

**DETERMINANTS OF THE IMPLEMENTATION OF INFORMATION AND  
COMMUNICATION TECHNOLOGY PROGRAMMES IN ORGANISATIONS IN  
KENYA: A CASE OF MANAGED WI-FI AT THE MOMBASA TECHNICAL  
TRAINING INSTITUTE**

**BY**

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**DECLARATION**

This research project report is my original work and has not been presented for any academic award in any university.

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**L50/78788/2015**

Signed .....

Date .....

This research project report has been submitted for examination with my approval as the University Supervisor.

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Date.....

## **DEDICATION**

This report is dedicated to my parents whose tenacity and grit greatly inspired all through.

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## **ABBREVIATIONS AND ACRONYMS**

<b>ICT</b>	Information and Communications Technology
<b>ISPs</b>	Internet Service Providers
<b>WI-FI</b>	IEEE 802.11 standard
<b>LAN</b>	Local Area Network
<b>MDGs</b>	Millennium Development Goals
<b>MOEST</b>	Ministry of Education Science & Technology
<b>NEPAD</b>	New Partnership for African Development
<b>NGOs</b>	Non-Governmental Organizations
<b>NICE</b>	Network Initiative for Computers in Education
<b>ODE</b>	Open and Distance Education
<b>PPP</b>	Public & Private Partnership
<b>SAGAs</b>	Semi-Autonomous Government Agencies
<b>TIVET</b>	Technical, Industrial, Vocational and Entrepreneurship Training
<b>WAN</b>	Wide Area Networks
<b>WSIS</b>	World Summit on the Information Society

## ABSTRACT

The implementation of ICT infrastructure in learning institutions has become a fundamental concern basically because education is the backbone of a successful society. Hence a need to evaluate how learning can be enhanced through the successful implementation of managed Wi-Fi project in organizations, its operational dynamics and the conditions through which it changes due to its implementation. The main objective of this study is to investigate the determinants of the implementation of ICT programmes at the Mombasa Technical Training Institute, Mombasa County. Related literature includes key aspects that influence existing standards of wireless local area network, hardware devices and other myriad of ultra-modern devices in organizations. The independent variables included Internet Service providers, Project funding, Stakeholders' participation and Capacity building. The ICT infrastructure requires appropriate bandwidth obtained from Internet service providers that will be cost effective and ideal for enabling digital skills to trickle down to the students and the community at large. Stakeholders need to be on the same footing in order to sustain the wireless infrastructure, hardware devices and their peripherals. The Lewis' force field theory, Technology acceptance model (TAM) and Diffusion of innovation model formed the theoretical framework. The models formed a basis of key variables influence the implementation of ICT projects in organizations. This study focused on a target population of 345 respondents using the descriptive survey design because it is a cross sectional analysis where quantitative and qualitative data were collected at one specific point in time. Secondary data is to be collected through journal reviews as well as previous studies by different authors. The sampling techniques included Stratified and Simple random since the population study involves different groupings of teachers, administration, heads of departments and students at the Mombasa Technical Training institute. Closed ended questionnaires were used to collect primary data which was analysed using statistical package SPSS using statistical tools such as percentages, means, frequencies and interpretational analysis to identify patterns and constructs. Inferential statistics was used to test hypothesis and other information obtained from self-administered questionnaires, in-depth interviews and observation to facilitate for data analysis. It was established that all the managed Wi-Fi project employed at the Mombasa Technical Training Institute positively influenced the performance of ICT programmes under the Managed Wi-Fi project at Mombasa Technical Training Institute and that this influence was statistically significant at significance level of 0.05. Based on the findings of the study, the following conclusions are made on the determinants of the implementation of ICT programmes at the Mombasa Technical Training Institute. All the four determinants studied influenced the implementation ICT programmes in Mombasa Technical Training Institute to almost similar extents as demonstrated by the correlation coefficients that were moderate for Internet service providers, stakeholders' participation and capacity building and weak for project funding. The Managed Wi-Fi project should embark in all the four determinants in almost equal proportions. The institution should supplement the services provided by the Sole ISPs by engaging an additional provider to cater for the institution in case of Internet downtime or major outage. Furthermore the institution should invest in a team of experts that can help to resolve technical issues as they arise.

## CHAPTER ONE

### INTRODUCTION

#### 1.1 Background of the Study

Information and communication technology (ICT) is universally acknowledged as an important catalyst for social transformation and national progress. However, disparities in the levels of ICT readiness and use could translate into disparities in level of productivities and hence could influence a country's rate of economic growth. Understanding and leveraging ICT is therefore critical for countries striving for continued social and economic progress. (Kirimi, 2014). The Internet is playing a very important role in the evolution of digital technology, but although it has seen remarkable growth over the last few years, its dispersion remains highly asymmetric. It is impossible to assess the exact number of users, but present estimates range between 40 million and 60 million, in a total of more than 130 countries worldwide. There are also differences to access within countries, as most Internet users tend to belong to very narrow social sectors, suggesting that the Internet today is mainly the tool of a transnational "virtual elite." (Uimonen, 2013). Consumer products, durable goods, cars and trucks, industrial and utility components, sensors, and other everyday objects are being combined with Internet connectivity and powerful data analytic capabilities that promise to transform the way we work, live, and play (Rose, 2015)

According to the Turkey Vision 2023, Turkey is one of the top 10 countries in e-transformation where 8% of GDP comes from ICT, 80% of population are computer literate and provision of all public services is to be provided electronically by 2019. Turkey has initiated FATIH Project with the aim of enabling equal opportunities in education and improving technology in schools for the efficient usage of ICT tools. Currently broadband connectivity is up to 42,000 schools, 15 million students and 1 million teachers have access to tablets whereas 570,000 computerized smart classes including interactive boards. E-content includes 6,247 video productions, 5,826 interactive contents, 1,593 e-books, 3,320 graphical work and photography, 52 mobile applications, 1,320 e-magazines, 4,241 audio book and other contents (ITU/Intel online Training Workshop, 2015)

Worldwide, the utilization of information technology in education has been regarded an essential factor for economic growth, although the educational practices and structures and

the economic growth have a complex and reciprocal relationship, as (Wagner, 2005) describes them comparing Finland, Hong Kong and Egypt regarding their solutions to applying technology in education. The global village is becoming more advanced at a rate that no institution can control. In the last decade, developed countries have struggled with meeting wireless internet needs. A report from the U.S Commerce Department titled “Exploring the Digital Nation,” found that the digital divide is still very much present in the United States. According to the Report, low income and less educated households experienced computer ownership and broadband adoption rates well below the national average. (Cohen, 2013) Wireless technology has become a primary system for delivering high-speed Internet access in developing countries such as Latvia. Because of poor-quality telephone infrastructure, such countries face the difficult task of connecting locations with dedicated high-bandwidth needs (from 256 kbps to 4 Mbps). The Eastern European countries of Latvia and Moldova are given as examples of where poor telephone infrastructure has been overcome by providing high-speed wireless Internet links to universities, schools, and government agencies. (Arnis Riekstins, 2011)

The Royal Belfast Academical Institution traditionally took a “chalk and board” approach to teaching Latin until teacher Christelle Bernard suggested making greater use of ICT as part of an eTwinning project with schools in France and Germany. Her aim was to make Latin more relevant by developing the digital skills of teachers and students. The project made extensive use of ICT applications, including Voki, Thinglink and Quizlet, to motivate students and encourage collaboration. With such clear aims, Bernard was able to measure impact in three ways: the subject’s reputation in school, her colleagues’ use of ICT and student achievement. “This project had a huge impact as it enabled me to revitalise my subject and encouraged colleagues to use ICT more in their practice,” Bernard says. The effect on students was clear: “Motivation with the lower-ability pupils was increased, and attention to detail was more important as we were exchanging work with a real audience. As with many eTwinning projects, Bernard didn’t have to struggle to gain cut-through with the rest of the school for the project – the buzz created by students did the work for her. “As we progressed, pupils started to talk about it in other classes and colleagues approached me to get involved,” she says (British Council, 2015)

In some countries, like Singapore, Malaysia, and the United Kingdom, teaching accreditation requirements include training in ICT use. ICTs are swiftly evolving technologies, and the

most fluent ICT teachers need to continuously upgrade their skills and keep abreast of the latest developments and best practices. Teacher anxiety over being replaced by technology or losing their authority in the classroom as the learning process becomes more learner – centred- an acknowledged barrier to ICT adoption- can be alleviated only if teachers have a keen understanding and appreciation of their changing role (Kirimi, 2014). Every OECD country is working to install networks in schools, connect them to the Internet, and ensure a workable configuration of multimedia computers, educational software, technical support, and ICT-competent teachers. While development is increasingly ICT driven, Africa still has limited capacities and infrastructures that support ICT (Organization for Economic Co-operation and Development, OECD, 2004). Kenya has made remarkable progress putting in place an ICT policy framework and implementation strategy, complete with measurable outcomes and time frames. The process has had the benefit of sound advice from officials and stakeholders and, perhaps more importantly, strong leadership from the office of the permanent Secretary of the Ministry of Education. However, universal implementation is challenging given the lack of resources, national ICT infrastructure, and even electrical supply particularly in the rural areas. As technology is bound to rule our present and future, it is good to obtain know-how of the technological reforms at the earliest (Kirimi, 2014).

In Africa, only Tunisia has been able to achieve ICT network readiness and hence in the list among those able to overcome the last mile problem by end users being able to connect to a communication network (Karugu, 2012). Youth for Technology (YTF) is making a difference. Established in 2000, YTF is an international non-profit organization dedicated to two main goals. The first is teaching youth about their communities and the world through the use of technology. The second is providing basic computer skills and expanding upon those skills for potential use in the workplace as well as in their communities. Over the past 8 years, YTF has worked with other non-profit organizations to create community technology and learning centers, known as Digital Villages, in rural communities on the African continent. The Owerri Digital Village has created an after school educational enrichment program that complements the education provided by schools. It has contributed to greater numbers of disadvantaged youth graduating from secondary schools and enrolling in universities, with a substantial number pursuing careers in science, business, technology or engineering. It has also promoted rural community development by providing technical, educational and entrepreneurial skills training to disadvantaged individuals in an effort to create social and economic opportunities. These opportunities have the potential to change



peoples' lives and transform communities. Access to technology and information can expand opportunities for youth in farming communities by providing them with resources on how to grow their family's income base through sustainable businesses including farming and petty trading. The center serves young people who have not yet been able to benefit fully from the opportunities provided by technology. Because technology is still not a core component of the Nigerian educational system, most of the youth participants are recruited from local, primary, secondary and university institutions in the Owerri vicinity (Youth for Technology Foundation, 2013)

Tanzania's Information and Communication Technology (ICT) Policy for Basic Education which incorporates the integration of ICTs in schools has been developed in consultation with stakeholders, including a workshop in October 2006. The policy considers issues of infrastructure; curriculum and content; training and capacity development; planning procurement and administration; management, support and sustainability and monitoring and evaluation. However, even in these schools, ICTs are mostly confined to administration. There is some limited use for teaching basic ICT skills and in most cases ICTs have not been integrated as a medium of instruction. Tanzania's Ministry of Education with support from the Swedish International Development Cooperation Agency (SIDA) has initiated a programme for introducing ICT in teachers' colleges in 2005. The programme is aimed at improving the quality of teacher education by using ICTs to improve both pre-service and in-service teacher education (Hare, 2007)

While other countries have reported up to 41% of integration of ICT to teaching and learning, the proportion remains substantially low in Africa, Kenya included. Integration aims at the use ICT to support teaching and learning in the delivery of the various curricula to achieve improved education outcomes. Because ICT is interactive media, it facilitates students to develop diversified skills needed for industrialization and a knowledge-based economy. It also allows teachers and learners to proceed at different paces depending on the prevailing circumstances. It is recognized in this plan that integration of ICT to teaching and learning will also play an important role in preparing students for the demanding job market. It is recognized further that the education sector needs to be proactive in meeting the requirements for ICT skills. (Ministry of Education, 2012). Kenya has placed considerable emphasis on the importance of ICT in its Education Sector Support Programme as evidenced in the recent promulgation of the National ICT strategy for Education and training. The Ministry of

Education has taken the steps to support the implementation of the strategy either by direct action or through the various institutions and agencies with which it works. In addition, there are many other organizations not involved directly with the Ministry of Education that continue to be active in implementing and supporting projects involving ICT in education (Kirimi, 2014).

Despite the challenges that are likely to arise in the course of implementation of ICT, Kenyan universities are being compelled by the government within the framework of Kenya Vision 2030 to introduce e-learning and blended learning as an alternative delivery system to increase accessibility to higher education in Kenya. Full implementation of e-learning at university levels is considered as a long term strategy in Kenya Vision 2030 which is anticipated to address the strategic areas, namely, access, quality, equity, technology and innovation. Furthermore it is “to have globally competitive quality education, training and research for sustainable development” ( National Economic and Social Council of Kenya., 2007).

## **1.2 Statement of the Problem**

Digital literacy is a requirement for closing the digital divide. Benefits of ICT extend beyond the students to the local community by significantly increasing broadband and ICT penetration. The use of apps and mobile technologies allow for easier delivery of tried and tested accommodations and encourage more independence and confidence in learning.(ITU/Intel online Training Workshop, 2015). The increasing proliferation of mobile devices that connect to the internet and the development of apps (applications) are already having an impact on education. The value of mobile technologies for education is highlighted by numerous researchers, for example; (Passey, 2010) suggests that current ICTs provide excellent tools to help teach autistic students (as long as the devices are set up appropriately) and educators are encouraged to use them as the costs are low and the technology less stigmatising. ICT integrated learning promotes collaborative, active and lifelong learning, increase students’ motivation, offer better access to information and shared working resources, deepen understanding, help students think and communicate creatively (Khan, 2012).

Several studies have been done in order to determine the influence of implementing ICT programs in Kenya although not much has been highlighted on Managed Wi-Fi Projects in

Mombasa County. Despite having many institutions of learning acquiring internet enabled hardware, students and the administration still struggle with access to high speed wireless internet. Challenges that impede the successful use of wireless internet range from implementation of cheap infrastructure that has failed to cater for institutions' needs, choice of vending company, lack of involvement of major stakeholders to limited capacity building of students and the staff. Students continue to experience slow, unstable bandwidth and in addition the low personal computer ratio hence their efforts towards full utilization of e-learning still faces other numerous obstacles (Kashorda, 2014). Further to this is the fact that ICT hardware and software deliverables are ever changing and the need to acquire new knowledge regularly is inevitable (European Agency for Development in Special Needs Education, 2013). In addition, wireless links are susceptible to malware attacks and questions as to whether institutions have been able to tackle this issue calls for answers.

This study therefore evaluated the existing standard of wireless local area network (WLAN) technology for connecting computers and myriad of electronic devices to each other to the Internet at the Mombasa Technical Training Institute.

### **1.3 Purpose of the Study**

The purpose of the study was to examine the determinants of the implementation of ICT programmes in organisations in Kenya, a case of managed WI-FI at the MTTI, Mombasa.

