

**FACTORS INFLUENCING IMPLEMENTATION OF HYBRID
FIBER AND COAX TECHNOLOGY IN KENYA: A CASE OF
WANANCHI GROUP KENYA LIMITED – MOMBASA COUNTY**

BY

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DECLARATION

This research project report is my original work and has not been submitted for any award in any institution or University for Examination.

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DEDICATION

I dedicate this research project to my beloved parents Charles Ooko and Margaret Ooko for the push, sacrifice and commitment towards seeing me attain this degree.

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ABBREVIATIONS AND SYNONYMS

| | |
|-------|------------------------------------|
| R&D: | Research and Development |
| WGK: | Wananchi Group Kenya Ltd |
| CCK: | Communications Commission of Kenya |
| GDP: | Gross Domestic Product |
| TAM: | Technology Acceptance Model |
| IDT: | Innovation Diffusion Theory |
| VOD: | Video on Demand |
| HDTV: | High Definition TV |
| HFC: | Hybrid Fiber Coax |
| RF: | Radio Frequency |
| DSL: | Digital Subscriber Line |
| MBps: | Megabytes per second |
| Mbps: | Megabits per second |
| IPTv: | Internet Protocol Television |

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ABSTRACT

As the broadband revolution continues, the ever increasing competition in the broadband service market is forcing broadband service providers to plan their strategies to deliver more affordable and competitive services with add-on advantages. “Triple play” is a form of broadband connectivity where voice, data and video are provided by a single coaxial cable connection. Over the recent years, as the internet and intranets have evolved, increasing requirements for bandwidth intensive applications such as peer to peer file sharing and Teleworking have resulted in relentlessly increasing demands for higher broadband bandwidth provisioning. However, it is the bandwidth required by the next generation TV and video services such as Video on Demand (VoD) and more significantly, high definition TV (HDTV) which have recently began to place most pressure on bandwidth provisioning in broadband networks. Even with the latest data compression techniques, HDTV requires in the order of 15 to 20 Mbps of downstream bandwidth and this is testing the capabilities of a number of broadband technologies. There is a myriad of competing technologies which can provide the bandwidth required in delivering broadband services but each technology has its limit in terms of bandwidth, reliability, cost and coverage. Optical fiber offers almost limitless bandwidth capabilities, has excellent reliability and is becoming increasingly economical to install. Consequently, fiber seems to be unsurpassed in its superiority over the other broadband technologies. However, many competitive copper and wireless technologies are developing at a significant pace and some technologies have so far managed to continually meet the ever increasing bandwidth requirements of the consumer. Hybrid Fiber and Coax (HFC) is one of the evolving technologies used for bi-directional data transfer in addition to voice and digital TV services. This study was geared towards determining factors influencing implementation of hybrid and Coax technology in Kenya: Case of Wananchi group. The study applied both qualitative and descriptive survey models to clearly identify the relationship between the factors identified in the literature review and the implantation of fiber and coax network. Data was collected using questionnaires before coding and testing for validity and reliability. The study found out that successful implementation of Hybrid Fiber and coax networks is influenced by availability of funds, Service quality, Network coverage, customer relation and government policies and regulations. The study found out that the implementation of Hybrid Fiber and Coax networks by Wananchi group has been successful and much of this success is attributed to competence of the project teams, proper utilization of allocated funds, good leadership skills from project managers and friendly government policies. From these findings recommendations have been made in the report. The findings were presented in tables and availed in Library for use by scholars and other stakeholders interested in such infrastructure projects.

CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

As the broadband revolution continues, the ever increasing competition in the broadband service market is forcing broadband service suppliers to plan their strategies for delivery of “triple play” services, with voice, data and video provided by a single connection (Bradshaw 1991). Over recent years, as the internet and intranets have evolved, increasing requirements for bandwidth intensive applications such as peer to peer file sharing and tele-working have resulted in relentlessly increasing demands for higher broadband bandwidth provisioning. However it is the bandwidth required by next generation TV and video services, such as Video on Demand (VoD) and, more significantly, high definition TV (HDTV) which have recently began to place the most pressure on bandwidth provisioning in broadband networks (Liu, 2010).

Hybrid fiber coaxial (HFC) is a telecommunications industry term for a broadband network that combines optical fiber and coaxial cable. It has been commonly employed globally by cable television operators since the early 1990s. At its most basic level, HFC technology is any configuration of fiber optic and coaxial cable that is used for the distribution of local broadband communications (Stoneman, 2001). Hybrid fiber coax networks all rely upon radio frequency (RF) modulation of the information onto a carrier that connects the information supplier with the information user. Media adapters convert the various digital format signals for compatibility with an HFC network. These media adapters are nothing more than high speed digital modems that operate much like a computer modem to send data over an analogue telephone line. Wallen (2008), the more complex higher order modulators provide a degree of RF signal compression, thereby increasing the bit carrying capacity of a given carrier. HFC networks provide high performance at low cost because they can be designed to match the asymmetrical bandwidth needs of most broad band distribution systems.

Once broadband subscriptions rise to the level of current cable television subscription, their model predicts that 70 percent of households will have a choice of three facilities-based

providers. Jackson (2002) also examines the economics of offering broadband over DSL on an incumbent telephone company's network and via cable modem over a cable television network. He finds that the costs are relatively similar. However, Jackson does not analyse the effects of the necessary investment in modifying existing telephone networks or cable systems to deliver these new broadband services.

The opportunities provided by digital video, internet and interactive video services are very attractive thus prompting cable operators like Wananchi Group Kenya Limited (WGK) to invest and upgrade its existing outdated cable infrastructure. According to Mr. PreethiRamkumar (2001) a leading broadband researcher, one advantage of HFC is that some of the characteristics of fiber optic cable (high bandwidth, low noise and interference susceptibility) can be brought close to the user without having to replace the existing coaxial cable that is installed all the way to their home and business. WGK has been able to use this new vibrant technology to build the first fully triple play network in Kenya hence improving the company's competitive advantage in both data and entertainment industries. Being the sole player in this technology in Kenya and East Africa, WGK which is still rolling out the network in Nairobi and Mombasa homes and SME's and has recorded quite an overwhelming applause from consumers for the quality of service thus posing threat to other broadband service providers like Access Kenya, Kenya Data Networks, Africa Online, Safaricom, Jamii Telecom, etc.

1.1.1 Information and Communication Technology (ICT) in Kenya

The information and communication technology (ICT) sector in Kenya is vibrant. Kenya has witnessed significant growth in the ICT sector as demonstrated by rapid rise in the number of telephone lines, Internet Service Providers (ISPs), number of internet users and, broadcasting stations. Available statistics, (CAK, 2013) indicates that there were; 31.4million mobile telephone subscribers as of October 2013 representing 77% penetration. Safaricom is the dominant player with 73.2% share of the subscribers. Airtel, Telkom Kenya and Essar Yu Mobile had a market share of 14.9%, 6.9%, and 4.6% respectively. There were 21.2 million internet users in the same period with population having access to internet standing at 52.3%.

The Kenya Government recognizes the role of ICTs in the social and economic development of the nation and has promulgated a national ICT Policy based on the Economic Recovery Strategy for Wealth and Employment Creation (2003-2007) (GOK, 2002). East Africa

traditionally has been characterized by limited supply of pay television and Internet services due to high cost and inadequate infrastructure. Penetration rates of cable television and broadband Internet throughout Kenya and Tanzania remain low, standing at less than 1 percent each. By comparison, South Africa's penetration rates for pay television and broadband Internet are approximately 15 percent and 4 percent, respectively, while Mexico's adoption rates are 24 percent and 20 percent. However, East Africa's demand for these services is growing, spurred by strong GDP growth, the emergence of a middle class, and the development of undersea fiber lines that are making services more accessible and affordable.

The rapid growth of bandwidth hungry fixed and mobile services will require significant increases in peak network speeds, throughput, and capacity. By 2015 (GOK, 2007), for example, the average home connectivity requirements will jump fourfold from year-2011 levels to over 100 Mbps (Megabits per second). Mobile speed and capacity requirements will expand at a similar pace. Also, new devices and services capable of using both fixed and mobile networks such as tablet computers and cloud computing, respectively are creating a need for "technology agnostic" access to data connectivity. And increasing consumer acceptance of fixed-mobile bundled plans is causing single network players, such as cable companies and mobile attackers, to seek options for integration in order to become fixed/mobile providers.

The availability of new mobile frequencies at auctions could attract fixed-line players or other attackers to the market. The Communications Authority of Kenya is responsible for ensuring fair play in the ICT sector as defined by the Kenya Communications (CAK, Act No-2 of 1998). It is the independent regulatory authority for the communications industry in Kenya to license and regulate telecommunications, radio communication and postal/courier services in Kenya. Furthermore, a number of new regulatory frameworks for fixed, next-generation access have already been established. As a result, the influence of future regulation on both the fixed and mobile industries will expand. Other factors which have risen include; cost – which the company has made very competitive, offering lowest costing the market; bandwidth – lowest bandwidth being 1Mb of unlimited connection; free equipment – saving consumer from the cost of purchasing equipment and ensuring that the equipment remain properties of the company to be remitted back in case of termination; round the clock customer service – to answer any customer queries that may arise and provide information in case of technical difficulties.

