and empirically validated its performance in order to reach a unified view of users' technology acceptance. Consequently, Venkatesh et al (2003) proposed the UTAUT model, a new robust and comprehensive model, as a composition or consolidation of the eight prominent models (TRA, TAM, MM, TPB, Combined TAM-TPB, MPCU, DOIT and SCT) that have been used to explain technology acceptance behaviors.

After the review, Venkatesh and his colleagues have come up with five drawbacks of the aforementioned model tests and comparisons. Hence, their work has tried to address these limitations. The following are the drawbacks identified during the review (Venkatesh et al, 2003):

- The technologies studied were simple and individual-oriented as opposed to complex and sophisticated organizational technologies.
- Most participants in these studies were students except for a few studies.
- Time of measurement was general and in most studies tested well after acceptance or rejection of the usage decisions so individuals' reactions were retrospective.
- The nature of measurement was in general cross-sectional
- Most of the studies were conducted in voluntary usage contexts making it rather difficult to generalize results to mandatory settings.

Then after, the authors have empirically compared the eight models in longitudinal field studies conducted in four different organizations among individuals that were introduced to a new technology in the workplace and validated the model empirically in two other new organizations to make it more acceptable (Venkatesh et al, 2003).

The UTAUT model was developed with the objective to explain user behavioral intentions to use an IS and the subsequent usage behaviors. This theory, UTAUT holds four key constructs (Performance expectancy, Effort expectancy, Social influence, and facilitating conditions) are direct determinants of usage intention and usage behavior (Venkatesh et al, 2003). Moreover, Venkatesh et al (2003) explained that gender, age, experience, and voluntariness of use are posited to mediate the impact of the four key constructs on usage intention and behavior. With empirical analysis and longitudinal study, Venkatesh et al (2003) found that UTAUT can explain 70% of variance of usage intention and this exceeds the variance explained by any other theory. Since its inception, UTAUT has gradually got significant attention from researchers and has been used in different contexts and settings to explain user acceptance of information technologies.

Venkatesh et al (2003) examined the commonalities among the models and found seven constructs (Performance expectancy, Effort expectancy, Social influence, facilitating conditions, attitude, computer self-efficacy and anxiety) to be significant direct determinants of intention or usage in one or more of the individual models. However, based on the result of their study, the authors have identified and proposed only four key constructs (Performance expectancy, Effort expectancy, Social influence, and facilitating conditions) that have a direct effect on behavioral intentions and usage. The rest three constructs (attitude, computer self-efficacy and anxiety) were hypothesized not to have a direct effect on behavioral intention.

The four key constructs in the UTAUT model were defined in relation to other similar variables or constructs in the eight prominent models as follows:

Performance Expectancy (PE) is the degree to which an individual believes that using the technology will help him/her to attain gains in job performance. The constructs in the other models that pertain to performance expectancy are: perceived usefulness of TAM, and C-TAM-TPB, extrinsic motivation of MM, job-fit of MPCU, relative advantage of DOIT, and outcome expectancy of SCT. This construct, within each individual model, was the strongest predictor of intention and remained significant at all points of measurement in both voluntary and mandatory settings.

Based on the literature, the influence of performance expectancy on behavioral intention is hypothesized to be moderated by gender and age; such an effect would be stronger for men, particularly younger workers.

Effort Expectancy (EE) is the degree of ease associated with the use of a certain technology. The constructs in the other models that capture the same concept are: perceived ease of use of the TAM model and complexity of DOIT and MPCU. The construct in each individual model was significant in both voluntary and mandatory settings, and as expected from the literature it was significant only during the post training measurement.

Based on the literature, the influence of effort expectancy on behavioral intentions is hypothesized to be moderated by gender, age, and experience; such an effect would be stronger for young women and older workers at early stages of experience.

Social Influence (SI) is the degree to which an individual perceives that important other people believe he/she should use the new system. This construct is derived from

three similar determinants of the previous or existing models: subjective norms (TRA, TAM2, TPB/DTPB, and combined TAM-TPB), social factors (MPCU), and image (DOI). The comparison between models found that this construct behaved similarly; it is insignificant in voluntary contexts and becomes significant when used in mandatory settings.

Based on the literature, the effect of social influences on behavioral intentions is hypothesized to be moderated by gender, age, voluntariness and experience; such an effect would be stronger for women, particularly in mandatory settings in the early stages of experience.

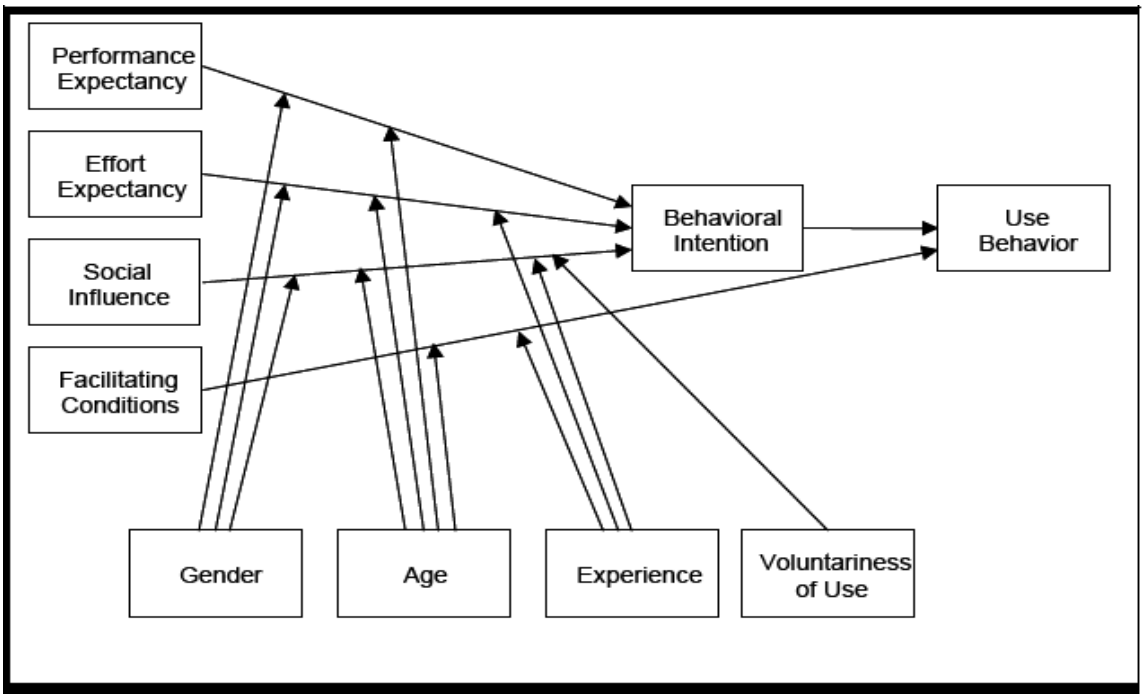

Figure 2.1 The UTAUT Model (Venkatesh et al, 2003)

Facilitating Conditions (FC) is the degree to which an individual believes that organizational and technical infrastructures exist to support the use of the system. This determinant captures three different constructs from the existing models: perceived

behavioral control from TPB/DTPB and combined TAM-TPB, facilitating conditions from MPCU, and compatibility from the DOIT. As noted by Venkatesh et al (2003), the comparison between models revealed that the relationship between intention and this construct in each model is similar in both voluntary and mandatory settings in the first training period but such influence disappears in the second period (one month after implementation).

Based on the literature, when both performance expectancy and effort expectancy constructs are presented, facilitating conditions become insignificant; and consistent with TPB/DTPB facilitating conditions are also direct antecedents of usage (an attribute found also in MPCU). This effect is expected to increase with experience with technology as users find multiple avenues for help and support. Hence, the influence of facilitating conditions on usage is hypothesized to be moderated by age and experience; such an effect would be stronger for older workers, particularly with increased experience.

Behavioral intention (BI): intention is a proper proxy to examine and predict a user's behavior towards a particular technology or system. Use behavior is largely influenced by behavioral intention. Therefore, behavioral intention plays very important role in predicting usage behavior.

Use Behavior (UB): usage behavior of an information system can be volitional or forced. The effect, however, would be good if it is under volitional control.

Moderators: Gender, age, experience and voluntariness of use are the moderating factors of the key constructs of the UTAUT model. Gender moderates performance expectancy, effort expectancy, and social influence. Age moderates all the four key

constructs of the model. Experience facilitates all key constructs but performance expectancy. Voluntariness of use moderates only the social influence construct of the model.

In conclusion, the empirical test of the original data (collected from four organizations) and the cross-validation using new data (collected from two additional organizations) provided strong support for the UTAUT model. The new model, UTAUT, was able to account for 70 percent of the variance in usage intention, which is considered as a major improvement over any of the original previous models where the maximum was around 40 percent (Venkatesh et al., 2003).

2.3.2 Comparison of Technology Acceptance Models

Kripanont (2007) viewed and put technology acceptance models in three General groups of theories and made comparisons among only those theories that have similarities of concepts associated with the personal beliefs in determining IT adoption, acceptance and usage. Hence, the comparison heavily weighted on TRA, TAM, TPB, DTPB, C-TAM-TPB and UTAUT models.

These three general groups of theories stated by Kripanont (2007) based on their concept similarities and beliefs are:

- The innovations Diffusion Theory (IDT) that suggests adoption of an information system is affected by the user's perception of the characteristics of an innovation.
- The intention-based theories (such as TAM, TRA and TPB) of IT adoption that have shown users' adoption and usage of an IT innovation is ultimately determined by personal beliefs and attitudes toward the information systems.

- Other theories (such as SCT and UTAUT) that have been applied to user adoption of information system studies.

Therefore, this study also made comparisons of the prevailing technology adoption models based on their concept similarities and associated personal beliefs in determining e-library services adoption and use behaviors of end users. Hence, this section compares the available and prominent models and selected one model which can perform better and fit to the problem at hand.

TAM, TRA and TPB

The comparisons made by Venkatesh (2003) confirmed that TAM is parsimonious and easy to apply across different research settings and contexts. Nevertheless, it has to pay the trade-off of losing information richness derived from the studies. Moreover, TAM compared favorably with both TRA and TPB in parsimonious capability by Mathieson in 1991 (Venkatesh et al, 2003). The result of this comparison indicated that TAM and TPB explained intention very well with TAM out weighting TPB.

TAM, TPB and DTPB

These models are comparable and showed clear strengths in terms of their ability to explain IT usage behaviors. The explanatory power for both TPB and DTPB outweighs the TAM model when considering behavioral intention. While the TAM is useful in predicting IT usage behavior, the DTPB considering normative and control beliefs provides a more complete understanding of behavior and behavioral intention. Social influences and control factors in organizations influence IT usage during system implementation process (Kripanont, 2007 citing Taylor & Todd, 1995b). Abdu (2009) has put in brief the results of Taylor and Todd's comparison of the three models (TAM, TPB

and DTPB) in 1995 as explained by Venkatesh et al (2003), that TAM explained 52% of variance in intention, TPB explained 57% of variance in intention and DTPB explained 60% of variance of intention.

TPB and DTPB

DTPB increases its explanatory power of predicting behavior through incorporating additional belief constructs (attitude toward behavior, subjective norm and perceived behavioral control) on the original TPB. Moreover, DTPB provides greater insight into the factors that influence IT usage (Kripanont, 2007 citing Taylor & Todd, 1995b). Hence, DTPB outperforms TPB as it provides better diagnostic value than the original TPB model.

UTAUT and Other Theories

Kripanont (2007) citing Bagozzi (1992) and Venkatesh et al (2003) compared and explained the attributes of best model. Accordingly, the bets model is the one which is the most parsimonious, provides good prediction while using the fewest predictors and facilitate understanding.

To this end, Venkatesh et al (2003) compared eight models in association with core constructs, beliefs, moderators and percentage of explained variance including TRA, TAM, a motivational model (MM), theory of planned behavior (TPB), C-TAM-TPB, Model of PC utilization (MPCU), Innovation Diffusion Theory (IDT), and Social Cognitive Theory (SCT). The result of their study illustrated that the eight models under comparison explained up to 53% of the variance in user intention to use information technology. The variance explained by TAM2, for example, was 53%. After reviewing and empirically comparing the eight competing models, they formulated the UTAUT

model and empirically tested it using the same data they used for the eight models, and the result illustrated the out performance of the UTAUT model with 69% adjusted R-squared value (R^2).