### **1.4 Objectives of the Study**

The study was based on the following objectives:

- i. To assess the influence of Internet Service providers on the implementation of managed Wi-Fi project at the Mombasa Technical Training Institute in coast region, Kenya.
- ii. To determine the influence of Project Funding on the implementation of managed Wi-Fi project at the Mombasa Technical Training Institute in coast region, Kenya.
- iii. To examine the influence of Stakeholder's Participation on the implementation of managed Wi-Fi project at the Mombasa Technical Training Institute in coast region, Kenya.

- iv. To assess the influence of Capacity building on the implementation of managed Wi-Fi project at the Mombasa Technical Training Institute in coast region, Kenya.

## **1.5 Research Questions**

The research questions for this study were:

- i. To what extent have internet service providers (ISPs) influenced the implementation of the Managed Wi-Fi project at the Mombasa Technical Training Institute in coast region, Kenya?
- ii. To what extent has project funding influenced the implementation of Managed Wi-Fi project at the Mombasa Technical Training Institute in coast region, Kenya?
- iii. To what extent has stakeholder's participation influenced the implementation of Managed Wi-Fi project at the Mombasa Technical Training Institute in coast region, Kenya?
- iv. To what extent has capacity building on the implementation of Managed Wi-Fi project at the Mombasa Technical Training Institute in coast region, Kenya?

## **1.6 Research Hypothesis**

The study was guided by the following hypothesis to be tested at 95% significance Level:

**H<sub>1</sub>1:** There is significant relationship between internet service providers (ISPs) and implementation of ICT programmes.

**H<sub>1</sub>2:** There is significant relationship between project funding and implementation of ICT programmes.

**H<sub>1</sub>3:** There is significant relationship between stakeholder's participation and implementation of ICT programmes.

**H<sub>14</sub>:** There is significant relationship between capacity building and implementation of ICT programmes.

### **1.7 Significance of the Study**

This study will be useful to day to day running of institutions of learning and organizations that support on job training, government agencies within the education sector for policy making and education reforms. In addition, the information gathered in this research will be useful for other researchers who want to advance in related studies.

### **1.8 Delimitation of the Study**

This report study was delimited to the students, heads of departments and staff of Mombasa Technical Training Institute in the implementation of the managed WI-FI project.

### **1.9 Limitations of the Study**

The key limitations of the study were;

- i. Busy schedules for the actual study especially because people have other things to do; the researcher overcome this by requesting appointments at a convenient time usually during extra curriculum hours of study.
- ii. It was not possible to collect all data at once since people are situated at different locations at different times.

### **1.10 Assumptions of the Study**

The study has the following assumptions;

- i. The report was based on the assumption that people may not give adequate answers due to unlimited technical knowledge.
- ii. Further, it was assumed that the targeted respondents would be willing to participate in the survey, and that they would answer the questions truthfully.

### **1.11 Definitions of Significant Terms Used in the Study**

**ICT (Information and Communications Technology)** includes the range of hardware and software devices and programmes such as personal computers, assistive technology, scanners, digital cameras, multimedia programmes and image editing software, database and spreadsheet programmes.

An **Internet Service Provider (ISP)** is a company that provides you with access to the Internet, usually for a fee.

**Project funding** is the provision of financial resources, usually in the form of money, or other values such as effort or time, to finance a need, program, and project, usually by an organization or government.

**Stakeholders** are people who can affect or be affected by organization's actions, objectives and policies. They include staff, trustees, volunteers, clients, partner organisations, members, funders and/or anyone else with a stake or interest in the organisation's success.

**Capacity building** is learning the theories that will provide the skills to do something rather than just know about something.

### **1.12 Organization of the Study**

The Report study comprise of five chapters. Chapter one focused on the background of the study that will give an overview of ICT programmes in different countries both internationally and locally. This also involved on the objectives, questions and hypothesis that guided the study. Delimitations and limitations allowed the study to forecast on the direction of the project. Another main component of this study is Chapter two which provided a review of the relevant works that have been investigated by previous studies in order to establish a research gap. This also included review of key variables that are relevant in this research and therefore provide a basis for new information for this study. This research report comprised of Chapter three that elaborated in detail the research methodology used so as to pave way for data analysis and interpretation in subsequent chapters. In chapter four it involved data analysis, presentation and interpretation of the research findings collected by use of the research instruments used. Finally chapter five gives summary, discussion, conclusions and recommendations of the findings.

## **CHAPTER TWO**

### **LITERATURE REVIEW**

#### **2.1 Introduction**

This chapter will focus on the key variables that facilitate for the successful implementation of ICT Projects; these are internet service providers, project funding, stakeholders' participation and education and training. Critical review of literature in these areas aided in presenting the works of other contributors and identify the gap as well as closing the ICT gap in relation to learning institutions.

#### **2.2 The Concept of ICT Infrastructure**

Several studies conducted on the area of information and communication technologies (ICT) infrastructure reveal that it is a key element in many organizations. It basically comprises of hardware, software, services, procedures, processes and persons. This infrastructure should interact with its environment, adapt to it and evolve. The ICT infrastructure must be flexible to support the operation among different applications and to facilitate the communication of the information inside and outside of the enterprise (Baquero, 2006). The use of ICT is widely recognised as an everyday part of many people's lives that has an impact on many aspects of society, including education, training and employment, the economic prosperity of individuals and countries, as well as media, information transfer and leisure activity. Significant effort and investment has been put into maximising the benefits of ICT within education and training across developed and developing nations. As is reported in the review of European and International Policy for Supporting ICT for Inclusion although there are country variations, increasingly the focus of policy is on how to move from a situation where there is a sufficient infrastructure (numbers of computer devices available and widespread reliable high-speed internet connectivity) to one of effective use of ICT by all concerned (European Agency for Development in Special Needs Education, 2013).

According to (Reiser, 2001) two major tracks arose in educational technology at the beginning of major ICT use in education, from the 1980s on: computer-supported learning (also referred to as computer-aided learning and computer-based training) and the use of computer as a tool. The former consisted of different kinds of educational software, which

still has a strong representation in learning objects (LOs). For instance, the Nordic countries collaborated in developing, designing and producing educational software during the years 1986-1995. During the years of using ICT in education, the selection of technology, meaning what to adopt from the huge diversity of applications, has been a process which determines how the pedagogical practices are shaped. The implementation of technology into education is an innovation process (L.Ilomaki, 2008).

The ICT infrastructure enables learners to share the ICT capabilities which provide services for other systems of the organization; these capabilities require the complex combination of the technical infrastructure (cabling infrastructure, hardware platform, base software platform), ICT shared services (as communications services), ICT applications (as WEB services), the human operators and the managerial expertise to guarantee reliable services. All these resources are designed, developed and managed over time which requires adequate funding however the managed WI-FI basically means that institutions are becoming wireless and hence doing away with expensive activity of cabling. ICT has enabled institutions to use access points in order to make internet accessible from one point to another. Servers, switches and other specific tools permit the network management, sharing resources and applications, that are also improved with new functionality such as the distribution of applications, backups, and virus shields, among others. The Intranet configuration enables the maintenance of interconnected machines through the main network (Baquero, 2006). Using web-based conferencing and seminar (Webinars) technology enables organizations to reach other personnel virtually all over world. This will demand for stable and fast speeds by the consumers (Marchese, F., & Ishak, 2005)

The government of Kenya whose principal objective will be to integrate ICT in the delivery of education and training curricula is geared towards digitization. In order to achieve this objective every educational institution, teacher, learner and the respective community should be equipped with appropriate ICT infrastructure, competencies and policies for usage and progress. It calls for recognition of the fact that ICT provides capabilities and skills needed for a knowledge-based economy. A survey done by EMIS 2004, calls for transforming teaching and learning to incorporate new pedagogies that are appropriate for the 21st century. The Ministry of Education's (MOE) mission therefore is to facilitate effective use of ICT to improve access, learning and administration in delivery education programmes and services. (The European MSM Internet Survey, 2004).



Further research by the Ministry of Education Science and Technology argues that enhances communication and technical efficiency as well as facilitating greater decentralization in the delivery of education services. With proper planning and coordination in ICTs programmes end users will be prepared to acquire skills, competencies and socio skills that are fundamental for competing in the emerging global “knowledge” economy (Ministry of Education, 2012)

A different characteristic cited in ICT is that of government through sessional paper no. 1 of 2005 noted that ICT will present new opportunities for teaching and learning by providing opportunities for teacher-to-learners, teacher-to-teacher and learner-to-learner communication and cooperation, enhanced opportunities for several technologies delivered by teachers, creating superior keenness for learning among students and presenting access to a wider variety of courses. The policy highlights providing affordable ICT infrastructure to facilitate dissemination of knowledge and skills through e-learning platform, promoting the development of integrated e-learning curriculum to support ICT in schools and promoting the establishment of a National ICT centre of excellence (MOEST, 2006)

Researchers also view implementation of ICT in schools as elusive since most of them are not connected to electricity grid, has no capacity to buy the required infrastructure, and has school leaders and teachers who are either computer illiterate or technology ignorant, though the current global technology changes puts emphasis on digitalization and modernization of all sectors including schools. Despite the apparent benefits of the use of ICT in schools, research shows that many schools are not implementing it, thus depriving learners and the school community from accessing the potential of ICT (Manduku, 2012). Implementation of state-of-Art internet hubs can therefore be negatively affected when these stakeholders lack the appropriate skills and confidence to mobilize for adequate funding.

The major challenge in implementing ICT infrastructure is inadequate connectivity and network Infrastructure such as limited access to dedicated phone lines and high-speed systems or connectivity to access e-mail and Internet resources. The EMIS Survey (2003/2004) asserts the same view that many parts of Kenya cannot easily get internet services because of the poor cable networks. Alternative and appropriate technologies for access to Internet resources, including wireless systems remain quite expensive. Indeed, a small proportion of schools have direct access, through Internet Service Providers (ISPs), to high-speed data and communication systems. Institutions whose main objective is to oversee

the implementation of ICT programmes are working towards promoting access to ICT infrastructure by connecting all remote educational institutions through the Internet and support establishment of a National Educational Portal (NEP). Economies of scale will be achieved by leveraging the use of high-end connectivity and network systems (Ministry of Education, 2012). A clear understanding of this relationship is critical information for those who develop, deploy, and manage WLAN technology, and those who develop systems and application software for wireless networks. This is important for the introduction, sustenance and growth of campus wireless networks as well as the relationship between implementations of various security configurations of wireless campus networks and the internet usage within the University community (Siunduh, 2013)

According (Gichoya, 2005), ICT project implementation is a complex endeavor, a lot of research is therefore needed to name challenges, good practice and solutions for successful implementation. In the development and implementation of ICT software system, there are generally accepted principles to achieve success in these projects (Middleton, 1997). Stakeholders at this point the end users need to be involved in the customization level (Kibera, 2013)

### **2.3 Influence of Internet Service Providers on the Implementation of ICT Programmes**

The internet was introduced in Kenya in 1993, and the first commercial internet service provider (ISP) began operating in 1995. Since 2008, there have been no confirmed incidents of government filtering or interference with online communication. However, in March 2012, the CCK announced its intention to set up a surveillance system aimed to monitor private emails, citing a rise in cyber security threats as justification. The installation of the internet traffic monitoring equipment known as the Network Early Warning System (NEWS) will be set up by International Telecommunication Union (ITU) experts and is expected to be operational in mid-2012. Kenya is one of Africa's fastest growing internet markets with internet penetration increasing from 7.5 percent in 2006 to 28 percent in 2011. Much of this growth can be attributed to increases in mobile internet connections, improved internet bandwidth capacity, and intensified promotions on social media applications by mobile operators. The spread of internet to underserved areas is hampered by high operation and maintenance costs, especially due to the lack of electricity, high license and spectrum fees, limited access to roads, and poor security against vandalism for the infrastructure deployed. The internet continues to be an important platform for political debate and mobilization

around critical issues such as the rising cost of living and insecurity affecting ordinary citizens.<sup>29</sup> For example, the Unga (Flour) Revolution protests against rising food and fuel prices throughout 2011 were organized largely through Twitter, Facebook and other websites. In July 2011, a demonstration against Kenya's Minister of Education over unaccounted funds from the Free Primary Education Fund was also organized through text messages, Twitter, and Facebook. Furthermore, ICT users in Kenya have not been subject to widespread technical violence; however, in early 2012, 103 Kenyan government websites were defaced by an Indonesian hacker and cyber security threats have become a growing concern to the CCK in recent years (Freedom House, 2012)

The Internet is one of the Twentieth Century's most important innovations. Now, more than ever before practically anyone can influence the duplication and dissemination of information around the world (Yen, 2000). Internet service providers provide subscribers with a data connection allowing access to the Internet through physical transport infrastructure. This access is necessary for Internet users to access content and services on the Internet and for content providers to publish or distribute material online. ISPs may provide local, regional, and/or national coverage for clients or provide backbone services for other Internet service providers. They include pure-play ISPs as well as wired and wireless telecommunications providers, and cable providers that provide Internet access in addition to network infrastructure. The various types of internet last mile connectivity in Kenya include the traditional LAN, analog modems, ISDN, DSL, fiber optics, Wireless Networks, light waves, radio waves and satellite communication. African Partnership Forum (2008) also noted that national interconnection between networks still needs improvement, along with increased deployment and low cost access. Interconnection rates between telephony operators are often costly and links often congested. Broadband connectivity is relatively slow mainly due to high prices combined with limited availability. There is a need to embark on a solid progress in the construction of the digital highway (Karugu, 2012)

As at 31 March 2012, there were 6.49million internet subscriptions and a total of 11.8million internet users, up from 7.248million users in 2011. Of the subscriptions, 98.8% (6.41million) were through mobile internet/data subscriptions on GPRS/EDGE and 3G networks. The construction of the TEAMS 5 500 km undersea cable was completed in 2009-10. Two more cables, SEACOM and EASSY, were completed in 2011 and 2012. The availability of the three submarine fibre optic cables in Kenya has resulted in increased internet speeds and

increased amounts of broadband available for users at a slightly reduced cost. By the year 2012, the total amount of bandwidth available in the country was 5 361 918.5 mbps, of which only 3.1% was being utilised (Ndung'u, 2012)

Internet intermediaries are rapidly evolving in nature, scale and scope and are poised to connect an increasing number of users, information and services, and to do so at increasing speeds. ISPs are typically commercial organizations that generally charge their users whether households, businesses or governments a monthly fee on a contractual basis. Sometimes the fee is bundled with other services, as in the triple play offered by cable and telephone companies for television, telephone, and Internet access. Laptop users in Internet cafes or wireless —hot spots may pay an ISP (directly or indirectly) for daily access or even hourly access. ISPs range from large organizations, with their own geographically dispersed networks, local points of presence and numerous connections to other such networks (Tier 1 providers – usually large telecommunications companies), to small providers with a single connection into another organization's network (OECD, 2010)

As Internet services grow in complexity, Internet Service Providers (ISP's) are finding out that the ad hoc methods that they have employed to monitor and diagnose their services are not sufficient to provide acceptable service quality to their subscribers. This is due to increased competition and lower revenues that have meant that Internet Service Providers (ISP's) are often understaffed, and the few experts who possess all the domain knowledge necessary to rapidly diagnose and fix problems are often overworked. As a result, these experts are often unavailable to deal with many of the problems that occur. Problem resolution is often left to relatively inexperienced operators who resort to ad hoc methods for diagnosing problems. Consequently, ISP subscribers have often experienced poor service with frequent outages. Poor speeds, erratic connection- drops and pathetic electricity supply has buttressed the cause for no use of internet even in the areas which are advanced in relative terms (Karugu, 2012). Since each ISP system is unique in many respects (e.g., configurations of servers, types of application servers, service offerings, organizational structure, interservice dependencies, etc.), unique service models have to be crafted for each of the services in every ISP system. However, handcrafting service models that are customized to a target ISP system requires enormous effort and time on the part of a human expert (Ramanathan, 2000)

Making the right decision when it comes to choosing the right internet vendor will ultimately determine the successful implementation of the managed Wi- fi Infrastructure. To date there are many internet service providers offering different wireless technology depending on consumer specifications. Heightened customer awareness results in search for better alternative offerings in the market. Recent studies found that before customer make a decision to purchase or stay with a service provider, they considered service uptime, network coverage, and customer service. This is usually a major factor that will ensure that the ICT infrastructure in place is up and running. It is therefore a prerequisite that Internet Service Providers should invest in a modern and efficient customer care service that can provide solutions to customers who have issues with their internet. Hence an important purchase decision factor by Organizations which are willing to invest on quality ICT infrastructure (O. Nyaega, 2015). Other studies indicate that the largest and most comprehensive trace of network activity in a large, production wireless LAN traced the activity of nearly two thousand users drawn from a general campus population, using a campus-wide network of 476 access points spread over 161 buildings at Dartmouth College. They found that students are increasingly choosing a wireless laptop as their primary computer (Siunduh, 2013).