1.1.2 Wananchi Group Limited

Wananchi Group is a telecom and media operator which provides pay television and broadband internet services in Kenya. The company was founded in 2000 and is headquartered in Nairobi, Kenya with additional offices in Mombasa, Nakuru, Nyeri, and Eldoret. The company under the Zuku brand name provides cable television and broadband internet services to residential customers in Kenya using hybrid fibre-coaxial and WiMAX technologies; and under the SimbaNET brand, provides internet and VPN services to corporations, local governments, and non-governmental organizations on their robust Metro fiber. The company also offers products which are designed to support business growth through managed mail services, dedicated access, managed security and Web presence.

Furthermore, the company's Web and messaging solutions provides domain registration, e-commerce, email, Web hosting, and collocation solutions for individuals, businesses, developers, and resellers. Thus it was established that Wananchi serves corporate organizations, small to medium sized enterprises, and individual customers in the major cities. It also offers ZUKU DTH pay TV services across East Africa. It's mission is to create stakeholder value by becoming the leading company providing affordable, must have entertainment and communications services for the 'wananchi' in East Africa, through the delivery of innovative, internet, voice, data and pay TV services to residential and corporate customers at an affordable price in a manner that delights and inspires our customers.

1.2 Statement of the Problem

All industries suffer from voluntary churn – the decision by the consumer to switch to another product or service and consequently a different service provider. This is particularly true for telecommunication companies. Annual churn rates for telecommunications companies average between 10 and 67 per cent (Hughes, 2007). Increase and retention of loyal customers is the key factor for long-term success of the companies. The main emphasis in marketing has shifted from winning new customers to the retention of existing ones.

Studies have shown that it can cost as much as six times more to win a new customer than it does to keep an existing one (Rosenberg and Czepiel, 1984). Depending on the particular industry, it is possible to increase profit by up to 60 per cent after reducing potential migration by 5 per cent (Reichheld, 1993). Internet service providers in Kenya are experiencing high

churn rates while the new entrants are struggling to grow their subscriber base, this clearly shows that these companies have not yet identified what internet subscribers look for in a network provider or are unable to meet consumer requirements. Consumer demand for services such as high-speed internet access, multiple voice lines and video on demand has continued to grow in recent years.

There have been various studies on internet technology connections, Kyounglim (2012). The growth of Broadband Internet connections in South Korea: Contributing factors examined that, successful deployment of broadband Internet connections has become an important policy goal for many countries. HFC networks have been proved as the only singular, proven, residential access networks able to deliver the enormous bandwidth necessary for supplying these services. The changing economic situation in Kenya is linked to an increasing interest for new ways of entertainment and delivering of information. In big cities like Nairobi, Mombasa, Nakuru, Kisumu and the rapidly growing Eldoret creates a higher demand for a large variety of video entertainment channels and higher speed internet access. It is therefore a fundamental factor for organizations to stay abreast with technology to enable them provide better, efficient, customer retentive and cost effective service to enhance their profitability and sustainability in the market.

Building a nationwide broadband network infrastructure and making people “always” connected to “high-speed” Internet is viewed as the first step toward a transition into the new “information society.” The development of a broadband network is a key element to empowering competitiveness in many nations. Choongok Lee (2010) on comparative advantage of broadband internet: A comparative study between South Korea and the United States revealed that the deployment of the broadband Internet infrastructure is shaping the nature of business for many industries involved in media, communications, entertainment, and many other forms of content and interactive services delivered via conventional channels and/or the Internet (Wolf & Zee, 2000).

The growing availability of broadband Internet access is enhancing business growth opportunities and driving a range of new applications from movies on demand to remote medical services (Reuters, 2002). At the same time, the Internet has fundamentally altered the nature of global markets as it enables people to connect to other networks, people, and businesses, free from the limitations of time and space (Sprano & Zakak, 2000). In fact, the

diffusion of such an infrastructure is now strategically important for individual countries as it carries the potential to significantly contribute to a country's economic wealth in the emerging age of electronic commerce.

Gichoya (2013) Factors affecting the successful implementation of ICT Projects in Governments in Kenya examined that over the last five years, the Kenyan government has initiated some capital investment towards set up and installation of ICT infrastructure. Funding for these investments is achieved through partnerships between the government and development partners. The foreign funding component constitutes the largest percentage of this investment in terms of technology. The government contribution is usually in the form of technical and support staff and facilities including buildings. With the emergence of information and communication technologies (ICTs), and e-Government, it is possible to improve efficiency and effectiveness of internal administration within government and to relocate government service from government offices to locations closer to the citizens. Given the large body of evidence on Fiber and coax technology, there is also need to investigate factors influencing the implementation of hybrid Fiber and coax technology in Kenya: A case of Wananchi group Kenya Limited – Mombasa County. Motivated by this gap in literature, the study sought to answer the question: What are the factors influencing the implementation of hybrid Fiber and coax technology in Kenya: A case of Wananchi group Kenya Limited – Mombasa County?

1.3 Purpose of the study

The purpose of this study was to explore the factors influencing the implementation of hybrid Fiber and coax technology in Kenya. A case of Wananchi Group Kenya Limited

1.4 Objectives of the study

The objectives of this study were;

- i. To explore how finance influence the implementation of hybrid Fiber and coax technology in Kenya.
- ii. To examine how service quality influence the implementation of hybrid Fiber and coax technology in Kenya.

- iii. To determine how Network coverage influence the implementation of hybrid Fiber and coax technology in Kenya.
- iv. To determine the moderating influence of government regulations in the implementation of hybrid Fiber and Coax technology in Kenya.
- v. To determine the moderating influence of infrastructure in the implementation of hybrid Fiber and Coax technology in Kenya.

1.5 Research question

This study was guided by the following research questions;

1. How does finance influence the implementation of hybrid Fiber and coax technology in Kenya?
2. How does service quality influence the implementation of hybrid Fiber and coax technology in Kenya?
3. How does network coverage influence the implementation of hybrid Fiber and coax technology in Kenya?
4. How does government and regulation influence the implementation of hybrid Fiber and Coax technology in Kenya?
5. How does Infrastructure influence implementation of hybrid Fiber and Coax technology in Kenya?

1.6 Research hypothesis

The research project answered the following hypothesis;

- i. **H₀**; Finance does not influence the implementation of hybrid Fiber and coax technology in Kenya.
H₁; Finance influences the implementation of hybrid Fiber and coax technology in Kenya.
- ii. **H₀**; Service Quality does not influence the implementation of hybrid Fiber and coax technology in Kenya.
H₁; Service Quality influences the implementation of hybrid Fiber and coax technology in Kenya.

- iii. **H₀**; Network Coverage does not influence the implementation of hybrid Fiber and coax technology in Kenya.
H₁; Network Coverage influences the implementation of hybrid Fiber and coax technology in Kenya.
- iv. **H₀**; Government and regulation does not influence the implementation of hybrid Fiber and coax technology in Kenya
H₁; Government and regulation influences the implementation of hybrid Fiber and coax technology
- v. **H₀**; Infrastructure does not influence the implementation of hybrid Fiber and Coax technology in Kenya
H₁; Infrastructure influences the implementation of hybrid Fiber and Coax technology in Kenya

1.7 Significance of the study.

This study will be useful towards extension of knowledge as it sought to establish the determinants and core factors that influence the implementation of Information technology and Telecommunication infrastructural projects in Kenya. It will also help new international and local investors in strategic ideologies when planning to setup such projects and be able to determine both profitability and sustainability of such a project.

This study establishes that ISP's which are companies in the business of providing internet services will be the biggest beneficiary as it focusses more in their business area. The challenges to be discussed and others to be unveiled will enable them to take the necessary measures to improve their services and maximize profits.

The study will give all those learners who are looking for a reliable source of information on the current factors influencing the choice of data providers in Kenya will benefit from this research work. Students and researchers will also have an opportunity to understand the HFC (triple play) network and its advantages over others. This will also open an avenue for more research primarily from engineering students and scholars on the duo, triple and quadruple play services in Africa and the world beyond

Foreign and domestic investors will be able to analyse the market and get a rough idea of the technological and market trends in the data and entertainment industries in Kenya. Chances of injecting more to help grow the ICT sector through the Ministry of Information and Technology and Private sectors may arise.

Job seeking Kenyans may get a chance for employment if more investors set up businesses in the country. Young entrepreneurs may also get employment opportunities as contractors and casuals during construction of such infrastructural plants.

1.8 Basic assumptions of the study

The research project report was based on the assumption that the sample chosen was a good representation of data and entertainment preference in the Mombasa County.

The researcher also assumed that the data collection instrument has validity and is measuring the desired constructs and that the respondents answered questions correctly and truthfully.

