ICT ADOPTION IN THE MANAGEMENT OF TVET INSTITUTIONS IN KENYA

by James Mwangi

CHAPTER ONE

INTRODUCTION

1.1   Background

Information Communication Technology (ICT) is critical in support of efficient administration and management of education sector. ICT is mainly used in communication and general administration. ICT enables information to be processed, stored, retrieved and transferred by all those who interact with the institution in one way or the other. Use of ICT in institutions of learning is critical if Africa is to reduce the knowledge, technical and economic gaps between itself and the rest of the world (Farrell and Shatik, 2007). ICT can be used in various aspects ranging from the administration of students to resource administration (Krishnaveni, 2010).

The importance of ICTs in influencing change cannot be over. Various researchers have shown that ICT infrastructure is vital for the rapid development of developing economies and has become increasingly important to organizations throughout the world. Adoption of ICTs is critical for organizational continued existence, since ICT improves efficiency of business processes and presents new ways which realize and maintain a competitive advantage. In addition, ICT provides a vital component in the client firm relationship, improving client satisfaction and commitment (Iniesta-Bonillo et al., 2013).

ICT is defined as the entirety of the electronic way of collection, process, store and present information to the end-users which support of their various activities, and consists mainly of computer systems, communication systems, knowledge based systems and office support systems (Attuquayefio, 2014). ICTs include a range of technologies that include but not limited to mobile and fixed telephone, cable networks, satellite, television and radio as well as video. It also includes various digital technologies such as computers, the internet, World Wide Web, local and wide area networks software applications (Mascarenhas, 2010).

Technology to be adopted and the level of adoption vary the definition of any technology adoption. ICT adoption is defined as "the process during which a firm becomes capable of transacting business using ICT". The aim of an organization when adopting ICT is to gain efficiency and effectiveness. ICT adoption takes effect on two levels, organizational and individual or user levels. In the organizational level the investment and installation of ICT

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occurs and in the user level, the individual decision to use ICT takes place (Honarmand and Manian, 2013).

Nowadays, ICT is universally considered to be a critical tool for enhancing operational efficiency and also improves decision making in many areas of governance. Nowadays it is generally acknowledged that ICT has a very major impact on the efficiency and productivity of organizations. The impact on productivity will only be realized by users when ICT is spread and used across the organizations. It is therefore imperative to identify which key factors affect ICT adoption and the various models and frameworks that exist to address its adoption (Oliveira and Martins 2011). ICT can positively change how institutions are managed if the factors that affect its adoption and usage are addressed.

It is an established fact the role played by TVET institutions on human resource and capital training and the subsequent development and prosperity of the public. This is due to the fact that TVET equips one with proficiency knowledge necessary to improve work productivity, enhance levels of income and improve accessibility to employment opportunities for citizens (Kerre, 2009).

TVET is defined by (UNESCO-UNEVOC, 2004) as an education and training based activity that is provides participants with necessary skills for employment tailored for a particular occupation. TVET institutions ought to adopt ICT in order to compete with institutions of higher learning and reach stakeholders beyond their geographical boundaries.

There are many ways of introducing ICT in TVET institutions such as use of email to send notices and agendas, submission of lesson plans, creation of college websites, and admission through web enabled services. Administration subsystem includes personnel, student, resources, financial and general administration (Maki, 2008).

In Kenya, TVET are middle level colleges that offer courses ranging from artisan certificate to diploma level. TVET institutions are registered and accredited by the Technical and Vocational Education and Training Authority (TVETA). TVETA is a government of Kenya owned corporation that was established under the TVET Act, 2013. The mandate of the Authority is to regulate TVET sector through Licensing, Registration and Accreditation of institutions, programs and trainers.

The TVET in Kenya currently comprises of two national polytechnics based in Kisumu and Eldoret, one technical teachers training college in Nairobi, twenty six technical training institutes and seventeen institutes of technology. There are about 540 registered private TVET institutions in the country.

1.2 Problem Statement

Kenya like other developing countries struggles with the adoption and implementation of ICT in the management of learning institutions. Despite ICT innovations in Administration and Management of institutions of learning, TVET institutions in Kenya are still lagging behind in adoption of ICT. This results to ineffectiveness and inefficiency in the administration and management of these institutions. The cause of failure to adopt ICT still remains uncertain.

The significance of ICTs in TVET institutions is evident based on studies currently available in the knowledge based society. Adoption and integration of ICTs in TVET remains low within UNESCO's Member States (UNESCO, 2006). Though there have been various studies showing the extent of application of ICTs in different educational specializations, literature on the effective integration of lCTs into TVETA accredited institutions is limited and therefore requires further exploration (Saud et al. 2011).

Studies done on ICT usage in the administration and management of higher education are still under-researched in many sub-Saharan African countries Kenya included. For example Aleke et al. (2009) has noted that the extent to which the usage of ICT applications have on TVET institutions not been researched fully in the sub-Saharan African countries.

There have been quite a number of studies focusing on the pace of embracing and levels application of ICTs in administration of education which have suggested there is need for further investigation on the levels of adoption and usage including the impacts of its use in various perspective worldwide, especially in third world countries (Bringula & Basa, 2011). However, none of these studies have dealt on the adoption of ICT in administration and management of TVET accredited institutions.

1.3 Objectives

This study aimed at establishing the key challenges that impinge on adoption of ICT in management of TVET institutions.

1.4   Specific Objectives

i.   Determine the key challenges that impinge on adoption of ICT by TVET institutions.
ii.   Evaluate levels of ICT adoption in TVET institutions.
iii. Validate TOE framework for ICT adoption by TVET institutions.

1.5   Research Questions

The main research questions that guided this study were;

i.   What were the challenges that influence adoption of ICT by TVET institutions?
ii.   What were the levels of availability of ICT in the management of TVET institutions?
iii. What were the levels of usage of ICT in the management of TVET institutions?
iv.   To what extent is the TOE framework best suited to investigate ICT adoption in the management of TVET institutions?

1.6   Significance of the Study

The government officials will find the results valuable when making future policies that will support Kenya to achieve her vision 2030 goals where education sector is critical to the achievement of the vision. Results of the study will bring to the fore the level of ICT adoption and use in TVET institutions and therefore help the policy makers in formulation and implementation of the existing ICT policy with the aim of dealing with the significant factors that impinge on adoption and usage ICT in TVET institutions Nairobi county.

The study findings are expected to help TVET institutions in identifying barriers that limit the adoption and use of ICT by the management for administration purposes.

1.7   Assumptions and Limitations of the Study

This study assumed that adoption of ICT in management of TVET institutions was influenced by certain factors which this study sought to establish. It also presumed respondents would be corporative and provide the requested information honestly. The study was confined to the adoption of ICT by TVET institutions that are accredited by TVETA within Nairobi County.

CHAPTER TWO

LITERATURE REVIEW

2.1   ICT Adoption

Means and reasons by which individuals and organizations adopt various innovations have inspired various studies. The decision of whether to adopt a specific type of technology and timeframe required has been a source of research in many disciplines. In his definition of an innovation, Rogers (1995) stated that it is an idea, object or practice that and individual observes as new. The idea, object or practice may not of necessity be new, rather a perception on novelty. An innovation can either be abstract like an idea, or concrete such as technology (Straub 2009). This study focuses on ICT as particular type of innovation of interest.

As claimed by to Rogers (1995), adoption takes place when a decision is made by any individual or organization to use the innovation. Adoption is described by Rangaswamy & Gupta, (2000) are decisions made by individuals whenever that they consider to opt for a particular innovation.

 In this study, adoption refers to the decision of a TVETA accredited institution to acquire and use ICT in the administration and management of the institution. Innovation is similarly used to imply any new ICT being adopted.

Diffusion refers to the extent in which the general use and application technology spread across functional areas of an entity. Integration relates to the acceptance and transparency within the user environment (Carr, 2006).

2.2   Previous Studies Undertaken

Previous studies on ICT adoption in Kenya have mainly focused on adoption in secondary schools and tertiary institutions. In their study Nchunge et al., (2013) noted that the rate of ICT adoption in both public and private secondary schools was significantly affected by lack IT literacy, insufficient technical readiness and poor policy guidelines. Kiptoo et al., (2014) did a study on adoption of MIS in institutions of higher education in Kenya. The aim of the study was to establishing the relationship that existed and impinged on the adoption of computer-based information systems in those institutions.

The study found out that external factors such as government policies and private enterprise support do not significantly influence adoption. However it was notable that funds from external sources, government policies and support and donor organizations support significantly impacted on adoption of ICT.

Macharia & Pelser (2014) focused their study on individual and other factors that were most likely to positively affect behaviour in usage ICT by student in Kenyan tertiary institutions. In their findings, it was apparent that the environment which an institution existed, the available technology, the structure of the organization and individual factors was significant determinants of ICT adoption.

Other previous studies on ICT adoption have been done in Ghana, (Yeboah, 2013). The study revealed that the primary factors that drive ICT adoption were easiness of use and perceived worthiness. The outcome of the study identified lack infrastructure and skills to use ICT as major challenges affecting ICT adoption. The study recommended that the top management of Institutions of higher learning in Ghana ought to have a clear model of integration that would not only enhance the adoption but also improve the use of ICT in their institutions.