However, Tibenderana and Ogao (2008a & 2008b) have modified the UTAUT model developed by Venkatesh et al (2003) and developed a new model called Service-Oriented UTAUT model (SO-UTAUT) in a library context. SO-UTAUT was then tested for its performance in predicting and explaining e-library patrons' acceptance and use visa verse non-acceptance and non-use behaviors. Tibenderana and Ogao (2008a & 2008b) found out that, the independent variable "effort expectancy" and the moderator variable "voluntariness" as irrelevant in e-library context. Tibenderana and Ogao (2008a & 2008b) eliminated these variables from the model and replaced the "effort expectancy" variable with "Relevance" and the "voluntariness" variable with "Awareness" which were found appropriate to the study context.

Hence, this study has applied the SO-UTAUT model, a modification and an improvement of the UTAUT model, to investigate the decisive determinants of e-library service acceptance and use; as well as to predict and explain the acceptance and use of e-library service patrons in academic libraries within Ethiopian context.

The UTAUT model has been proved and scientifically tested in different corners of the world as a best as well as a robust model. In the first place, UTAUT outperforms all the available prominent models. Secondly, the UTAUT model facilitates understanding and provides best prediction through using fewer constructs and easily understandable graphical representations of these predictors. Its modification, SO-UTAUT model, performs even better than the original UTAUT in predicting end-users' acceptance and use of new technologies (e-library services) and hence, has been used in this study.

CHAPTER THREE

RESEARCH DESIGN AND METHODOLOGY

3.1 Introduction

This chapter discusses the methodologies that have been followed in this study. Hence, the general approach, sampling procedures, sampling design, data collection procedures, instrument development, reliability and validity of the data collection instrument have been discussed in detail. Moreover, the data analysis and interpretation methodologies have been discussed.

3.2 Research Design

The general approach adopted and used in this study was both quantitative and qualitative research method. Accordingly, observation and survey research method as a data collection technique have been employed so as to get the required research output. According to Kothari (2004), Research design is a blueprint or a conceptual framework of the overall research process that explains and justifies the collection, measurement and analysis of data as well as the procedures and techniques to be used in processing and analyzing the data. Hence, this study has used questionnaire, a survey research methodology, as a data collection instrument. A cross-sectional survey study has been employed as a quantitative research design methodology in order to get multiple respondents' data at a time and study the research problem.

Kothari (2004) has put the basic research design considerations that any research should deal with during research design stage of a study. Hence, this study has also taken in to account the following research design considerations:

Purpose of Study

This study was mainly concerned with identifying and exploring the determinant factors that affect intention to use and use behaviors of a technology (e-library services) through hypothesis testing. Hence, the study has tried to explain the acceptance and use or non-acceptance and non-use behaviors of e-library services among academic library users.

Type of Study

Since this study has tried to investigate the determinant factors that affect e-library service end-users' intention to use and their use behaviors as well, it is both descriptive and exploratory research. Hence this study was a causal study in its very nature.

Study Setting and Context

Another research design consideration that a researcher should do carefully is defining the study settings and contexts. The study has covered two selected Ethiopian higher education institutions; Addis Ababa University and Adama University as a reference population for the study.

Depending on the basic factors; the objective of the research being undertaken, the type of data, the availability of budget, the availability of time and other resources; the study setting of any research could be of two types of settings: contrived or non-contrived. In a contrived study setting, the researcher creates certain controlled environment for the subjects to be studied; while in a non-contrived, also called natural study setting, the study is conducted at the natural environment while the subjects are in their real life activity. In a contrived study setting the subjects may expose their artificial behaviors rather than showing their real life behaviors; hence may not reflect the real situation

while in a non-contrived study setting the subjects are studied at their real life situations and hence can accurately reflect the real situation. Accordingly, the research design consideration undertaken in this research has clearly reflected the second situation, the non-contrived or the natural study setting.

Time Horizon of the Study

The time horizon of a study has been also one consideration of the research design processes. Hence, there could be two types of studies based on their time horizon; cross-sectional and longitudinal studies. In Cross-sectional study, the data about the variables of interest from representative samples are collected only once in order to determine the relationship between the variable of interest. On the contrary, in a longitudinal study, the data about the variables of interest for the study is collected two or more times from the reference population so as to determine the relationship among the variables. In short, the fundamental difference between cross-sectional and longitudinal studies is that cross-sectional studies take place at a single point in time while longitudinal studies involves a series of measurements taken over a period of time. Both are a type of observational study. In this research, the study data about the variables has been collected only once since the time devoted to this study is a semester. Therefore, the study was a cross-sectional survey study in its very nature.

3.3 Survey Research Methodology

Survey research methodology is a technique that selects a sample of subjects from the reference population. Surveys are used extensively in social science research including information systems researches in general and in library and information science in particular in order to assess attitudes and characteristics of a wide range of subjects

(Pinsonneault and Kraemer, 1992). Hence, a survey research methodology has been applied in this study.

3.4 Defining the Population, Sampling Techniques and the Instrument

3.4.1 Study Population

The general reference population of this study has comprised of academic staffs and postgraduate students of Addis Ababa and Adama Universities. According to the respective human resource management director and main registrar offices of each institution, there were about 2,920 (2,175 and 745) academic staffs and 7,464 (6,984 and 480) postgraduate students in Addis Ababa and Adama Universities respectively in the academic year 2009/2010. The total population of 10,384 academic staffs and postgraduate students has been regarded as a reference population for the study.

Concerning academic staffs, only active academic staffs were considered in the study. Academic staffs who were at study as well as sabbatical leave were excluded from this study due to the reason that they could not be accessible to the study and to avoid double sampling of the same individual as a student and an academic staff in the case of study leave. Moreover, foreign staffs were also excluded from the study due to the assumption that they had different e-library service usage experiences. Hence, they might not represent the actual usage intentions, behaviors and situations in Ethiopian context.

With regard to postgraduate students, the study excluded blind students since there is no significant training programme, and ICT facility and support to encourage blind students' usage of e-library services. Moreover, new entry postgraduate students who have joined the two universities (in all the study settings/targets) in the second semester

of 2009/2010 were also excluded from the study due to the assumption that they had short or limited experiences in the study environment in general and in the library environment in particular. The study has assumed that these groups might not expose and represent the real situation of the library patrons in the study areas and intentionally excluded. Therefore, the total population size was dropped to 10,023.

3.4.2 Sampling Techniques

This study has applied multistage sampling technique that uses the combination of both probability and non-probability sampling methods so as to select representative samples from the total or the reference population. Despite the fact that Multistage sampling technique is time taking and tiresome, it is a very important and good sampling technique to select samples that are more representative of the study population since it is the combination of many sampling techniques (Yalew, 2009). This sampling technique has been applied in universities where the study encompassed representatives from each institution. The two institutions were selected as target research study area mainly because of their longer experiences and their proximity to the researcher. Hence, budgetary, time and other resource requirements were also considered. Moreover, these institutions have better ICT and library facilities, and many staffs and postgraduate students that were potentially users of e-library services.

Departments and faculties/institutes/colleges were identified and grouped into four strata of streams based on the nature of similarities existed in each discipline. Elias W. (2009) has grouped all the faculties and departments in Addis Ababa University into four homogeneous streams of strata (social science, natural science, health science, and technology and informatics) when studying undergraduate students' internet-based

sexual and HIV/ADIS resources usage. Therefore this study applied the four strata as the sources of data.

Consequently, in this study, proportionate stratified sampling technique has been applied to draw representatives from the four strata of streams. From each stream of stratum, departments were selected based on the proportion of the total number of departments and potential respondents existed in the strata and in each setting using simple random sampling technique. The lists of departments were obtained from the main registrar office. Accordingly, departments were chosen randomly based on proportion in the case of Addis Ababa University.

Then, subjects/respondents were chosen from each of the selected departments in the four strata using quota sampling method. Subjects or individual respondents were selected until the required numbers of samples were obtained in each department using simple random sampling method. Only those academic staffs and postgraduate students who were willing to be participants in the study were given the questionnaire. The same procedure has been followed and applied for Adama University except that the strata were only three, excluding the health science stream because of its early establishment and far location among other schools or faculties.

3.4.3 Sample Size

The sample size was calculated based on the standard sample size formula as:

$$S = \frac{(Z\ \alpha/2)^2 * (P) * (1-P)}{D^2}$$

Where: Z (α /2) = 1.96 for a 95% Confidence Level,

P= percentage of respondents who accept and use e-library services. Since there is no available previous study on it, p is unknown and is set to 0.5, and

D= the margin of error (tolerable error), which is 0.05 (5%),

Based on this,

$$S= \frac{(1.96)^2 * (0.5) * (0.5)}{(0.05)^2}$$

$$S = 384$$

And since the reference population is more than 10, 000, it doesn't need to make correction factor on the sample size.

However, the sampling procedure as it is shown in figure 1 above, involves a multistage process which takes more than two steps to reach the study population. Therefore, the sample size was multiplied by 2. Accordingly, the sample size S becomes 384 X 2= 768.

Even though the study should encompass 768 sample respondents, it has limited the sample size to 384 considering other important factors.

According to Kothari (2004), the nature of the study, availability of budget and time are also basic factors in determining the sample size of a research study. Yalew (2009) has also added and explained main sample size determination criterions or factors that a researcher should consider when deciding the sample size of a study. Among these factors; the type of the study, technique of the study, availability of budget and time, significance of the study results, number of dependent variables, type of data collection instrument, natures of the population, reliability of the study results, and number of the

study population are the major once. Moreover, Kripannont (2007) citing Roscoe (1975) has forwarded a rule of thumb which states that sample sizes larger than 30 and less than 500 are appropriate for most research studies. Hence, this study has also given due consideration for these factors (size of the reference population, availability of budget, time and other resources) so as to determine the actual sample size for the study. Accordingly, this study has limited the sample size to 384.

These 384 respondents were selected proportionally from both academic staffs and postgraduate students in both universities. Therefore, 125 samples were chosen from academic staffs in the two universities. The rest 259 respondents were drawn from postgraduate students of the two universities. These samples were allocated proportionally and reasonably to the two universities and the strata in each institution. Hence, 205 postgraduate students and 86 academic staffs were chosen from Addis Ababa University as respondents. The rest 54 postgraduate student and 39 academic staff respondents were drawn from Adama University. The following diagrams (Figure 3.1 and figure 3.2) will further illustrate the sampling procedures and frames for the two universities in detail.

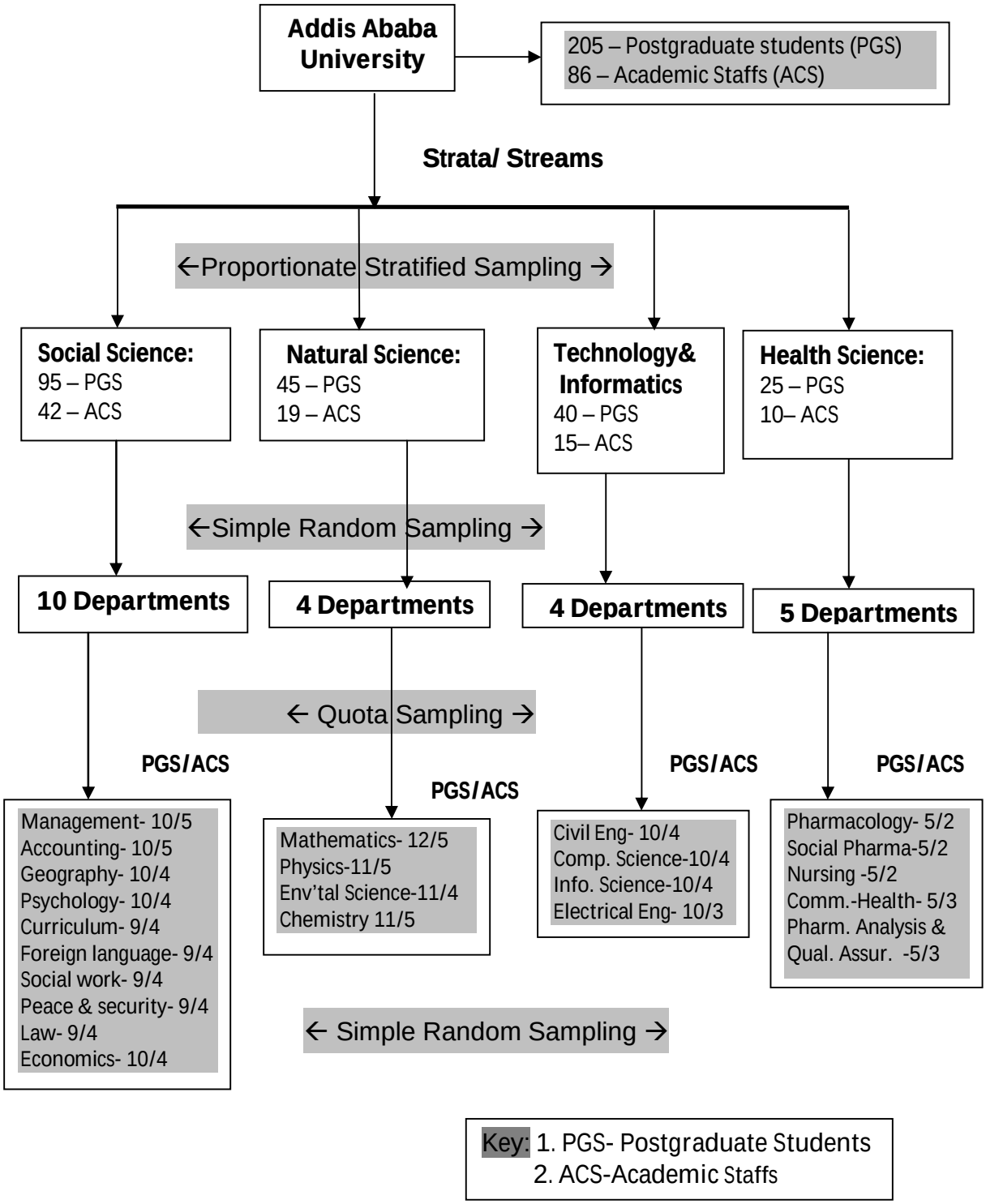

Figure 3.1: Sampling frame of study subjects of AAU Postgraduate Students & Academic Staffs