1.9 Delimitation of the study

This research covered Mombasa Island specifically in the Kizingo area. The study confined itself only to use of data and entertainment on static receiver stations not mobile receivers.

The Kizingo area has a demography that is inclusive of both the youth and older generation, elite as well as business minded population. It also has a well distribution of both gender and is easily accessible.

1.10 Limitations of the study

The limitations of this research were that the respondents may be reluctant to give information relating to the policies on issue under study. However, the researcher took necessary measures to assure the respondents that the information given will ultimately be treated with confidentiality it deserves.

Reluctance to respond to questionnaires might be a key limitation in collecting the required data for the study. This may be due to some reservations held by the target population. This may lead to generalization during the analysis and presentation of the data made from those who responded to represent the views of the rest of the respondents.

1.11 Definitions of key terms.

Network Coverage: This is the geographical area covered by the network of a service provider.

Price: Cost of acquiring services that is payable in terms of cash per uptime and bandwidth

Customer Awareness: This is the ability of the current customer or potential customer to be knowledgeable about particular services offered by the services providers and on which platform.

Quality of Service (QoS): These are specific pointers of the services rendered by a data and entertainment service provider that a customer uses to rate the services received.

Data Service Provider: This is internet connection services offered by Internet service providing companies in Kenya.

1.12 organization of the study report

This study is organized in five chapters, chapter one gives the introduction as well as its background. The statement of the problem, the purpose of the study, objectives, research questions, research hypothesis, delimitations of the study, limitations of the study, significance of the study and definition of key terms are all found in chapter one. Literature review is shown in chapter two where the researcher reviews the relevant studies concerning the topic under investigation. Chapter three examines the research methodology which includes the research design, target population, sample size and sampling procedure, research instruments reliability and validity of the instruments and data collection procedure. The fourth chapter talks about the presentation, analysis and interpretation of data while chapter five discusses the summary of the study, conclusion as well as recommendations.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter presents literature information on the study topic in line with research objectives. Covers an overview of how cost influences implementation of Fiber and coax technology, technology and systems, quality of service and network coverage influences implementation of Fiber and coax technology in Wananchi group Kenya Limited.

2.2 Hybrid Fiber and Coax Technology

Motivated by the phenomenal increase in popularity and growth of the Internet, cable operators worldwide are beginning to deploy Hybrid Fiber Coaxial (HFC) technology to offer high-speed access to residential subscribers. Using efficient data modulation schemes such as Quadrature Amplitude Modulation (QAM), these HFC access networks are capable of transporting tens of Megabits of information per second, thereby offering nearly thousand-fold increase in access bandwidth to residential subscribers compared to conventional telephone dial-up networks. Using cable modems in their homes, residential subscribers connect to the HFC network and access a variety of Internet applications on the World Wide Web.

Since it relies on in-built instrumentation, HFC provides an extremely low-cost, attractive alternative to the more expensive, external instrumentation that is currently deployed in many HFC networks. Since many other emerging broadband access technologies such as Asymmetric Digital Subscriber Line (ADSL) and Wireless Local Multipoint Distribution Service (LMDS) share many of the characteristics of HFC networks, the basic principles of HFC are applicable to these other local loop technologies as well.

2.3 Finance and Implementation of hybrid Fiber and Coax Technology

The telecommunications sector is changing radically. The changes are driven by a combination of market, business and technological forces (Evangelos, 2004). A revolutionary permeation of information has had worldwide witness due to increased efficiency by market players. Gupta (2008) indicates that the telecommunications industry is characterized by new technologies, new services, and huge capital investments to make content accessible anywhere. Market players are frequently coming up with new products, services, and tariffs to increase their market share in consequence, the industry competition has become fierce. The emergence of

electronic commerce has multiplied the amount of available information and thus offers new ways for companies to efficiently respond to clients' expectations. Simultaneously, customers can more easily inquire about the market opportunities. They become more demanding and tend to switch from their previous supplier to another retailer. This gave birth to the notion of churn.

This phenomenon has been magnified by electronic commerce. The Internet channel returns control and power to customers who are no longer confined to the decisions of a single company. The outcomes are increase in customer power (Peppard, 2000) and competition exacerbation. Competitors are only one "click away". Customer empowerment is likely to persist and amplify customer attrition issues. On the other hand, Zettelmeyer (2000) asserts that companies competing on multiple channels get information from multiple sources and can decide to communicate different amounts of data to different clusters of customers, thereby creating new differentiation opportunities. As a result, companies augment their market power, impede the emergence of a competitive strategy essentially based on the cost dominance and thus can design strategies that aim at softening churn problems.

2.3.1 Influence of Cost in implementation of ICT projects

Reliable cost estimates are necessary for implementation of the project at every stage. The term "project cost estimate", as used during the project development process, includes all capital outlay costs, including right-of-way, structures and landscaping, but does not normally include capital outlay support costs. Project cost estimates should never be artificially reduced to stay within the funding limits, nor should they be reduced to make more project funding available.

Likewise, project cost estimates should not be artificially raised beyond the contingency percentages provided unless the increase is adequately justified. Unreliable cost estimates cause significant problems for programming and budgeting and may also lead to staffing and budgeting decisions that use resources incorrectly or inefficiently. The Global report on the Costs of IT 2013, indicates that the total money spent on IT worldwide has been most recently estimated as US \$3.5 trillion, and is currently growing at 5% p.a. – doubling every 15 years. IT costs, as a percentage of corporate revenue, have grown 50% since 2002, putting a strain on IT budgets. Today, when looking at companies' IT budgets, 75% are recurrent costs, used to "keep the lights on" in the IT department, and 25% are cost of new initiatives for technology development (Nut, J. 2010).

2.3.2 Availability of funds in implementation of ICT projects

Adequate and timely funding is essential for project implementation. Inadequate funding and untimely funding may interfere with implementation schedule of projects. According to Zagorsky (2007) contractors' financial difficulties are major causes of delays in projects this includes payment for the materials, labourers', salaries and equipment to be used for the projects.

Thornton (2007), in his survey, found that slow collection, low profit margins and insufficient capital or excessive debt are the three major causes of financial difficulties among contractors. Slow collections topped the list in the years 2007 and 2005, in which the contractor received late payment from the client. This is supported by Arshi and Sameh (2005), Majid and McCaffer (1998) who found that delay in payment from the client would eventually cause financial difficulties to the contractor. Thus, most of the construction works cannot be carried out due to these financial difficulties. El-Razek, Bassioni, and Mobarak (2008) found that the owners and consultants considered financing by contractor during implementation as the top cause of delay in Egyptian building projects. Aibinu and Odeyinka (2006) found that contractors' financial difficulties were the most important cause of construction delay in Nigeria.

Coulter and Kelley (1992) postulated that insufficient capital is one of the major causes of financial difficulties among contractors. Poor financial control by the contractor can lead to insufficient capital (Liu, 2010). Hence, the contractor will have excessive debt which causes them to face financial difficulties as they cannot pay back the debt. Majid (1998) found that material shortages are due to poor materials planning, inefficient communication, unreliable suppliers and late delivery. Mochal (2003) stated that poor planning is mistake number one in project management. This is reflected in the scenario in which poor materials planning from the contractor could lead to material shortage because the materials needed for construction may not be available within a certain time frame. This is due to mistakes in the planning stage relating to when the materials are expected to be used in the implementation phase leading to project delays.

2.4 Service Quality in Implementation of hybrid and Coax Technology

Service quality is described as a function of the differences between the expected service quality, managers' beliefs of customer needs, service quality specifications and the actual delivered service (Parasuraman, Zeithaml & Berry, 1994). Gronroos (1988) explains in the perceived service quality model that service quality experienced by a customer has two dimensions: technical quality and functional quality. Technical quality also known as service product, describes what the customer received during service delivery while functional quality also called product service, describes how the service is delivered. He further suggests that the organisation's image works as a filter and hence it can negatively or positively modify the customer's perception of service quality.

Service quality can be evaluated by different models such as SERVQUAL model (Parasuraman et al., 1994), SERVPERF model (Cronin & Taylor, 1992), Johnston, Silvestro, Fitzgerald and Voss Model (1990) and Gronroos service quality model (1984). The SERVQUAL model (Parasuraman et al., 1991) also called the Gap model has five service quality dimensions namely responsiveness, reliability, empathy, tangibility and assurance. SERVPERF model (Cronin & Taylor, 1992) was developed from SERVQUAL model. Cronin and Taylor argue that performance is the best measure that explains customers perceived service quality. According to Chingang and Lukong (2011) Service quality is considered an important tool for a firm's struggle to differentiate itself from its competitors. The relevance of service quality to companies is emphasised because it offers a competitive advantage to companies to achieve customer satisfaction. Chingang and Lukong (2011) further point out that by defining and understanding service quality, companies will be able to deliver services with higher quality levels presumably resulting in increased customer satisfaction.