In the study by Eze et al., (2013) on factors that determinant ICT adoption in state owned institutions of higher education in Nigeria, it was evident that the government owned universities were yet to exploit the full potentials of ICT solutions in their operations. Most executives of Nigerian institutions were eluded by decisions involving radical operational changes.

Secondly, the researchers noted that though the pace of adoption differs among the schools. ICT readiness and relative advantage are influenced by availability of energy, expert skills, training, and technical support. Other factors identified included institutional support, managerial agility, corruption and other social vices, incentives, and size. Lastly, regulatory policies and government supports in the forms of legal protections, tax laws, requirements for adoption, and outright funding are necessary for ICT diffusion among colleges.

2.3   Theoretical Framework

Several theoretical models have been used in a number of studies focusing on how new innovations diffuse and get adopted, accepted and used. (Davis et al, 1989). The main

theories that have been dominant include but not limited to include (i) Technology Acceptance (ii) Theory of Acceptance and Use of Technology (iii) Theory of reasoned action (iv) Theory of Planned Behaviour (v) Diffusion of Innovations Theory and (vi) Technology Organization and Environment by (Tornatzky and Fleischer ,1990)

2.4 ICT Adoption Factors at User Level

Users' perceptions tend to influence the rate of ICT adoption. As reported by Van-Akkeren and Cavaye, (1999) the way users perceive how useful a system is and how easy one is able to use it determines the perception of the users while the perceptions have positive attitudes inclined towards the innovation adoption. The main factors that affect ICT adoption at user level are:

Perceived Ease of Use of a System

This is the amount of effort a system user applies mentally in order to learn a system and make use of it when interacting with the system. If the effort required is deemed to be much then it affects the intention to use information systems. The ease of use of a system depends on a number of system characteristics such as system design, number of errors generated and user satisfaction.

User Support Services

This refers to the personal support provided by organization to the system users. This assistance may include but not limited to user guide, online help and frequently asked questions with their answers. User support services which refer to the ability to respond to the system user's queries and the ability to solve their concerns and difficulties. Studies have shown that responsiveness (customer support) lead to higher use satisfaction.

Perceived Usefulness

Individual's perceptions on how useful an innovation is depend to some extent on believe that by making use a specific technology it would lead to the improvement of their professional performance within an organization or assist one to perform specific tasks much better. Such assistance may be realized through reducing time taken to perform the tasks or timely provision of information (Doll et al., 1998).

Usefulness and design are important in human-computer interaction because they influence user's satisfaction and task performance when using computers. The main reason why individuals use a system is the usefulness factor.

Most studies show there is correlation between ease of use, appearance and content of information, user support, reliability, perception and usage of systems. Schaper and Pervan (2007) in their research of factors influencing technology acceptance and usage noted that user attitude, self-efficacy and technology compatibility significantly impact on usage of the technology than effort needed or social influence. They concluded selflessness, individual commitment to the organization and motivation do contribute positively to the acceptance and usage of innovations.

2.5   ICT Adoption Factors at Organisational/Firm Level

The aim of organizational ICT adoption theories is to describe the processes of ICT adoption at firm level. Two models, (i) the theory of diffusion of innovations (ii) TOE model of Tornatzky and Fleischer (1990) both have been used by researchers in ICT adoption studies at firm level. The main factors that affect ICT adoption at firm level are as follows:

Inadequacy in Infrastructural Facilities

Inadequacy in key infrastructural facilities is a major obstacle to the adoption of ICT by organizations. This results in lack vital for connectivity. High initial installation and subsequent subscription expenses, poor quality of service by service providers at inception, is a major impediment to the adoption of ICT in institutions.

Lack of Adequate Financial Resources

Inadequate financial support which includes insufficient budget allocation coupled with lack financial readiness of an institution to support ICT adoption and usage (Obiri-Yeboah, Kwabena, Kwame, & Roderick, 2013).

Lack of Sufficient skills and training

Skills deficiencies among the college staff impede adoption of ICT. Most colleges do not invest on ICT due to initial cost of training human resource and the associated cost of maintaining the ICT equipment.

Size of Institution

The size of an Institution has an effect on adoption of ICT. Large Institutions are more likely to adopt since there are likely to have the financial resources required for implementation. The size of the institution could be measured with the number of students and staff or the number of campuses.

Institution Policy

Institutions that adopt ICT ought to have a policy framework that supports adoption and usage of ICT.

2.6   ICT Adoption Models

Technology Acceptance Model

Davis (1989), suggests that the decision to adopt any innovation by a user is determined by how the useful it is and the amount mental effort required to use it. Technology acceptance model is a theoretical extension of Theory of Reasoned Action. It is mainly used in social psychology domain and it concerns the behaviour of a person towards an innovation. The advantage of a TAM is that it is designed to address the adoption of Information Systems technology.
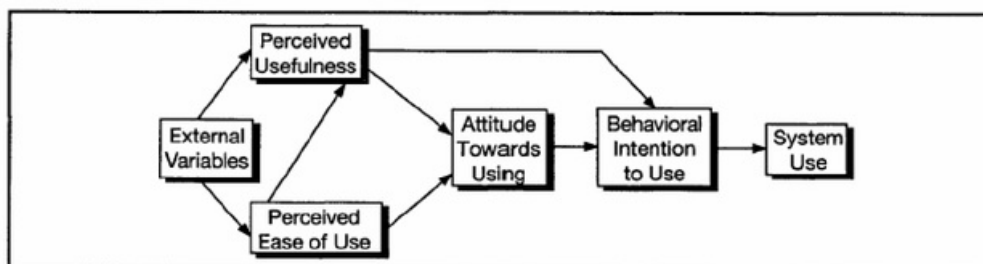
Figure 2.1   Technology Acceptance Model (TAM)

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A major limitation this model is that it fails to consider factors that would prevent an individual from adopting a particular technology (Taylor and Todd, 2001). The barriers that are not included in the model are the characteristics of system, training needs of the user, end-user support, and the characteristics of the top management.

The success rate of predicting technology adoption using this model is between 30% and 40% of the cases. Due to this limitation, researchers have developed other technology acceptance models that are more successful in prediction. This resulted to modified models that include both human and social variables. This led to the extension of technology acceptance model to the Unified Theory of Acceptance and Use of Technology.

Unified Theory of Acceptance and Use of Technology (UTAUT)

UTAUT develop by Venkatesh et al. (2003) has condensed a number of the existing variables found in other models into four major effect and four moderating factors. This has seen the efficiency of prediction increase to 70% which is a major improvement. The four main constructs of this model are performance, effort, social pressure and conditions that affect behaviour. The variables that affect behaviour are namely age, gender, experience, and voluntariness. The UTAUT has been used in the conduct various empirical studies in a wide range of research areas such as in Ghana (Abaidoo, 2014).
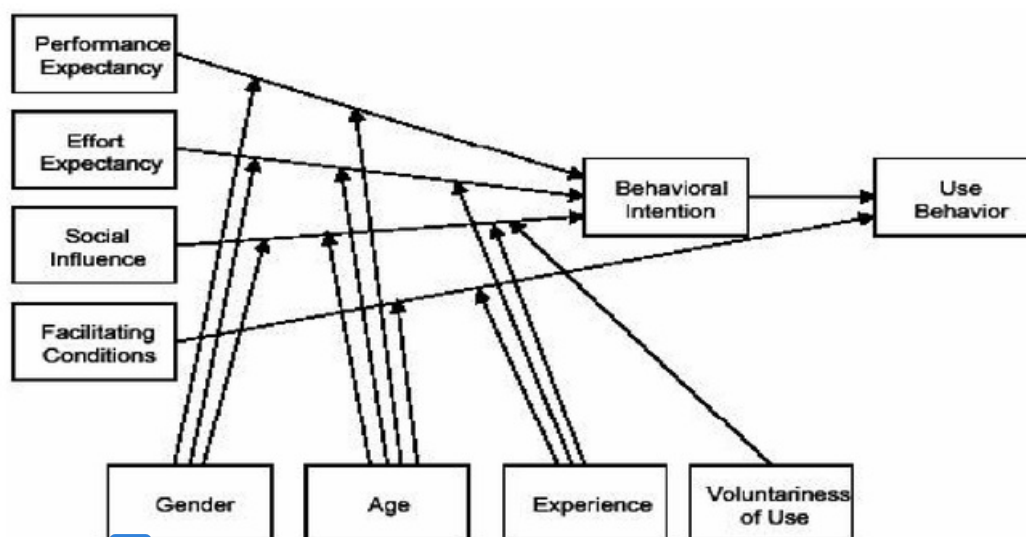
Figure 2.2   Unified Theory of Acceptance and Use of Technology (UTAUT)

UTAUT Model (Venkatesh et al., 2003, p. 447)

Theory of Reasoned Action

It examines the relationship between attitudes and behaviour of an individual. According to the theory, the performance of person depends on intention of the behaviour. This is determined by the attitude of the person and subjective norms towards the behaviour in question.