Internet users are abysmal in developing countries and apart from the prohibitive operational cost that keep the lower strata of the society out of the loop, perception of computer use as a highly sophisticated machine is still lingering in many parts of the society and institutions (Karugu, 2012). Lack of institutional commitment and lack of updated ICT strategy ranked top as factors affecting ICT availability and use of ICT (Haliso, 2011)

#### **2.4 The Influence of Project Funding on the Implementation of ICT Programmes**

A country's educational technology infrastructure sits on top of the national telecommunications and information infrastructure. Research noted that before any ICT-based programme is launched, policymakers and planners must carefully consider the infrastructure, electricity and telephony. Limited access to electricity and phone lines or nowadays fibre cables has led to low computer usage in Kenyan institutions and homes. Access to computers in schools, communities, households and affordable internet service has been affected by procurement regulations. Duties and taxes currently levied on ICT products make them too expensive and computer purchases are not given priority in the annual school budgets (Kirimi, 2014). Even if infrastructure is somehow present, the operating cost has been a major drawback (Karugu, 2012).

Other research indicates that implementation of ICT in Education involves diagnosing the need for change, and developing strategies that can lead to innovative and integrated processes of increasing student achievement and improving school administration. The Kenyan government budgeted for 1.3 million laptops for students in public schools at an estimated cost of \$1.8 billion in the next five years in order to fund the free laptop initiative program. This program will ensure that students in the underserved areas will benefit from the free laptop program (Okutoyi, 2013). Research on the Wezesha laptop project funded by the World Bank and implemented by the Kenya ICT Trust Fund under the Kenya Transparency and Communications Infrastructure Project (TCIP) will enable university students to get laptops at subsidized rates. In another project dubbed Badiliko, 14 digital hubs have been built in Kenya providing access to 70 schools. The hubs contain 20 networked desktop computers and they have a lab administrator who provides support with ICT training (Mugo, 2016). Most ICT projects are initially donor funded where some of the donations are made without prior consultation or carrying out a needs analysis by the recipient organization. Operational/running costs are met by the government and it is evident with the rising ICT demands, budgets of such projects are inadequate but rising. Funding in terms of capital and human resource requirements ends with the project phase. However, ICT expenditure can only be justified if there are benefits accruing to it and not adopting it for its own sake (D.Gichoya, 2005)

Although project funding is not a panacea for ICT project implementation, building a flexible infrastructure implies cost and complexity because it must consider the variety of user necessities that an organization can handle without modifying the infrastructure significantly. Baquero 2006 believes departments in institutions ensure guaranteed quality of service for the entire infrastructure that entails investing a considerable amount of time and more importantly money. Maintaining an ICT Centre which administrates the whole ICT infrastructure, as well as the attention and service to all users will call for planning a budget that will sustain it. ICT Centre should be endowed with an organizational structure and technological tools to carry out the centralized administration of ICT resources. All kind of inquiries, problems, petitions or mishaps are managed until their complete resolution. All these involve maintenance costs to guarantee stakeholders ability to utilize the network devoid of setbacks (Baquero, 2006).

Budgeting for Monitoring & Evaluation of ICT activities is also an essential step in ICT project implementation. Researchers like Wagner 2005, suggests that approximately 5 to 10 percent of total project costs be set aside as a reasonable target for M&E programming. This is because M&E should be an integral component of any planned ICT program and should be factored into planning before a project starts. It suggests appropriate, realistic and measurable indicators which should be used to monitor outputs and outcomes, and advises that major stakeholders should be identified and involved in making M&E decisions. The past decade provides strong evidence that misguided policies and funding for internet communication technology (ICT) in education may fail to have the desired education outcomes, while costing more than other education interventions (Wagner, 2005). Procured ICT equipment included desktop computers, printers, server installation and connection, internet access, business software including general ledger, sales and inventory applications developed by local service providers as “custom applications”, software training for 2-3 people and hardware (1-year) and software (2-years) warranties (Marchese, 2005)

According to Baquero 2006 in his research about basic technological architecture there are three evolutionary projects namely: the Individualize Networks of Schools, the Integrated Broadband Network and the Management System. This basic technological architectural has been designed considering that at the same time we are planning, designing, building, using and operating. ICT infrastructural projects therefore require a set of actions that become the basic pillars for a correct execution of it, and these actions are carried out in a coordinated and complementary way. This clearly indicates why the project team needs to be knowledgeable in ICT processes and procedures. Research done through a case study of the Canary Islands Educational system, a school ICT infrastructure should entail approximately by 25.000 PCs, 1.200 servers, 3.000 peripherals, 4.000 switches, 3.000 access points (WI-FI), 1.200 routers, 50.000 network points, 1.000 cabling infrastructures, 1.100 ADSL lines, 100 satellite lines, central services (as software deployment, security copies, monitoring services, etc.), corporate applications, 1.200 cooperative environments in each school, an ICT coordinator in each school, etc. In this ICT infrastructure the human infrastructure play a very important role and is composed approximately by 20 technical operators, 20 software developers and a technical office with 8 persons. Also, we can consider that the 20.000 teachers are inside of this ICT infrastructure when they are considered as an element to fulfil the educational activities (Baquero, 2006). With respect to the great concern about the digital divide, it will be noted that access to ICT facilities is currently one of the major challenges in

Africa Kenya is no exception. Where there is electricity, hindrances to application of ICT include, high costs of Internet provision, costs associated with digital equipment, significant recurrent costs (maintenance and training), opportunities for knowledge distortions due to the high profile (and political) aspects, inadequate infrastructure and support (Wagner, 2005).

Projected investment in ICT is worth it. The best way to do this is to understand what the true total cost of ICT ownership (TCO) is. Hence a need to look beyond the hardware and software costs to determine the combined financial and human resource costs associated with ICT. Costs associated with preparing, launching and sustaining an ICT initiative. Consideration should also be put in implementing complicated initiatives, such as integrating all current database systems into one comprehensive system. There are always hidden costs both in terms of finance and other resources. Before organizations can finally enjoy connectivity, a series of activities need to be completed, these however entail costs covering consultants' fees and/or staff who develop and implement assessment, planning and evaluation-related activities, time spent by internal stakeholders (such as staff, trustees or volunteers) who provide information, suppliers costs related to surveying or other data-gathering activities for assessment and/or evaluation, cost for off-the-peg software and subscription fees for online software applications, and software licensing fees (Kanter, 2007)

Universities have placed ICT as an essential part of their strategies. This has necessitated allocation of ICT budget. Google has rolled out initiatives to support development of wireless campus infrastructure. Google initiatives include donation of switches through KENET, support for wireless infrastructure development in various Universities e.g. Inoorero University, St Pauls University, Kabarak University among others and setup of Google cache at KIXP. Currently, universities are generating about 400Mb/s of traffic to Google cache at KIXP, saving this capacity on international links. The 'Wezesha' laptop initiative driven by Ministry of Information and Communication and Kenya ICT Board enabled university students acquire laptops at subsidized rates (Siunduh, 2013)

Internet users are abysmal in developing countries and apart from the prohibitive operational cost that keep the lower strata of the society out of the loop, perception of computer use as a highly sophisticated machine is still lingering in many parts of the society and institutions (Karugu, 2012). Lack of institutional commitment and lack of updated ICT strategy ranked top as factors affecting ICT availability and use of ICT (Haliso, 2011)



## **2.5 The influence of Stakeholders' Participation on the Implementation of ICT programmes**

Kibera asserts projects whether small or large must place more weight on participation of stakeholders to build awareness, set realistic expectations, raise support, minimize resistance and ensure successful implementation and user adoption. Information and Communication Technology (ICT) projects are no different. It is important to add the organization top management to the stakeholder list to make sure that there is no misunderstanding as well as get their support. The head management may have very different view onto the problem domain than the employees at the bottom of the hierarchy, the end users usually have more realistic view because they interact with the system on a daily routine basis hence understand the problems and a way out to those problems. Owing to complexities that come with these software projects, stakeholders have to be involved so that they own the project and thus increase their success rate (Kibera, 2013)

In the Badiliko Digital Hubs projects situated in clusters of schools or at community centres, infrastructure, curriculum, and training for educators is provided in Sub-Saharan Africa. PTAs, the government, private sector, NGOs and other developmental agencies provide assistance to schools in setting up infrastructure in institutions (Mugo, 2016). Furthermore other research show that without financial support of the government and assistance from development partners implementation of ICT programmes will continue to remain an expensive venture in spite of the fact that the cost of hardware and software has been coming down over the years (MOESTa, 2005). According to USAID personnel in a case study of Implementation of the pilot phases of the "ICT for SMEs" program in Assiut and Mansoura, grant selection and funding criteria conform strictly to USAID contracting and procurement guidelines and were developed with USAID guidance and approval. Further, review of GD grant documents reveals that grant criteria are a "flow down" to grant recipients of contractual terms and conditions applied by USAID and the US Government to its prime contractors (Marchese, F., & Ishak, 2005).

According to research done by Burton (2005), different levels of participation will be appropriate for different stages of the project. He however emphasizes on the importance of stakeholders understanding how they are being involved, how the information they provide will be used and whether they have any power to influence decisions. Participation of stakeholders is most crucial at the beginning stages of a project. They give valuable inputs to

the development of a project (Burton, 2005). Stakeholders are part and parcel of development projects such as those of ICT since they provide for cooperation with the private sector to make available the benefits of new technologies, especially information and communications. (Wagner, 2005). Monitoring and evaluation (M&E) of development activities provides government officials, development managers, and civil society as stakeholders in ICT programmes with better means for learning from past experience, improving service delivery, planning and allocating resources, and demonstrating results as part of accountability to key stakeholders (World Bank, 2015). Attention grabbing headlines about the hacking of Internet connected devices, surveillance concerns, and privacy fears already have captured public attention. Technical challenges remain and new policy, legal and development challenges are emerging. Other legal issues with Internet of Things (IoT) devices include the conflict between law enforcement surveillance and civil rights; data retention and destruction policies; and legal liability for unintended uses, security breaches or privacy lapses (Rose, 2015). Due to open market-based licensing process instituted in 2008, internet service providers have formed organizations such as the Kenyan ISP Association, the Telecommunications Service Providers of Kenya, and the Kenya Cybercafe Owners to lobby the government for better regulations, lower costs, and increased efforts to improve computer literacy. In addition, despite concerns over the use of the internet to propagate hate speech, the government does not employ technical filtering or any administrative censorship system to restrict access to political or other content. Citizens can access a wide range of viewpoints. Individual internet users generally seem comfortable with expressing themselves freely online. The Freedom of Information Bill and the ICT Sector Policy Guidelines 2011 are some of those undergoing internal review. The process is being spearheaded by the Commission for the Implementation of the Constitution (Freedom House, 2012)

ICT integration at all levels in the education sector is capital intensive, requiring the participation of other partners for tangible impact to be felt. Current ICT initiatives have covered an estimated 4% of the sector, with most initiatives concentrated in the urban centres. Public – Private Partnership (PPP) will help in rolling out a comprehensive ICT strategy with substantial impact. The overall objective for ICT development in this component is to foster a favourable environment and provide leadership for public/private/development partner collaboration. This would lead to effective sector-wide ICT initiatives and coordination. The UAE is investing heavily to bring the latest technology to the schools, encouraging the development of creativity, analytic thinking and innovation. The initiative, funded through

the Telecommunications Regulatory Authority's Information & Communication Technology (ICT) Fund, is under the guidance of the Ministry of Education as well as the Prime Minister's office. This is a testament to both the promise of the Program and the dedication of the UAE Government to education and ICT (ITU/Intel online Training Workshop, 2015)

Public and private enterprises associated with e-education projects may share common 'development' interests in having educated and healthy citizens, in putting in place the physical and social infrastructure that would improve the quality of learning, and in expanding markets for sustainable growth of e-education. A sharing of resources between public and private enterprises in e-education interventions make possible a shift away from collective, tax based financing of educational infrastructure and services. Such partnerships draw in new ideas and capacities for problem-solving and leverage investments and professional expertise. Thus, the sum of the partnership wields greater influence, touches more people in need, and reaps benefits for all participants. The experience of Organisation for Economic Co-operation and Development (OECD) countries shows that public-private partnerships (PPP) can play a vital role in mobilizing the scale of resources required for financing and building ICT infrastructure, developing applications and locally relevant content, and developing the human capacity required for harnessing the full capacity of ICT productive tools (McNamara, 2003)

An example of PPP in training is the Cisco Academy, which provides online training through partnerships with public and private institutions or universities that they designate as Learning Solutions Partners or Cisco Learning Partners. The flexibility and cost-efficiency of developing and delivering e-education and training, which traditionally has been the role of universities and IT vendors, has caught the interest of large multinational private organizations. These companies are forming 'concession' partnerships to jointly develop and deliver training on new equipment, software, and use of productive tools to public and private organizations. Several international donor and philanthropic agencies have forged partnerships with governments, NGOs, and commercial enterprises to support e-education for social development. NGOs also enter into partnerships with governments to promote ICT integration in basic education. International agencies such as the Asian Development Bank and the World Bank have also invested in providing ICT to the basic education sub-sector. Some of these initiatives have involved setting up computer labs in schools, computerizing

education administration through Education Management Information Systems (EMIS), and developing an e-curriculum with appropriate learning materials (Hearn, 2010)

## **2.6 The Influence of Capacity building on the implementation of ICT programmes.**

Researchers have argued that one of the major limitation for change in ICT and education is that the large majority of the instructional staff in the education systems (formal and non-formal) in LDCs remains with little or no ICT literacy (Kibera, 2013). In a research done by Baquero (2006), integrating ICT in educational non university environments in an effective way would lead to qualified teachers and students in a short/middle-term period of technological resources. This will permit new ways of teaching and learning, and that will also help to establish new ways of communication and contribution with other educational agents. Furthermore, training teachers, students and other agents is an important pillar in ICT projects in institutions for the successful execution of the Project. Users training is conceived as functional, practical and adapted to the contexts, to the materials and environment in which the Project develops. Moreover when training contents and offers are flexible, the promotion and support to innovation and educational research projects will be another source of provision, with the added value that these materials are already contextualized in specific classroom situations, so that the level of motivation is very high, because they will be suggested by teachers that work with them (Baquero, 2006).