2.5 Network Coverage in Implementation of hybrid and Coax Technology

In today's economy, network effects due to technology standards are very important because there is a high degree of interrelation among technologies. A technology has a network effect when the value of the technology to a user increases with the number of total users in the network. Network effects in adoption can arise from two different but related reasons, often characterized as direct and indirect. Direct network effects are present when a user's utility from using a technology directly increases with the total size of the network. For example, the utility that a user gets from using electronic mail directly depends on how many other people are accessible by electronic mail. Similarly, the benefit from having a telephone also directly

depends on the number of telephone sets in the network since the benefit will increase as more people can be reached by the phone.

It is clear that network effects are likely to significantly impact technology adoption since they affect the expected benefit from a new technology. Most empirical work in this area has confirmed this fact. (Garth Saloner and Andrea Shepard, 1995) found evidence for the role of network effect in their study of ATM adoption by banks. In the case of ATM machines, the network effect emerges in the following way: if ATM's are largely available over geographically dispersed areas, the benefit from using an ATM will increase since customers will be able to access their bank accounts from any geographic location they want. This implies that the value of an ATM network increases with the number of available ATM locations, and the value of a bank's network to a customer will be determined in part by the final network size of the bank. As a result, assuming that a bank can extract part of the consumer surplus, a bank will adopt ATM more rapidly if it expects to have a larger number of ATM locations in equilibrium, which implies that its network will have more value for its consumers.

2.6 Government and Regulation in Implementation of hybrid and Coax Technology

The regulatory environment and governmental institutions more generally can have a powerful effect on technology adoption, often via the ability of a government to "sponsor" a technology with network effects. Economic regulation has effects similar to the market structure/size effects discussed earlier, in that the effect of regulation is often to foreclose entry and grant fairly large market shares to incumbents, reducing incentives for cost reducing innovation but also in many cases increasing the benefits from innovation due to the small number of firms in the market. The exact effects observed will depend partly on the particular price-setting mechanisms chosen by the regulator.

Adoption of new technology is impacted not only by regulations about market structure or the insurance environment, but also by other types of regulations, such as environmental regulation. Environmental regulations directly affect adoption because in many industries regulations will either prohibit or require the use of certain technology or production methods.

2.7 Infrastructure and Implementation of hybrid and Coax Technology

According to (Singh, Das, and Joseph, 2007), ICT infrastructure facilitates the supply of e-government, and human capital stimulates the demand for ICT projects and e-government in a

country. IT can help government public sectors to increase productivity and performance, improve policy making, and provide better public services to the citizens (Akbulut, 2002). Moreover, there is an opportunity to derive productivity and business benefits from an intelligent IT infrastructure built on the pervasive computing paradigm. Furthermore, there is a need to protect investments already made in the existing IT infrastructure (Gupta and Moitra, 2004). Developing E-government system based on the IT infrastructure which has played as a bedrock role. Internet allows access to multiple services, as a foundation to support the digital broadcast systems to apply a global digital network. It is a government's responsibility to determine the quality and quantity of the telecommunications networks to handle the new traffic resulting from the use of these new services' level of service quality

According to Government of Kenya ICT policy (2005), inadequate ICT infrastructure has hampered provision of efficient and affordable ICT services in the country. There is therefore need to put more emphasis on provision of support infrastructure, such as, energy and roads; supporting software development; promotion of local manufacture and assembly of ICT equipment and accessories; and provision of incentives for the provision of ICT infrastructure. Telecommunication infrastructure is a major issue that stands as an impediment to access of information, most people are not able to access digital information due to lack of the necessary infrastructure (GoK, 2007). This has left a bigger part of the population unable to access the digital information hence discouraging the adoption of ICT thus widening digital divide between developed and developing economies as well as between haves and have not, setting classes and levels of learning institutions rather than sink poverty levels and narrow economic gaps (ICT Authority of Kenya, 2014).

2.8 Conceptual Framework

The conceptual framework outlines the dependent, independent and intervening variables as discussed in the literature review and elaborated in the Figure 1 below. It helps one to understand the relationship between the variables of the study.

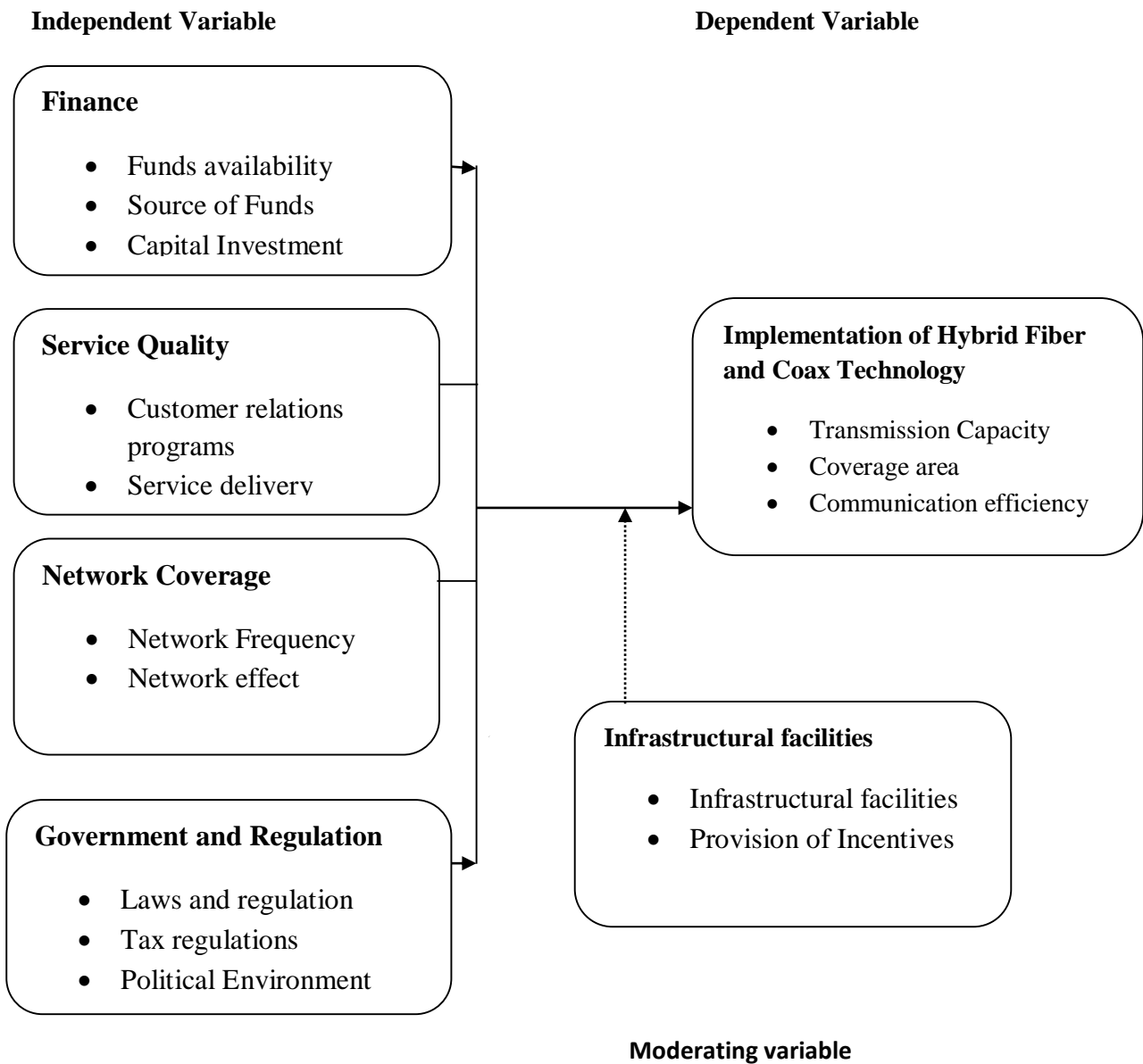


Figure 1: Conceptual Framework

2.9 Summary of Chapter and Research gaps

This chapter discusses the major determinants factors on implementation of hybrid and Coax technology in Kenya. Project finance reviews that cost estimates are necessary for implementation of the project and Inadequate funding and untimely funding may interfere with implementation schedule of projects. Secondly Service quality is essential is emphasised because it offers a competitive advantage to companies to achieve customer satisfaction. Network coverage has an influence of hybrid coax technology implementation due to network effects since technology standards are very important because there is a high degree of interrelation among technologies. A technology has a network effect when the value of the technology to a user increases with the number of total users in the network. Governance regulation is key because adoption of new technology is impacted not only by regulations about market structure or the insurance environment, but also by other types of regulations, such as environmental regulation and lastly there is therefore need to put more emphasis on provision of support infrastructure, such as, energy and roads; supporting software development; promotion of local manufacture and assembly of ICT equipment and accessories; and provision of incentives for the provision of ICT infrastructure.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This purpose of this chapter was to describe the methodology to be used in conducting the study. It explains the research design chosen for the study, target population, sampling techniques, data research instruments, validity and reliability of research instruments, data collection procedure and data analysis techniques.