There are four components in the TRA that need to be explained clearly in ICT adoption which are attitude, subjective norms, intentions, and behaviour.

The major weakness of this theory is its inability to be applied to acts which are not voluntary such as those that are mandatory. When a public organization has endorsed the adoption of ICT as new way of performing tasks, it becomes a non- voluntary act that everybody must follow to undertake the tasks.
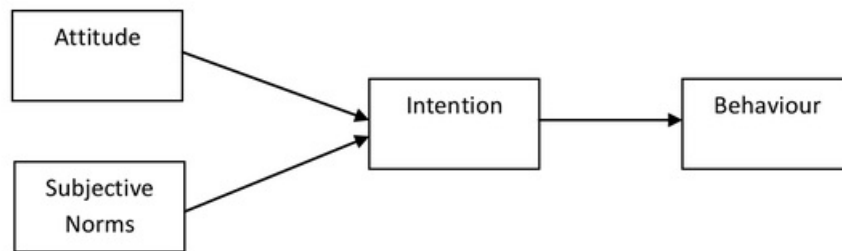
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┌──────────────┐
│   Attitude   │──────┐
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                      ├─────▶│  Intention │─────▶│  Behaviour │
┌──────────────┐      │      └────────────┘      └────────────┘
│  Subjective  │──────┘
│    Norms     │
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Figure 2.3   Theory of Reasoned Action (TRA)

Theory of Planned Behaviour (TPB)

It is built on the following of constructs. (i) The attitude towards the act or behaviour which makes a positive or negative contribution towards that person's life. (ii) The subjective law which focuses on the individual environment. This includes various networks, customs and beliefs. (iii) The ease of act in a certain way.

According to prior researches, behavioural intention plays a critical role in predicting usage behaviour (Ajzen and Fishbein, 1980) and has been well established in IS (Venkatesh et al., 2003b).

The model is criticized for overlooking other emotional variables including, threat, and fear, according to Sniehotta (2009).
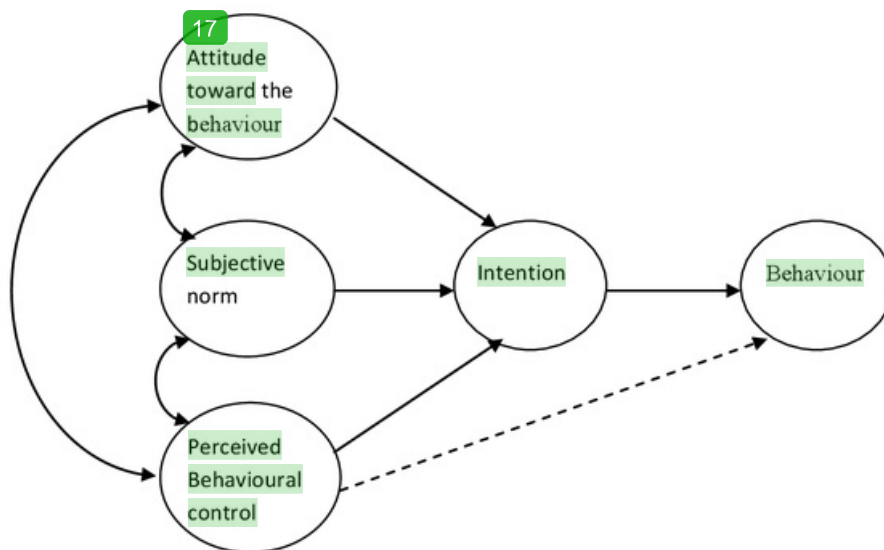
Figure 2.4   Theory of Planned Behaviour

Technology Organization Environment (TOE)

IT is an organization-level theory that has three major elements that influence ICT adoption decisions. The three elements are the technology to be adopted, the organization adopting the technology and the environment around the organization.

This model emphasizes both internal and external characteristics of organization as significant for organizations adoption of technology. It also includes the environmental context that presents both challenges and opportunities to organizations in implementation of technology. The model suggests organizational factors both formal and informal structures and various communication processes within the organization determine how ready an organization is to adopt technology. Environment factors such as infrastructures and government regulations determine the speed of technology uptake by organization. Also, availability of technology and cost will have affect on the way technology is implemented by organizations (Mingaine, 2013).

Technology Context

This includes all technologies that are applicable, including technologies that are already exist in the organization as well as those technologies available in the market but not in the organization. Technologies in the organization determine the scope and pace of adoption of

technology. Innovations that exist but are not in the organization show the organization which direction it can take to adopt.

Organization Context

This context refers to the characteristics of an organization and the resources at its disposal. These include communication structures, size and financial resources. Communication process can promote or inhibit adoption. Top management that encourage change should also encourage faster adoption. The mission and vision of an organization can also encourage pace of adoption.

Environmental Context

This refers to the structure of the industry the organization belongs to, the presence of various service providers such internt and the regulatory environment. Under industry, intense competition stimulates adoption of technology. Availability of skilled labour also impact on adoption. Government regulation can be beneficial or detrimental.

Studies have demonstrated that TOE framework has wide applicability across various technological and industrial contexts. It's been used in various technologies such as open systems, ERPs and general IS applications. It's been used across industries from health, retail, and education among others. In all the studies, the three elements have been shown to influence how ICT is adopted. In Kenya it has been used in the study of challenges affecting the implementation of ICT in Secondary Schools by (Mingaine, 2013).

2.7   Justification for using the TOE Framework

The justification for using the TOE as a theoretical framework are that first, the research framework of the study which consists of meaningful constructs matched with three dimensions of TOE framework. Additionally, it provides useful analytical framework which is appropriate to understand the important determinant factors which may significantly impede the adoption and usage of ICT by TVET institutions in administration. Secondly, it is the most well-known and extensively utilised theory of organization adoption of innovation since its development (Baker, 2012). Thirdly, it has not been applied in the analysis of the adoption and use of ICT by TVETA accredited institutions. TOE framework looks at organizational perspective as opposed to individual perspective.
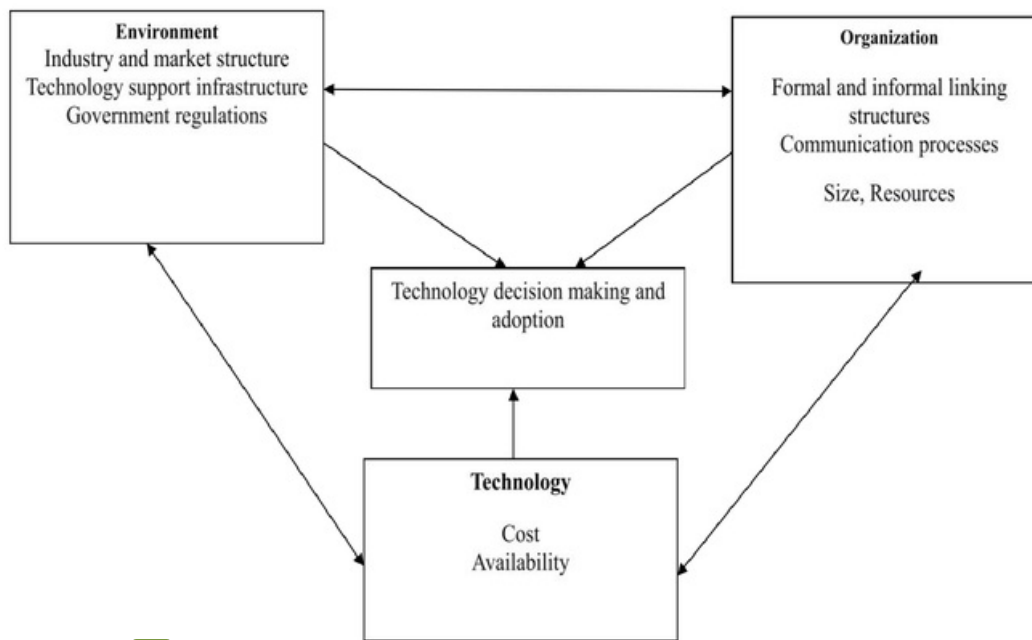
Figure 2.5 Technology, organization, and environment framework

(Tornatzky and Fleischer 1990)

2.8   Conceptual Framework

In non-experimental research, where no manipulation of data takes place, the independent variable is the variable that logically has some effect on a dependent variable. Wang et al. (2010) identified the independent variables as relative advantage, complexity and compatibility, top management support, firm size, technology, pressure from industry, availability of service providers and government regulations.