Simply putting computers into schools is not enough to impact student learning; specific applications of ICT can positively impact student knowledge, skills and attitudes, as well as teaching practices, school innovation, and community services (Wagner, 2005). Most people really are not computer savvy, but give them a low-cost, non-threatening way to solve ICT problems or increase productivity and they will embrace it (Marchese, & Ishak, 2005).

Another report by the Kenya's Ministry of Education show that learning institutions still undergo numerous challenges especially in the limited and uncoordinated approach to imparting appropriate ICT skills and competencies to teaching staff which remains a major barrier in the integration of ICT in education in Africa. The ministry has therefore proposed training programmes for the education management sector, its agencies and institutional managers, especially in EMIS. The rapid change in ICT demands continuous training at all levels. The teaching staff force of 197,000 primary school teachers; 38,000 secondary school teachers should be trained in ICT literacy and integration. Basically the agenda is to build

basic capacity in ICT-skills for all players in the education sector. It is well recognized that there is limited research in Africa and specifically in Kenya to identify and address key challenges that stand in the way of adoption and use of ICT in general and particularly in education sector. As such, cooperation with all stakeholders at appropriate forums is needed in order to enhance user confidence, build trust, and protect both data and network integrity. This would also lead to consideration of existing and potential threats to ICT and address other information security and network safety issues (Ministry of Education, 2012)

Students use internet to support their social life through social networks such as face book and twitter. They also use internet for learning and research through e-learning platforms and e-libraries, to access for free e-journals and e-books available on internet. This is demonstrated by the number of hits on the e-learning and e-library platforms (Siunduh, 2013). An organization's IT infrastructure may enable strategic innovations in business processes, while another's IT infrastructure may limit such innovations. Researchers have suggested that infrastructure flexibility improves systems developers' ability to design and build systems to meet organizational business objectives (Chung, 2009). End users therefore need to have a wide range of skills in ICT to be able to take advantage of the flexibility of infrastructure components.

Furthermore Ilomaki (2008), summarizes general competencies required in ICT are in the installation, operation and maintenance of technical equipment, network administration, and network security. Without on-site technical support, much time and money may be lost due to technical breakdowns. In the Philistines, for example, one of the major obstacles to optimizing computer use in high schools has been the lack of timely technical support. In some extreme cases involving schools in remote areas, disabled computers take months to be sent to the nearest city hundreds of kilometers away (Kirimi, 2014). Students have the skills to use new kinds of applications and new forms of technology, and their ICT skills are wide, although not necessarily adequate; the working habits might be ineffective and even wrong. Some students have a special kind of ICT-related adaptive expertise which develops in a beneficial interaction between school guidance and challenges, and individual interest and activity. Teachers' skills are more heterogeneous. The large majority of teachers have sufficient skills for everyday and routine working practices, but many of them still have difficulties in finding a meaningful pedagogical use for technology (Ilomaki, 2008)

Many large companies have invested heavily in e-learning and content management systems, reporting high levels of satisfaction and significant cost reductions. Many large public sector organisations have also followed this path. Most of these large systems are run as web-based resource centres, which employees can access from work or from home. Home access to ICT opens the way to using them as learning resources, technical support and personal guidance. Many large organisations are now using web applications to support their business development by enabling informal learning and knowledge sharing. They often include partner SMEs in this process, so co-opting them into the learning process. One of ICT's main strengths is its capacity to support informal learning. Self-learning and informal peer-learning are by far the two most important mechanisms for obtaining skills and competences. Electronic networks of interests or professions provide important platforms to access and share information, to collaborate and collectively develop skills and competences. These new ICT tools not only present new opportunities for e-learning but also offer a great potential to reconnect groups at risk of exclusion to public services, learning and civic engagement. Social networks and software tools such as blogs and wikis can help develop key skills and competences. Projects that encourage individuals to share internet connectivity, to develop software, online content or virtual communities are examples of the added value of informal learning through ICT. Innovative companies and educational institutions are already tapping these online spaces and incorporating novel "open innovation" methods (Commission of the European Communities, 2008)

## **2.7 Theoretical Framework**

### **2.7.1 Lewin's Force –Field Theory of Change**

Force Field Analysis was developed by Kurt Lewin (1951) and is widely used to inform decision making, particularly in planning and implementing change management programmes in organizations. It is a powerful method of gaining a comprehensive overview of the different forces acting on a potential organizational change issue, and for assessing their source and strength. The study will adapt the force field analysis in an attempt to improve success in implementing ICT projects. This model posits that organizational change is influenced by two opposing forces of change which are competitive, economic, political, global, demographic, social or ethical forces. These are evaluated in terms of the driving forces and restraining forces whereby each force is rated by its importance and by the degree of control it exerts over that force. Lewin's Change model of unfreezing, changing and

refreezing can be applied to the educational context. It involves individuals learning something new and discontinuing current attitudes, behaviours and organizational practices (Lewin, 1951). The model frames problems in terms of factors or pressures that support the status quo and those pressures that support change in the desired direction. In this study it is clear that there is a need to fully incorporate ICT infrastructure in the normal running of institutions for the benefit of all. However, different stakeholders may have diverging views that affect the successful implementation. Furthermore, there is a need to show whether projects have been adequately funded or whether the project beneficiaries are the restraining forces. This is because the more predictable and routine activities are, the higher the level of efficiency that can be obtained. Thus, the status quo is preferred in many cases (Lunenburg, 2010)

### **2.7.2 The Model of the IT Implementation Process**

This model has been selected for this research study in order to clearly show how the different stakeholders cooperate in implementation of the managed Wi-Fi at different stages to serve a wider community in the long run. (Cooper, 1990) took (Kwon, 1987)'s model of the IT Implementation Process and developed it further. The model is based on the organizational change, innovation, and technological diffusion literature. The purpose of the model is to offer a directing and organizing framework for ICT implementation research. It comprises six stages, namely initiation, organizational adoption, adaptation, acceptance and adoption, routinization, and infusion. Thus, the model covers an implementation process from the scanning of organizational needs to a full and effective use of the technology in daily practice. The model also identifies five contextual factors which impact on processes and products in each implementation stage: the characteristics of the user community, the organization, the technology being adopted, the task, and the organizational environment (Nchunge, 2013). Therefore this model will help us understand how end users will gradually utilize and accept the implemented technology.

### **2.7.3 Diffusion of Innovation theory (DOI)**

This model has been selected because it presents managed Wi-Fi as a new technology to organizations that are willing to invest in wireless platforms. Hence it depicts the aspects that stakeholders have to put into consideration before such a technology can be internalized. For example; providing as much information as needed to end users. This may involve people changing their perception on existing technology and adapting to new ones. DOI is a general theory of how new ideas are spread and adopted in a community, and it seeks to explain how

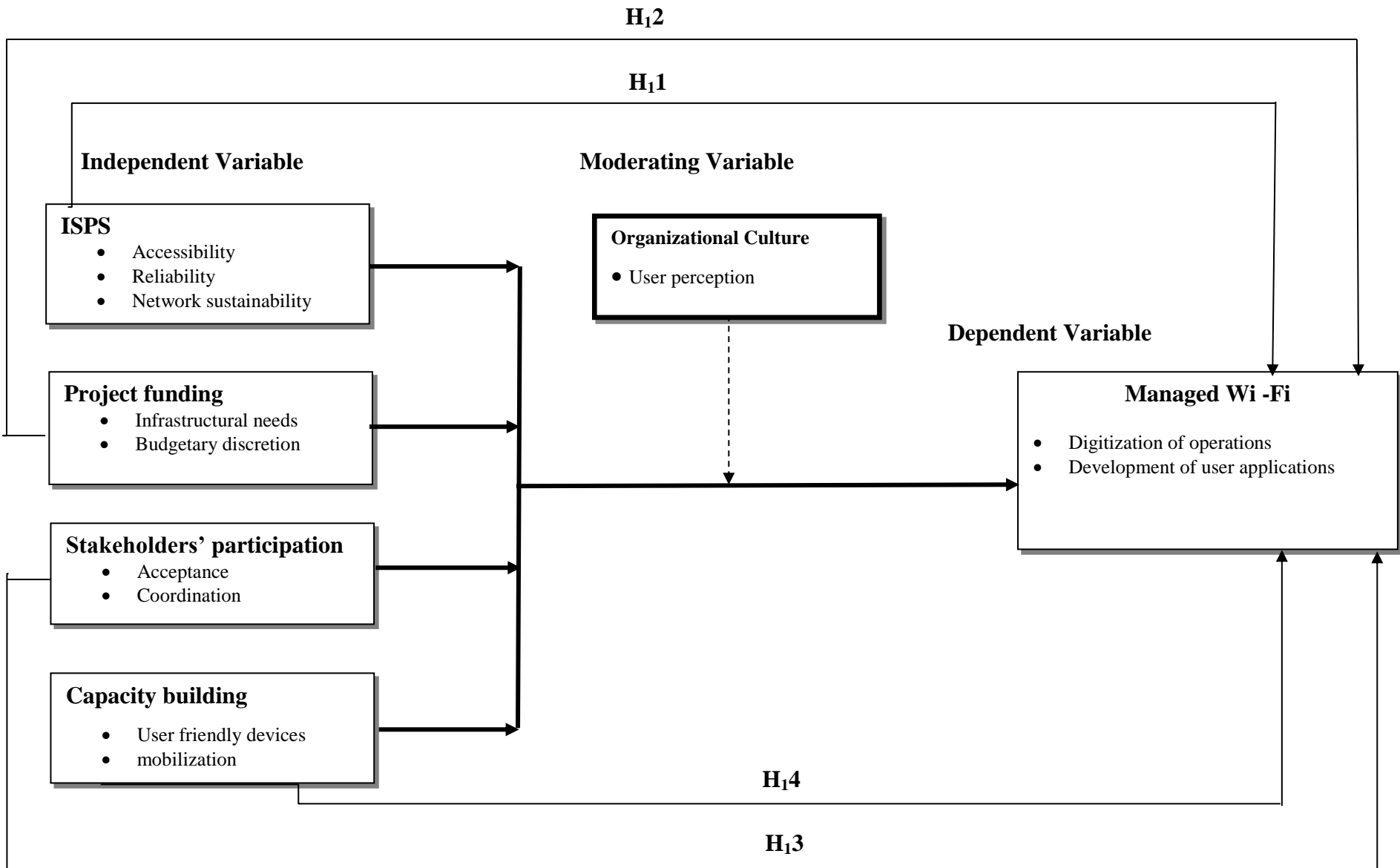
communication channels and opinion leaders shape adoption. The four major factors that influence diffusion process includes; innovation, communication, time and nature of the social system into which the technology is being introduced. It states that an innovation (technology) is passed on from its source to end users through a medium of agents and its diffusion in potential users for the most part dependent on the personal attributes of the individual user. Information filters through the networks and depending on the nature of the networks and the roles of its opinion leaders, new innovations are either adopted or rejected. The model assumes that the technology in question is appropriate for use unless hindered by the lack of effective communication (Rogers, 1995)

## **2.8 Conceptual Framework**

According to Mugenda (2008), a conceptual framework is a hypothesized model portraying the relationship between variables diagrammatically. It clearly indicates relationships between the variables identified for the study; these are independent and the dependent variables. In this study, the independent variables are Internet Services Providers, Project Funding, Stakeholders Participation and Capacity building which will influence the dependent variable of the implementation of ICT programmes being measured in terms of digitization of operations and development of user operations.

Organizational culture is the moderating variable in this study. This is because user perception can make a big difference in influencing the successful implementation of the managed Wi-Fi Project.





**Figure 2.1: Conceptual Framework**

### **2.8.1 Explanation of Relationships of Variables in the Conceptual Framework**

Information and communication technologies (ICTs) is defined as a diverse set of technological tools and resources used to communicate and create, disseminate, store, and manage information (Blurton, 1999). For learning institutions to embark on cost effective ICT infrastructure, suitable ISPs need to be considered as well as involve the right stakeholders during the planning and implementation process. This will ensure that the project will have a positive impact on training and development among the students and the institutions staff and the general academic content. This indeed indicates the direct relationship between stakeholders involved, technology to be used for networking and for end users and what the project is likely to incur. ICT infrastructure is the ultimate hub where information for use, capacity building, management information system, digital libraries and resource sharing/document delivery through telecommunication technologies and digital technologies can enable stakeholders to survive in a fast paced global village (Chisenga, 2006). The internet is an ocean of information which can be harnessed for the rendition of information in school. The inclusion of technology in the learning process makes learning an enjoyable activity, thus inviting greater interest from the learners. The administration processes, the official procedures of the school can be simplified by the means of technology. School records, the information about all the students and the teachers and other school employees can efficiently be maintained by means of the advanced technology. Thus we see that technology not only benefits the school students but also eases the office work. It makes possible a more effective way of storage and distribution of information. The realization of the importance of technology in schools and its successful implementation is a necessity (Kirimi, 2014).