3.2 Research Design

The research design constitutes the blue print for the collection, measurement and analysis of data (Cooper and Schindler, 2006). It expresses the research problem, the framework, organization and relationships among variables of the study. A case study was adopted in carrying out the study, to determine the factors affecting the implementation of hybrid fiber and Coax technology: Case of Wananchi group Kenya Limited. As pointed out by Leedy and Ormond (2005), case studies are useful for investigating why individuals or programmes change as a result of circumstances or intervention over time. Moreover, information is readily accessible, and the facts gathered in the study can be applicable to the ISPs providers.

Case research can be particularly valuable because one of the most difficult, but most important things that researchers try to identify in research is the relation between cause and effect.

3.3 Target Population

A population can be defined as the complete set of subjects that can be studied, people, objects, plants, animals, organizations from which a sample may be obtained; (Shao,1999).

The target population for this study consist of the staff and management personnel involved in the implementation of the hybrid and coaxial network in Kizingo area of Mombasa. These include the Project managers, Supervisors, Engineers, Contractors and Consultants of WGK in Mombasa County.

3.4 Sample Size and Sampling Procedures

Sampling technique is the process of selecting a specific number of objects to form respondents for study; (Ngulube, 2003). The study used random sampling. This sampling technique is one where the items for the sample are selected without any preferred order by the researcher and the researcher's choice concerning the items remains supreme (Kothari, 2004). The main rationale behind using samples is so that the findings represent the entire population. The main

advantage of using sampling is that it saves a lot of time and effort and yet able to meet the objectives of the research (Kothari, 2007).

Table 3.1: Target Population and Sample Size used in the study

| Population | Target Population | Sample Size |
|-------------------|--------------------------|--------------------|
| Engineers | 16 | 16 |
| Project Manager | 8 | 8 |
| Contractor | 4 | 4 |
| Consultant | 4 | 4 |
| Total | 32 | 32 |
| Percentage | | 100% |

3.5 Data Collection Instruments

The research used only primary data. The researcher relied on use of questionnaires. data was captured using structured questionnaires to enable coding and quantitative analysis of the findings. Questionnaires were used because the population is literate and able to comprehend the questions. It was appropriate since respondents can even take their time and respond comprehensibly. Such information is best collected using questionnaires as recommended by Mugenda and Mugenda (1999).

3.6 Data Collection Procedures

Given the number of factors that determine the implementation of HFC networks, data collection was done using the most appropriate data collection instrument. Communication to the respondents was mainly done in English. The researcher used the drop and pick method for the questionnaires to enable the respondents sufficient time and confidentiality while filling in the questionnaires.

3.7 Validity and Reliability of Instruments

Frankel and Wallen (2008) define validity as the appropriateness, correctness and meaningfulness of the inferences selected on research results. It is the degree to which results obtained from analysis of the data actually represent the phenomenon under study. The question of validity is raised in the context of the form of the test, the purpose of the test and the target population. The researcher concentrated on content validity. Mugenda and Mugenda

(2003) define content validity as a measure of the degree to which data collected using a certain instrument represent a specific domain of indicators or content of a particular subject.

Reliability is the degree to which a test consistently measures whatever it measures (Gay, 1987). It is the ability to consistently yield the same results when repeated measurements are taken under the same conditions. Reliability was assessed using the Split half technique and questionnaires administered to a small group of respondents. The questionnaire items were assigned arbitrary scores and data entered into computer software for Statistical Package for Social Sciences.

3.7.1 Validity of Instruments

Instrument validity refers to accuracy, meaningfulness and technical soundness of the research instrument; Mugenda and Mugenda (1999). The questionnaire guide are said to be valid when they actually measure the intended parameters; Borg and Gall, (1989). The researcher enhanced the validity of the instrument by subjecting them to the supervisor appraisal and also carried out a field pre-test through a pilot of a few respondents. The researcher then made adjustment of the tools to improve validity.

3.7.2 Reliability of Instruments

Reliability is the extent to which the results are consistent over time and are accurate representation of the total population of the study.

Instrument reliability is the dependability and trustworthiness of the test. This will be measured through a test-retest technique where the questionnaire will administered to a group of individuals with similar characteristics as the actual sample. The test will then be repeated after one week.

3.8 Ethical Considerations

The researcher obtained consent from the Management of Wananchi Group for to carry out data collection from the respondents. Secondly, the researcher made it an obligation to protect sources of information which is critical and sensitive. The information obtained was used for academic purposes only.

3.9 Data Analysis Methods

Data analysis is the process of obtaining raw data and converting it into information useful for decision making by users. Data is analyzed to answer questions, test hypotheses or disprove theories.

The nature of data collected was qualitative. It was analyzed using descriptive statistics as well as inferential statistics. According to DeCaro, (2003), descriptive statistics describes a big chunk of data with summary, charts and tables but do not attempt to draw conclusions about the population. Inferential statistics tests hypothesis to draw conclusions about the population under study. This study used both descriptive and inferential statistics by way of charts, frequency diagrams, graphs and percentages to summarize data. The study also used regression analysis to analyze data.

$$Y = a + b_1X_1 + b_2X_2 + b_3X_3 + b_4X_4 + b_5X_5 + \epsilon ; \text{ Where:}$$

Y = Implementation Factors (Dependent variable).

a = Constant

b₁, b₂, b₃, b₄, = Coefficients of Implementation.

X₁, X₂, X₃, X₄, = Implementation dimensions (Independent variables).

X₁, = Finance

X₂, = Service Quality

X₃, = Network Coverage

X₄, = Government and Regulation

X₅, = Infrastructure

€ = Error term.

Table 3.2: Operational Definition of Variables

| Research Question | Type of Variable | Indicator | Measurement Scale | Data analysis method | Tools of analysis |
|---|-------------------------|--|---|-----------------------------|--------------------------|
| To what extent does Finance influence implementation of hybrid and Fiber technology? | Independent | Funds availability Sources of funds Capital Investment | Sources of Funds Capital Investment | Ordinal Nominal | SPSS |
| How does Service quality influence implementation of hybrid and Fiber technology? | Service Quality | Customer relations programs Service delivery Customer Satisfaction | Customer satisfaction Service delivery | Ordinal Nominal | SPSS |
| How does Network Coverage influence implementation of hybrid and Fiber technology? | Network Coverage | Network Coverage Network Frequency Network effect | Network Coverage Network effect | Ordinal Nominal | SPSS |
| How does government regulations moderate implementation of hybrid and Fiber Technology? | Government Regulations | Economic regulation Price Setting mechanism | Government regulations | Ordinal Nominal | SPSS |
| How does Infrastructure moderate implementation of hybrid and Fiber Technology? | Infrastructure | Digital broadcast systems Provision of support mechanism | Infrastructure support mechanism | Ordinal nominal | SPSS |

CHAPTER FOUR

DATA ANALYSIS, PRESENTATION AND INTERPRETATION

4.1 Introduction

This chapter discusses the interpretation and presentation of the findings. Data collected was keyed and analysed by simple descriptive analysis using Statistical Package for Social Sciences (SPSS) version 20 software. Regression analysis was used to determine relationships between the variables under study. Data was then presented through tables and narrative analysis. The chapter presents data in different sub- sections that is: general information on category of gender, position, experience and level of education of the respondents.

4.2 Response Rate

Questionnaires were administered to 32 respondents and 32 responses were obtained which is 100% response rate of the entire population of the study. The collected data which is 100% of the response formed basis for this analysis.

4.3 Demographic Characteristics of Respondents

The study wanted to find out the demographic information of the respondents in terms of gender, Position, age, experience and education level.

4.3.1 Gender of respondents

The study found out the gender composition of the respondents in the study as shown in the table below.

Table 4.3 Gender Distribution of Respondents

| Gender | Frequency | Percent | Cumulative Percent |
|---------------|------------------|----------------|---------------------------|
| Female | 10 | 31.3 | 31.3 |
| Male | 22 | 68.8 | 100 |
| Total | 32 | 100 | |

From table 4.3, male respondents were highest, since they formed the majority, with 68.8%, compared to the female counterparts at 31.3%, this is an indication that at Wananchi group male dominate.

4.3.2 Respondents Position

The study sought to find respondents position in the study and the results are as shown in the table below

Table 4.4 Respondents Position

| Position | Frequency | Percent | Cumulative Percent |
|-----------------|------------------|----------------|---------------------------|
| ICT Engineer | 16 | 50 | 50.0 |
| Project Manager | 8.0 | 25 | 75.0 |
| Contractor | 4.0 | 12.5 | 87.5 |
| Consultant | 4.0 | 12.5 | 100 |
| Total | 32 | 100 | |

From table 4.4 above, the respondents' position are as follows: ICT Engineer 50.0%, Project Manager 25.0%, Contractor 12.5%, and lastly Consultant 12.5%, in that order whom are involved in the implementation of hybrid and fiber Coax technology at Wananchi group.

4.3.3 Age distribution of Respondents

The study sought to find the age brackets of the respondents in the study and the results are as shown in table 4.5.