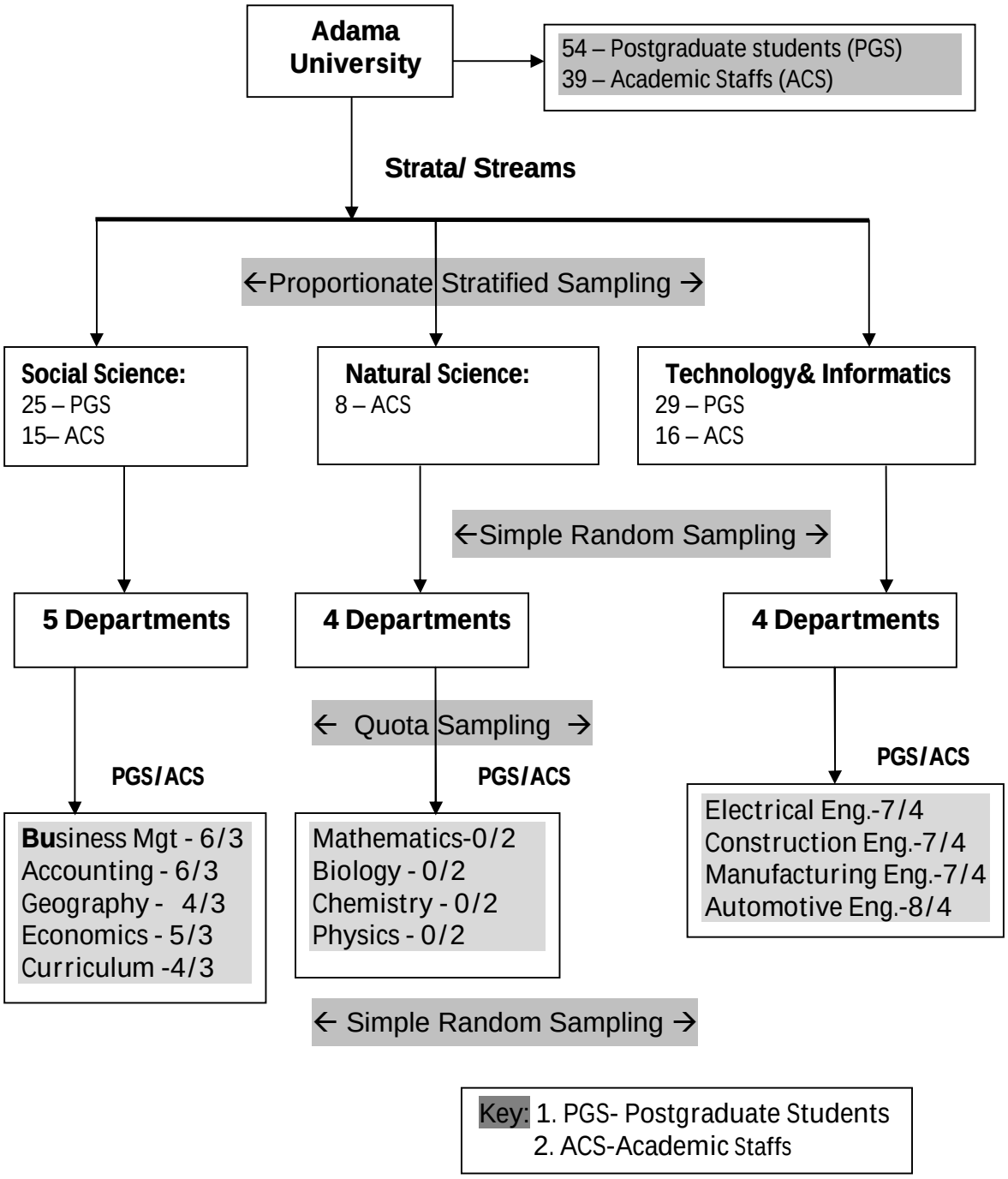

Figure 3.2: Sampling frame of study subjects of AU Postgraduate Students & Academic Staffs

The health science stream or medical faculty of Adama University was excluded from the study due to two main reasons. The first reason was that, the Faculty has been newly established and had very insignificant experience. Secondly, the faculty has been located very far away from Adama town which is located at Assella Town. Hence, it was excluded from this study.

3.4.4 Data Collection Instrument

Among the many data collection tools, this study has applied the questionnaire method as the main tool to collect all the relevant data from the reference population. The questionnaire method was selected for so many reasons; that were; the study population was too large, best to avoid bias during analysis, required low cost and short time. In short, it was more appropriate to collect data from many subjects within minimum time, budget and other resource constraints. Moreover, observation was used to augment the questionnaire method during analysis. Interview has also been used to confirm the availability of ICT hardware and e-library services in both universities. Hence, the library managements in both universities have been interviewed.

Instrument Design & Development

Prior to the design of the instrument, a thorough reading and analysis of various literatures was conducted regarding technology acceptance theories in general and the UTAUT model in particular. Indeed the questionnaire items were adopted from Tibenderana and Ogao(2008a & 2008b), who adapted the pre-existing questionnaire items of Venkatesh et al (2003) in to a library context. Tibenderana and Ogao (2008a & 2008b) had developed the questionnaire items and tested the items in two international workshops. Tibenderana and Ogao (2008a & 2008b) has modified the well known Venkatesh's UTAUT model into a library context and come up with a new model called

Service-Oriented UTAUT model (SO-UTAUT). Hence, this study adopted theses questionnaire items and customized the items in such a way that they fit to Ethiopian contexts and situations.

In the first place, the Questionnaire items were well tested and validated among Ugandan respondents. Moreover, in this study, the wordings of each item were checked well if it was easily understandable or not. Due attention was also given to the general appearance of the questionnaire as a whole. The questionnaire in this study had four parts:

Part I: This part of the questionnaire has asked general information of respondents. There were about 12 questions in this part.

Part II: This part of the questionnaire contained 24 (twenty four) questions about the status of libraries (the status of e-library services) in the selected institutions. Respondents were asked to check/thick the status of available e-library services and related ICT hardware. The answers were explained as 'yes', 'no' and 'not sure'.

Part III: This part of the questionnaire contained about 43 (forty-three) questions which were the main or the core constructs of questionnaire items on the SO-UTAUT model. This part was intended to ask respondents about their acceptance and usage of e-library services available in the respective universities. A five level Likert scale; strongly agree = 5, agree = 4, neutral = 3, disagree = 2, and strongly disagree = 1 was used to measure questionnaire items in this part. Hence, the answers of respondents were scaled based on the described Likert scale.

Part IV: This part of the questionnaire contained two subjective question items that asked respondents to put their recommendations about e-library services and patrons.

The interview questions consist of 24 ‘yes’ ‘No’ questions about the availability of ICT hardware and e-library services in the university libraries. It also has other three explanation questions. All the interview questions were prepared for university library managements in order to confirm hardware and e-library services Available.

3.5 Pilot Testing

Prior to the collection of the actual data for the study, pilot testing was conducted to observe the reliability and validity of the instrument. Hence, 40 questionnaires (25 for postgraduate students and 15 for academic staffs) were self-administered within the target group and the results were used to test the reliability and validity of the instrument and modify the items accordingly. Piloted respondents were excluded from the main survey.

3.5.1 Reliability of the Instrument

The reliability of a research instrument deals with the extent to which the instrument yields the same results on repeated trials. Reliability refers to the consistency, stability or equivalence of a number of measurements taken using the same measurement method on the same subject. If repeated measurements are highly consistent (even identical), then there is a high degree of reliability with the measurement method. If the variations among the repeated measurements are large, then the reliability of the instrument is low (Golafshani, 2003; Kripanont, 2007 citing Sekaran, 2003; & Yalew, 2009).

Reliability can be estimated and measured in one of the four ways; internal consistency, split-half reliability, test-retest reliability and inter-rater reliability. This research used the internal consistency reliability measurement method (See Table 3.1 and Table 3.2).

Internal consistency refers to a mechanism by which the reliability of an instrument is measured where the researcher distributes the questionnaire only once to the respondents (Yalew, 2009). Among the different methods of measuring internal consistency (split-half method, Kuder-Richardson method and Cronbach's coefficient alpha method), Cronbach's coefficient alpha method was used. Cronbach's coefficient alpha method is the most commonly used and recommended method of measuring internal consistency over the other methods because of its better measuring power (Yu, 2003). Therefore, this research has used the Cronbach's coefficient alpha method.

Reliability Statistics	
Cronbach's Alpha	Number of Items
0.912	43

Table 3.1 Overall Reliability of the instrument.

Cronbach's coefficient alpha value of 0.7 and above is indicates good reliability of the instrument (Yalew, 2009 and Brace, Kemp and Snelgar, 2006). Therefore, the Cronbach's coefficient alpha value of this research instrument showed internal consistency of 0.912 which is a good result indicating better reliability of the instrument.

Constructs/ Measurement Items	Number of Items	Cronbach's Alpha	Inter-item Correlations	Result Remarks
Overall Instrument	43	0.912	0.305	Good
Awareness	4	0.825	0.534	good
Performance Expectancy	4	0.961	0.861	good
Relevancy	5	0.868	0.576	good
Social Influence	3	0.812	0.590	good
Facilitating Conditions	8	0.512	0.217	Will be improved
Behavioral Intention	5	0.817	0.495	good
Expected benefits	6	0.907	0.624	good
Behavioral Usage	8	0.679	0.229	Will be improved

Table 3.2: Reliability and Validity Analysis of the pilot survey

The reliability coefficients bellow 0.7 and the inter-item correlation values bellow 0.3 in the pilot study will be improved in the main survey/study. This has been done by rephrasing the wordings, excluding weak items, and so on.

3.5.2 Validity of the Instrument

Validity of an instrument refers to the degree to which a study accurately reflects or assesses the specific concept that the researcher is attempting to measure through insuring the data collection instrument's ability to collect the intended data fully and appropriately (Golafshani, 2003 and Yalew, 2009). In short, validity is concerned with the study's success at measuring what the researchers set out to measure and indicates the extent to which the data collected reflects the phenomena under investigation (Kripannont, 2007).

According to Ridley (2005) citing (Morrow, 2002; and Sallis & Saelens, 2000), there are three forms of validity that can be related to self-reporting questionnaires: content;

construct; and criterion validity. Hence, content validity and construct validity of the instrument are discussed bellow.

Content Validity

Content validity refers the extent to which a measure or an instrument adequately represents all facets of a concept in line with the well known literatures on the topic under investigation (Yalew, 2009; Singh, 2007; and Golafshani, 2003). Hence, the construct validity of the instrument used in this study has been checked and evaluated by two graduating class information science postgraduate students, two library professionals (the Head of Addis Ababa University libraries and the Coordinator of AAU libraries ICT section) and the supervisor of this research work whether the important elements or contents and concepts were incorporated or missing.

Construct Validity

Construct validity refers to the degree of confidence that the information provided by the Instrument reflects the activities that are being measured. Construct validity is assessed by comparing trends or relationships from data collected via a self-reporting questionnaire with established trends or relationships that previous research findings are in clear agreement (Ridley, 2005). Construct validity encompass all forms of validity, which refers to the extent to which a measure adequately assesses the construct it purports to assess (Nunnally & Bernstein, 1994 cited in Westen and Rosenthal, 2003). It indicates that items that are indicators of a specific construct should converge or share a high proportion of variance in common (Kripnont, 2007 citing Hair et al. 2006). In other words, it assesses the degree to which two measures of the same concept are correlated, with high correlation indicating that the scale is measuring its intended concept. Thus reliability is also an indicator of convergent validity (Kripnont, 2007 citing Hair et al,

2006). Singh (2007) has categorized construct validity in to two subcategories, namely convergent validity and discriminate validity.