### **2.9 Gaps in Literature Review**

The research observed the gaps identified within the review of relevant literature as shown in the table below;

**Table 2.1: Knowledge Gap**

<b>Variable</b>	<b>Author and Year</b>	<b>Findings</b>	<b>Knowledge gap</b>
ISPs	(O. Nyaega, 2015) (Siunduh, 2013)	The study recommends that Internet Service Providers should invest in a modern and efficient customer care service that can provide solutions to customers who have issues with their internet. ISPs in Kenya should ensure that they enhance the level of service uptime which customers considered before making a decision to purchase an ISP product or to stay with the same ISP.	The literature emphasis was on the customer service providing solutions in case of network failure. However there is a need to create a team of experts within institutions who are able to troubleshoot and monitor the network in a more proactive way. Little is known about the relationship between security levels configured on wireless campus network to the growth in internet usage.
Project Funding	(Kiriimi, 2014) (Wagner, 2005)	Access to computers in schools, communities, households and affordable internet service has been affected by procurement regulations. Budgeting for Monitoring & Evaluation activities is an essential step in ICT projects, research suggests that approximately 5 to 10 percent of total project costs be set aside as a reasonable target for M&E programming.	The authors focus on budgeting for devices and internet but fail to highlight on the quality of the devices as well as that of the network. Basically if they are both of bad quality in terms of versatility and obsolescence, the essence of ICT programs may not be realized. Furthermore, literature reviewed did not indicate whether devices sourced should be user friendly and therefore appropriate for learning.
Stakeholders' Participation	(Kibera, 2013) (Ministry of Education, 2012) (World Bank,	Projects whether small or large must place more weight on participation of stakeholders to build awareness, set realistic expectations, raise support, minimize resistance and ensure successful implementation and user adoption. Stakeholder	There was limited literature on how stakeholders differ especially educators when it comes to how Internet should be utilized in the learning environment. In addition the role of school management in empowering

	2015)	<p>resistance to new technology adoption and their concerns of their association with it and the prevailing power structures have a great impact on the actual implementation of the ICT infrastructure.</p> <p>ICT integration at all levels in the education sector is capital intensive, requiring the participation of other partners for tangible impact to be felt. Stakeholders will have better means for learning from past experience, improving service delivery, planning and allocating resources, and demonstrating results as part of accountability to key stakeholders.</p>	<p>teachers with digital skills has not been highlighted.</p>
Education and Training	(S. Chung, 2009) (Baquero, 2006)	<p>Infrastructure flexibility improves systems developers' ability to design and build systems to meet organizational business objectives.</p> <p>Training teachers, students and other agents is an important pillar in ICT projects in institutions for the successful execution of the Project. It is important especially to the materials and environment in which the Project develops.</p>	<p>The researchers did not focus on professional expertise, talents and skills to be acquired by learning in a ICT enabled environment. Furthermore, researchers did not put forth any information of how institutions can self-reliant when it comes to maintenance of their network and creating E-content.</p>

## 2.10 Summary of Literature

ICTs facilities such as the Internet, have had the effect of reducing digital disparities leading to increased interest in computer education by institutions. Besides limited access, unavailability of ICT teachers, and relatively high costs of ICT components are other challenges that continue to hamper adoption of ICTs in most parts of Africa and particularly so in education sector. (Commission of the European Communities, 2008). An ICT literate workforce is the foundation on which the nation will become a knowledge-based economy

and create dynamic and sustainable economic growth. The E-Government Strategy which was adopted in 2004 emphasizes transformation of Government services from manual to digital-based operations including operationalization of the Education Management Information System (EMIS). (The European MSM Internet Survey, 2004).

ICT infrastructure will therefore facilitate mechanisms that would encourage educational institutions to keep abreast and harness emerging technologies to enhance the process of teaching, learning and acquisition of knowledge and skills in tandem with the modern world (Ministry of Education, 2012). However, lack of funding by government has been cited as one of the notable challenges including limited funding to support the purchase of the ICT facilities to improve access to educational materials (Richardson, 2007). For ICT technologies to be efficient and effective, a great deal of care and attention needs to go into its implementation. That is to say, institutions, teachers and head teachers need to be involved in the decision making processes as well as invest adequate human and financial resources especially at the initial stages (Cox, 2010). Most of the Kenyan public universities rely on government exchequer for funding which has been dwindling in the recent years (Gichoya, 2013).

## **CHAPTER THREE**

### **RESEARCH METHODOLOGY**

#### **3.1 Introduction**

This chapter clearly describes the method and processes that were used to identify the population, sample size, sampling techniques and the instruments that were used for the study of appraisal of implementation of ICT programmes in Kenya which focused on a target population of 365 respondents using the descriptive survey design.

#### **3.2 Research design**

For the intended purpose of the study to be achieved, a set of items for measuring quality management practices were developed based on a thorough review of the appraisal of implementation of ICT programmes literature, expert guidance and inputs from colleagues. This study determined to what extent key variables such as Internet Service Providers, project funding, stakeholders participation and education and training have played a key role in implementation of ICT wireless platforms in learning institutions.

Descriptive survey design was used to gather information. This was incorporated with descriptive study concerned with the description of events or phenomenon as they are, were or will be (present, past and future). Present oriented methodologies were used to investigate populations by taking a part of it. This method is ideal for this study as it describes the area of interest by bringing out the facts on the ground as they are without alterations. Survey is concerned with describing, recording, analyzing and reporting conditions that exist or existed (Kothari, 2005). Survey method is widely used to obtain data useful in evaluating present practices and in providing basis for decisions (Sharma, 2006).

The research was carried out using a cross-sectional survey. According to David (2001), the standard cross-sectional design, data are collected at one point in time. He adds that cross-sectional designs are most cost effective than comparable experimental and longitudinal design. This is because cross-sectional designs do not entail the cost of repeated data collections, tracking respondents or of experimental interventions. The researcher therefore interviewed the respondents once, administered the questionnaires once and drew conclusions

after analysis. Survey research design allowed the researcher to investigate populations by selecting samples to analyze and discover occurrences.

### 3.3 Target Population

This study focused on a target population of 365 respondents using the Descriptive survey design. The focus group involved students, ICT staff, administrators and head of departments.

**Table 3.1: Target Population**

	<b>Target Population</b>
Administrators	10
ICT Staff	15
Students	300
Heads of departments	20
<b>Total</b>	<b>365</b>

### 3.4 Sample Size and Sampling Procedures

#### 3.4.1 Sample Size

The sample of the study was drawn from the students, ICT staff, head of departments and administrators. A sample of 20% was drawn from each stratum through simple random sampling. According to Kothari, (2004), a sample size between 5-20% is ideal to represent the entire population. The number of the respondents to which the questionnaires were administered from each stratum has been determined through the population frame list below.

**Table 3.2: Sampling Frame**

<b>Target Population</b>	<b>Numbers</b>	<b>Sample Size Number</b>
Administrators	10	2
ICT Staffs	15	3
Students	300	60
Heads of departments	20	5
<b>Total</b>	<b>365</b>	<b>70</b>

### **3.4.2 Sampling Procedures**

Stratified sampling and simple random sampling techniques were applied in selection of respondents. First, the ICT functional units within Mombasa Technical Training Institute were treated as strata upon which the respondents were selected. Stratification was used because the population was structured into various non-homogenous units, hence the need for sample diversity.

### **3.5 Data Collection Instruments**

Questionnaires were convenient for collecting data because it was cheap and confidential on identifying as to who filled it. In addition it helped to analyze on the perception of individual about the appraisal of implementation of ICT programmes in Kenya. In addition the study also used observation as an instrument of data collection.

### **3.6 Validity and Reliability of Instruments**

#### **3.6.1 Pilot Testing of the Instruments**

According to Mugenda, & Mugenda, (2003) pilot testing ensures that the research instruments are clearly stated and have the same meanings to all the respondents. Pilot testing was carried out at Mombasa Technical Training Institute. The outcome helped in identifying areas and questions in the instruments that need modification, the appropriateness of data analysis methods and the adjustments necessary to refine the research instruments. The outcome also assisted in restructuring the sequence of questions and moderating the questionnaires in order to yield the desired response in the actual research. This exercise gave an indication of the time needed for full response.

#### **3.6.2 Validity of the Instrument**

Validity is the degree to which a test measures what it purports to measure (Borg, & Gall, 2005). To enhance validity the researcher exposed the instruments to experts in research for judgment.

The researcher conducted a pilot survey study whereby inappropriate questionnaires item were discarded, rephrased and or merged. The piloting was conducted in Mombasa Technical



Training Institute to respondents from the study area that was not be among those sampled and were selected randomly.

### **3.6.3 Reliability of the Instrument**

Reliability is a measure of the degree to which a research instrument yields consistent result or data after repeated trials, (Mugenda, & Mugenda, 2003). Reliability in research is influenced by random error of which it is high, reliability is low. Test-retest technique was used to test reliability. The research instruments were presented to the respondents selected for the pilot study the result was recorded for the same instrument which was presented to the same group after two weeks and the results of both tests were correlated. The scores from the two testing periods were correlated and a reliability index was found of which a reliability index above 0.8 generally indicate good consistency (Borg, & Gall, 1983)

### **3.7 Data Collection Procedures**

The study was commenced by conducting a survey in Mombasa Technical Training Institute after approval from the senior management of both organizations that is Nairobi University and Mombasa Technical Training Institute. Visiting was conducted prior to the date to enable the researcher to start winning the confidence of the staff.

The standardized, structured self-administered questionnaires were distributed or issued to staffs equivalent to the number of questionnaires designed. Each of the staff filled them by putting a tick in one of the boxes provided to his or her answers.

The questionnaires were collected back after a specified period of time agreed upon by the researcher and the respondents.

### **3.8 Data Analysis Techniques**

The data analysis technique that was used to analyse data was quantitative since this technique was very vital to provide the best report of findings.

The statistical packages for the social science (SPSS) was used to analyse data. The primarily analysis was conducted to check for any violation in normality, equality of variance and linearity. The data from the sample fulfilled all the assumption allowing for parametric tests that were conducted.

### **3.9 Ethical Considerations**

The goal of ethics in research is to ensure that no one is harmed or suffers adverse consequences from research activities (Cooper, & Schindler, 2003) The following was done to ensure that the respondents' rights are protected: Informed consent was sought and appropriate documentation was kept, questionnaires were coded guarantee anonymity as one of the respondents were named at any time during the research or in the subsequent study, and respondents was selected for their willingness to participate without compulsion, and no risks to the respondents were identified at any stage during the research.

### 3.10 Operational Definition of Variables

**Table 3.3 Operationalization of Variables**

Independent Variables	Indicators	Measures	Data Collection Method	Scale	Tool of Analysis
Internet Service Providers	<ul style="list-style-type: none"> <li>• Accessibility</li> <li>• Reliability</li> <li>• Network sustainability</li> </ul>	<ul style="list-style-type: none"> <li>• percentage of internet speeds</li> <li>• Technical representatives</li> </ul>	<ul style="list-style-type: none"> <li>• Questionnaire</li> <li>• Observation</li> </ul>	<ul style="list-style-type: none"> <li>• Ordinal</li> <li>• Interval</li> </ul>	SPSS
Project Funding	<ul style="list-style-type: none"> <li>• Infrastructural needs</li> <li>• Budgetary discretion</li> </ul>	<ul style="list-style-type: none"> <li>• System maintenance</li> <li>• Procurement of hardware</li> </ul>	<ul style="list-style-type: none"> <li>• Questionnaire</li> <li>• Observation</li> </ul>	<ul style="list-style-type: none"> <li>• Interval</li> <li>• Ratio</li> </ul>	SPSS
Stakeholder's Participation	<ul style="list-style-type: none"> <li>• Coordination</li> <li>• Acceptance</li> </ul>	<ul style="list-style-type: none"> <li>• EMIS</li> <li>• E-portfolio</li> <li>• Learning management system</li> </ul>	<ul style="list-style-type: none"> <li>• Questionnaire</li> <li>• Observation</li> </ul>	<ul style="list-style-type: none"> <li>• Ordinal</li> <li>• Nominal</li> <li>• Interval</li> </ul>	SPSS
Capacity building	<ul style="list-style-type: none"> <li>• User friendly devices</li> <li>• Mobilization</li> </ul>	<ul style="list-style-type: none"> <li>• New skills</li> <li>• New user applications</li> <li>• State-of-the-art devices.</li> </ul>	<ul style="list-style-type: none"> <li>• Questionnaire</li> <li>• Observation</li> </ul>	<ul style="list-style-type: none"> <li>• Ordinal</li> <li>• Nominal</li> <li>• Interval</li> </ul>	SPSS

## CHAPTER FOUR

### DATA ANALYSIS, PRESENTATION AND INTERPRETATION

#### 4.1 Introduction

This chapter presents the data analysis, presentation and interpretation of findings on the data collected from Mombasa Technical Training Institute, based on the determinants of the implementation of information and communication technology programmes. The purpose of the study was to determinants of the implementation of information and communication technology programmes in organisations. The study sought to answer the research questions: To what extent have internet service providers (ISPs) influenced the implementation of the Managed Wi-Fi project at the Mombasa Technical Training Institute in coast region, Kenya? To what extent has project funding influenced the implementation of Managed Wi-Fi project at the Mombasa Technical Training Institute in coast region, Kenya? To what extent has stakeholder's participation influenced the implementation of Managed Wi-Fi project at the Mombasa Technical Training Institute in coast region, Kenya? To what extent has capacity building on the implementation of Managed Wi-Fi project at the Mombasa Technical Training Institute in coast region, Kenya?

#### 4.2 Response Rate

A total of 70 questionnaires were distributed to the respondents. After the questionnaires were filled by the respondents and collected, they were screened and sorted out by the researcher. The responses were put in percentage form and presented in the Table and Chart below.

**Table 4.1: Response Rate**

<b>Respondents</b>	<b>Questionnaires Administered</b>	<b>Questionnaires Filled and Returned</b>	<b>Percentage (%)</b>
<b>Total</b>	<b>70</b>	<b>65</b>	<b>93%</b>

As seen from Table 4.1 a total of 70 questionnaires were distributed to the respondents. After the questionnaires were filled by the respondents and collected, they were screened and sorted out by the researcher, and 65 of the questionnaires were duly filled and returned giving 90% response rate while the remaining 5 questionnaires were not returned giving a response rate of 10%. This was in line with Mugenda and Mugenda (2003) who suggested that a 50% response rate is adequate, 60% good and above 70% is rated very good. This also concurs with (Kothari, 2004) assertion that a response rate of 50% is adequate, while a response rate greater than 70% is very good. This implies that based on these assertions; the response rate for this study, 93% is very good.

### 4.3 Demographic Information

The study found it of paramount importance to establish the demographic information in order to evaluate the determinants of the implementation of information and communication technology programmes at Mombasa Technical Training Institute.

#### 4.3.1 Gender

The respondents were asked about their gender. The responses were put in percentage form and presented in the table and chart below.

**Table 4.2 Gender**

<b>Gender</b>	<b>Frequency</b>	<b>Percentage</b>
Male	42	65%
Female	23	35%
<b>Total</b>	<b>65</b>	<b>100%</b>

From Table 4.2 above the study revealed that there was good representation in gender in Mombasa Technical Training Institute. It was found out that males were the majority (42) accounting to 65% of all the respondents while females (23) accounting to 35% of all the respondents. Nevertheless, the company had a policy of equitable gender representation and not reserving any position for neither of the genders.

### 4.3.2 Age of Respondent

The researcher sought to determine the age under which the respondents fall and the findings are shown in table 4.3.

**Table 4.3: Age of Respondent**

<b>Age</b>	<b>Frequency</b>	<b>Percentage (%)</b>
21-30 Years	39	60
31-40 Years	10	15
41-50 Years	13	20
Above 50 Years	3	5
<b>Total</b>	<b>65</b>	<b>100</b>

The findings revealed that majority (39) respondents are between 21 – 30 years representing 60%, 10 respondents are of the age between 31 - 40 years representing 15%, 13 respondents are of the age between 41 – 50 years representing 20% and 3 respondents are of the age above 50 years representing 5%. It can therefore be observed from the findings of the study that most of respondents were in the age bracket of 21 – 30 years. This has been well illustrated in figure 4.2 shown below.

### 4.3.2 Level of Education of the respondents

The respondents were asked of their educational levels. The responses were put in percentage form and presented in the table and chart below.

**Table 4.4: Education level**

<b>Qualification</b>	<b>Frequency</b>	<b>Percentage</b>
<b>Certificate</b>	8	12
<b>Diploma</b>	21	32
<b>Degree</b>	28	44
<b>Masters</b>	8	12
<b>Total</b>	<b>65</b>	<b>100</b>

Findings in Table 4.4 above shows that there were no respondents who have less than tertiary education, 12% are certificate holders, 32% are diploma holders, 44% are degree holders and 12% have master's degree. Majority of the respondents were diploma and degree holders indicating that they were able to interpret the questionnaires as per the expectation of the researcher.

