DIFFUSION, UTILIZATION AND IMPLICATIONS OF THE MOBILE PHONE FOR RURAL DEVELOPMENT: A CASE STUDY FOR IGEMBE SOUTH WEST DIVISION IN MERU NORTH DISTRICT

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Declaration

I hereby declare that this is my original work and it has not been presented in any other forum.

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Dedication

To my family for their steadfast support throughout my studies.

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List of Abbreviations

ACCE	-	African Council for Communication Education
AISI	-	African Information Society Initiative
BS	-	Base Station
CBS	-	Central Bureau of Statistics
CCK	-	Communications Commission of Kenya
CDMA	-	Code Division Multiple Access
FCC	-	Federal Communications Commission
GPRS	-	General Packet Radio Service
GSM	-	Global System for Mobile Communication
IT	-	Information Technology
ICT	-	Information and Communication Technologies
ISP	-	Internet Service Provider
LCD	-	Liquid Crystal Display
MS	-	Mobile Station
MSC	-	Mobile Switching Center
NICI	-	National Information Communication Infrastructure
TDMA	-	Time Division Multiple Access
USA	-	United States of America
UK	-	United Kingdom
UNESCO	-	United Nations Education, Science and Cultural Organization
SIM	-	Subscriber Identity Module
SMS	-	Short Message Service
WAP	-	Wireless Application Protocol

CHAPTER ONE

1.0 Background

The mobile telephone, otherwise called the cell phone is a recent communication innovation in our Kenyan society. And so it is to many other developing countries throughout the world.

The introduction of this communication gadget in Kenya in 1997 has brought about varied implications as well as transformations in the communication patterns of the society.

A couple of mobile phone subscribers have lately acquired this imported communication innovation and have in the process developed a new communication habit in the society. It must be appreciated that every innovation brings its advantages and disadvantages to the adopting society. In this case the new innovation under scrutiny is the mobile phone to the rural inhabitants.

The introduction of the mobile phone that falls within the realm of the new information and communication technologies (ICTs) has evidently prompted several transformations in our Kenyan society. ICT effects are indeed felt in all spheres of human life in this so-called 'information age'.

At the heart of these developments in Kenya are technological advancements in the west and policy changes in the country. Prior to the recent liberalization and glooalization policy changes, mobile phones were few and expensive. They were restricted only to a few individuals,

especially the rich elite in the urban areas who could afford them. Then a mobile phone piece cost tens of thousands of shillings. It was often perceived as a status symbol since whoever possessed it was seen to belong to the high class. Those in the lower status regarded it with awe.

Times have however changed drastically and mobile phones have found their way into more peoples' pockets, including those of the lower social classes who live in the rural areas. On this account the rapid diffusion and adoption of the mobile phone innovation in our society merits candid research to establish their treads and understand their actual impact in the society, especially in the rural villages.

Two mobile phone service providers, namely Kencell Communications Limited and Safaricom Limited have been licensed to provide mobile phone services in Kenya. Safaricom was the first mobile service provider in Kenya. It was started in the late 1990s by the telecommunication parastatal, Telkom. In the year 2000 Safaricom was re-launched as a joint venture between Vodafone UK and Telkom Kenya. Vodafone bought 40% of the shares while Telkom kept 60% of them. (http:// www.kencell.co.ke/kencell_2/ about kencell. asp).

Kencell Communications Limited entered the Kenyan market in 2000, following policy changes aimed at liberalizing the telecommunications industry. Kencell thus became the first privately owned commercial company authorized to provide mobile telephone services in Kenya. Vivendi Telecom of France with 40% of the shares and Sammer group of

companies, which has 60% of the shares, jointly own Kencell Communications Limited. Econett Wireless Company is hopefully set to join the market in the course of the year.

Soon, thousands of enthusiastic urban subscribers (initially in Nairobi) acquired new mobile phones for communication. The amazing innovation fast diffused and got adopted in other urban centers. According to the figures provided by the central bureau of statistics (CBS) in the Statistical Abstract (2002), a chronology of the increasing tread of the mobile phone adoption and use since its inception in the Kenyan market in 1997 is given. The source of this information is Telkom Kenya.

1997 5,000
1998 9,000
1999 15,000
2000 85,000
2001 668,767

With the lapse of 2002 to 2004 this figure has however increased tremendously to 2.8 million mobile phone subscribers throughout the country. By June 1 Safaricom had hit the 1.6 million mark with Kencell at 1.2 million. According to the Director of the Communications Commission of Kenya Mr. Sammy Kirui in a televised interview with KTN Television on 8 July 2004, the mobile phone industry is growing at the rate of 46% per annum. This rapidly changing scenario can be attributed to the fact that this is a new field that is yet to be fully exploited. This figure though is small compared to a population of 30 million people. For these reasons, this is an exploratory research.

Presently the innovation is fast finding its way into remote areas of Kenya as the versatile mobile phone companies install their transmitters in these rural regions. For example Kencell Communications Limited has presently covered about 68 towns countrywide-including the most remote parts of these regions. Safaricom Limited similarly has almost the same coverage, as the two mobile service providers are locked in fierce market competition.

This new technological communication equipment is attracting keen attention and curious excitement in these rural areas. This imported artifact is indeed affecting the lives of people in those areas in fundamental ways.