This study has used the first category (convergent validity) to justify the instrument's validity using correlation analysis in SPSS package. Hence, the construct validity of the instrument has been tested using inter-item correlation matrix analysis in SPSS.

Kripannot (2007) citing Robinson, Shaver & Wrightsman (1991a) stated that inter-item correlations above 0.3 are good indicators of the instrument's validity. Hence, the inter-item correlations in this study have met an acceptable level of validity since most of inter-item correlation values in the pilot exceed the lower limit (0.3) (See Table 3.2).

3.6 Data Collection procedure

This survey research was conducted in two selected Ethiopian higher education institutions; Addis Ababa University and Adama University at one time horizon (in a cross-sectional) method. The questionnaires were self-administered in all the study settings. The questionnaires were distributed to academic staffs of both universities (Addis Ababa and Adama Universities) by the researcher in the offices of each academic staff during the working hours and respondents were asked to fill and drop the questionnaires at department offices. Secretaries of each sampled department were asked to collect the questionnaires by using the name-check list and making thick marks on the checklist to indicate a particular respondent has returned the questionnaire. Finally, the researcher collected the questionnaires from department secretaries' offices' and respondents' own offices for those who didn't return the questionnaire to the secretary.

In the case of postgraduate students, the questionnaires were distributed to each respondent in class rooms during lecture hours with the consent of instructors and collected in the next lecture class after days or a week accordingly. This was done for those students who enrolled in course works. For those students who complete course works, the questionnaires were distributed through their advisors and to the students themselves during their consultation hours at their advisors office. Students were asked kindly to fill and drop the questionnaires at the department offices through secretaries when they come the next day or consultation time. Finally, the researcher collected the questionnaires from each department secretaries accordingly.

3.7 Data Analysis and Interpretation

Concerning the data analysis, statistical package for social science (SPSS version 13.0) and PLS graph Beta testing software (version 3.0 build 1130) were used at different stages for the analysis and interpretation of the collected data. SPSS was selected to analyze frequencies, percentages, tables, charts, correlations and partial correlations of moderator variables, and the reliability and validity of the instrument. Moreover, PLS graph beta testing was used for its ability to model path analysis and analyze latent variables.

The analysis of the data has been divided in to descriptive statistics that describes the general demographic information and introductory parts and the status of the available electronic library services in the respective universities. Hence, frequencies, graphs, and percentages were used to interpret the results. The reliability and validity analysis were also conducted. Cronbach's alpha coefficient methods of internal consistency concerning reliability measurement, and content and construct validity concerning validity measurements were conducted. Finally, partial list square (PLS) regression

analysis, a structural equation modeling technique, was conducted on the core constructs/latent variables so as to predict the effect of the independent latent variables on the dependent variables and test the stated hypothesis accordingly. Therefore, interpretations of correlations, path analysis and regressions were explained.

3.8 Structural Equation Modeling

Structural Equation Modeling (SEM) is a multivariate technique combining aspects of multiple regression (examining dependence relationships) and factor analysis (representing unmeasured concepts-factors with multiple variables) to estimate a series of interrelated dependence relationships simultaneously (Kripanont, 2007 citing Hair et al, 2006; Schumacker & Lomax 1996). SEM is a more powerful multivariate analysis technique that creates greater flexibility that researchers have with the interplay of theory and data (Saneifard, 2009 citing Chin, 1998). Data analysis using SEM procedures can incorporate both unobserved (i.e. latent) and observed variables, but the former data analysis methods (linear regression, ANOVA, MANOVA) are based on observed measurements only (Kripanont, 2007 citing Hair et al, 2006).

SEM techniques such as AMOS, LISREL and PLS enables researchers to answer a set of interrelated research questions in a single, systematic and comprehensive analysis by modeling the relationship among multiple independent and dependent constructs simultaneously (Saneifard, 2009). This ability for simultaneous analysis is different from most first generation regression models such as linear regression, analysis of variance (ANOVA) and Multivariate analysis of variance (MANOVA) which can analyze only one level of relationship between independent and dependent variables at a time. Hence, in this study PLS has been used as a SEM technique.

Partial Least Square (PLS) Analysis

Partial Least Square (PLS) regression is a recent Structural Equation Modeling (SEM) technique that generalizes and combines features from principal component analysis and multiple regression analysis. It is particularly useful when we need to predict a set of dependent variables from a (very) large set of independent variables (i.e., predictors) (Abdi, 2003). Moreover, it is useful to deal with small datasets, missing values and multicollinearity problems in data (Pirouz, 2006). PLS regression analysis technique is mainly designed to predict Y from X and to describe the common structure underlying the two variables (Abdi, 2003).

PLS regression technique is used to find the fundamental relations between two matrices (X and Y), i.e. a latent variable approach to model the covariance structures in these two spaces. PLS regression technique is appropriate when the standard regression techniques fail to do so. Hence, a PLS model tries to find the multidimensional direction in the X space that explains the maximum multidimensional variance direction in the Y space. PLS-regression is particularly suited when the matrix of predictors has more variables than observations, and when there is multicollinearity problem among X values.

The PLS regression technique can model multiple dependant and multiple independent latent variables, can handle nominal, ordinal or continuous variables, is robust despite the data is noisy or missing (Pirouz, 2006). This research has used the PLS regression technique because of these underlying reasons. Figure 4.8 shows the path coefficients of each of the latent variables and the R-Squared values of the dependent constructs.

CHAPTER FOUR

DATA PRESENTATION, ANALYSIS AND INTERPRETAIONS OF RESULTS

4.1 Introduction

This chapter presents the demographic characteristics and descriptive statistics of respondents and the background information about the status and availability of ICT services in the two universities' libraries. Moreover, the chapter presents assessment of the reliability and validity of the instrument used in the main survey, hypothesis test results and major findings of the study.

4.2 Socio-Demographic Characteristics of the Respondents

A total of 384 self administered questionnaires were distributed to selected sample of both postgraduate students and academic staffs of the two universities (Addis Ababa and Adama Universities) as per the samples allocated to the four streams of strata (Social science, Natural Science, Technology and Informatics, and Health Science) in Addis Ababa university and three streams of strata (Social science, Natural Science, Technology and Informatics) in Adama university. Out of 384 questionnaires distributed, a total of 311 questionnaires were collected indicating that the response rate was 81%. From the collected 311 questionnaires, 276 (72%) questionnaires were found usable. The rest 35 questionnaires (9%) were rejected for the reason that, either they were not properly filled or incomplete. Hence, the non-respondent rate of the main survey was 19%. McColl et al (2001) citing Mangione (1995) indicated that response rates greater than 50% are acceptable, 60% are good, 70% are very good and 85% are excellent for questionnaire surveys. Hence, the 81% response rate in this study is very good.

Summary of Questionnaires used in the survey			Percentage (%)
1	Number of Questionnaires Distributed	384	100%
2	Number of Questionnaires Collected	311	81%
3	Number of Questionnaires not Collected	73	19%
4	Number of Questionnaires Rejected	35	9%
5	Number of Questionnaires Qualified for analysis	276	72%

Table 4.1 Summary of Questionnaires used in the main survey.

In general, from the total 276 respondents, 206 (76.6%) of the respondents were from Addis Ababa university while the rest 70 (25.4%) of the respondents were from Adama university. Moreover, 186 (67.4%) and 90 (32.6%) of respondents were postgraduate students and academic staffs respectively.

The figure bellow (Figure 4.1) shows that 251 (90.94%) of the respondents were male and the remaining 25 (9.06%) of the respondents were female. Hence, the majority of respondents were males. This is because the proportion of female academic staffs and post graduate students is very small in the universities.

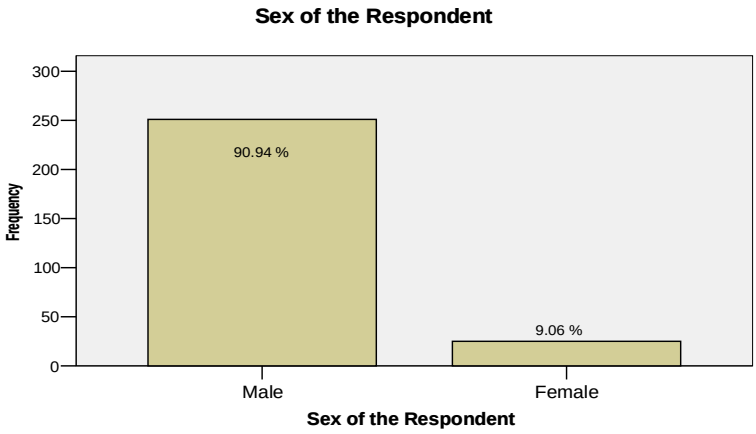

Figure 4.1 Percentage of respondents by Gender

The Majority of respondents' age lay between 25-34 years followed by 18-24 years and 35-44 years which account 58.7%, 21.7 and 13.4% of the total respondents' age category respectively. The following table, Table 4.2 clearly depicts the frequencies, percentages and cumulative percentages of the respondents' age in each category.

Respondents' Age Range	Frequency	Cumulative Frequency	Percent	Cumulative Percent
18 – 24	60	60	21.7	21.7
25 – 34	162	222	58.7	80.4
35 – 44	37	259	13.4	93.8
45 – 60	16	275	5.8	99.6
> 60 +	1	276	0.4	100.0
Total	276	276	100.0	

Table 4.2 Age Ranges of Respondents participated in the survey

In terms of streams of strata, the distribution of respondents was as follows: 129, 50, 77 and 20 of respondents were from Social Science (46.7%), Natural Science (18.1%), Technology & Informatics (27.9%) and Health Science (7.2%) streams respectively.

Streams		Frequency	Cumulative Frequency	Percent	Cumulative Percent
1	Social Science	129	129	46.7	46.7
2	Natural Science	50	179	18.1	64.9
3	Technology & Informatics/IT	77	256	27.9	92.8
4	Health Science	20	276	7.2	100.0
Total		276	276	100.0	

Table 4.3 Distribution of Respondents by Streams

From the total of 186 postgraduate respondents during the main survey, 85 respondents (45.7%) were first year postgraduate students who stayed for less than a year in the University while the 79 respondents (42.5%) stayed in the university for about 1-2 years. The rest 22 respondents (11.8%) responded that they have stayed for more than two years in the universities as post graduate students. On the other hand, from the total of 90 academic staff respondents, 46 respondents (51%) stayed in the respective universities for less than five years while 32 respondents (35.6%) stayed in the university for about 5-10 years. The rest 4 (4.4%), 5 (5.6%), 3(3.3%) and 3(3.3%) respondents responded that they stayed in their university as an academic staff for about 11-15, 16-20 and above 25 years respectively. Moreover, the current qualification of academic staff respondents was found in the survey as 22 First Degree (24%), 53 Master's Degree (59%) and 15 PhD and above (17%) respondents.

In response to the question about basic computer skills, the majority of respondents, 265 respondents (96%) responded that they have the basic computer skills while the rest 11 (4%) responded that they have no basic computer skills as indicted in figure 4.3 bellow. Respondents were asked in the survey to indicate their first time PC touch or encounter. Accordingly, 19.9%, 23.6%, 41.3% and 15.2% of respondents indicated their first time PC encounter 1-2 years ago, 3-6 years ago, 6-10 years ago and 10 years ago respectively as depicted in (figure 4.2). Moreover, 70.3% of the respondents have enough PC/Laptop access as shown in figure 4.3 bellow that may help them to use the e-library services available in their university.