### 4.3.3 Role of Respondents in the Institution

The respondents were asked of their roles in the company. The responses were put in percentage form and presented in the table 4.5 and chart 4.5 below.

**Table 4.4: Role of respondents in the Mombasa Technical Training Institute**

<b>Role of Respondents</b>	<b>Frequency</b>	<b>Percentage (%)</b>
Student	39	60%
Administrative Staff	5	8%
Teacher	21	32%
Parent	-	-
<b>Total</b>	<b>65</b>	<b>100</b>

As seen from Table 4.4 out of the 39 respondents 60% were students, 8% administrative staff, and the remaining 32% were teachers. 80% of the data was obtained from our focus group. This confirmed the reliability of the data sources as they emanated from key and responsible people in the institution.

### 4.4 Descriptive Statistics on Internet Service Providers

In an effort to determine the determinants of the implementation of ICT programmes in Mombasa Technical Training Institute, respondents in this study were asked to indicate their level of agreement with specific statements in the questionnaire that related to Internet Service Providers and its influence on the Implementation of ICT Programmes. The coding employed in the analysis was 1 to 5 with 1 representing strong agreement and 5 representing strong disagreement with the statements. Table 4.5 shows the statistics on some of the findings from questions in the survey related to on the Implementation of ICT Programmes and how respondents were in agreement or disagreement with the statements.

**Table 4.5: Descriptive Statistics on Internet Services Providers**

Statements on Internet Services Providers	N Valid	Median	Mode	Std. deviation
The managed Wi-Fi has been an effective internet service to the students and staff at the Mombasa technical training Institute.	65	2	2	.364
Students and staff can easily download and upload content.	65	3	3	.378
The Internet Service is always running at convenient speeds.	65	2	2	.444
The internet downtime is resolved within the appropriate time.	65	3	3	.497
Signals are well spread out around institutions blocks	65	3	3	.657

Table 4.5 shows a mode of 2 for the questionnaire item of ‘managed Wi-Fi has been an effective internet service to the students and staff at the Mombasa technical training Institute’ implying that most of the respondents ‘agreed’ with this statement. All the other items had a mode of 3 implying that most of the respondents interviewed were neutral with the statements. It can therefore be concluded that all the respondents concurred that the Internet Services Providers have an influence on the Implementation of ICT Programmes in Mombasa Technical Training Institute.

#### **4.4.1 Effectiveness of Internet Service to the Students and Staff**

The respondents were asked to rate whether there is effective internet service to the students and staff in Mombasa Technical Training Institute. The findings are shown in table 4.6.



**Table 4.6 Effectiveness of Internet Service to the Students and Staff**

	Frequency	Valid Percent	Cumulative Percent
<b>Strongly agree</b>	7	11.1	11.1
<b>Agree</b>	29	44.5	55.6
<b>Neutral</b>	22	33.3	88.9
<b>Disagree</b>	7	11.1	100.0
<b>Strongly disagree</b>	0	0	100.0
<b>Total</b>	<b>65</b>	<b>100.0</b>	

In table 4.6, 55.6% of the respondents were in agreement that there is effective internet service to the students and staff in Mombasa Technical Training Institute though to different extents. Only 11.1% of the respondents disagreed with this assertion while 33.3% of the respondents opted to remain neutral. This indicates that there is effective internet service to the students and staff in Mombasa Technical Training Institute.

#### **4.4.2 Ease in Downloading and Uploading of Content by Students and staff**

This question sought to determine if the Students and staff can easily download and upload content in Mombasa Technical Training Institute. The findings are shown in table 4.7

**Table 4.7 Ease in Downloading and Uploading of Content by Students and staff**

	Frequency	Valid Percent	Cumulative Percent
<b>Strongly agree</b>	6	8.9	8.9
<b>Agree</b>	22	33.3	42.2
<b>Neutral</b>	34	53.4	95.6
<b>Disagree</b>	3	4.4	100.0
<b>Strongly disagree</b>	0	0	100.0
<b>Total</b>	<b>65</b>	<b>100.0</b>	

Table 4.7 shows that 8.9% of the respondents strongly agreed that students and staff can easily download and upload content in Mombasa Technical Training Institute while 33.3% agreed to the questionnaire item. Only 4.4% of the respondents disagreed that Students and staff can easily download and upload content at Mombasa Technical Training Institute while 53.4% of the respondents were undecided on the issue. At 42.2% agreement, it implies that

there is no consistency in downloading and uploading of content by students and staff at the Mombasa Technical Training Institute.

#### 4.4.3 Convenient Speeds of the Internet Service

This question sought to determine if the Internet Service is always running at convenient speeds at Mombasa Technical Training Institute. The findings are summarised in table 4.8

**Table 4.8 Convenient Speeds of the Internet Service**

	Frequency	Valid Percent	Cumulative Percent
<b>Strongly agree</b>	7	11.1	11.1
<b>Agree</b>	30	44.4	55.5
<b>Neutral</b>	10	15.6	70.1
<b>Disagree</b>	14	22.2	92.3
<b>Strongly disagree</b>	4	6.7	100.0
<b>Total</b>	<b>65</b>	<b>100.0</b>	

On the issue of convenient speeds of Internet Service in Mombasa Technical Training Institute, 11.1% of the respondents strongly agreed that there the internet service was running at convenient speeds while 44.4% agreed with the statement. Only 22.2% of the respondents disagreed with the statement. At 55.5% agreement with the statement, is evident that Internet Service is always running at convenient speeds in Mombasa Technical Training Institute.

#### 4.4.4 Internet Downtime is Resolved within the appropriate time

This question sought to determine if the internet downtime is resolved within the appropriate time in Mombasa Technical Training Institute. The findings are shown in table 4.9

**Table 4.9 Internet Downtime is Resolved within the appropriate time**

	Frequency	Valid Percent	Cumulative Percent
<b>Strongly agree</b>	4	6.7	6.7
<b>Agree</b>	7	11.1	17.8
<b>Neutral</b>	28	40.0	57.8
<b>Disagree</b>	16	26.7	84.5
<b>Strongly disagree</b>	10	15.5	100.0
<b>Total</b>	<b>65</b>	<b>100.0</b>	

Table 4.9 shows that 6.7% of the respondents strongly agreed that Internet Downtime is resolved within the appropriate time in Mombasa Technical Training Institute while 17.8% agreed to the questionnaire item. Only 42.2% of the respondents disagreed that Internet downtime is resolved within the appropriate time at Mombasa Technical Training Institute while 40.0% of the respondents were undecided on the issue. At 17.8% agreement, it implies that there was no good mechanism to resolve internet downtime within the appropriate time in Mombasa Technical Training Institute.

#### **4.4.5 Spreading out of Signals around institutions blocks**

This question sought to determine if signals are well spread out around institutions blocks in Mombasa Technical Training Institute. The findings are summarised in table 4.10

**Table 4.10 Spreading out of Signals around institutions blocks**

	Frequency	Valid Percent	Cumulative Percent
<b>Strongly agree</b>	6	8.9	8.9
<b>Agree</b>	13	20.0	28.9
<b>Neutral</b>	25	37.8	66.7
<b>Disagree</b>	14	22.2	88.9
<b>Strongly disagree</b>	7	11.1	100.0
<b>Total</b>	<b>65</b>	<b>100.0</b>	

As shown in table 4.10, shows that 28.9%, agreed, to different extents, that Signals are well spread out around institutions blocks in Mombasa Technical Training Institute. Only 33.3% were in disagreement with this statement but 37.8% were undecided. This finding implies

that signals are not well spread out around institutions blocks in Mombasa Technical Training Institute.

#### 4.5 Inferential Statistics on Internet Service Providers

Spearman correlation analysis was conducted at 95% confidence interval and 5% significance level and was a 2-tailed test. Table 4.11 indicates the correlation between the Internet Service Providers and its influence on the Implementation of ICT Programmes

**Table 4.11: Inferential Statistics on Internet Service Providers**

			Internet Service Providers	Influence on the Implementation of ICT Programmes
<b>Spearman's value</b>	Internet Service Providers	Correlation Coefficient	1.000	0.462*
		Sig. (2-tailed)		0.05
		N	65	65
	Influence on the Implementation of ICT Programmes	Correlation Coefficient	0.462*	
		Sig. (2-tailed)	0.05	
		N	65	65

\* Correlation is significant at the 0.05 level (2-tailed)

Table 4.11 shows a moderate positive correlation between Internet Service Providers and its influence on the Implementation of ICT Programmes conducted in Mombasa Technical Training Institute with a Spearman's value of 0.462. This finding shows that the Internet Service Providers is positively correlated with its influence on the Implementation of ICT Programmes at Mombasa Technical Training Institute. The value of 0.462 for a sample size of 65 at significance level of 0.05 is statistically significant. Based on these analyses, the hypothesis that;

**H<sub>1</sub>1:** There is significant relationship between internet service providers (ISPs) and implementation of ICT programmes is not rejected.

#### 4.6 Descriptive Statistics on Project Funding

In an effort to determine the influence of Project Funding on the implementation of managed Wi-Fi project at the Mombasa Technical Training Institute in coast region, Kenya, respondents in this study were asked to indicate their level of agreement with specific statements in the questionnaire that related to the Influence of Project Funding on the Implementation of ICT Programmes. The coding employed in the analysis was 1 to 5 with 1 representing strong agreement and 5 representing strong disagreement with the statements.

Table 4.12 shows the statistics on some of the findings from questions in the survey related to Project Funding and how respondents were in agreement or disagreement with the statements.

**Table 4.12: Descriptive Statistics on Project Funding**

Statements on Project Funding	N Valid	Median	Mode	Std. deviation
The initial cost of setting up the ICT infrastructure was facilitated by the Mombasa Technical Training Institution.	65	1	1	.282
The institution has subscribed to more than one Internet Service Providers.	65	4	5	.623
The benefit of situating ICTs for use outside the classroom has had more benefits than costs.	65	2	1	.265
The managed Wi-Fi service has been implemented alongside State-of-the-Art learning tools such as smart boards, projectors and teleconferencing facilities among others.	65	4	4	.537

Table 4.12 indicates that for the items on Project Funding on the implementation of managed Wi-Fi project, the mode of 1 implies that most of the participants strongly agreed that the benefit of situating ICTs for use outside the classroom has had more benefits than costs and that Facilitation of initial cost of setting up the ICT infrastructure was done by Mombasa Technical Training Institute. A mode of 5 for the other items indicates that most of the

respondents were in disagreement that institution has subscribed to more than one Internet Service Providers.

#### 4.6.1 Facilitation of initial cost of setting up the ICT infrastructure

This question sought to determine if the initial cost of setting up the ICT infrastructure was facilitated by Mombasa Technical Training Institute. The findings are summarised in table 4.13

**Table 4.13 Facilitation of initial cost of setting up the ICT infrastructure**

	Frequency	Valid Percent	Cumulative Percent
<b>Strongly agree</b>	44	66.7	66.7
<b>Agree</b>	14	22.2	88.9
<b>Neutral</b>	7	11.1	100.0
<b>Disagree</b>	0	0	100.0
<b>Strongly disagree</b>	0	0	100.0
<b>Total</b>	<b>65</b>	<b>100.0</b>	

From table 4.13 it is evident that majority of respondents at 66.7% strongly agreed that the selection of the facilitation of initial cost of setting up the ICT infrastructure was done by Mombasa Technical Training Institute. This is in concurrence with the mode of 1 under Table 4.12. None of the respondents disagreed or strongly disagreed with the statement while 11.1% of the respondents remained neutral on the statement. With majority of the respondents; 88.9% agreeing with the statement, then it implies that facilitation of initial cost of setting up the ICT infrastructure was done by Mombasa Technical Training Institute.

#### 4.6.2 Subscription to more than one Internet Service Providers in the Institution

This question sought to determine whether Mombasa Technical Training Institute has subscribed to more than one Internet Service Providers. The findings are summarised in table 4.14

**Table 4.14: Subscription to more than one Internet Service Providers in the Institution**

	Frequency	Valid Percent	Cumulative Percent
<b>Strongly agree</b>	3	4.4	4.4
<b>Agree</b>	4	6.7	11.1
<b>Neutral</b>	7	11.1	22.2
<b>Disagree</b>	14	22.2	44.4
<b>Strongly disagree</b>	37	55.6	100.0
<b>Total</b>	<b>65</b>	<b>100.0</b>	

Table 4.14 shows that majority of the respondents who constituted 55.6% disagreed that there is subscription to more than one Internet Service Providers in Mombasa Technical Training Institute. A tenth of the respondents agreed with the statement and only 4.4% strongly agreed with the statement with 11.1% remaining neutral. This then implies that in Mombasa Technical Training Institute there were no subscription to more than one Internet Service Providers in the Institution.

#### **4.6.3 Situating ICTs for use outside the classroom has had more benefits than costs**

This question sought to determine if there have been benefit of situating ICTs for use outside the classroom has had more benefits than costs in Mombasa Technical Training Institute. The findings are summarised in table 4.15

**Table 4.15: Situating ICTs for use outside the classroom has had more benefits than costs**

	Frequency	Valid Percent	Cumulative Percent
<b>Strongly agree</b>	29	44.5	44.5
<b>Agree</b>	22	33.3	77.8
<b>Neutral</b>	14	22.2	100.0
<b>Disagree</b>	0	0	100.0
<b>Strongly disagree</b>	0	0	100.0
<b>Total</b>	<b>65</b>	<b>100.0</b>	

Table 4.15 shows that the majority of the respondents; 77.8%, were in agreement, though to different extents, that situating ICTs for use outside the classroom has had more benefits than

costs in Mombasa Technical Training Institute. 22.2% of the respondents were undecided on whether situating ICTs for use outside the classroom has had more benefits than costs but no respondent was in disagreement with the statement. It is therefore evident that situating ICTs for use outside the classroom at Mombasa Technical Training Institute has had more benefits than costs.

#### 4.6.4 Implementation of managed Wi-Fi services alongside State-of-the-Art

This question sought to find out if managed Wi-Fi service has been implemented alongside State-of-the-Art learning tools such as smart boards, projectors and teleconferencing facilities among others. The findings on this question are summarised in table 4.16

**Table 4.16: Implementation of managed Wi-Fi services alongside State-of-the-Art**

	Frequency	Valid Percent	Cumulative Percent
<b>Strongly agree</b>	0	0	0
<b>Agree</b>	7	11.1	11.1
<b>Neutral</b>	22	33.3	44.4
<b>Disagree</b>	26	40.0	84.4
<b>Strongly disagree</b>	10	15.6	100.0
<b>Total</b>	<b>65</b>	<b>100.0</b>	

Table 4.16 shows that there were no respondents who strongly agreed with managed Wi-Fi service has been implemented alongside State-of-the-Art learning tools such as smart boards, projectors and teleconferencing facilities among others. 11.1% of the respondents agreed with the statement while 33.3% were neutral on the matter. Only 55.6% disagreed with this statement. This finding shows that largely, managed Wi-Fi service has not been implemented alongside State-of-the-Art learning tools at Mombasa Technical Training Institute.