Table 4.5 Age Distribution of Respondents

| Years | Frequency | Percent | Cumulative Percent |
|--------------|------------------|----------------|---------------------------|
| 20 – 29 | 4 | 12.5 | 12.5 |
| 30 – 39 | 18 | 56.3 | 68.8 |
| 40 – 49 | 6 | 18.8 | 87.5 |
| Over 50 | 4 | 12.5 | 100 |
| Total | 52 | 100 | |

From table 4.5, the age bracket of the majority respondents in the study are at 56.3% in the bracket of 30-39, followed by 40 - 49 18.8%, while 12.5% in the subsequent category in that order of the respondents involved in the implementation of hybrid and fiber in the group.

4.3.4 Experience of Respondents in Construction

The study sought to find out respondents experience in implementation of hybrid and fiber technology at Wananchi group and the results are as shown in table 4.6.

Table 4.6 Experience of respondents in Construction

| Period | Frequency | Percent | Cumulative Percent |
|--------------------|------------------|----------------|---------------------------|
| 6 months to 1 year | 4 | 2.5 | 12.5 |
| 1 – 3 Years | 8 | 25.0 | 37.5 |
| 3 – 5 Years | 12 | 37.5 | 75.0 |
| Above 5 Years | 8 | 25.0 | 100 |
| Total | 32 | 100 | |

As stated in table 4.6 the study sought to find out the period the respondents have been involved with the company. The study sought to find out the experience of respondents in group. Majority of the respondents have an experience of over 3 years at 37.5%, followed by above 5 years at 25.0% and lastly from 6 months to 1 year at 12.5%.

4.3.5 Education Level of Respondents

The study sought to establish the level of education of the respondents that are involved in the implementation of the technology and the findings are as shown in the table below.

Table 4.7 Education Level of Respondents

| Level | Frequency | Percent | Cumulative Percent |
|---------------------|------------------|----------------|---------------------------|
| Tertiary Level | 8 | 25 | 25 |
| Undergraduate Level | 16 | 50 | 75 |
| Postgraduate Level | 8 | 25 | 100 |
| Total | 32 | 100 | |

From table 4.7 analysis, those at undergraduate level form the majority of the respondents at 50% while tertiary and Postgraduate level have similar frequency at 8 (25%).

4.4 Finance Influence on Implementation of Technology

The researcher sought to find out how finance influence implementation of the technology as well as how the allocation determines the implementation in the group as outlined below.

4.4.1 Adequate Allocation and implementation of Technology

The study sought to find out whether adequate allocation influence implementation of the technology in the firm and the findings are as outlined in table 4.8

Table 4.8 Adequate allocation and Implementation of Technology

| | Frequency | Percent | Cumulative Percent |
|-------------------|------------------|----------------|---------------------------|
| Strongly agree | 10 | 31.3 | 31.3 |
| Agree | 12 | 34.4 | 65.6 |
| Disagree | 8.0 | 25.0 | 90.6 |
| Strongly Disagree | 3.0 | 9.4 | 100 |
| Total | 32 | 100 | |

From table 4.8 analysis, majority of the respondents agreed that adequate funding influence implementation of the technology, followed by strongly agree at 31.3%, disagree 25% and

lastly strongly disagree at 9.4%. This therefore shows that funding is a key aspect in implementation of the technology project in the group.

4.4.2 Misappropriations of Project Funds

The study sought to find whether misappropriations of project funds in the firm is a key factor in the implementation of the technology, findings are as outlined in table 4.9.

Table 4.9 Misappropriations of Project Funds

| | Frequency | Percent | Cumulative Percent |
|----------------|------------------|----------------|---------------------------|
| Strongly agree | 12 | 37.5 | 37.5 |
| Agree | 20 | 62.5 | 100 |
| Total | 52 | 100 | |

From table 4.9 analysis, majority of the respondents said that misuse of funds hinder implementation of the fiber and Coax technology in the group at agree 62.5% and strongly agree at 37.5%.

4.5 Service Quality on Implementation of Hybrid and Coax Technology

The study sought to find out influence of Service quality on implementation of Hybrid and Coax Technology, the findings are as outlined below

4.5.1 Service Delivery

The study sought to establish the influence of Service delivery on implementation of Hybrid and coax technology, the findings are as outlined in 4.11.

Table 4.10 Service Delivery

| | Frequency | Percent | Cumulative Percent |
|----------------|------------------|----------------|---------------------------|
| Strongly agree | 18 | 56.3 | 56.3 |
| Agree | 12 | 37.5 | 93.8 |
| Neutral | 2.0 | 6.3 | 100 |
| Total | 32 | 100 | |

From table 4.10, most respondents strongly agree that service delivery influence implementation of Hybrid and Coax at 56.3% and agree at 37.5% in the company, this is an indication that service quality is key in implementation of Hybrid and Coax technology in the company.

4.5.2 Customer satisfaction and Implementation of Hybrid Technology

The study sought to find the influence of Customer satisfaction on Implementation of Hybrid and coax technology in the company.

Table 4.11 Customer satisfaction and Implementation of hybrid Technology

| | Frequency | Percent | Cumulative Percent |
|----------------|-----------|------------|--------------------|
| Strongly agree | 24 | 75 | 75.0 |
| Agree | 8 | 25 | 100 |
| Total | 32 | 100 | |

From table 4.12, most respondents strongly agree that customer satisfaction strongly agree at 75% while agree 25% influence implementation of Hybrid and Fiber technology at Wananchi group.

4.5.3 Customer Relation Program

The study sought to find out whether customer relation program influence implementation of Hybrid and Fiber technology, Findings are as outlined in table 4.12.

Table 4.12 Customer Relation program

| | Frequency | Percent | Cumulative Percent |
|------------------------|-----------|------------|--------------------|
| Very great extent | 16 | 50.0 | 50.0 |
| Great Extent | 8.0 | 25.0 | 75.0 |
| Neutral | 4.0 | 12.5 | 87.5 |
| To a small extent | 3.0 | 9.4 | 96.9 |
| To a very small extent | 1.0 | 3.1 | 100 |
| Total | 32 | 100 | |

From table 4.12, the study looked at Customer relation Program on the influence on implementation of hybrid and Coax technology in the organisation. The respondents strongly agree at 50% that customer relation program influence implementation of technology, followed by great extent at 25%, Neutral at 12.5% while small extent and very small extent at 9.4% and 3.1%.

4.6 Network Coverage

The study sought to find out how Network Effects influence implementation of the Hybrid and Coax technology in the Company.

4.6.1 Network Effects

The study sought to find out whether Network effects influence implementation of Hybrid and Fiber technology, Findings are as outlined in table 4.13.

Table 4.13 Network Effects

| | Frequency | Percent | Cumulative Percent |
|------------------------|------------------|----------------|---------------------------|
| To a very large extent | 12 | 37.5 | 37.5 |
| To a large extent | 8 | 25.0 | 62.5 |
| Undecided | 4 | 12.5 | 75.0 |
| To a small extent | 4 | 12.5 | 87.5 |
| To a very small extent | 4 | 12.5 | 100 |
| Total | 32 | 100 | |

The study found how Network effects influence implementation of Hybrid and Coax technology, the respondents to a very large extent at 37.5%, large extent at 25% while the rest fall at 12.5% on how Network effects influence implementation of hybrid and Coax technology in the Company.

4.6.2 Network Coverage

The study sought to find out how Network Coverage influence implementation of the hybrid and Fiber Coax technology. The findings are as outlined in table 4.14.

Table 4.14 Network Coverage

| | Frequency | Percent | Cumulative Percent |
|------------------------|------------------|----------------|---------------------------|
| To a very large extent | 19 | 59.4 | 59.4 |
| To a large extent | 13 | 40.6 | 100 |
| Total | 32 | 100 | |

From the findings as illustrated in table 4.14 of the study, respondents indicated that to a very great 59.4% and large extent at 40.6% network coverage influence implementation of hybrid and Coat technology at Wananchi Group.

4.7 Government and Regulation

The study sought to find out the influence of government and regulation on Implementation of hybrid and Fiber technology. Findings are as outlined below.

4.7.1. Government Laws

The study sought to find out whether National government and county governments had laws that influence implementation of Hybrid and Fiber technology, Findings are as outlined in table 4.15.

Table 4.15 Government and Regulation Laws

| | Frequency | Percent | Cumulative Percent |
|------------------------|------------------|----------------|---------------------------|
| To a very large extent | 12 | 37.5 | 37.5 |
| To a large extent | 6 | 18.8 | 56.3 |
| Undecided | 5 | 15.6 | 71.9 |
| To a small extent | 8 | 25.0 | 96.9 |
| To a very small extent | 1 | 3.1 | 100 |
| Total | 32 | 100 | |

From the findings as illustrated in table 4.15 of the study, respondents indicated that to a very great extent 37.5% government and regulation influence implementation of hybrid and coax technology followed by small extent 25%, to a large extent 18.8% , neutral 15.6% and lastly to a very small extent 3.1% in the company.