In this study, the following model, based on TOE is proposed, to form the basis of the study. The independent variables have been selected based on the the framework. The independent variables were selected, based on relevance, Tornatzky and Fleisher (1990).
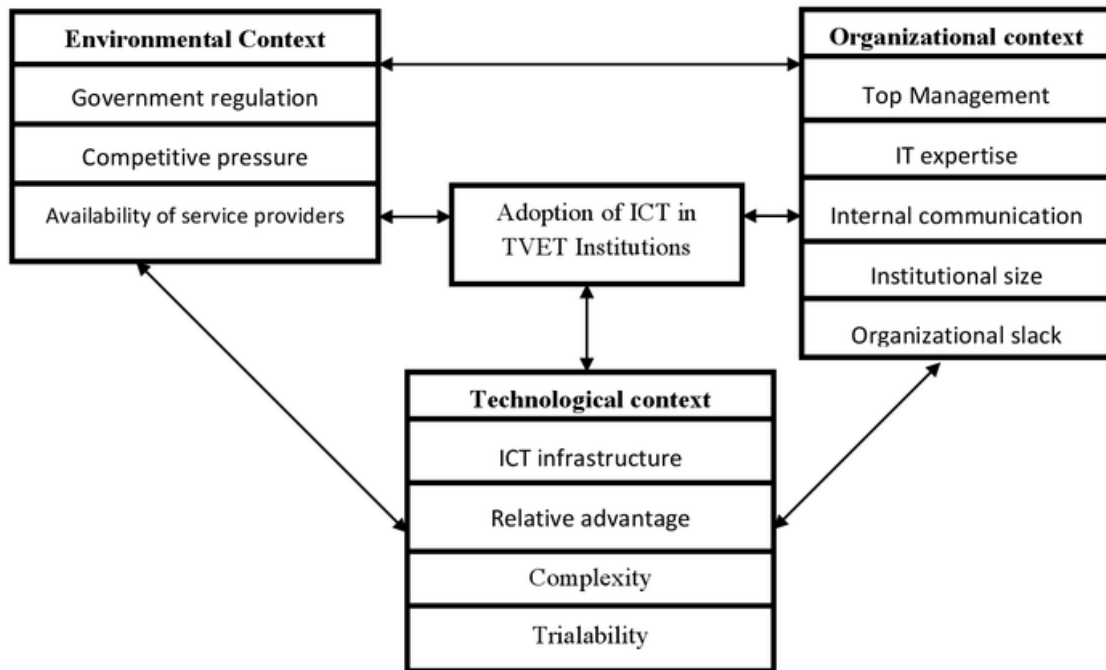
Figure 2.6 Conceptual Framework

CHAPTER THREE

METHODOLOGY

3.1 Research Design

The design used in this study was descriptive survey type of design also called known experimental research. Descriptive research is used to identify present conditions, beliefs, processes, relationships and point out needs. This type of study determines the key characteristics of the variables of importance in a context (Sekeran, 2003). This type of research is used to gather data of the prevailing conditions with the purpose of interpreting. (Dr. Y.P. Aggarwal, 2008). In this case, to identify challenges that influence adoption of ICT, identify levels of availability and usage of ICT and point out what is needed by TVETA accredited institutions.

3.2 Research Method

The research was designed to assess the key challenges that affect ICT adoption at TVETA accredited institutions in Nairobi County. The focus was on the Principals/Heads of the institutions. There are about one hundred and thirty accredited institutions in Nairobi County. The sample size was 97 institutions which were determined using Krejcie R.V and Morgan D.W (1970) formulae with a margin error of 5%. Out of 97 institutions, 76 responded which was 78.35 %. This was adequate according to Gay (1995). The data was later collected using questionnaires which had 5-point likert scale type of questions. Data was analysed using descriptive data analysis which involved measuring of central tendency such as mean and dispersion such as standard deviation (SD). Demographic data which included education level and length of service of the principals was analysed using quantitative analysis.

The most significant factors that affected the adoption of ICT by TVET Institutions were identified using factor analysis.

3.3 Target Population

Population of study is defined as finite elements from which inferences can be made (Cooper, & Schindler, 2008). The sample size is a finite part of the population (Orodho & Kombo, 2002). Target population was one hundred and thirty TVET institutions principals who provided information required for the research. Simple random sampling was used.

3.4 Data Collection

Data was gathered using interviews with the purpose of gathering information from the Principals of the institutions. The interviews were intended to investigate the usage of ICT by the management of the TVET institutions. Interviews were chosen since they improve the understanding and credibility of the study (Key, 1997). They are known to provide more understanding of the topic under study in this case the adoption and usage of ICT on management of TVET institutions.

Observations were be made to ascertain the presence of physical ICT infrastructures such as computers, servers and networks currently used in the management of TVET institutions. The information obtained through observation was current. This method of study is known to be independent of respondents' willingness to respond.

Research instruments used were questionnaires which were divided into three parts. Part one was used to capture the demographic data of the institution while part two which was based on the likert scale type of questions was used to analyse the three main TOE model constructs Technology, Organization and Environment. Part three had semi structured questions designed to capture usage of ICT by the institutions.

Based on the conceptual framework, the first set of questions focused on the relative advantage and trialability of ICTs in the technological construct. This was intended to provide the answer to the research question on the challenges that impede adoption of ICT in the management of institutions. On the organization construct the questions related to top management support and ICT expertise. The third set questions focuses on the environmental factors which included availability of service providers, competition from other institutions and government regulations.

A pilot survey was initially carried out before the tool was used. The purpose of the piloting was to bring out to light weakness of the questionnaires and also of the survey method.

3.5 Validity and Reliability of the Instruments

Internal-consistency reliability refers to the consistency of a measure within itself. To ensure the instruments used were valid and reliable, Cronbach's Alpha with a minimum value of 0.7 was used.

3.6   Data Analysis

Data was be coded to make it measurable and was organized and analyzed using Microsoft Office Excel and Statistical Packages for Social Science (SPSS) version 20. The first part of the questionnaire was mainly quantitative demographic data which was analysed by use of frequency and presented in percentages. Demographic information captured was on highest education level attained and duration of service in terms of years the principal had been with the institution. Out of the 76 respondents, 63 had attained education up to undergraduate level while 14 had attained postgraduate level. In terms of length of service, 31 had been with the institution for over 5 years, 23 had been with the institution for between 2 and 3 years while 17 had been with the institution for between 1 and 2 years. Only 5 had been with the institution for less than 1 year. Based on the length of service in years and highest educational level, the respondents were experienced enough and had a good understanding of the institutions operations and therefore the information they provided was reliable for the study.

The other three parts had qualitative statements which were scaled on a five point Likert scale as follows; 1.Strongly Disagree (SD), 2. Disagree (D), 3. Neutral (N), 4. Agree (A), and 5. Strongly Agree (SA). The respondents indicated to the degree they were of same opinion with the statements by choosing one scale against each statement. These parts were analysed using descriptive data analysis. This involved measuring of the mean and the standard deviation (SD). Percentage, mean and SD of each response were derived from the data and presented in tables and figures. The factor analysis was then conducted in order to establish and group core factors affecting adoption of ICT by institutions.

3.7   Ethical Consideration

In this study, the researcher ensured that the information collected was used for the purpose of the study only and was treated with the confidentiality it deserves. Any harm to the respondent both physical and psychological was avoided and the respondents' right to privacy was respected.

CHAPTER FOUR

RESULTS AND DISCUSSIONS

4.1 Response Rate

The study had targeted a total of 97 respondents, however owing to study limitations 76 responded. This response rate was 78.35% which was considered good for the study. According to Gay (1995) a response rate of 50% is adequate and therefore that of 78.35% was adequate for data to be analyzed and interpreted.

4.2 Highest Education Qualification Attained

The respondents were asked to show their highest education qualification attained. As Table 4.1 indicates majority of the respondents 82.89% had attained up to degree level while only 17.11% had attained their education up to post graduate level while none was at secondary level. This meant that majority of those working in the institutions had attained education up to university level and therefore they were appropriate for responding to the study questions.

Table 4.1 Demographic Data

Education Level	Qualification	Percentage
	Secondary School	0
	Undergraduate	82.89
	Post Graduate	17.11
Length of Service	**Period**	**Percentage**
	Less than 1 year	6.58
	Between 1 and 2 years	22.37
	Between 3 and 5 years	30.26
	More than 5 years	40.79

4.3 Length of Service

The respondents indicated the duration of time in terms of years they had worked in the institution. Table 4.1 presents the findings on length of service of the respondents. From the table, 6.58% indicated that they had been in the institution for less than year. This could be explained by the fact that some of the institutions were relatively new. It can be observed that 22.37% of the respondents indicated a period of between 1 and 2 years, 30.26% indicated a period between 3 and 5 years while 40.79% indicted that they had worked for over 5years.

4.4   Technological Factors

Table 4.2 shows an analysis of the respondents' opinion on the Technological factors that affect ICT adoption in their institutions. Based on the analysis, the total mean and standard deviation were 3.42 and 1.13 respectively. From this analysis, it can be deduced that respondents were in agreement with the technological factors attributes as stated.

The attribute on ICT improves the quality of work scored a mean of 2.54 and standard deviation of 0.999 which concluded that the respondents disagreed with the statement. However, on ICT improves job performance and users could satisfactory try out various ICT applications attributes scored a mean of 4.07, 3.58 and SD of 0.639, 1.244 respectively which meant the respondents were in agreement that adoption of ICT improves job performance and one could satisfactory try out various ICT applications before adoption. This could be attributed to the fact that it is possible for one to get ICT applications which can be used for a limited period of time before purchase. The respondents were also in agreement Adoption and use of ICT improves productivity.