#### 4.7 Inferential Statistics on Project Funding

Spearman correlation analysis was conducted at 95% confidence interval and 5% significance level and was a 2-tailed test. Table 4.18 indicates the correlation between the Project Funding and its influence on the Implementation of ICT Programmes



**Table 4.18: Inferential Statistics on Project Funding**

			Project Funding	Influence on the Implementation of ICT Programmes
<b>Spearman's value</b>	Project Funding	Correlation Coefficient	1.000	0.298*
		Sig. (2-tailed)		0.005
		N	65	65
	Influence on the Implementation of ICT Programmes	Correlation Coefficient	0.298*	
		Sig. (2-tailed)	0.005	
		N	65	65

\* Correlation is significant at the 0.05 level (2-tailed)

Table 4.18 shows a weak positive correlation between project funding and the implementation of ICTs programmes, indicated by a Spearman's value value of 0.298. This finding shows that the Project Funding is influenced on the Implementation of ICT Programmes at Mombasa Technical Training Institute. Additionally, the value of 0.298 for a sample size of 65 at a significance level of 0.05 is statistically significant. From these analyses, the hypothesis that;

**H<sub>12</sub>:** There is significant relationship between project funding and implementation of ICT programmes is not rejected.

#### **4.8 Descriptive Statistics on Stakeholders Participation**

In an effort to determine the influence of Project Funding on the implementation of managed Wi-Fi project at the Mombasa Technical Training Institute in coast region, Kenya, respondents in this study were asked to indicate their level of agreement with specific statements in the questionnaire that related to the influence of Stakeholder's Participation on the implementation of managed Wi-Fi project. The coding employed in the analysis was 1 to 5 with 1 representing very small extent and 5 representing very large extent with the statements. Table 4.19 shows the statistics on some of the findings from questions in the

survey related to Stakeholder’s Participation and how respondents were in agreement or disagreement with the statements.

**Table 4.19: Descriptive Statistics on Stakeholder’s Participation**

Statements on Stakeholders Participation	N Valid	Median	Mode	Std. deviation
The management and other relevant parties work together to ensure the successful use of ICT system	65	2	2	.364
Donors and other stakeholders have participated in improving your ICT project.	65	2	2	.328
Public-private-community partnerships are supporting education for ICT equipment provision and maintenance.	65	2	2	.358
Your current ICT infrastructure has helped you operate successful management information systems (MIS).	65	2	1	.361

As shown in table 4.19, a mode of 2 indicates that majority of the respondents agreed to the statement that Stakeholder’s Participation on the implementation of managed Wi-Fi project is on a small extent in Mombasa Technical Training Institute.

#### **4.8.1 The management and other relevant parties work together to ensure the successful use of ICT system**

This question sought to determine if the management and other relevant parties work together to ensure the successful use of ICT system in Mombasa Technical Training Institute. The findings are summarised in table 4.19

**Table 4.20: Management and other Relevant Parties Work Together**

	Frequency	Valid Percent	Cumulative Percent
<b>Very Large Extent</b>	3	4.6	4.6
<b>Large Extent</b>	7	10.8	15.4
<b>Moderate Extent</b>	17	26.2	41.6
<b>Small Extent</b>	26	40.0	81.6
<b>Very Small Extent</b>	12	18.4	100.0
<b>Total</b>	<b>65</b>	<b>100.0</b>	

Table 4.19 indicates that a minority of 4.3% responded that management and other relevant parties work together to ensure the successful use of ICT system at a very large extent in Mombasa Technical Training Institute. 4.2% were in agreement at a large extent with the statement. A sizeable 26.2% of the respondents were at a moderate extent to that management and other relevant parties work together to ensure the successful use of ICT system and majority were in agreement at a small extent with 58.4%. This therefore implies that management and other relevant parties work together to ensure the successful use of ICT system in Mombasa Technical Training Institute at a small extent.

#### **4.8.2 Donors and other stakeholders have participated in improving your ICT project**

The statement sought to find out if Donors and other stakeholders have participated in improving your ICT project in Mombasa Technical Training Institute. The findings are summarised in table 4.21

**Table 4.21: Donors and other stakeholders have participated in improving your ICT project**

	Frequency	Valid Percent	Cumulative Percent
<b>Very Large Extent</b>	0	0	0
<b>Large Extent</b>	9	13.8	13.8
<b>Moderate Extent</b>	15	23.2	37.0
<b>Small Extent</b>	27	41.5	78.5
<b>Very Small Extent</b>	14	21.5	100.0
<b>Total</b>	<b>72</b>	<b>100.0</b>	

The study also sought to assess the extent to which donors and other stakeholders have participated in improving ICT project at Mombasa Technical Training Institute. Table 4.21 shows that majority (41.5%) of the respondents indicated that donors and other stakeholders have participated in improving ICT project to a small extent. The study also found that most (23.2%) of the respondents were moderate on extent to which donors and other stakeholders have participated in improving ICT project but those who supported that donors and other stakeholders have participated in improving ICT project to a large extent were (13.8%).

### 4.8.3 Extent to which current ICT infrastructure has helped operate successful management information systems (MIS)

The statement sought to find out to which extent current ICT infrastructure has helped operates successful management information systems (MIS) in Mombasa Technical Training Institute. The findings are summarised in table 4.22

**Table 4.22: Extent to which current ICT infrastructure has helped operate successful management information systems (MIS)**

	Frequency	Valid Percent	Cumulative Percent
<b>Very Large Extent</b>	8	12.3	12.3
<b>Large Extent</b>	9	13.8	26.1
<b>Moderate Extent</b>	8	12.3	38.4
<b>Small Extent</b>	28	43.1	81.5
<b>Very Small Extent</b>	12	18.5	100.0
<b>Total</b>	<b>72</b>	<b>100.0</b>	

The study also sought to assess the extent to which current ICT infrastructure has helped operate successful management information systems (MIS) at Mombasa Technical Training Institute. Table 4.22 shows that majority (43.1%) of the respondents indicated that current ICT infrastructure has helped operate successful management information systems (MIS) to a small extent. The study also found that (12.3%) of the respondents were moderate on extent to which current ICT infrastructure has helped operate successful management information systems (MIS) but those who supported that current ICT infrastructure has helped operate successful management information systems (MIS) to a large extent were (26.1%).

### 4.9 Inferential Statistics on Stakeholders participation

Spearman correlation analysis was conducted at 95% confidence interval and 5% significance level and was a 2-tailed test. Table 4.23 indicates the correlation between the stakeholder's participation and its influence on the Implementation of ICT Programmes.

**Table 4.23: Inferential Statistics on Stakeholders Participation**

			Stakeholders Participation	Influence on the Implementation of ICT Programmes
<b>Spearman's value</b>	Stakeholders Participation	Correlation Coefficient	1.000	0.388*
		Sig. (2-tailed)		0.0002
		N	65	65
	Influence on the Implementation of ICT Programmes	Correlation Coefficient	0.388*	
		Sig. (2-tailed)	0.0002	
		N	65	65

\* Correlation is significant at the 0.05 level (2-tailed)

The Spearman's value of 0.388 indicates a moderate positive relationship between stakeholder's participation and its influence on the Implementation of ICT Programmes. The value of 0.388 for a sample size of 65 at significance level of 0.05 is statistically significant. Thus, the hypothesis that;

**H<sub>13</sub>:** There is significant relationship between stakeholder's participation and implementation of ICT programmes is not rejected.

#### **4.10 Descriptive Statistics on Capacity Building**

In an effort to determine the influence of Capacity building on the implementation of managed Wi-Fi project at the Mombasa Technical Training Institute in coast region, Kenya, respondents in this study were asked to indicate their level of agreement with specific statements in the questionnaire that related to Capacity building and its influence on the Implementation of ICT Programmes at the Mombasa Technical Training Institute in coast region, Kenya. The coding employed in the analysis was 1 to 5 with 1 representing strong

agreement and 5 representing strong disagreement with the statements. Table 4.24 shows the statistics on some of the findings from questions in the survey related to Capacity building and managed Wi-Fi project Programmes and how respondents were in agreement or disagreement with the statements.

**Table 4.24: Descriptive Statistics on Capacity Building**

Statements on Capacity Building	N Valid	Median	Mode	Std. deviation
Internet has supported and promoted the introduction of relevant virtual groups.	65	2	2	.279
The institution has sufficient number of hardware devices to be used to access the internet.	65	2	2	.265
The institution has introduced the Bring Your Own Devices (BYOD) policy to facilitate digitalized learning.	65	3	2	.366
High quality internet service has enhanced professional development for educators, the administration, users and the community at large.	65	2	2	.244
The institution is using “open source software” to facilitate state-of-Art learning and software development.	65	2	2	.275

Table 4.24 indicates that for the variable of Capacity building, a mode of 2 for all the analyzed items shows that majority of the respondents agreed with the statements that Capacity building have influence on the Implementation of ICT Programmes in Mombasa Technical Training Institute.

#### **4.10.1 Internet has supported and promoted the introduction of relevant virtual groups**

The statement sought to find out if the internet has supported and promoted the introduction of relevant virtual groups in Mombasa Technical Training Institute. The findings are summarised in table 4.25

**Table 4.25: Internet has supported and promoted the introduction of relevant virtual groups**

	Frequency	Valid Percent	Cumulative Percent
<b>Strongly agree</b>	15	23.1	23.1
<b>Agree</b>	30	46.2	69.3
<b>Neutral</b>	12	18.5	87.8
<b>Disagree</b>	5	7.6	95.4
<b>Strongly disagree</b>	3	4.6	100.0
<b>Total</b>	<b>65</b>	<b>100.0</b>	

Table 4.25 shows findings similar to table 4.24 with the majority of the respondents; 69.3%, either strongly agreeing or agreeing that Internet has supported and promoted the introduction of relevant virtual groups. Only 12.2% either disagreed or strongly disagreed to this statement. This finding implies that majority of the respondents agreed that Internet has supported and promoted the introduction of relevant virtual groups.

#### **4.10.2 Sufficient number of hardware devices to be used to access the internet in the Institution**

The statement sought to find out if in Mombasa Technical Training Institute has sufficient number of hardware devices to be used to access the internet. The findings are summarised in table 4.26

**Table 4.26: Sufficient number of hardware devices to be used to access the internet**

	Frequency	Valid Percent	Cumulative Percent
<b>Strongly agree</b>	10	15.4	15.4
<b>Agree</b>	38	58.5	73.9
<b>Neutral</b>	15	23.1	97
<b>Disagree</b>	2	3.0	100.0
<b>Strongly disagree</b>	0	0	100.0
<b>Total</b>	<b>65</b>	<b>100.0</b>	

Table 4.26 shows that 73.9% of the respondents agreed, even if to different extents, that there is sufficient number of hardware devices to be used to access the internet in the Institution in

Mombasa Technical Training Institute. Only a small minority of 3.0% disagreed and no one strongly disagreed with this statement while a sizeable 23.1% were neutral, implying they are undecided on whether there is sufficient number of hardware devices to be used to access the internet in the Institution in Mombasa Technical Training Institute. This then implies that there is sufficient number of hardware devices to be used to access the internet in Mombasa Technical Training Institute.

#### **4.10.3 Introduction of Bring Your Own Devices (BYOD) policy to facilitate digitalized learning**

The statement sought to find out if in Mombasa Technical Training Institute has introduced the Bring Your Own Devices (BYOD) policy to facilitate digitalized learning. The findings are summarised in table 4.27

**Table 4.27: Introduction of Bring Your Own Devices (BYOD) policy to facilitate digitalized learning**

	Frequency	Valid Percent	Cumulative Percent
<b>Strongly agree</b>	18	27.7	27.7
<b>Agree</b>	35	53.8	81.5
<b>Neutral</b>	8	12.3	93.8
<b>Disagree</b>	4	6.2	100.0
<b>Strongly disagree</b>	0	0	100.0
<b>Total</b>	<b>65</b>	<b>100.0</b>	

A huge majority at 81.5% agreed with the statement though to different extents that the Mombasa Technical Training Institute has introduced the Bring Your Own Devices (BYOD) policy to facilitate digitalized learning. Only a minority of 6.2% of the respondents disagreed with the statement while 12.3% were undecided. 81% agreement points that introduction of Bring Your Own Devices (BYOD) policy to facilitate digitalized learning in Mombasa Technical Training Institute its influence on the Implementation of ICT Programmes.



#### 4.10.4 High quality internet service has enhanced professional development

The statement sought to find out if high quality internet service has enhanced professional development for educators, the administration, users and the community at large in Mombasa Technical Training Institute. The findings are summarised in table 4.28

**Table 4.28: High quality internet service has enhanced professional development .**

	Frequency	Valid Percent	Cumulative Percent
<b>Strongly agree</b>	14	21.5	21.5
<b>Agree</b>	32	49.2	70.7
<b>Neutral</b>	12	18.5	89.2
<b>Disagree</b>	5	7.8	97.0
<b>Strongly disagree</b>	2	3.0	100.0
<b>Total</b>	<b>65</b>	<b>100.0</b>	

Table 4.28 shows that almost two thirds of the respondents agreed with the statement though to different extents that the high quality internet service has enhanced professional development for educators, the administration, users and the community in Mombasa Technical Training Institute. However a small minority of 3.0% disagreed with the statement to different extents. A sizeable 18.5% of the respondents were undecided on this issue. This then implies that high quality internet service has enhanced professional development in Mombasa Technical Training Institute especially educators, the administration, users and the community.

#### 4.11 Inferential Statistics on Capacity Building

Spearman correlation analysis was conducted at 95% confidence interval and 5% significance level and was a 2-tailed test. Table 4.29 indicates the correlation between the Capacity Building and managed Wi-Fi project Programmes

**Table 4.29: Inferential Statistics on Capacity Building**

			Capacity Building	Influence on the Implementation of ICT Programmes
<b>Spearman's value</b>	Capacity Building	Correlation Coefficient	1.000	0.492*
		Sig. (2-tailed)		1.000
		N	65	65
	Influence on the Implementation of ICT Programmes	Correlation Coefficient	0.492*	
		Sig. (2-tailed)	1.000	
		N	65	65

\* Correlation is significant at the 0.05 level (2-tailed)

Table 4.29 shows a Spearman's Value value of 0.492, indicating a moderate positive correlation between capacity building and its Influence on the managed Wi-Fi project in Mombasa Technical Training Institute. In addition, the value of 0.492, for a sample size of 65 at significance level of 0.05, is statistically significant. Hence, the hypothesis that;

**H<sub>14</sub>:** There is significant relationship between capacity building and implementation of ICT programmes is not rejected.

## **CHAPTER FIVE**

### **SUMMARY OF FINDINGS, DISCUSSIONS, CONCLUSIONS AND RECOMMENDATIONS**

#### **5.1 Introduction**

This chapter presents a summary of the study findings, conclusions and recommendations. The findings are summarized in line with the objectives of the study which include internet service providers, project funding, stakeholder's participation and capacity buildings. These independent variables were studied against the dependent variable which is determinants of managed Wi-Fi at the Mombasa Technical Training Institute.