4.7.2 Tax Regulation

The study sought to find out the influence of tax regulation on Implementation of hybrid and Fiber technology. Findings are as outlined below.

Table 4.16 Tax Regulation

| | Frequency | Percent | Cumulative Percent |
|------------------------|------------------|----------------|---------------------------|
| To a very large extent | 10 | 31.3 | 31.3 |
| To a large extent | 8 | 25.0 | 56.3 |
| Undecided | 7 | 21.9 | 78.1 |
| To a small extent | 7 | 21.9 | 100 |
| Total | 32 | 100 | |

From the findings as illustrated in table 4.16 of the study, respondents indicated that to a very great extent 31.3% tax regulation influence implementation of hybrid and coax technology followed by large extent 25%, undecided and small extent at 21.9% in the company.

4.7.3 Political Environment

The study sought to find out how Political Environment on Implementation of hybrid and Coax technology. Findings are as outlined below.

Table 4.17 Political Environment

| | Frequency | Percent | Cumulative Percent |
|------------------------|------------------|----------------|---------------------------|
| To a very large extent | 16 | 50.0 | 50.0 |
| To a large extent | 6 | 18.8 | 68.8 |
| Undecided | 6 | 18.8 | 87.5 |
| To a small extent | 4 | 12.5 | 100 |
| Total | 32 | 100 | |

From the findings as illustrated in table 4.17 of the study, respondents indicated that to a very great extent 50% political environment influence implementation of hybrid and coax technology followed by large extent 18.8%, undecided and small extent at 18.8% and 12.5% respectively in the company.

4.8 Infrastructural Facilities

The study sought to find out how Infrastructural Facilities on Implementation of hybrid and Coax technology. Findings are as outlined below.

4.8.1 Infrastructural Facilities

The study sought to find out whether infrastructural facilities influence implementation of Hybrid and Fiber technology, Findings are as outlined in table 4.18.

Table 4.18 Infrastructural Facilities

| | Frequency | Percent | Cumulative Percent |
|------------------------|------------------|----------------|---------------------------|
| To a very large extent | 18 | 50.0 | 50.0 |
| To a large extent | 12 | 18.8 | 68.8 |
| Undecided | 1 | 18.8 | 87.5 |
| To a small extent | 1 | 12.5 | 100 |
| Total | 32 | 100 | |

From the findings as illustrated in table 4.17 of the study, respondents indicated that to a very great extent 50% political environment influence implementation of hybrid and coax technology followed by large extent 18.8%, undecided and small extent at 18.8% and 12.5% respectively in the company.

4.8.2 Provision of Incentives

The study sought to find out how Provision of Incentives on Implementation of hybrid and Coax technology. Findings are as outlined below.

Table 4.19 Provision of Incentives

| | Frequency | Percent | Cumulative Percent |
|------------------------|------------------|----------------|---------------------------|
| To a very large extent | 9 | 28.1 | 28.1 |
| To a large extent | 9 | 28.1 | 56.3 |
| Undecided | 3 | 9.4 | 65.6 |
| To a small extent | 6 | 18.8 | 84.4 |
| To a very small extent | 5 | 15.6 | 100 |
| Total | 32 | 100 | |

From the findings as illustrated in table 4.17 of the study, respondents indicated that to a very great extent/large extent 28.1% provision of incentives influence implementation of hybrid and coax technology followed by small extent 18.8%, to a very small extent at 15.6% and undecided 9.4% respectively in the company.

4.9 Overall Model of Variables

The following table 4.26 depicts the regression model which highlights the relationship of the variables in the study and findings are as outlined.

Overall Model of Variables

From table 4.20, the study used correlation coefficient r to check on the magnitude and the direction of the relationship between the variables, coefficient of determination (the percentage variation in the dependent variable being explained by the changes in the independent variables) and p - value were used to check on the overall significance of the model.

Table 4.20: Model Summary

| Model Summary ^b | | | | | |
|----------------------------|-------------------|----------|-------------------|----------------------------|---------------|
| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate | Durbin-Watson |
| 1 | .817 ^a | .667 | .617 | 1.78754 | 2.832 |

a. Predictors: (Constant), GOVERNMENT, FINANCE, SERVICE, NETWORK

b. Dependent Variable: IMPLEMENTATION

. Correlation Coefficient r of 0.817 indicates a strong positive correlation between the dependent and independent variables. On the other hand coefficient of determination R square of 0.617 shows that 61.7% of the variation of implementation of projects is influenced by government, finance, Network service and Coverage. The adjusted R square of 66.7% shows that the model is a good estimate of the relationship between the variables.

Tests of Hypothesis

The ANOVA below was obtained from the step-wise regression that was carried out,

Table 4.21: Tests of Hypothesis

| ANOVA ^a | | | | | | |
|--------------------|------------|----------------|----|-------------|--------|-------------------|
| Model | | Sum of Squares | df | Mean Square | F | Sig. |
| 1 | Regression | 77.420 | 1 | 77.420 | 12.800 | .001 ^b |
| | Residual | 181.455 | 30 | 6.049 | | |
| | Total | 258.875 | 31 | | | |
| 2 | Regression | 116.478 | 2 | 58.239 | 11.861 | .000 ^c |
| | Residual | 142.397 | 29 | 4.910 | | |
| | Total | 258.875 | 31 | | | |
| 3 | Regression | 161.245 | 3 | 53.748 | 15.415 | .000 ^d |
| | Residual | 97.630 | 28 | 3.487 | | |
| | Total | 258.875 | 31 | | | |
| 4 | Regression | 172.602 | 4 | 43.151 | 13.504 | .000 ^e |
| | Residual | 86.273 | 27 | 3.195 | | |
| | Total | 258.875 | 31 | | | |

a. Dependent Variable: IMPLEMENTATION

b. Predictors: (Constant), FINANCE

c. Predictors: (Constant), FINANCE, SERVICE

d. Predictors: (Constant), FINANCE, SERVICE, NETWORK

e. Predictors: (Constant), FINANCE, SERVICE, NETWORK, GOVERNMENT

Hypothesis 1

H₀; Finance does not influence the implementation of hybrid Fiber and coax technology in Kenya.

H₁; Finance influences the implementation of hybrid Fiber and coax technology in Kenya.

With $\alpha=0.05$ the p-value for finance is 0.001 which is less than 0.05 implying that we have to reject the null hypothesis and accept the alternative hypothesis. Hence finance influences the implementation of hybrid Fiber and coax technology in Kenya.

Hypothesis 2

H₀; Service Quality does not influence the implementation of hybrid Fiber and coax technology in Kenya.

H₁; Service Quality influences the implementation of hybrid Fiber and coax technology in Kenya.

With $\alpha=0.05$ the p-value for service quality is 0.000 which is less than 0.05 this implies that we have to reject the null hypothesis and accept the alternative hypothesis. Hence Service Quality influences the implementation of hybrid Fiber and coax technology in Kenya.

Hypothesis 3

H₀; Network Coverage does not influence the implementation of hybrid Fiber and coax technology in Kenya.

H₁; Network Coverage influences the implementation of hybrid Fiber and coax technology in Kenya.

Given that $\alpha=0.05$ the p-value for network coverage is 0.000 which is less than 0.05 this implies that we have to reject the null hypothesis and accept the alternative hypothesis. Hence Service Quality influences the implementation of hybrid Fiber and coax technology in Kenya. Network Coverage was regressed together with infrastructure (the moderating variable), since the predictor and moderator variables can be coded together Hayes, A.F and Matthes, J (2009).

Hypothesis 4

H₀; Government and regulation does not influence the implementation of hybrid Fiber and coax technology in Kenya

H₁; Government and regulation influences the implementation of hybrid Fiber and coax technology in Kenya.

Since $\alpha=0.05$ the p-value for government and regulation is 0.000 which is less than 0.05 this implies that we have to reject the null hypothesis and accept the alternative hypothesis. Hence Government and regulation influences the implementation of hybrid Fiber and coax technology in Kenya.

Regression Analysis

Regression analysis was carried out and the results are as shown here below;

Table 4.22: Regression Analysis

| Coefficients ^a | | | | | | |
|---------------------------|-----------------------------|------------|---------------------------|------|-------|------|
| Model | Unstandardized Coefficients | | Standardized Coefficients | t | Sig. | |
| | B | Std. Error | Beta | | | |
| 1 | (Constant) | -.854 | 1.207 | | -.708 | .485 |
| | FINANCE | .122 | .244 | .071 | .500 | .621 |
| | SERVICE | .407 | .285 | .198 | 1.428 | .165 |
| | NETWORK | .794 | .298 | .399 | 2.665 | .013 |
| | GOVERNMENT | .322 | .171 | .312 | 1.885 | .070 |

a. Dependent Variable: IMPLEMENTATION

Note: Dependent variable – Implementation; X_1 = Finance; X_2 = Service Quality; X_3 = Network Coverage; X_4 = Government and regulation; the resultant regression model is as follows:

$$Y = -.854 + 0.122X_1 + 0.407X_2 + 0.794X_3 + 0.322X_4$$

Based on the analysis of variables in the above table, a positive change in network coverage has the largest positive effect in implementation of technology by 0.794. Similarly, a positive change in service quality will positively impact on project implementation 0.407. Additionally, a positive change in government and regulation significantly leads to an improvement of implementation of technology by 0.322. Lastly, finance leads to positive change in implementation of technology by 0.122.