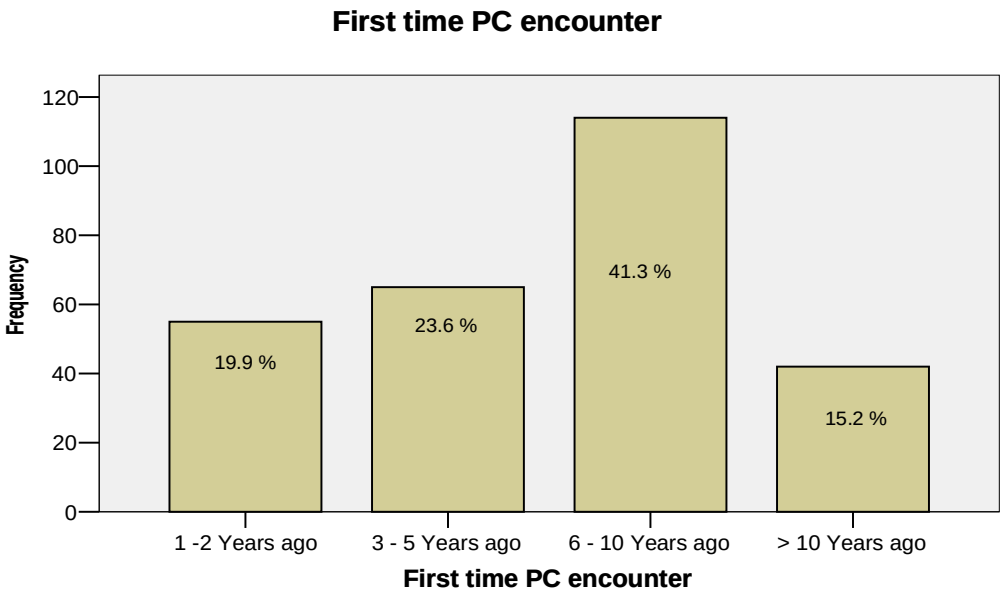

Figure 4.2 First Time PC Encounter

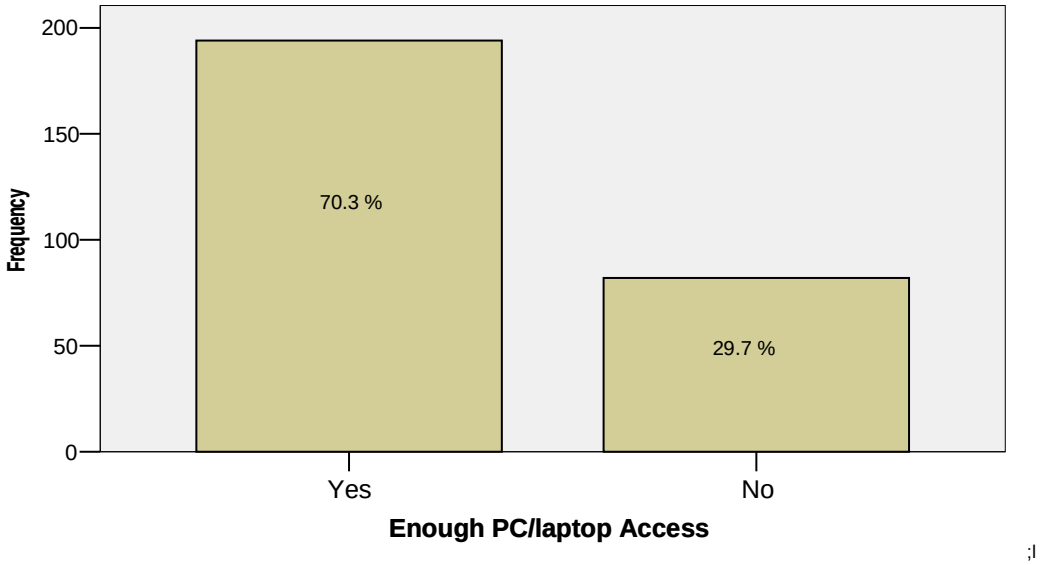

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Figure 4.3 PC/Laptop Access

4.3 General Awareness and Skills Need to Use E-library Services

Respondents have been introduced about the basic concepts of e-libraries and their services in the questionnaire for the purpose of clarity. Then after, they were asked if they have enough skills that enable them to use the available electronic library services. Therefore, the survey indicated that 39.13% of the respondents have enough skills to use the e-library services. Moreover, 47.83% of respondents answered the question "To some extent", to indicate that they have some basic skills but fill uncomfortable about the sufficiency of their skills to utilize ICT services provided in the universities that they are in. In contrary, 13.04% of respondents responded that they have no ICT skills at all that enable them to use e-library services. Table 4.5 bellow depicts this information.

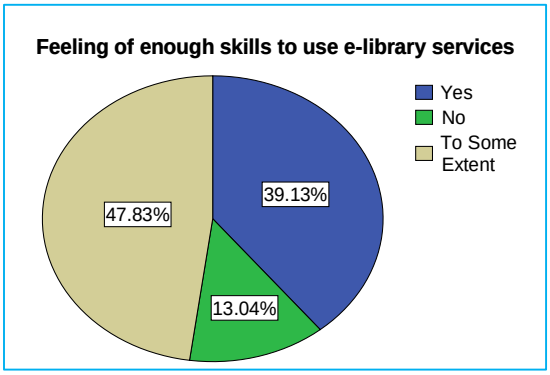

Figure 4.4 Respondents Skill Feeling to use e-library services

Respondents were asked about their awareness of the available e-library services to indicate their answers by way of saying "Yes", "No" and "To some extent". The majority of respondents (57.97%) responded "To some extent" to indicate that they have only limited awareness about the existence of e-libraries resources and didn't know well and in detail. 20.65% of respondents do not know anything about the existence of the e-library services at all. Only 21.38% of the respondents were well aware of the

existence of the e-library services. The figure bellow (Figure 4.5) depicted these facts as follows.

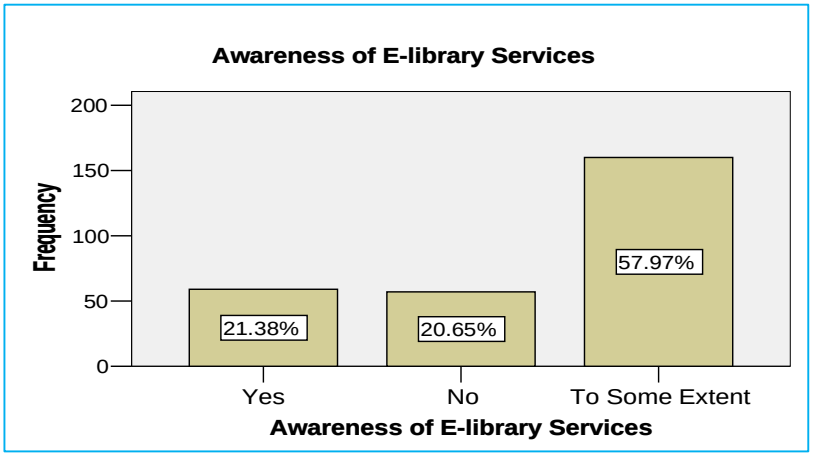

Figure 4.5 Respondents Awareness of E-library services

In general, the study has found out that, there is no significant difference in awareness of e-library services that existed between universities, academic staffs & postgraduate students, and among streams (faculties/colleges/institutions). It can clearly be observed from the following figures (Figure 4.6 and Figure 4.7).

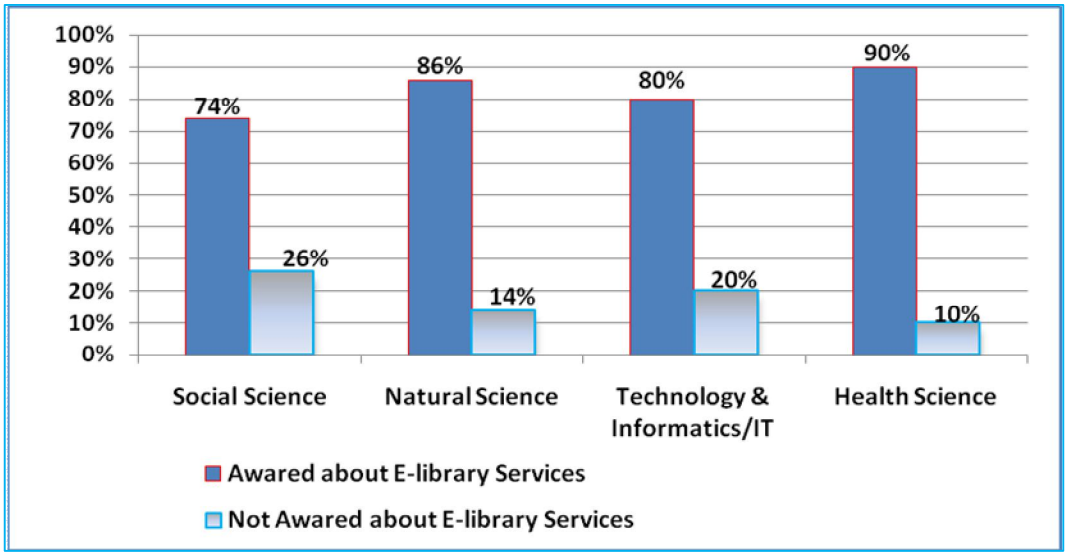

Figure 4.6 Awareness of E-library Services among Faculties/Institutes/Colleges

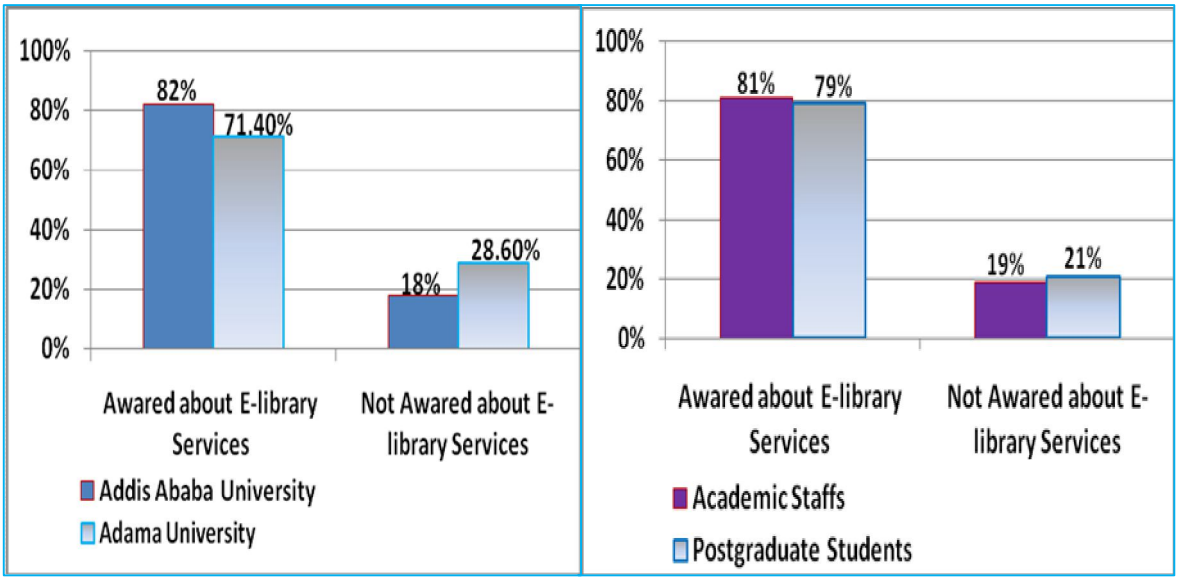

Figure 4.7 Awareness of E-library Services between Universities; and Academic staffs & Postgraduate Students

4.4 Availability and Awareness of ICTs Hardware in the Libraries.

Respondents were asked about the availability of ICT hardware in the universities and answered that most of the ICT hardware were available (See Table 4.4). The majority of the respondents from both universities confirmed that Networked servers, Local Area Networks, Wide Area Networks, CD-ROM Readers/writers and computers are available in the universities' libraries. Respondents in the study also confirmed that libraries have no scanners in both universities. Furthermore, only few respondents from Addis Ababa University have confirmed the availability of printers, Photocopying Machines and Generators in their libraries. However, the majority of respondents from Adama University confirmed the availability of printers, Photocopying Machines and Generators in their libraries. Hence, these results indicate that there is a gap in awareness between the two universities' library patrons.