Table 4.2   Descriptive Statistics of Technological Factors

Item Statistics			
Statement	Mean	Std. Dev	N
Adoption and use of ICT improves quality of work.	2.54	.999	76
I have had an opportunity to try out new ICT applications.	3.33	1.148	76
Adoption and use of ICT enables accomplishment of tasks quickly.	3.28	1.563	76
Adoption and use of ICT improves my productivity.	3.70	1.244	76
Adoption and use of ICT improves my job performance.	4.07	.639	76
I know where I can satisfactory try out various ICT applications.	3.58	1.169	76
Overall Mean	**3.42**	**1.13**	

Reliability of the tool used in collection of data, the questionnaire was tested by Cronbach's alpha. The computed value was 0.733 which was greater than the recommended level of 0.70.This shows that the instrument used for the study was reliable enough.

Table 4.3 Reliability Statistics and Test Adequacy of Sample

Type of Construct	Cronbach's Alpha Value	Cronbach's Alpha Value on Standardized Items	KMO	Test of Sphericity			N of Items
				Chi-Square	df	Sig.	
Technological	0.733	0.727	0.730	114.972	15	.000	6
Organizational	0.784	0.786	.731	141.211	10	.000	5
Environmental	.809	.809	.725	190.964	15	.000	6

4.5 Test of Adequacy of Sample Size

The test used to measure whether the sample size was adequate was Kaiser-Meyer-Olkin whose value range between 0 and 1. The minimum accepted value is 0.5 while any value between 0.7 and 0.8 is acceptable. Anything above 0.9 is excellent. To test the null hypothesis which shows correlation matrix has an identity, the Barlett's test of Sphericity was used. These tests are necessary if one is to proceed with the factor analysis. As shown in table 4.3, the measure of sample size adequacy was 0.730 which was acceptable while test of Sphericity was 0.000 which is less than 0.05. This meant that the factor analysis was valid. The value of the Chi-square with 15 degrees of freedom at 0.000 significant level was 114.972. It was therefore a good idea to proceed with factor analysis.

From Table 4.4 it is evident that 70% of the variance in "Adoption and use of ICT enables accomplishment of tasks quickly.", "Adoption and use of ICT improves my job performance.", "I know where I can satisfactory try out various ICT applications." and "Adoption and use of ICT improves quality of work." is accounted for, while about 50% of the variance in "I have had an opportunity to try out new ICT applications." and "Adoption and use of ICT improves my productivity." is accounted for.

Table 4.4 Communalities

Statement	Initial	Extraction
Adoption and use of ICT improves quality of work.	1.000	.693
I have had an opportunity to try out new ICT applications.	1.000	.529
Adoption and use of ICT enables accomplishment of tasks quickly	1.000	.713
Adoption and use of ICT improves my productivity.	1.000	.490
Adoption and use of ICT improves my job performance.	1.000	.700
I know where I can satisfactory try out various ICT applications.	1.000	.716

Table 4.5 Eigen Values for Technological Factors

Component No	Eigen values			Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	2.687	44.776	44.776	2.687	44.776	44.776	2.473	41.212	41.212
2	1.154	19.238	64.014	1.154	19.238	64.014	1.368	22.801	64.014
3	.807	13.446	77.459						
4	.629	10.475	87.935						
5	.404	6.725	94.660						
6	.320	5.340	100.000						

Extraction Method: Principal Component Analysis.

4.6 Eigen values for Technological Factors

Eigen values of the technological factors were extracted using Kaiser Criterion and only those with value greater than one were retained. The initial components are the numbers of the variables used in the Factor Analysis. In this case they were six but only two were retained since they have Eigen value of 1 or more. The first factor had an eigen value of 2.687 which accounted for 44.776% of the total variance and representing the highest Eigen value. The second one accounted for 19.238% of the total variance. The two factors

22

accounted for 64.014% of the variance. This implies that the data set could be simplified by using the first two factors since only 35.986% of information was lost.
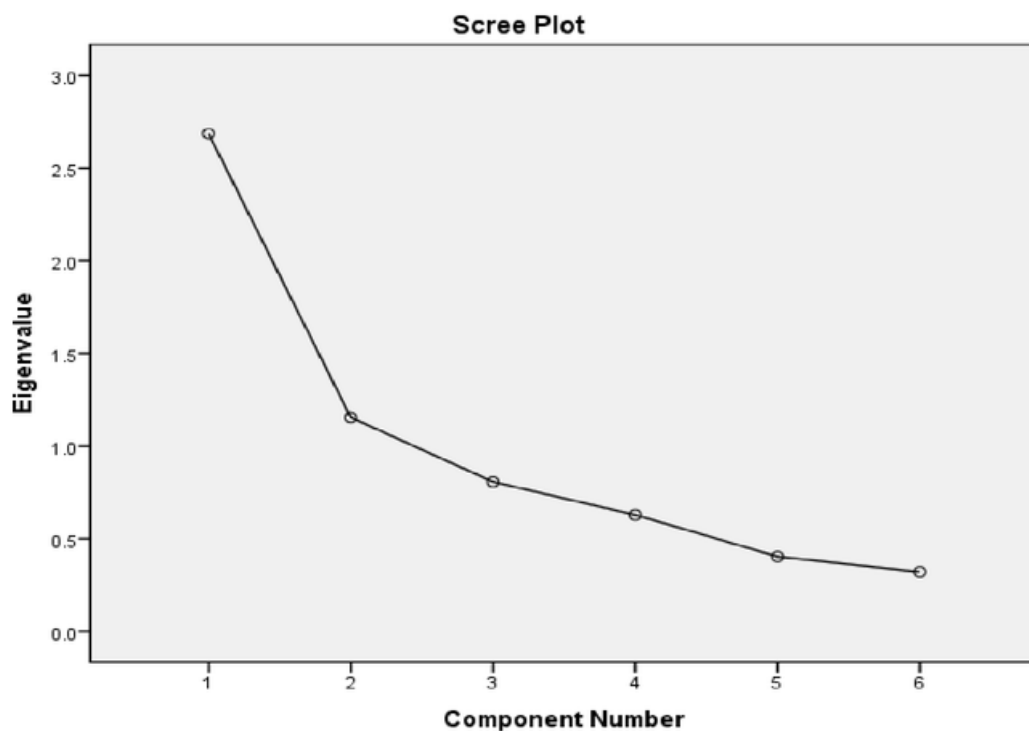

Figure 4.7 Scree plot of Technological Factors.

To determine the maximum number of factors to retain, a scree test of eigen values was used. Based on Kaiser's criterion all factors that were above the Eigen value of 1 were retained. Thus, looking at Figure 4.8, two factors were retained.

Table 4.6 Loading Matrix

Statement	Component	
	1	2
Adoption and use of ICT improves quality of work.	**.830**	.064
Adoption and use of ICT enables accomplishment of tasks quickly	**.778**	.328
Adoption and use of ICT improves my job performance.	**.683**	-.482
Adoption and use of ICT improves my productivity.	**.656**	.245
I have had an opportunity to try out new ICT applications.	.060	**.725**
I know where I can satisfactory try out various ICT applications.	.526	**.662**

Loading matrix was generated by rotating the factors. Table 4.6 shows indicate how the variables correlate with the extracted factors. Only those variables with the highest value in each row were selected to be included in the respective factor. The values highlighted were those greater than 0.5 and were combined to create two components.

Component number one consists of four of the six variables. These variables had positive loadings and addressed Relative advantage. The second component included the remaining two variables which had positive loadings. These variables addressed Trialability.

Table 4.7 Factor Variable Reduction

Factor	Variables Included	Component
1	Adoption and use of ICT enhances quality of work.	**Relative advantage**
	Adoption and use of ICT enables accomplishment of tasks quickly.	
	Adoption and use of ICT improves my job performance.	
	Adoption and use of ICT improves my productivity.	
2	I have had an opportunity to try out new ICT applications.	**Trialability**
	I know where I can satisfactory try out various ICT applications.	

4.7   Factor Variable Reduction

The factor variables of the extracted component were combined and formed new components, **Relative advantage** and **Trialability** whose items are listed in Table 4.7. The study established, based on average mean for Relative advantage equal 3.4, that the respondents were in agreement regarding Relative advantage attributes as stated. The attributes of Trialability had a factor mean of 3.46 indicating the respondents were in agreement that Trialability affected ICT adoption in TVET institutions.

4.8   Organizational Factors

Table 4.8 Descriptive Statistics of Organizational Factors

Statement	Mean	Std. Dev
Support and commitment from top management encourage adoption and use of ICT.	4.00	.952
There is need to have clear policy guidelines regarding adoption of ICT.	3.22	.961
Top management need to set sufficient budgetary allocation for adoption and use of ICT.	3.39	.939
Availability of skilled manpower is critical for adoption and use of ICT.	3.33	1.012
Accessibility of technical support is essential for adoption and use of ICT.	3.55	.929
Overall Mean	**3.5**	**0.959**

Table 4.8 shows an analysis of the degree to which respondents strongly agreed or disagreed with organizational factors that affect ICT adoption in their institutions. Based on the analysis, the total mean and standard deviation were 3.5 and 0.959 respectively.