CHAPTER FIVE

SUMMARY OF FINDINGS, DISCUSSIONS, RECOMMENDATIONS AND CONCLUSION

5.1 Introduction

This chapter presents the summary of the study findings, discussions, recommendations and conclusion of the research. The chapter also contains suggestions of related studies that may be carried out in the future.

5.2 Summary of Findings

The purpose of this study was to examine factors influencing implementation of hybrid fiber and Coax technology: Case of Wananchi group from the analysis and review of research data through questionnaires.

From the analysis the respondents indicated that funding is key in implementation of hybrid and Coax technology with 34.4% agreeing. This therefore shows that funding is a key factor to hybrid and fiber technology.

Service quality is a major contributor to implementation of the project with service delivery at 56.3% highest, customer satisfaction 75% influence and lastly customer relations programs at 50% influence on implementation of the Project in the company.

On the issue of Network coverage the respondents indicated at highest of 75% to a great extent network effects, Network coverage 59.5% large extent on the implementation of hybrid and fiber technology in the firm.

On the issue of government and regulation, government laws at 37.5% highly influence implementation of the technology, tax regulations at 31.3% and political environment at 50% highest in the influence of implementation of hybrid and fiber technology at Wananchi group Limited.

5.3 Discussion of Findings

From the study there are five variables that affect implementation of hybrid fiber and Coax technology.

Finance is one of the key determinant that affects implementation of project in the firm, with all respondents agreeing that funding is key in the implementation of the technology, in view adequate funding most respondents agreed that it affects implementation of the technology at

34.4%, while misappropriation of funds at 62.5% greatly affects implementation of the technology.

Service quality is one the key indicator of implementation of technology, this therefore indicates quality in implementation is key, in the case most respondents at service delivery strongly agreed that 56.3% affects implementation of the project, customer satisfaction at 75% and Customer relation programs at 50%.

Network coverage is also a contributing factor in implementation of project with network effects at 37.5% highest and network coverage 59.4%.

On government regulation, government laws at 56.3% highest, tax regulations at 31.3% highest and political environment at 50% highest.

Infrastructure at 53.1% supporting infrastructural facilities ensure implementation of hybrid and fiber technology while provision of incentives at 28.1% are provided to ensure ICT infrastructure is implemented in the organisation. The implementing factors of Transmission capacity, Coverage area and Communication efficiency are also key in ensuring implementation of hybrid fiber and coax technology.

5.4 Conclusion

With reference to the study findings obtained under the analysis of the collected data, the researcher makes conclusions with respect to each research question. From the above findings it was concluded that finance determines implementation of hybrid fiber and coax technology, Service quality factors s such as service delivery, customer satisfaction and customer relation programs to a great extent influence implementation of hybrid and fiber technology.

The study acknowledges the importance of Network coverage in terms of network effects and coverage affecting implementation of technology at 37.5% and 59.4%. However, a lot needs to be done to ensure that the implementation is done effectively on the part of the company and all involved stakeholders at Wananchi group since this is a digital era and most customers are switching to the technology age.

5.5 Recommendations

Based on the findings of the study, the researcher recommends that:

The firm should ensure that adequate funds are allocated in the firm, since this is a major determinant to implementation of the technology.

The researcher also recommends that the firm should view service quality in implementation of the project thus service delivery, customer satisfaction and customer relation programs should be implemented to ensure that the technology is adequately implemented in the company.

The researcher also recommends that there should be a clear network coverage and network effects for effective implementation of the technology to the clients.

The researcher also recommends that government and regulation as well as infrastructural facilities to be factored to ensure that the technology is successfully implemented in the company.

The researcher also notes that transmission capacity, coverage area and communication efficiency are the major implementing factor in the firm.

5.6 Suggestions for Further Study

This study could be carried out in other firms in the Country

The researcher suggests a study on factors influencing implementation of hybrid and fiber technology in other ISP firms.

A study can be carried out on determinants of implementing hybrid fiber and coax technology at Wananchi group in Kenya.

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APPENDIX

Appendix 1: Letter of Transmittal

P.O Box 26660-00504,
NAIROBI.

Tel: 0737339743

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 Factors influencing implementation of Hybrid Fiber and Coax Technology in Kenya: A case of Wananchi Group Kenya Limited - Mombasa County.

You have been randomly selected to provide information on the implementation of the HFC Technology in Kenya. 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,

Elijah Odhiambo Ooko
L50/76842/2009

Appendix 2: Research Questionnaire

Section A: Respondents' Profile

1. Kindly indicate your gender:

Female

Male

2. Respondents' Position:

a) ICT Engineer

b) Project Manager /Supervisor

c) Contractor

d) Consultant

3. Which one best describes your age bracket?

20 – 29 years

30 – 39 years

40– 49years

Over 50 years

4. Experience in the ICT industry

Between 6 months to 1 years

Between 1-3 years

Between 3-5 years

Above 5 years

5. Indicate your professional qualification:

- Basic Education (Pry & Sec) []
- Tertiary []
- Undergraduate []
- Postgraduate (Masters/PhD) []

SECTION B: Finance in Implementation of hybrid and Coax Technology

1. Does funding influence implementation of hybrid and Coax Technology?

- Yes []
- No []

2. Indicate the level of finance on implementation of hybrid and Coax Technology at Wananchi. React on the items provided by using the scale given. **Please tick (√) appropriately.**

- Very Great []
- Great []
- Minor []
- No effect []
- Not Sure []

| Statement | 1 | 2 | 3 | 4 | 5 |
|---|----------|----------|----------|----------|----------|
| Do you think adequate funding allocation enhances implementation of the hybrid and fiber technology | | | | | |
| Does misappropriations of project funds lead to incompleteness of hybrid and fiber technology | | | | | |

SECTION C: Service quality on Implementation of Hybrid and Coax Technology

6. Do you think that service delivery influence implementation of hybrid and Coax Technology?

Strongly agree []

Neutral []

Disagree []

Strongly disagree []

7. Is Customer satisfaction key in Implementation of the Hybrid Technology?

Strongly agree []

Agree []

Neutral []

Disagree []

Strongly disagree []

8. Do you think that customer relation programs influence implementation of Hybrid Technology?

Strongly agree []

Agree []

Neutral []

Disagree []

Strongly disagree []

SECTION D: Network Coverage and Implementation of hybrid and Coax Technology

9. Does Network coverage influence the successful Implementation of the hybrid and Coax Technology? React on the items provided by using the scale given. Please tick (✓) appropriately.

- To a Very large extent []
- To a large Extent []
- Undecided []
- To a small Extent []
- To a Very small Extent []

7. Does Network coverage influence the quality of a hybrid and Coax Technology?

- Very much []
- Not very much []
- Not at all []

SECTION E: Government Regulation and Implementation of Hybrid and Coax Technology

8 To what extent does government and Regulation influence Implementation of hybrid and Coax Technology? React on the items provided by using the scale given.

- To a Very large extent []
- To a large Extent []
- Undecided []
- To a small Extent []
- To a Very small Extent []

| Statement | 1 | 2 | 3 | 4 | 5 |
|--|----------|----------|----------|----------|----------|
| Does government laws and regulations Influence Implementation of the Technology | | | | | |
| Does tax regulations affect implementation of the hybrid and Coax Technology | | | | | |
| Is the political environment conducive for the implementation of hybrid and fiber technology | | | | | |

SECTION F: Infrastructure and Implementation of hybrid and Fiber technology

9. To what extent does Infrastructure influence Implementation of hybrid and Coax Technology? React on the items provided by using the scale given. Please tick (√) appropriately.

- To a Very large extent []
- To a large Extent []
- Undecided []
- To a small Extent []
- To a Very small Extent []

| Statement | 1 | 2 | 3 | 4 | 5 |
|---|----------|----------|----------|----------|----------|
| Are the supporting infrastructural facilities ensure implementation of hybrid and coax technology | | | | | |
| Is there a provision of incentives for the provision of ICT infrastructure? | | | | | |

SECTION G: Implementation of Hybrid and Fiber technology

Are the following key in implementing hybrid fiber and Coax technology at Wananchi Group?

10. Transmission Capacity

- To a Very large extent []
- To a large Extent []
- Undecided []
- To a small Extent []
- To a Very small Extent []

11. Coverage area

- To a Very large extent []
- To a large Extent []
- Undecided []
- To a small Extent []
- To a Very small Extent []

12. Communication Efficiency

- To a Very large extent []
- To a large Extent []
- Undecided []
- To a small Extent []
- To a Very small Extent []

Thank You for your time and co-operation.