ICTs Available		No of Respondents					Percentages
		AAU	%	AU	%	Total	
Computers	Yes	196	95 %	62	89 %	258	94 %
	No	4	2 %	2	3 %	6	2 %
	Not Sure	6	3 %	6	8 %	12	4 %
Networked Servers	Yes	126	61 %	45	64 %	171	62 %
	No	27	13 %	5	7 %	32	12 %
	Not Sure	53	26 %	20	29 %	73	26 %
Printers	Yes	26	13 %	35	50 %	61	22 %
	No	116	56 %	12	17 %	128	46 %
	Not Sure	64	31 %	23	33 %	87	32 %
Scanners	Yes	0	0 %	0	0 %	0	0.0 %
	No	118	57 %	23	33 %	141	51 %
	Not Sure	88	43 %	47	67 %	135	49 %
Local Area Network s	Yes	135	66 %	49	70 %	184	67 %
	No	20	10 %	8	11 %	28	10 %
	Not Sure	51	25 %	13	19 %	64	23 %
Wide Area Network	Yes	123	60 %	47	67 %	170	62 %
	No	17	8 %	12	17 %	29	10 %
	Not Sure	66	32 %	11	16 %	77	28 %
CD-ROM Readers/writers	Yes	112	54 %	38	54 %	150	54 %
	No	34	17 %	8	11 %	42	15 %
	Not Sure	60	29 %	24	34 %	84	31 %
Photocopying Machines	Yes	69	33 %	47	67 %	116	42 %
	No	66	32 %	8	11 %	74	27 %
	Not Sure	71	34 %	15	21 %	86	31 %
Generator	Yes	22	11 %	52	74 %	74	27 %
	No	141	68 %	7	10 %	148	53 %
	Not Sure	43	21 %	11	16 %	54	20 %

Table 4.4 Availability of ICTs Hardware in both Universities' Libraries

However, the study has confirmed the availability of the ICT hardware (listed in table 4.4) in the universities' libraries from the managements' of both universities' libraries' using interviews. Hence, Adama University has fulfilled all the above listed ICT hardware (Table 4.4) in almost all of its libraries except scanners. On the other hand, Addis Ababa University has also most of the ICT hardware except scanners and printers. There is only one printer in science faculty digital library offered by the faculty

administration, but not by the library. Nevertheless, generators are not currently functioning and the number of computers available in all libraries is very limited and not enough to serve the library patrons as stated by the library management of Addis Ababa University.

4.5 The Status and Awareness of Electronic Library Services

Respondents were asked about the existence of electronic library services in their university. Hence, the majority of respondents in both universities have confirmed the availability of Internet services, E-mail services and University/library Websites. More than two-third (69%) of respondents in Addis Ababa University know the existence of Full text journal articles. On the contrary, less than one-third (29%) of respondents from Adama University have confirmed the availability of Full text journal articles. This awareness discrepancy between the two universities may be due to the longer experiences of Addis Ababa University libraries and library patrons in using journal articles. The majority of respondents from Adama University confirmed the availability of E-books while the minority confirmed in Addis Ababa University. Furthermore, some of the respondents from both universities have confirmed the availability of Online Public Access Catalogue (OPAC), Bibliographic databases, and CD-ROM Services in their university libraries.

Only few respondents (6%) in both universities know about the existence of End Users Training Programmes offered to the library patrons. Adama University respondents are by far better than Addis Ababa University respondents about their knowledge of the existing Current Awareness services and Printing Services are available in their University libraries as shown in table 4.5.

The respondents from both universities (Addis Ababa and Adama Universities) confirmed that Electronic Book Check Systems, Reservation and recall services, Electronic Interlibrary Loan Services and Document Scanning and Digitization Services were not available in both universities. Therefore, these electronic library services are not available for use in both universities for end users.

The study clearly disclosed that better awareness of some e-library services has been observed in Adama University particularly Internet services, E-mail services, Electronic Books and University/library Website, Current Awareness services and Printing Services than that of Addis Ababa University. However, awareness of respondents about the availability of full text journal articles is by far better in Addis Ababa University which is 69% than that of Adama University which is 29%.

E-library Services	Available	No of Respondents					Percentage
		AAU	%	AU	%	Total	
Internet services	Yes	196	95 %	70	100 %	266	96 %
	No	3	1 %	0	0 %	3	1 %
	Not Sure	7	3 %	0	0 %	7	3 %
E-mail services	Yes	191	93 %	68	97 %	259	94 %
	No	3	1 %	1	1 %	4	1 %
	Not Sure	12	6 %	1	1 %	13	5 %
Full text journal articles	Yes	143	69 %	20	29 %	163	59 %
	No	16	8 %	17	24 %	33	12 %
	Not Sure	47	23 %	33	47 %	80	29 %
Online Public Access Catalogue (OPAC)	Yes	71	34 %	9	13 %	80	29 %
	No	35	17 %	14	20 %	49	17 %
	Not Sure	105	51 %	47	67 %	152	54 %
Bibliographic databases	Yes	61	30 %	8	11 %	69	25 %
	No	25	12 %	21	30 %	46	17 %
	Not Sure	120	58 %	41	59 %	161	58 %
CD-ROM Services	Yes	70	34 %	22	31 %	92	33 %
	No	33	16 %	12	17 %	45	16 %
	Not Sure	103	50 %	36	51 %	139	51 %
Electronic Books	Yes	79	38 %	46	66 %	125	45 %
	No	37	18 %	9	13 %	46	17 %

	Not Sure	90	44 %	15	21 %	105	38 %
University/library Website	Yes	151	73 %	54	77 %	205	74 %
	No	13	6 %	6	9 %	19	7 %
	Not Sure	42	20 %	10	14 %	52	19 %
Document Scanning Services	Yes	0	0 %	0	0 %	0	0 %
	No	93	45 %	25	36 %	118	43 %
	Not Sure	113	55 %	45	64 %	158	57 %
End Users Training Programme	Yes	10	5 %	8	11 %	18	6 %
	No	90	44 %	20	29 %	110	40 %
	Not Sure	106	51 %	42	60 %	148	54 %
Current Awareness services	Yes	18	9 %	18	26 %	36	13 %
	No	89	43 %	16	23 %	105	38 %
	Not Sure	99	48 %	36	51 %	135	49 %
Book Check Systems, Reservation and recall services	Yes	0	0 %	0	0 %	0	0 %
	No	74	36 %	16	23 %	90	33 %
	Not Sure	132	64 %	54	77 %	186	67 %
Electronic Interlibrary Loan Services	Yes	0	0 %	0	0 %	0	0 %
	No	89	43 %	28	40 %	117	42 %
	Not Sure	117	57 %	42	60 %	159	58 %
Printing Services	Yes	23	11 %	31	44 %	54	20 %
	No	119	58 %	12	17 %	131	47 %
	Not Sure	64	31 %	27	39 %	91	33 %
Digitization Services	Yes	0	0 %	0	0 %	0	0.0 %
	No	87	42 %	21	30 %	108	39 %
	Not Sure	119	58 %	49	70 %	168	61 %

Table 4.5 Availability of E-library services in Libraries

Moreover, the data collected from the libraries managements' of both universities using interviews has disclosed that most of the e-library services are available in both universities' libraries while some are not available. For instance, digitization or document scanning services, electronic interlibrary loan services and book check systems, reservation and recall services are not available in both universities' libraries. Addis Ababa university libraries have no printing services except the one at science faculty digital library offered by the faculty with its own initiation and support.

4.6 Reliability and Validity Analysis

The reliability and validity analysis of the main survey has been discussed bellow in connection with the reliability and validity analysis results of the pilot study.

4.6.1 Reliability Analysis

Testing goodness of data is testing the reliability and validity of the measures. Hence the reliability of the instruments in this study is measures both for the pilot and main studies. The Cronbach's alpha coefficient value of the instrument in the main survey is found to be 0.937 which is better than the pilot survey (0.912). According to Kripanont (2007) citing Sekarem (2000) and Yalew (2009), reliabilities less than 0.6 are considered to be poor, those in the 0.7 range are acceptable, and those over 0.8 are considered good. The closer the reliability coefficient, Cronbach's alpha coefficient value to 1.0, imply the better the instrument. Therefore, the Cronbach's alpha coefficient value of main survey in this study was 0.937 which can indicate better reliability of the instrument used in this study.

In most of the cases (constructs or latent variables), the internal consistency reliability of the instrument in the main survey has shown improvements. Moreover, the overall Cronbach's alpha coefficient value of the main survey has been improved from 0.912 in the pilot study to 0.937. The following table (Table 4.6) clearly depicts the Cronbach's alpha coefficient values of both the pilot and main study.

Construct or Measurement item	Number of items	Group Reliability	Number of items Retained	Group Reliability	Inter-item Correlations
Overall instrument	43	0.923	38	0.937	0.390
Awareness	4	0.708	3	0.730	0.475
Performance Expectancy	4	0.947	4	0.947	0.819
Relevancy	5	0.887	5	0.887	0.613
Social Influence	3	0.675	3	0.675	0.410
Facilitating Conditions	8	0.632	6	0.728	0.413
Behavioral Intention	5	0.824	5	0.824	0515
Behavioral Usage	8	0.784	6	0.909	0.633
Expected Benefits	6	0.895	6	0.895	0.595

Table 4.6 Reliability and Validity Analysis of the Main Survey

4.6.2 Validity Analysis

It is important to note that high reliability coefficients do not necessarily assume the questionnaires are precisely measuring true activity patterns. That is, the instrument might be consistent, but not necessarily accurate to measure responses of subjects at the two points in time. Therefore, it is important to note that the validity (i.e. the degree to which an instrument measures what it is intended to measure) of self-reporting questionnaires should be investigated (Baranowski, 1988 cited in Ridley, 2005). Hence, in the main study, convergent validity analysis was used to measure the construct validity of the instrument and the correlation values exceeding 0.3 indicate that the scale is measuring its intended concept (Ridley, 2005; and Kripannot, 2007 citing Hair, et al, 2006). As presented in Table 4.6, the inter-item correlation values in this study are good since they are greater than 0.3.

4.7 Findings and Interpretations of Results

This section presents and discusses the results and findings of the study in connection with the prior stated hypotheses in chapter one and validates the model. There were seven separate hypotheses in this study related to independent and dependent latent variables and a moderator variable, awareness. The hypotheses were established according to the modified UTAUT model called SO-UTAUT and analyzed based on the SEM technique, PLS graph beta testing. PLS-Graph path coefficients or Beta results and regressions as predicated by the empirical model paths (Figure 4.8) and partial correlation coefficients produced by SPSS software were used for analysis.

The SO-UTAUT model comprises of eight constructs or latent variables, which could not be measured directly. The model was evaluated using path coefficients and Squared Multiple Correlations (R-Squared) generated by the PLS-Graph regression technique to determine the interaction effects of independent factors on the dependent factors and depicts how well the model fits the hypothesized relationships. Moreover, the p-value of this dependent model constructs or latent variables in the model, SO-UTAUT has been observed as significant with 95% confidence (0.05 P-value). Hence, the R-Squared, and P-value results are presented in the table bellow (Table 4.7) for the dependent constructs (Behavioral Intentions (BI), Use Behavior (UB) and Expected Benefits (EB)). The SO-UTAUT model with the study data has explained the variance in 22.2% of Behavioral Intention, 29.9% of Behavioral Usage and 52.2% of Expected Benefits of e-library services patrons' behaviors regarding the services. Moreover, the P-values of 0.05 have shown the significance of the model with the study data.

Dependent Constructs	R^2	P-value
Behavioral Intention	0.222	0.05
Behavioral Usage	0.299	0.05
Expected Benefits	0.522	0.05

Table 4.7: R-Squared and P-values for the Model Dependent Constructs

In this empirical study, performance expectancy has been found to be the core determinant factor than that of relevancy and social influence on the users' inclination to use e-library services. However, the influence and encouragement from peers or colleagues, university management and other people (social influence) was found very insignificant to use the e-library services. End users' inclination/intention to use e-library services has been found to be the core determinant factor for the actual usage of e-library services. Moreover, the actual usage behaviors of individuals have significantly determined end users expectation of the benefits obtained from using e-library services.