From this analysis, it can be deduced that respondents were in agreement with the organizational factors attributes as stated. The attribute on Support and commitment from top management scored a mean of 4.00 and SD of .952 which meant that the respondents were in agreement that Support and commitment from top management has an effect on the adoption of ICT in their institutions. However, the respondents were neutral on whether policy guidelines, budgetary allocation and skilled manpower affected ICT adoption.

The reliability statistic in table 4.3 indicates that they were total of 5 items. To calculate the reliability of the factors, the researcher computed Cronbach's alpha(p) of   0. 784, which is coefficient of reliability and it suggests that the measures are acceptable.

4.9   Test Adequacy of Sample Size

As shown in table 4.3, the measure of sample size adequacy was 0.731 which was acceptable while test of Sphericity was 0.000 which is less than 0.05. This meant that the factor analysis was valid. The value of the Chi-square with 10 degrees of freedom at 0.000 significant level was 141.211. It was therefore a good idea to proceed with factor analysis.

4.10   Communalities

Table 4.9 show the communalities of the organizational factors. It is evident that 84% of the variance in "Clear policy guidelines regarding ICT are essential for adoption and use of ICT." and "Support and commitment from top management encourages adoption and use of ICT." "Lack of policy guidelines regarding ICT adoption has affected adoption." is accounted for, while about 60% of the variance in "Lack of sufficient funds has affected adoption and use of ICT." is accounted for.

Table 4.9 Communalities

Communalities	Initial	Extraction
Support and commitment from top management encourage adoption and use of ICT.	1.000	.837
There is need to have clear policy guidelines regarding ICT adoption of ICT.	1.000	.840
Top management need to set sufficient budgetary allocation for adoption and use of ICT.	1.000	.722
Availability of skilled manpower is critical for adoption and use of ICT.	1.000	.789
Accessibility of technical support is essential for adoption and use of ICT.	1.000	.676

Table 4.10 Total Variance of Technological Construct Explained

Component	Eigen values			Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	2.767	55.344	55.344	2.767	55.344	55.344	2.047	40.942	40.942
2	1.097	21.938	77.282	1.097	21.938	77.282	1.817	36.340	77.282
3	.491	9.825	87.107						
4	.413	8.265	95.372						
5	.231	4.628	100.000						
Extraction Method Used: Principal Component Analysis.									

4.11 Eigen values for Organizational factors

Eigen values of the organizational factors were extracted using Kaiser Criterion and only those with value greater than one were retained. The initial components are the numbers of the variables used in the Factor Analysis. In this case they were five but only two were retained since they have Eigen value of 1 or more. The first factor had an eigen value of 2.767which accounted for 55.344% of the total variance and being the highest Eigen value. The second one accounted for 21.938% of the total variance. The two factors accounted for 77.282% of the variance. This implies that the data set could be simplified by using the first two factors since only 22.718% of information was lost.
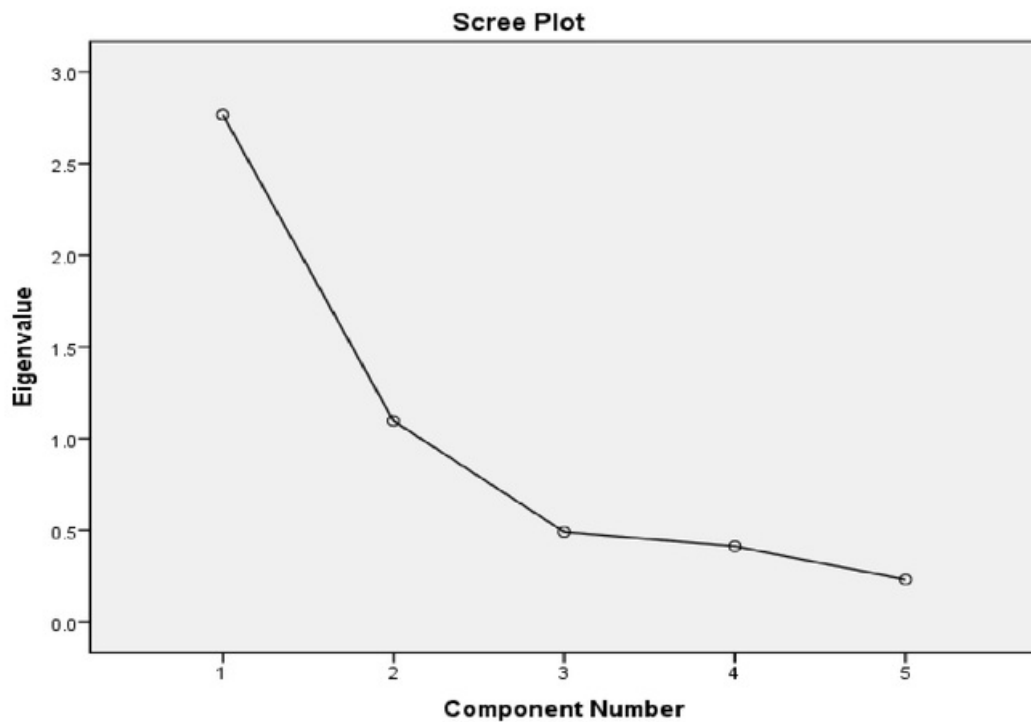

Figure 4.8 Scree plot of Organizational factors.

To determine the maximum number of factors to retain, a scree test of eigen values was used. Based on Kaiser's criterion all factors that were above the Eigen value of 1 were retained. Thus, looking at Figure 4.9, two factors were retained.

Table 4.11 Component Matrix

Statement	Component	
	1	2
There is need to have clear policy guidelines regarding ICT adoption of ICT.	.909	-.118
Top management need to set sufficient budgetary allocation for adoption and use of ICT.	.835	-.156
Accessibility of technical support is essential for adoption and use of ICT.	.741	.357
Support and commitment from top management encourage adoption and use of ICT.	.606	-.685
Availability of skilled manpower is critical for adoption and use of ICT.	.572	.680

Table 4.12 Rotated Component Matrix

Statement	Component	
	1	2
Support and commitment from top management encourage adoption and use of ICT.	.907	-.119
There is need to have clear policy guidelines regarding ICT adoption of ICT.	.763	.508
Top management need to set sufficient budgetary allocation for adoption and use of ICT.	.732	.431
Availability of skilled manpower is critical for adoption and use of ICT.	-.015	.888
Accessibility of technical support is essential for adoption and use of ICT.	.324	.756

The table 4.12 of rotated component matrix show component 1 loaded highly with the factors "Support and commitment from top management encourage adoption and use of ICT.", "There is need to have clear policy guidelines regarding ICT adoption of ICT." and "Top management need to set sufficient budgetary allocation for adoption and use of ICT." while component 2 loaded highly with the factor "Availability of skilled manpower is critical for adoption and use of ICT." and "Accessibility of technical support is essential for adoption and use of ICT." .

4.12 Factor Variable Reduction

The factor variables of the extracted component were combined and formed new components, **Top Management support** and **ICT expertise** whose items are listed in Table 4.13. Items for Top Management support; indicating that support of the top management with a factor mean of 3.56 significantly affect adoption while that of ICT expertise had a factor mean of 3.44 indicating the respondents were in agreement on need to have ICT expertise in their institutions.

Table 4.13 Factor Variables Reduction

Factor	Variables Included	Component
1	Support and commitment from top management encourage adoption and use of ICT.	**Top Management support**
	There is need to have clear policy guidelines regarding ICT adoption of ICT.	
	Top management need to set sufficient budgetary allocation for adoption and use of ICT.	
2	Availability of skilled manpower is critical for adoption and use of ICT.	**ICT expertise**
	Accessibility of technical support is essential for adoption and use of ICT.	

4.13 Environmental Factors

Table 4.14 Environmental Factors

Statement	Mean	Std. Dev
None availability of specialized ICT services providers affects ICT adoption and use.	2.93	1.417
Competition from other institutions does affect adoption and use of ICT.	3.32	1.278
Availability of appropriate ICT systems is crucial to adoption and use of ICT.	3.43	1.289
Government regulations affect adoption and use of ICT.	3.26	1.215
Pressure from stakeholders is a key driver of ICT adoption and usage.	3.39	1.156
The customer service provided by the ICT providers is vital to adoption and usage of ICT.	3.70	1.233
Overall Mean	**3.34**	**1.265**

Table 4.14 shows an analysis of the degree to which respondents strongly agreed or disagreed with organizational factors that affect ICT adoption in their institutions. Based on the analysis, the total mean and standard deviation were 3.34 and 1.265 respectively. From this analysis, it can be deduced that respondents different views regarding Environmental aspects as stated. The attribute on none availability of specialized ICT services providers affects ICT adoption and use scored a mean of 2.93 and Standard Deviation of 1.417 which implied that the respondents were neutral. The attribute on the customer service provided by the ICT providers is vital to adoption and usage of ICT scored a mean of 3.70 and SD of 1.265 which meant the respondents were in agreement the Environmental attributes as stated.