#### **5.2 Summary of Findings**

This section presents the findings from the study on the determinants of the implementation of ICT programmes at the Mombasa Technical Training Institute under the Managed Wi-Fi project. It was established that all the managed Wi-Fi project employed at the Mombasa Technical Training Institute positively influenced the performance of ICT programmes under the Managed Wi-Fi project at Mombasa Technical Training Institute and that this influence was statistically significant at significance level of 0.05.

##### **5.2.1 Findings on Internet Service Provider and its influence on ICT programmes**

Following the research carried out at the Mombasa Technical Training Institute of the managed WI-FI project, 55.6% of the respondents reported that there is effective internet service to the students and staff at the institution, 57.8% noted that there is no consistency in downloading and uploading of content by students and staff, 55.5% indicated that internet service is always running at convenient speeds while 82.2% were not in agreement that there is good mechanism to resolve internet downtime within the appropriate time in the institution. The study established that there exists a significant relationship between the internet service provider and implementation of ICT programme at Mombasa Technical Training Institute , with p value of  $0.000 < 0.05$  and Spearman's rank correlation coefficient of 0.401.

### **5.2.2 Findings on Project funding and its influence on ICT programmes**

The study established that majority of the respondents were in agreement with the positive role that project funding played in implementation of ICT programmes in Mombasa Technical Training Institute. Majority of the respondents at 88.9% agreed that facilitation of initial cost of setting up the ICT infrastructure was funded by the institution, 77.8% noted that there is no subscription to more than one internet service provider in the institution. 77.8% indicated that situating ICTs for use outside the classroom has had more benefits than costs and 55.6% observed that there is no implementation of managed Wi-Fi alongside state-of-the-art learning tools at the Mombasa Technical Training Institute. The study established that there is a significant relationship between Project funding and implementation of ICT programmes at Mombasa Technical Training Institute with p value of  $0.000 < 0.05$  and Spearman's rank correlation coefficient of 0.298

### **5.2.3 Findings on Stakeholders' participation and its influence on ICT programmes**

Majority of the respondents in the study at 58.4% indicated that to a small extent, management and other relevant parties work together at the Mombasa Technical Training Institute, 63% agreed to a small extent that donors and other stakeholders have participated in improving ICT programmes in the institution. 61.6% of the respondents indicated, that the current ICT infrastructure has helped operate successful management Information System (MIS) to a small extent at the Mombasa Technical Training Institute. The study established that there was a significant relationship between stakeholders participation at the Mombasa Technical Training Institute with p value of  $0.000 < 0.05$  and Spearman's rank correlation coefficient of 0.388

### **5.2.4 Findings on Capacity Building and its influence on ICT programmes**

69.3% of the respondents in the study were of the opinion that internet has supported and promoted the introduction of relevant virtual groups at the Mombasa Technical Training Institute. 73.9% indicated that there is sufficient number of hardware devices to be used to assess the internet in the institution. 81.5% of the respondents noted that there is an introduction of Bring Your own Device (BYOD) policy to facilitate digitalized learning at the Institution. 70.7% of the respondents agreed that there is high quality internet service that enhanced professional development at the institution. The study established that there was a

significant relationship between capacity building and the implementation of ICT programmes at Mombasa Technical Training Institute with p value of  $0.000 < 0.05$  and Spearman's rank correlation coefficient of 0.492.

### **5.3 Discussion of Findings**

The findings showed positive significant correlation between all the four ICT variables employed by the managed Wi-Fi project in Mombasa Technical Training Institute. These findings however did not explain why there was minimal reduction in the levels of violent conflicts in Mombasa Technical Training Institute when all the ICT programmes studied were shown to be positively correlated and significant in the performance of community ICT programmes. The discussion of findings from this study is presented as follows;

#### **5.3.1 Internet Service Providers and its influence on ICT programmes**

The study established that the Internet Service Provider has influenced ICT programmes at Mombasa Technical Training Institute. The study established that there effective internet services to the students and staff at the institution. Additionally it is evident that internet service is always running at convenient speeds. However it was established that there were no good mechanisms to resolve internet downtime within the appropriate time and signals are not well spread out in the institution.

The study findings are in consonance with Karugu (2012) who asserted that internet service providers have not provided acceptable service quality to their subscribers and as result the experts are often unavailable to deal with many problems that occur. Thus the internet Service providers should invest in a modern and efficient customer care service that can provide solutions to users who have issues with the internet (Nyaega, 2015).

#### **5.3.2 Project Funding and its influence on ICT programmes**

The study established that Project funding at the Mombasa Technical Training Institute has enhanced the implementation of the ICT programme as it is evident that facilitation of initial cost of setting up the ICT infrastructure was done by the institution. Furthermore situating ICT outside the classroom has had more benefits than costs. However, the institution has not been able to subscribe to more than one Internet Service provider as well as implementing the Managed Wi -Fi alongside State-of-the-art learning tools. Kirimi, (2014) established that

duties and taxes currently levied on ICT products make them too expensive and computer purchases are not given priority in the annual school budgets. Baquero (2006) asserts that project is not a panacea for implementation of ICT projects instead such infrastructure should invest considerable amount of time because most implementation programmes receive support from government. Wagner (2005), has cited access to ICT facilities as a major challenge, he attributed this to recurrent costs of maintenance and training.

### **5.3.3 Stakeholders participation and its influence on implementation of ICT programmes**

The study has established that management and other relevant parties work together at a small extent to ensure the successful use of ICT system in the institution. The study has shown that public private partnerships have participated to a small extent in improving the ICT project at the Mombasa Technical Training Institute. In addition, the current ICT infrastructure has helped operate a successful Education Management Information System to a small extent. Kibera (2013) has established that the stakeholders have to be involved so that they own the project and thus increase the success rate. The experience of OECD countries show that PPPs can play a vital role in mobilizing the scale of resources required for financing and building ICT infrastructure, developing applications and locally relevant contents and developing the human capacity required for harnessing the full capacity of ICT productive tools McNamara (2003).

### **5.3.4 Capacity Building and its influence on the implementation of ICT programmes**

The study has established that internet has supported and promoted the introduction of relevant virtual groups to a large extent at Mombasa Technical Training Institute. The research has established that there is sufficient number of hardware devices to be used to access internet in the institution. Furthermore, it has been established that there is introduction of Bring Your Own Device (BYOD) policy to facilitate digitalized learning at the institution. The findings are in line with the Ministry of Education (2012), has proposed training programmes for the education management sector, its agencies and institutional managers especially in EMIS. General competencies are required in ICT especially in installations, operation and maintenance of technical equipments, network administration and network security areas. Without on-site technical support, much time and money maybe lost due to technical breakdowns Ilomaki (2008).

## 5.4 Conclusion

Based on the findings of the study, the following conclusions are made on the determinants of the implementation of ICT programmes at the Mombasa Technical Training Institute. All the four determinants studied influenced the implementation ICT programmes in Mombasa Technical Training Institute to almost similar extents as demonstrated by the correlation coefficients that were moderate for Internet service providers, stakeholders' participation and capacity building and weak for project funding. Internet Service Providers has been found to be an effective determinant in implementation of ICT programmes as it provides a platform through which all other determinants can be enhanced. Stakeholders can utilize the internet to gather advanced skills to manage the ICT infrastructure. ISPs can also provide the institution with affordable package and at the same time provide maintenance for the Managed Wi-fi at Mombasa Technical Training Institute.

The Institution has not in-cooperated proper consultation of stakeholders so as to invest in the relevant ICT infrastructure. The establishment of internet access points at various strategic areas around the institution has enabled users to receive signals outside the classroom which has more benefits than cost. Since the institution has not subscribed to more than one internet service provider, in case of internet outage of the sole Provider, the institution experiences difficulty in running of the day to day activities that require internet. The users also require state-of-art learning tools to match with the effective internet service. Project funding is therefore deemed as an important determinant that ensures the ICT infrastructure is successful.

The Mombasa Technical Training institute has not wholly involved other stakeholders such as Non-Governmental Organizations in the implementation of their ICT programme to this effect; there have not been able to improve their ICT infrastructure. Even though Cisco Networking has partnered with the institution, it has not played a key role in assisting in networking the ICT infrastructure or provision of hardware devices. This has lagged behind the digitalization of their education system. The institution has not established an effective EMIS. This can be seen in the way the administration still depends on accessing records manually.

Due to well established internet services, relevant virtual groups have been introduced to enable all users to communicate or interact for learning purposes. A well-established

computer laboratory as well the introduction of BYOD policy has enabled students to access the internet and develop their skills in a digital manner. However E-learning has not been well established such that there is no evident student portal, e library or other e resources for the users at the Mombasa technical training institute.

## **5.5 Recommendations**

On the basis of the findings from the study, it is recommended that:

Future implementation of ICT programmes in organizations should embrace not just one of these determinants but all of them as they influence the successful implementation to different extents.

1. The Managed Wi-Fi project should embark in all the four determinants in almost equal proportions. The institution should supplement the services provided by the Sole ISPs by engaging an additional provider to cater for the institution in case of Internet downtime or major outage. Furthermore the institution should invest in a team of experts that can help to resolve technical issues as they arise.
2. The institution needs to partner with major NGOs that provide ICT implementation support which will allow for the procurement of State-of-the-art equipments such as smart boards and facilities for teleconferencing as well as building a more effective EMIS.
3. In the event of improving the ICT infrastructure the institution needs to involve the end users since they will provide the institution with viable insight of what specific part of the infrastructure to improve.

## **5.6 Suggestions for Further Research**

Consequently, from this study, the researcher recommends that similar studies be conducted in other organizations in Kenya that have implemented ICT programmes to correlate these findings.

Conducting a study on organizational based factors that influence implementation of ICT programmes in development of the Organisation.



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## APPENDICES

### APPENDIX I: LETTER OF TRANSMITTAL

P.O Box 33102-00600,

NAIROBI.

Tel: 0703111831

Date.....

Dear Madam/sir,

#### **RE: DATA COLLECTION**

I am currently undertaking Masters of Arts degree in Project Planning and Management at the University of Nairobi-School of Continuing and Distance Education.

My research study seeks to evaluate the influence of implementation of ICT Programmes in Organizations mainly focusing on Managed Wi-Fi at the Mombasa Technical Training Institute in Mombasa County.

You have been randomly selected to provide information on the implementation of the Managed Wi-Fi project. This is a request for your participation in responding to the attached questionnaire and allowing me to conduct a survey.

Be assured that any information given will be treated with utmost confidentiality and will be purposely used for this study only.

Any assistance given will be highly appreciated.

Yours Faithfully,

Naomi Wambui

L50/78788/2015

## APPENDIX II: QUESTIONNAIRE

### INFORMATION AND COMMUNICATION TECHNOLOGY PROJECT IN ORGANIZATIONS QUESTIONNAIRE

#### INTRODUCTION

The following questionnaire is aimed at collecting data from your institution. The main purpose is to gather research information on the determinants of the implementation of ICT programmes at the Mombasa Technical and Training Institute. The questionnaire has six sections. For each section, please tick only one response per question.

**CONFIDENTIALITY AND CONSENT:** I am going to ask you some questions relating to ICT use. Your answers are completely confidential and your response to this survey will be highly appreciated.

Would you be willing to participate?

YES .....NO.....

#### SECTION 1: BACKGROUND INFORMATION

##### Section A: General Information

##### Your Gender

- Female
- Male

##### Your Age

- 21-30
- 31-40
- 41-50
- above 50 years

##### Highest Level of Education

- Certificate
- Diploma
- Bachelor's Degree
- Master's Degree

##### Your Role in the institution

- Student
- Administrative staff
- Teacher

## SECTION 2: INTERNET SERVICE PROVIDERS

Please supply the required data by filling in the blanks where space is provided or by ticking [√] against the most appropriate answer. To examine the functionality of **INTERNET SERVICE PROVIDERS**, please use the scale where: **SA = Strongly Agree, A = Agree, N = Neutral, D = Disagree, SD = Strongly Disagree**

Statements on Internet Services Providers	SA	A	N	D	SD
The managed Wi-Fi has been an effective internet service to everyone.					
People can easily download and upload content.					
The Internet Service is always running at convenient speeds.					
The internet downtime is resolved within the appropriate time.					
Signals are well spread out around institutions blocks					

## SECTION 3: PROJECT FUNDING

Please supply the required data by filling in the blanks where space is provided or by ticking [√] against the most appropriate answer. To examine the functionality of **PROJECT FUNDING**, please use the scale where: **SA = Strongly Agree, A = Agree, N = Neutral, D = Disagree, SD = Strongly Disagree**

Statements on Project Funding	SA	A	N	D	SD
The initial cost of setting up the ICT infrastructure was facilitated by the Institution.					
The institution has subscribed to more than one Internet Service companies.					
The benefits of wireless technology have had an impact on day to day activities of the users.					
State-of-the-Art learning tools such as smart boards, projectors and teleconferencing facilities among other ultra modern ICT infrastructure are available.					

#### SECTION 4: STAKEHOLDERS PARTICIPATION

Please supply the required data by filling in the blanks where space is provided or by ticking [√] against the most appropriate answer. Rank the extent to which **STAKEHOLDERS PARTICIPATION**, please use the scale where: **5 = very large extent, 4 = large extent, 3 = moderate extent, 2 = small extent, 1 = very small extent**

Statements on Stakeholders Participation	5	4	3	2	1
The management and key stakeholders work together to ensure the successful use of ICT system as well as continuous improvement.					
Public-private-community partnerships have been supporting ICT equipment provision and maintenance.					
Your current ICT infrastructure has helped you operate successful management information systems (MIS).					

#### SECTION 5: CAPACITY BUILDING

Please supply the required data by filling in the blanks where space is provided or by ticking [√] against the most appropriate answer. To examine the functionality of **EDUCATION AND TRAINING**, please use the scale where: **SA = Strongly Agree, A = Agree, N = Neutral, D = Disagree, SD = Strongly Disagree**

Statements on Capacity Building	SA	A	N	D	SD
Internet has supported and promoted the introduction of relevant virtual groups.					
The institution has sufficient number of hardware devices to be used to access the internet.					
The institution has introduced the Bring Your Own Devices (BYOD) policy to facilitate digitalized learning.					
High quality internet service has enhanced professional development for educators, the administration, users and the community at large.					
The institution is using “open source software” to					



facilitate state-of-Art learning and software development.					
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**SETION 6: ORGANIZATIONAL CULTURE**

Please supply the required data by filling in the blanks where space is provided or by ticking [√] against the most appropriate answer. Rank the extent to which **ORGANIZATIONAL CULTURE** has influenced implementation of managed Wi-Fi in your institution. Please use the scale where: **5 = very large extent, 4 = large extent, 3 = moderate extent, 2 = small extent, 1 = very small extent**

<b>ORGNIZATIONAL CULTURE</b>	5	4	3	2	1
There are guidelines and best practices that enable proper use of ICT platforms at your institution					
Technical measures such as filtering have been used to prevent access to certain content and in particular websites.					
ICT use has been used to combat fraudulent activities that hamper productivity in your institution.					
People can easily log on to portals and other online platform and hence user friendly system.					

**APPENDIX III: RESEARCH AUTHORIZATIONS LETTER**