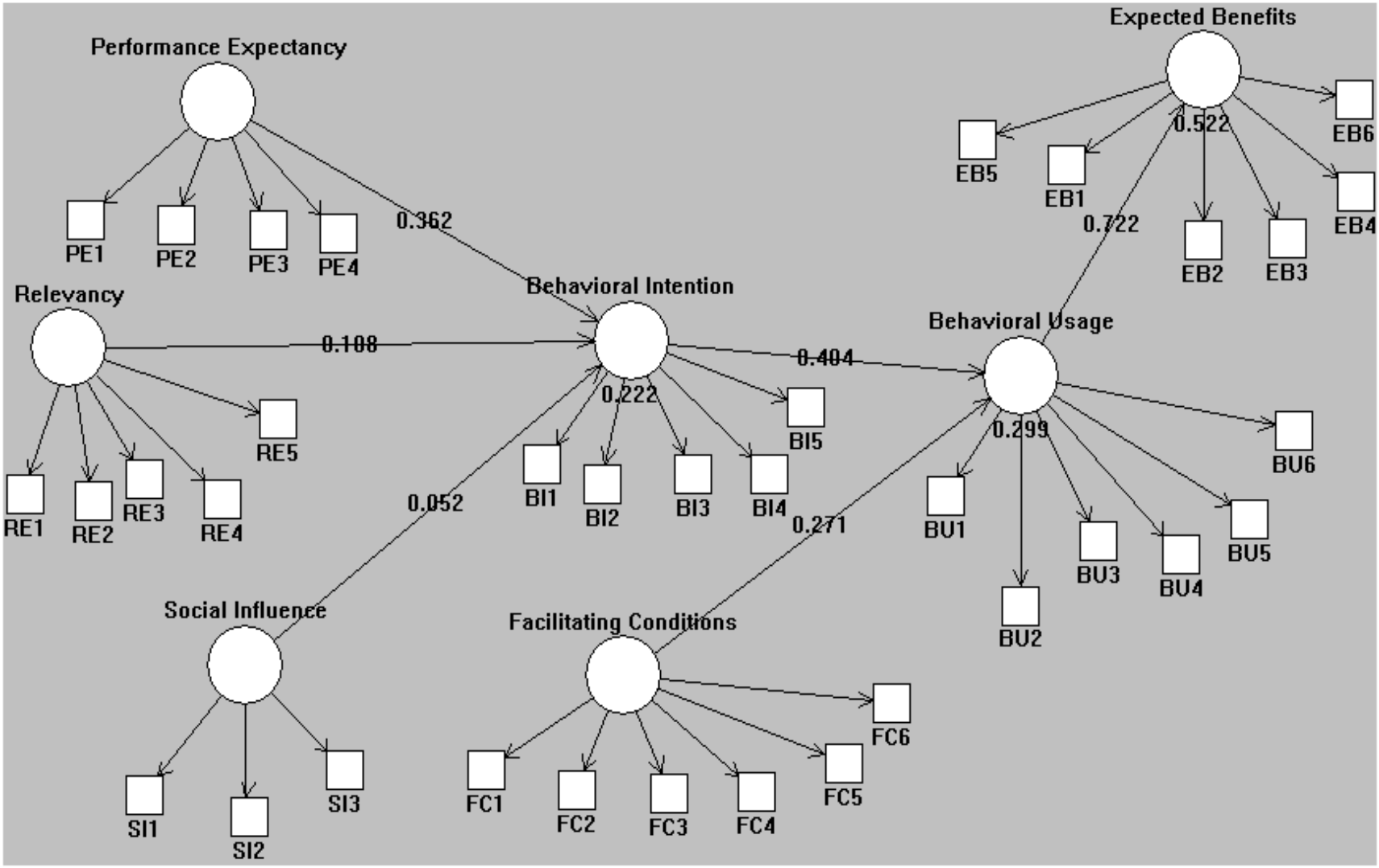

Figure 4.8 PLS Graph Structural Model

The results of the study regarding the seven hypotheses have been discussed to check if they are supported or rejected by the study data.

Hypothesis1: Performance Expectancy positively affects Behavioral intention to use E-library services.

Performance Expectancy contributes positively towards behavioral intentions to use e-library services. The positive path coefficient of the PLS graph (0.362 Beta coefficient) implies that e-library service end-users' inclination to use the services is due to the performance expectancy construct which accounts 36.2% contribution alone to BI. The result clearly depicts that e-library service patrons in the universities show an inclination or intention to use e-library services because of their feeling that, using e-library services would enhance their effectiveness and efficiency in their work (study, research, and teaching). In other words e-library service patrons in the universities have had the feeling that they can get performance gain from using e-library services. This construct has the majority contribution to the dependent variable Behavioral Intention. Therefore, this hypothesis is accepted. This finding is in line with Venkatesh et al (2003), Yang and Lee (2007) and Abdu (2009) where performance expectancy positively influences behavioral intention to use new technologies and have the majority contribution to behavioral intention.

Hypothesis2: Relevancy positively affects Behavioral intention to use E-library services.

Relevancy contributes positively towards behavioral intentions to use e-library services. A positive path coefficient of the PLS graph result (0.108) indicates that, e-library service users' inclination or intention to use the services is due to the Relevancy construct that accounts 10.8% contribution to BI. The result clearly depicts that e-library service

patrons in the universities have shown an inclination or intention to use e-library services because of their feeling that, the e-library services and resources are relevant to their work. In other words, e-library service patrons in the universities have had the feeling that they can get relevant resources and materials from using e-library services for their work (study, teaching, and research) and professional development. The implication is that e-library services end users expect to derive benefits from the use of electronic library resources and perceive the resources as being relevant to their work. Therefore, this hypothesis is accepted. This finding is in line with Tibenderana and Ogao (2008b) where the relevancy construct has positive Beta coefficient and hence positive contribution to behavioral intention in using e-library services. However, result Tibenderana and Ogao (2008a) is opposite to this finding where the path coefficient of relevancy construct indicates negative contribution to the behavioral intention construct. This may be due to the very small sample (20 samples only in Tibenderana and Ogao (2008a)).

Hypothesis3: Social Influence positively affects Behavioral intention to use E-library services.

Social Influence positively contributes an effect towards behavioral intentions to use e-library services though the contribution is too weak. A positive path coefficient of the PLS graph result (0.052) indicates that, e-library service users' inclination or intention to use the services is due to the Social Influence construct which accounts only 5.2% contribution to BI. E-library service patrons in the universities have shown weak inclination or intention to use e-library services in their feeling that important other people (colleagues, friends, university management and others) have encouraged and influenced them to use e-library services. This result clearly depicts that the influence from peers and colleagues and the support and encouragement from the university

management is very low and almost insignificant indicating its low contribution to behavioral intention though the path coefficient is positive (0.052) and the hypothesis is accepted. This is in line with the finding of Tibenderana and Ogao (2008b) where the path coefficient has shown positive beta value. However, Abdu (2009) has found out that social influence demonstrates negative effect on BI. This shows that social influence and encouragement to use new technologies is weak, where the extent is even harsher in non academic environments. However, Venkatesh et al (2003) and Yang and Lee (2007) found out social influence as a strong determinant of acceptance and use of technologies in a western culture.

Hypothesis4: Facilitating Conditions positively affects Usage Behaviors of E-library services end-users.

Facilitating Conditions positively contribute an effect towards Usage Behavior of e-library services end users. A positive path coefficient of the PLS graph result (0.271) indicates that, the Facilitating Condition latent variable or construct has 27.1% contribution to the actual usage behaviors of e-library service end users. The result clearly depicts that e-library service patrons in the universities have used the e-library services because of the available infrastructures that exist around them to support and facilitate the use of e-library services. However, the contribution of the Facilitating Condition construct to the actual usage behaviors of e-library service patrons is not that much strong and significant since it has only 27.1% contribution. This weak contribution, as observed from the response of open ended questions, is attributed to the low internet connection speed, limited or lack of skills to use the services, lack of awareness, absence of end user training programmes and supports from librarians. Since, the Facilitating Condition construct positively contributes (with positive beta coefficient) to actual usage behaviors of e-library service patrons, this hypothesis is

accepted. This finding is in line with Tibenderana and Ogao (2008b) where the path coefficient of the beta value indicates its positive contribution. However, this finding is contrary to Abdu (2009) where facilitating conditions demonstrate negative effect on BU. This discrepancy might be due to the fact that academic institutions have by far better facilities (like better internet speed and computers) and end user supports than privately owned telecenters.

Hypothesis5: Behavioral intention to use E-library services positively affects use behavior.

Behavioral Intention to use e-library services positively contributes an effect towards the actual Usage Behavior of e-library services end users. A positive path coefficient of the PLS graph result (0.404) indicates that, the behavioral intention (BI) construct has 40.4% contribution to actual usage behaviors (BU) of e-library service end users. The result clearly depicts that e-library service patrons in the universities have used the e-library services because of their inclination or intention to use the e-library services. This implies that individuals' inclination to use new technologies (e-library services in this case) demonstrates positive contribution to the actual usage behaviors of end users. Therefore, this hypothesis is supported by the data and accepted. This finding is in line with Tibenderana and Ogao (2008a & 2008b) and Abdu (2009).

Hypothesis6: Behavioral Usage positively affects the Expected Benefits of E-library services.

This hypothesis (Hypothesis: 6) is supported by the study data where the path coefficient of the PLS graph result (0.722 beta value) significantly depicts a positive contribution towards the expected benefits of using e-library services. Therefore, Usage

behavior has 72.2% contributions positively towards expected benefits of using the e-library services. Indeed, this contribution is the highest in the overall model setting. This implies that e-library service patrons aspire and use the services in order to ascertain any possible benefits that end-users expected as a result of adopting and using e- library service. In other words, e-library service patrons' actual usage behavior has significant positive contribution to expected benefits of using the service. Which means the end users' actual usage behavior is due to the assumption that using the technology (e-library services in this case) provides the potential advantages of expected benefits from using the technology. This finding is in line with Tibenderana and Ogao (2008a & 2008b). Hence, this hypothesis is supported by the data and accepted.

Hypothesis7: Awareness positively moderates the SO-UTAUT model independent constructs towards their respective dependent constructs.

This hypothesis is supported by the study data in that, awareness demonstrates an effect on most of the SO-UTAUT model independent constructs. Correlation and Partial correlation coefficients have been produced using SPSS. The coefficients indicate that awareness moderates the independent constructs (Performance Expectancy, Relevancy and Facilitating Conditions) and demonstrates significant contribution on the dependent constructs (Behavioral Intention and Behavioral Usage). The following table (Table 4.8) presents the correlation coefficients between dependent and independent constructs with the moderator variable effect and the partial correlation coefficients when the moderator variable effect is controlled or removed. The results clearly indicate that, awareness highly moderates relevancy and facilitating condition among others. This is in line with the findings of Tibenderana and Ogao (2008a & 2008b) where awareness moderates most of the SO-UTAUT model independent constructs (latent variables). Hence, this hypothesis is supported by the study data & accepted. However,

gender, age, and experience have shown insignificant moderating effects on the SO-UTAUT model independent constructs (PE, RE, SI, and FC). The detailed information is presented in Table 4.9 & Table 4.10 as follows.

Constructs	Correlation	Partial Correlations		Correlation
	BI	BI (AW controlled)	BU (AW controlled)	AW
PE	0.254	0.214		0.538
RE	0.226	0.181		0.518
SI	0.035	- 0.028		0.424
FC	0.322		0.134	0.558

Table 4.8 Correlation and partial correlation coefficients in relation to Awareness

Constructs	Correlation	Partial Correlations		
	BI	BI (Age controlled)	BU (Age controlled)	BI (Gender controlled)
PE	0.254	0.261		0.256
RE	0.226	0.227		0.227
SI	0.035	0.040		0.038
FC	0.322		0.330	

Table 4.9 Correlation and partial correlation coefficients in relation to Age & Gender

Constructs	Correlation	Partial Correlations	
	BI	BI (Experience controlled)	BU (Experience controlled)
RE	0.226	0.222	
SI	0.035	0.034	
FC	0.322		0.317

Table 4.10 Correlation and partial correlation coefficients in relation to Experience

CHAPTER FIVE

CONCLUSIONS AND RECOMANDATIONS

This chapter presents mainly concluding remarks and recommendations that are inferred from the data analysis, findings, interpretations and discussions in the previous section of the thesis.

5.1 Conclusions

Using the data collected through questionnaire survey methodology, the study has tried to investigate the determinant factors that affect the acceptance and use of e-library service end users using the SO-UTAUT model in Ethiopian context. The SO-UTAUT model has been empirically tested and proved that, it fits to the current study setting and can predict the acceptance and use of e-library services in Ethiopian universities.

Therefore, the study has shown that e-library service end users in the two universities have an inclination (behavioral intention) to adopt and use electronic library services at 22.2%, followed by a relatively high inclination of actual usage behaviors at 29.9% and they highly expect the benefits at 52.2% of the variance explained as presented by the PLS graph structural model (Figure 4.8).

Moreover, the path coefficients for all the independent constructs (Performance Expectancy, Relevancy, Social Influence and Facilitating conditions) and dependent constructs (Behavioral Intentions, Use Behavior and Expected Benefits) are positive. Hence they indicate or demonstrate a positive inclination of end users towards the acceptance and usage of electronic library services. These results (positive path coefficients) are somehow similar to Tibenderana and Ogao (2008b) where the independent constructs (Relevancy, Social Influence and Facilitating Conditions) except

Performance Expectancy have positive path coefficients. However, this study demonstrates significant differences on the Performance Expectancy construct which is the most significant determinant factor (the highest positive contributor, 36.2%) in explaining users' inclination/intention to use e-library services (See Figure 4.8).

In general, the SO-UTAUT model constructs account for a significant percentage of the variance explained on the user intention to use electronic library services (22.2% behavior intention, 29.9% usage behavior and 52.2% expected benefits of the variance in the intention to adopt and use electronic library services). In the model, the highest prediction level of the construct expected benefits (52.2%) implies that, the respondents were highly attracted towards e-library services and resources because they expect to drive benefits from using e-library services.