The reliability statistic in table 4.2 indicates that they were total of 6 items. To compute the reliability of the factors, the researcher computed Cronbach's alpha (p) of 0.809, which is coefficient of reliability and it suggests that the measures are acceptable.

Table 4.15 Communalities

	Initial	Extraction
None availability of specialized ICT services providers affects ICT adoption and use.	1.000	.833
Competition from other institutions does affect adoption and use of ICT.	1.000	.766
Availability of appropriate ICT systems is crucial to adoption and use of ICT.	1.000	.770
Government regulations affect adoption and use of ICT.	1.000	.715
Pressure from stakeholders is a key driver of ICT adoption and usage.	1.000	.766
The customer service provided by the ICT providers is vital to adoption and usage of ICT.	1.000	.614

Table 4.16 Total Variance of Environmental Construct Explained

Component	Eigen values			Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	3.100	51.667	51.667	3.100	51.667	51.667	2.311	38.518	38.518
2	1.365	22.742	74.409	1.365	22.742	74.409	2.153	35.891	74.409
3	.596	9.931	84.340						
4	.404	6.741	91.080						
5	.313	5.210	96.291						
6	.223	3.709	100.000						

Extraction Method: Principal Component Analysis.

4.14   Eigen values for Environmental factors

Eigen values of the environmental factors were extracted using Kaiser Criterion and only those with value greater than one were retained. The initial components are the numbers of the variables used in the Factor Analysis. In this case they were six but only two were retained since they have Eigen value of 1 or more. The first factor had an eigen value of

3.100which accounted for 51.667% of the total variance and being the highest Eigen value. The second one accounted for 22.742% of the total variance. The two factors accounted for 74.409% of the variance. This implies that the data set could be simplified by using the first two factors since only 25.591% of information was lost.
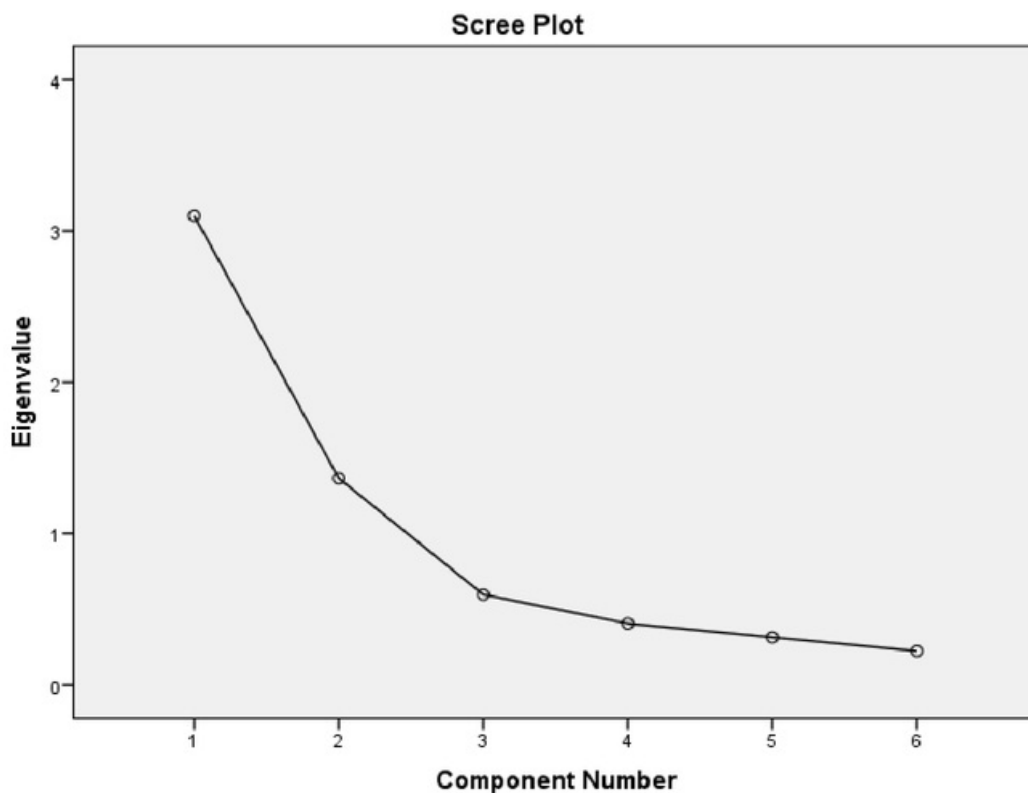

Figure 4.9 Scree plot of Environmental factors.

To determine the maximum number of factors to retain, a scree test of eigen values was used. Based on Kaiser's criterion all factors that were above the Eigen value of 1 were retained. Thus, looking at Figure 4.10, two factors were retained.

Table 4.17 Rotated Component Matrix

	Component	
	1	2
Pressure from stakeholders is a key driver of ICT adoption and usage.	**.875**	.013
Government regulations affect adoption and use of ICT.	**.825**	.187
Customer service provided by the ICT providers is vital to adoption and usage of ICT.	**.753**	.217
None availability of specialized ICT services providers affects ICT adoption and use.	.127	**.904**
Availability of appropriate ICT systems is crucial to adoption and use of ICT.	.060	**.876**
Competition from other institutions does affect adoption and use of ICT.	.527	**.698**

The table 4.17 of rotated component matrix show component 1 loaded highly with the factors "Pressure from stakeholders is a key driver of ICT adoption and usage.", "Government regulations affect on adoption and use of ICT." and "Customer service provided by the ICT providers is vital to adoption and usage of ICT." while component 2 loaded highly with the factor "None availability of specialized ICT services providers affects ICT adoption and use." , "Availability of appropriate ICT systems is crucial to adoption and use of ICT." and "Competition from other institutions does affect adoption and use of ICT." .

4.15 Factor Variable Reduction

The factor variables of the extracted component were combined and formed new components, **Education Sector Characteristics** and **Stakeholders Interest** whose items are listed in Table 4.18. Items for **Education Sector Characteristics** had a factor mean of 3.45. This indicated that the respondents agreed that Education Sector Characteristics had an effect on adoption of ICT. The factor mean of **Stakeholders Interest** was 3.23 which indicated the respondents were neutral on its effect on adoption of ICT.

Table 4.18 Environmental factor variables reduction

Factor	Variables Included	Component
1	Pressure from stakeholders is a key driver of ICT adoption and usage.	Stakeholders Interest
	Government regulations affect adoption and use of ICT.	
	Customer service provided by the ICT providers is vital to adoption and usage of ICT.	
2	None availability of specialized ICT services providers affects ICT adoption and use.	Education Sector characteristics
	Availability of appropriate ICT systems is crucial to adoption and use of ICT.	
	Competition from other institutions does affect adoption and use of ICT.	

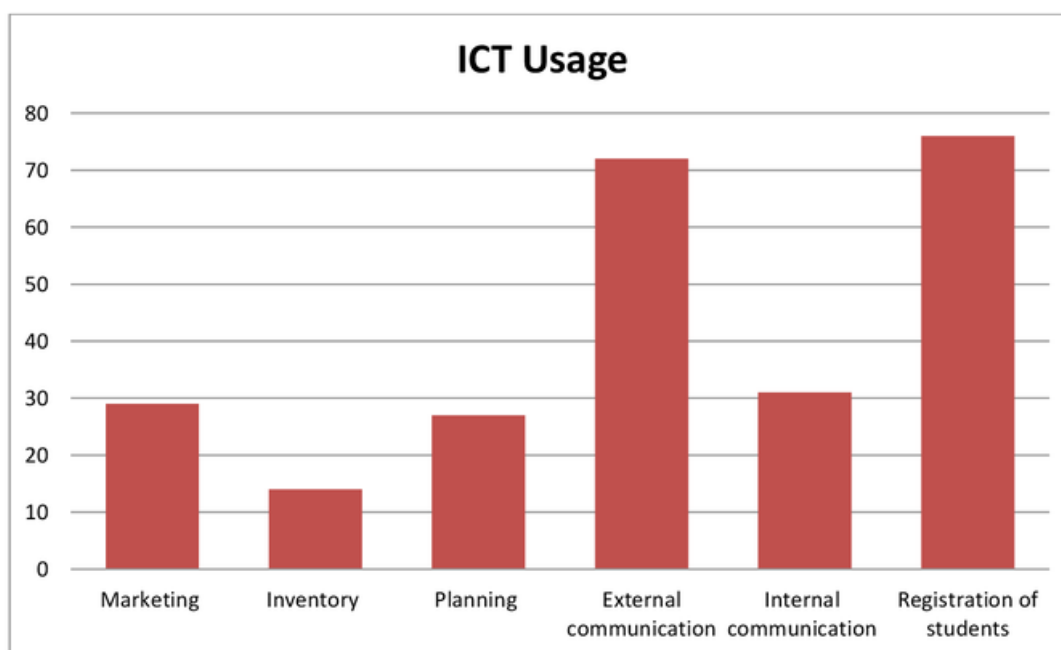## 4.16 ICT Usage by TVET Institutions

Figure 4.10 ICT Usage by TVET Institutions

The study revealed that most of the institutions used ICT for external communication mostly through email and in registration of students. It can be observed that 40.69% of the institutions used ICT for internal communication while twenty nine representing 38.16% used ICT for marketing purpose. Fourteen institutions which account for 18.42% used ICT for

inventory control while twenty seven accounting for 35.53% used ICT in planning of the institutions activities.