Nevertheless, in Tibenderana and Ogao (2008a), the SO-UTAUT model constructs account for a significant percentage of the variance explained on user intention to use electronic library services (11% behavior intention, 41% usage behavior and 81% expected benefits). Whereas, in Tibenderana and Ogao (2008b) the SO-UTAUT model constructs account for a significant percentage of the variance explained on user intention to use electronic library services (30.1% behavior intention, 9.1% usage behavior and 18.2% expected benefits. Hence, the performance of the model with the study data in Ethiopian context has demonstrated good explanation power of the variance explained on users' behavior to accept and use the e-library services.

The study has shown that awareness positively moderates most of the SO-UTAUT model independent constructs. This finding is in line with the findings of Tibenderana and Ogao (2008a and 2008b) where awareness moderates most of the SO-UTAUT model independent constructs.

Responses of respondents from the questionnaires and observation indicate that, the service delivery mechanisms such as awareness and associated university support facilities were low and should be improved so as to facilitate and increase users' acceptance and usage of the e-library services. Moreover, many respondents complained that the speed of the internet is slow and discouraging, e-journal articles are not sufficient enough in kind (limited databases) and no end user support is available to use the services. Most of Addis Ababa University respondents complained that there are no e-book databases available for users.

5.2 Recommendations

Based on the findings of this study, the following recommendations have been forwarded for both implementation and practice by the ministry of education, university management and librarians and for further research/study by other researchers in the area. Hence, the following are the major recommendations forwarded:

Recommendations for actual practice or implementation for the ministry of education, university managements and librarians:

- Universities should subscribe more databases of e-journal articles, e-books and other teaching materials to fulfill the increasing demands e-library patrons, assuming that the higher education enrolment especially at the graduate level in Ethiopia is drastically increasing.
- Libraries should use appropriate digital library interfaces (links, organization, opening and downloading options) that can attract and inspire e-library patrons to utilize the services.

- Librarians and the University managements should promote the availability, accessibility and the benefits of using e-library services. There should be current awareness services that inform users about the services and the contents. In this, regard Adama University has started better current awareness services via an info-Screen that inform users every few minutes about the available resources and services. Hence, Addis Ababa University should learn from Adama University in this regard.
- University as well as library managements should prepare and deliver end users training programme so as to help new users and motivate the benefits of the services as well.
- University libraries should fulfill the e-library services to their users. For example, printers, scanners, photocopy machines, bibliographic databases, book check systems, multimedia technologies etc.
- More computers should be available in libraries so that users (especially postgraduate students) can access e-resources without waiting two/three hours.
- Internet connection should be fast and reliable and generators should ensure consistent power supply to motivate and support users of the services.

Recommendations for further research:

The study has recommended the following potential works for further investigation by other researchers to:

- Conduct research using the SO-UTAUT model considering all universities of Ethiopia and validate the model at national level.
- Conduct longitudinal study using the SO-UTAUT model.

- Conduct a comparative study using SO-UTAUT model (between Universities, academic staffs and postgraduate students etc) to see the discrepancies if any.
- Conduct research considering different factors from different technology acceptance models and come up with a new technology acceptance model for developing countries like Ethiopia.
- Conduct research with other prominent models like TAM and see if there is significant difference or similarity with SO-UTAUT model results.
- Adapt the SO-UTAUT model and use in other ICT services like, internet banking, telemedicine and etc.

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Appendices

Appendix - I

Interview Questions for University Library Management

1. Are the following ICT Hardware and E-library Services available in your university libraries? Please explain the status and overall situations of each hardware or service in detail?

	ICTs Hardware Available the Library	Yes	No
1.	Computers		
2.	Networked Servers		
3.	Printers		
4.	Scanners		
5.	Local Area Network (LAN)		
6.	World Wide Area Network (WAN)		
7.	CD-ROM Readers/writers		
8.	Photocopying Machines		
9.	Generator to supply electricity whenever there is electricity failure		
	ICT (E-library) Service Available in the Library	**Yes**	**No**
1.	Internet web browsing services		
2.	E-mail services		
3.	Full text journal articles		
4.	Online Public Access Catalogue (OPAC)		
5.	Bibliographic databases		
6.	CD-ROM Services		
7.	Electronic Books		
8.	University/college/library Website		
9.	Document Scanning Services		
10.	End Users Training Programme		
11.	Current Awareness services		
12.	Book Check Systems, Reservation and recall services		
13.	Electronic Interlibrary Loan Services		
14.	Printing Services		
15.	Digitization Services		

2. How frequent and consistent is the end user training programmes offered for library patrons in your university, if any?
3. What type of awareness creation mechanisms your library use to aware users about the existence and use of E-library services, if any? How enough is the awareness services offered by the university?
4. Are there enough and consistent user support services by librarians in the library to help and encourage the library patrons?

Appendix II: Questionnaire

Addis Ababa University

School of Postgraduate Studies

Faculty of informatics, Department of Information science

Assessment on E- Library (hybrid library) Services

Dear Participants,

The aim of this questionnaire is to know the possible reasons that enable people to accept and use E-library (hybrid library) Services. This assessment is undertaken for an academic purpose only. Therefore, I request you to fill the questionnaire undoubtedly and honestly.

Hint on E-library Service Concepts: *E-library services are those services of libraries that contain and uphold library resources in electronic format, and make available and accessible to all users who seek information without time, space and place limitations within the institution's network (intranets) or the Internet together with the traditional printed services. E-library services include internet browsing, e-mail, e-journal article, Online Public Access Catalogue, Bibliographic databases, Electronic Books, Book Check Systems, Reservation and recall services, Printing Services or all the services listed in part two of this questionnaire and many other ICT services not listed here.*

SECTION 1: BACKGROUND INFORMATION: Put a '✓' Mark inside the Boxes.

1. What is your University or College? ----------
2. What is your Faculty/School/Institute? ----------

3. What is your sex?	
I. Male ☐	II. Female ☐
4. What is your age range? (In years)	
I. 18-24 ☐	III. 35-44 ☐
II. 25-34 ☐	IV. 45-60 ☐ V. >60+ ☐
5. What is your academic status in the University?	
I. Academic Staff ☐	II. Postgraduate Student ☐

6. If you are an academic staff, for how long have you been at the university? (In years)		
I. < 5 ☐	II. 5-10 ☐	III. 11-15 ☐
IV. 16-20 ☐	V. 21-25 ☐	VI. >25+ ☐
7. If you are a postgraduate student, for how long have you been at the university?		
I. < 1 year ☐	II. 1-2 years ☐	III. > 2 years ☐
8. Do you have basic computer skills?		
I. Yes ☐	II. No ☐	
9. Do you have enough access to personal computer or a laptop?		
I. Yes ☐	II. No ☐	
10. When was your first encounter with computers/laptops?		
I. 1-2 years ago	III. 6-10 years ago	
II. II. 3-5 years ago	IV. IV. >10 years ago	
11. Do you feel that you have enough skills to use electronic library services available in your university effectively?		
I. Yes ☐	II. No ☐	III. To some extent ☐
12. Are you aware of the available electronic library services in your university?		
I. Yes ☐	II. No ☐	III. To some extent ☐

SECTION 2: STATUS OF ICTs & LIBRARY SERVICES (E-library Services)

Q201	**Is the following ICT hardware available in your university libraries? Please, tick *yes, no or not sure* in each row as appropriate. Do not skip any row please.**			
	ICT Hardware	**Yes**	**No**	**Not Sure**
1.	Computers			
2.	Networked Servers			
3.	Printers			
4.	Scanners			
5.	Local Area Network (LAN)			
6.	World Wide Area Network (WAN)			
7.	CD-ROM Readers/writers			
8.	Photocopying Machines			
9.	Generator to supply electricity whenever there is electricity failure			

Q202	**Do the libraries in your university offer the following ICT services? Please, tick *Yes, no or not sure* in each row as appropriate. Do not skip any row please.**			
	Type of Service	**Yes**	**No**	**Not Sure**
1.	Internet web browsing services			
2.	E-mail services			
3.	Full text journal articles			
4.	Online Public Access Catalogue (OPAC)			
5.	Bibliographic databases			
6.	CD-ROM Services			
7.	Electronic Books			
8.	University/College/Library Website			
9.	Document Scanning Services			
10.	End Users Training Programme			
11.	Current Awareness services			
12.	Book Check Systems, Reservation and recall services			
13.	Electronic Interlibrary Loan Services			
14.	Printing Services			
15.	Digitization Services			

SECTION 3: Please indicate by way of ticking in the right column, the extent, to which you agree with the given statements in relation to ICT library services in your university, where: 5= Strongly Agree; 4 = Agree; 3 = Neutral, 2 = Disagree; 1 = Strongly Disagree.

301	**Awareness of the electronic library Services**	**5**	**4**	**3**	**2**	**1**
1	I knew about electronic library services offered by the university because of the important roles they played in an academic environment.					
2	My colleagues and friends told me about the existence of electronic library services.					
3	I knew about e-library services because of the facilitating conditions around.					
4	I knew about e-library services from the library website					
Q302	**Performance Expectancy**	**5**	**4**	**3**	**2**	**1**
1	I find e-library services useful for my study /teaching/research.					
2	The available electronic library services enable me					

	to find information quickly than it would have been otherwise.					
3	Using electronic library services increases my chances of getting information that helps me with study/teaching/research productivity.					
4	Using electronic library services increases my chances of finding the information I require for teaching/studying/writing academic papers or doing assignments					
Q303	**Relevance of Electronic Library Services**	**5**	**4**	**3**	**2**	**1**
1	I find e-library services relevant because they increase my self esteem or recognition amongst colleagues					
2	I find e-library services relevant for our local academic environment because of the links they provide to the outside world.					
3	I find e-library services relevant for our local environment because currently there are no enough print books and journals in our library to circulate.					
4	I find e-library services relevant for our local environment because our library does not have recently published books and journals					
5	I find electronic library services relevant for my professional development because I am able to get information I require in my field to do assignments/ write academic papers/teach different courses.					
Q304	**Social Influence**	**5**	**4**	**3**	**2**	**1**
1	My colleagues and friends have influenced (encouraged) me to use electronic library services.					
2	Management of this university has supported and encouraged the use of electronic library services.					
3	The society around me has influenced (encouraged) me to use electronic library services.					
Q305	**Facilitating conditions**	**5**	**4**	**3**	**2**	**1**
1	The university is very supportive and has provided necessary facilities needed for me to use electronic library services.					
2	I have the skills required to use electronic library					

	services.					
3	E-library services are compatible with the university Local Area Network (LAN).					
4	There is always uninterrupted electricity supply to enable me access e-library services					
5	The university has high speed Internet connection that allows me quick access to e-library services					
6	Librarians are available to assist me with electronic library services difficulties.					
7	I do not use e-library services because I can hardly get time to learn how to use them or use them					
8	I do not use e-library services because they are not user-friendly.					
Q306	**Behavioral Intention to use electronic library services**	**5**	**4**	**3**	**2**	**1**
1	I intend to use the e-library services in the next six months.					
2	I predict I shall use e-library services in the next six months.					
3	I plan to use the e-library services in the next six months.					
4	I must use the e-library services in the next six months.					
5	I already use e-library services					
Q307	**Expected Benefits of the e-library services**	**5**	**4**	**3**	**2**	**1**
1	I use electronic library services so that I can gain access to both offline and online library resources.					
2	I use e-library services so that I can become competitive in my profession/work/study					
3	I use e-library services so that I can remain current in my field of study/research.					
4	I use e-library services because I have been able to save costs on purchasing or copying books or journals.					
5	I use e-library services because they help me to improve my typing skills or Internet searching skills.					
6	I use e-library services because I can communicate					

	with my peer groups or colleagues					
Q308	**Behavioral usage**	**5**	**4**	**3**	**2**	**1**
1	I find using e-library services enjoyable					
2	I find the process of using e-library services pleasant					
3	E-library services make my work interesting					
4	Once I start using e-library services, I find it hard to stop					
5	Using e-library services is educative					
6	Using e-library services is fun					
7	Using e-library services is boring					
8	Using e-library services is frustrating					

SECTION 4: Recommendations

Q401. What suggestions would you like to make to ensure that non-users of e-library services can use the resources?

1._____

2._____

3._____

402. What recommendations would you like to make to improve e-library services in your University?

1._____

2._____

3._____

I Thank You!!!

Declaration

I, the undersigned, declare that this thesis is my original work and has not been presented as a partial requirement for a degree in any other university and that all sources of materials used for this thesis have been duly acknowledged.

_____

Abinew Ali Ayele

July 2010

The thesis has been submitted for examination with my approval as university advisor

_____

Tibebe Beshah (Ato)

July 2010