Table 4. 19 ICT Usage levels by TVET Institutions

ICT Usage	Levels
Marketing	38.16%
Inventory	18.42%
Planning	35.53%
External communication	94.74%
Internal communication	40.79%
Registration of students.	100%
Overall Mean	**54.61**

The overall mean for all the functional areas on ICT usage was 54.61 which show that all the functional areas contribute to some extent towards ICT usage. Based on Table 4.25 we conclude that ICT has become a necessary tool for accomplishing various administrative tasks by TVET institutions. Based on this study it is evident that TVET institutions usage levels of ICT were high in external communication at 94.74% and in the registration of students at 100%.It can be observed that the levels of ICT usage for Inventory control, Planning, Marketing and Internal communication were less than 50%.

This clearly points out that the usage of ICT in administration of TVET institutions has wider scope and more need to be done to cover all functional areas. From the ICT usage levels, it shows that ICT has become a crucial for accomplishing the administrative tasks.

The study found that there was transformation taking place in advancement of technology in the education sector. This is taking place mainly in the areas of student registration and external communication. The extent of usage for general administrative activities is comparatively less.

4.17 Discussion
4.17.1 Results Linkage to the Research Problem

The study sort to find the challenges that affected adoption of ICT in the management of TVET institution in Nairobi County. The study also sought to find out the challenges that influence ICT adoption and evaluate levels of adoption using TOE framework.

The results revealed that most of the respondents were of the opinion ICT adoption increased productivity and improved operational efficiency with a mean score of 3.77 and 4.05 respectively. This concurred with Akom, et al. (2016) who argued that use of ICT increased workforce productivity and improved communication efficiency.

As Table 4.9 shows, respondents were in agreement that the relative advantage and trialability positively impacted on ICT adoption by the TVET institutions. This was in agreement with previous studies by Oliveira and Martins (2011) who argues that relative advantage does relate with the extent of adoption of ICT.

As Table 4.13 shows, the respondents were of the opinion that top management support and ICT expertise were the main challenges affecting ICT adoption at the organization level. This supports Erind (2015) who argues that in middle level institutions due to limited human resource, which is the case with TVET institutions, critical decisions are made by the Principals. This supports the TOE framework whereby on the organizational construct, the main factors that affect ICT adoption are the top management support and availability of ICT expertise of an institution.

Competition from other institutions, lack of appropriate systems and customer service provided by the ICT providers were the main environmental factors that affected ICT adoption. This contradicts Jeon et. al.(2006) argument that industrial pressure (competition) is not a major factor in adoption of ICT but concurs with Low, et al., (2011) that competitive pressure is a key factor for adoption ICT.

On the usage of ICT, the result of the study revealed that, contrary to the general perception that the usage of ICT in administration is low in TVET institutions, the majority (54.61%) of respondents indicated positive. All the institutions used ICT to communicate externally mainly through emails and were also using ICT in registration of students. However, the

usage for inventory controls and planning were low at 18.42% and 35.53% respectively. This could be attributed to the size of the institutions of which most were small.

4.17.2 Results Link to the Research Framework

Similar to prior studies done by Rogers (2003) results of the analysis indicate that the Technological variables relative advantage and trialability, Organizational variables top management support and ICT expertise, and Environmental variables education sector characteristics and stakeholders interest are the significant variables to discriminate between the ICT adopters from non-adopters.

The empirical results indicate that there are significant determinants in each context. The results imply that the determinants of ICT adoption in TVET institutions should include the technological, organizational and environmental characteristics. This is consistent with the Technology, organization and environment framework (Tornatzky and Fleischer 1990) and hence justifies the use of the framework.

4.18   Exploring the Significant Variables

a) Relative advantage
Table 4.7 indicates that relative advantage which is a technological characteristic is a significant factor to discriminate those who adopter ICT from those who don't as expected, (Tsai et al. 2010).

Institutions adopt ICT to ensure efficiency of business processes and provide better ways to achieve and maintain a competitive advantage (Yau and Cheng 2010). This also shows institutions that adopt ICT have higher perceived relative advantage levels compared to non-adopters.

b) Trialability
Trialability reduces the users' perceived risk of an innovation. Table 4.7 indicates that Trialability which is a technological characteristic was viewed as a significant variable that affected ICT adoption by the respondents. This agrees with (Martins, Steil, & Todesco, 2004) who concluded that trialability significantly affect adoption of ICT.

c) Top Management Support

TVET institutions tend to have highly centralized structure where top management makes most decisions. Heads of institutions make nearly all decisions, from strategic to daily operations (Bruque & Moyano, 2007,Nguyen, 2009). Therefore, top management affect the adoption of ICT innovation in the institution and hence their support is an important requirement. Top management support includes: providing policy guidelines and providing adequate resources for adoption of ICT (Low, et al., 2011). Table 4.13 indicates that the Organizational characteristic of top management support significantly impact ICT adoption. This agrees with previous research on ICT adoption that has shown top management support through availing of resource is one of the important facilitator in ICT adoption (Oliveira & Martins, 2011).

d) ICT Expertise

Table 4.13 indicates that ICT expertise was viewed as an important variable for predicting adoption of ICT by the respondents. This agrees with previous study by (Thong, 1999) who contends that many institutions tend to put off their adoption of an innovation until they have in place internal expertise. Compared to large institutions TVET institutions face resource scarcity and thus difficulties in ICT adoption. Resource scarcity manifests itself also in financial constraints.

e) Stakeholders Interest

Stakeholders in the education sector, who include the national government, parents and the students, were viewed to have significant effect on ICT adoption. This is in agreement with the study by (Akom, 2016) which shows that all stakeholders in education should join in the crusade of introducing ICT in TVET Institutions.

f) Education Sector characteristics

The education sector consists of primary and secondary schools, tertiary institutions and universities. Education sector characteristics as depicted in table 4.24 has impacted on ICT adoption.

CHAPTER FIVE

CONCLUSION AND RECOMMENDATIONS

5.1   Research Findings

The broad objective of this research was to establish the factors that affect adoption of ICT in management of TVET institutions. Specifically, the objectives set out for the study were as follows:

Objectives 1:   Determine challenges that hinder adoption of ICT by TVET institutions.

Based on the findings, we conclude adoption and use of ICT in TVET institutions is positively influenced by the factors in the three constructs of the TOE framework. These factors are Relative advantage, Trialability, Top Management support, ICT expertise, Stakeholders interest, and Education sector characteristics. All the six factors were found to be significant determinants and they are successful facilitators of ICT adoption in TVET institutions.

Objectives 2:   Evaluate levels of ICT adoption in TVET institutions.

It can be observed from table 4.25 that the overall ICT adoption in TVET institutions stood at 54.61%. However, the adoption levels were highest in registration of students and external communication at 100% and 94.74% respectively. This could be improved if the factors affecting adoption were addressed by all concerned parties.

Objectives 3: Validate TOE framework for ICT adoption by TVET institutions.

The research findings further confirmed the value of the TOE framework in understanding technology adoption, and how the TOE framework can be applied in the studies relating to ICT adoption. This shows that the TOE framework remains useful in providing researchers and practitioners with model for innovations adoption studies.

5.2   Conclusion

This study established that there was a significant relationship between Technological Organizational and Environmental factors and ICT adoption in management of TVET institutions. The study also established that the levels of usage were low in other functional areas other than in registration of students and external communication.

5.3   Limitations

The first limitation was due to the fact that the sample size was limited to only one county out of the 47 in the country. Although the empirical results gave significant understanding, the sample of the study was constricted. The study would have been richer if it had covered TVET institutions from different geographical regions. To extrapolate the findings nationally a sample size covering several counties would have been preferred. In addition, the targets of this study were the Principals of the TVET institutions. The study would have been improved by including other users of ICT in TVET institutions.

5.4   Recommendations

This study adopted TOE framework with exploratory factor analysis technique so as to identify the factors that affect ICT adoption in TVET institutions. It is recommended that such other studies are conducted in other institutions not limited to TVET and expand the scope to include other Counties.

This study is of great significance to Policy makers, Academicians and ICT practitioners as it contributes to the body of knowledge on how ICT adoption relates to Technological Organizational and Environmental factors and how this can improve the adoption and usage of ICT when improved.

The study further recommends that the owners the TVET institutions, the TVET Authority and other stakeholders jointly work together in order to improve factors that affect ICT adoption and usage. This will assist Kenya to meet her vision 2030 goals where education sector is crucial to the success of the vision.

ICT ADOPTION IN THE MANAGEMENT OF TVET INSTITUTIONS IN KENYA

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