The current mobile phone subscription in Kenya has shot to about 2.8 million and the trend is still on the rise. In a nutshell, the introduction of the mobile phone innovation in Kenya has inspired tremendous revolution in the telecommunications sector that was previously pathetically handicapped in the rural areas. It has also revolutionized many other communication sectors, as the study seeks to expose. For example its role in enhancing interpersonal communication is particularly immense.

It was therefore the devoted commitment of this research project to explore the diffusion, utilization and implications of this new communication technology from the developed world to the remote Kenyan rural villages. The spread, uses and effects of the new communication technology must not be taken for granted since it brings diverse transformations in the society. For epistemological

reasons therefore, it is important to sit back and find out where we have come from and going as far as this exciting telecommunication innovation is concerned. This way new knowledge on this sector can be exposed for future application to streamline the sector.

1.1 Problem Statement

The world is currently undergoing tremendous changes in the information communication dissemination industry as inspired by the new ICTs. ICTs are the most fundamental innovations of recent times, especially in the context of the 'information age'. These developments are transforming the communication methods of people fundamentally. Indeed information has inherent power as it carries momentous knowledge capable of transforming people for the better.

ICTs thus bring with them many novel opportunities of development and those who do not have access to these information communication facilities are disadvantaged to the extent that they lag behind in the new global information communication matrix.

One of the most fundamental infrastructures boosted by these innovations is the telecommunications sector as manifested by the introduction of the mobile phone wireless communication technology. Just a short while ago, the mobile phone was a far-fetched technology in our society. It was more of a status symbol for a few wealthy elites, yet millions of needy people deserved it.

It is therefore appropriate and timely to investigate the status of our rural inhabitants in terms of their adoption ard utilization of this momentous telecommunication technology in their day-to-day lives. It is therefore prudent to gain an initial understanding of how mobile phones are diffusing and getting adopted in the rural areas for communication, as well as their broader effects in the society. Consequently the frustrating factors that hinder effective adoption and utilization of this important communication technology are exposed. This would provide the opportunity to correct the situation early enough.

This study therefore by its exploratory status can serve as a springboard for further studies on the mobile phones, their use and development in the rural areas. Unexploited knowledge gaps on diffusion and utilization of the mobile phones in the rural areas in Kenya will thus be bridged.

This study thus explores answers to questions on the above-introduced cause. Based on the findings of the study, suggestions on the most pragmatic way forward for the development of wireless telecommunications in the rural areas are formulated. The recommendations point to the necessity of better provision and creation of an enabling environment for the fullest utilization of mobile phones for rural development. These marginalized regions were not created to lag behind while the rest of the world moved forward with improved living standards. This state of affairs is not natural as may be taken for granted.

The fixed line telecommunications sector in the rural areas of Kenya is poor, with many rural regions without any

telecommunications connections at all. This lacking state of affairs subjected the rural inhabitants to great problems when they needed to communicate outside or within their respective regions. People traveled long distances to make calls in towns. They also incurred more expenses.

According to the minister of Transport and Communications (Honorable John Michuki) "The ratio of accessibility to telephone in the rural areas is 0.16 lines to 100 and 4 lines to 100 in the urban areas. The plan is to increase the ratio to 1 line per 100 people in the rural areas and 20 lines per 100 in the urban areas." This serves to show the desperate magnitude of this telecommunications deficiency in the rural areas of Kenya. The plight is particularly grave considering that majority of Kenyans live in the rural areas.

Despite the inception of mobile phones in Kenya almost a decade ago, quite a substantial span of time, the rural areas are still lagging behind. The diffusion and adoption of mobile phone innovation is relatively low vis-a-vis the demand in the population. The contention here thus is that the rural populace deserves more. More needs to be done on this front as there are still gaping shortfalls and restrictive handicaps.

1.2 Objectives

1.2.1 Broad Objective

- To find out the effects brought about by the adoption of the mobile phone communication innovation in the rural areas in Kenya.

1.2.2 Specific Objectives

- To determine the various communications transformations brought to the rural community as a result of adopting the mobile phone for innovation.

- To establish the effectiveness of the mobile phone as a communication tool in the rural areas.

1.3 Justification of the Study

The information communication technology revolution, within which the mobile phone falls, has fundamentally transformed many facets of the human life, from the economy, industry, mass media, health, entertainment to politics. Basically the tendrils of the ICT infrastructure today are pervasive to say the least.

Indeed we are living in an information society. The current era has also been described as the 'information age.' One

of the technological infrastructures that are enabling this state of affairs is the mobile phone innovation.

Another significant justification for the study was the fact that mobile phones fall under the communications component of the broad concept of the 'infrastructure'. A brief definition of this term as provided by the Collins English dictionary is "the stock of fixed capital equipment in a country considered as a determinant of economic growth." Mobile phones therefore serve a significant development function in the society. Their contribution in the society is immense.

Jerry Salvaggio (1989) in his book The Information Society wrote that "every society is tied together by three different kinds of infrastructure: transportation, energy grids and communication" (Pg 92). He further aptly asserts, "Telecommunications will be the central infrastructure tying together the society. Such network increases personal interaction and reduces the costs of distance." (Pg 93).

On this cue thus, the significant role played by the mobile phone in the revolution of the telecommunications sector, particularly in the rural areas of Kenya is of great value to the overall national economic growth and the improvement of the living standards of people.

In a nutshell mobile phones are very significant in improving the telecommunications needs of the people living in the rural areas in Kenya. These are basic in enhancing human communication.

There is therefore need to critically understand the actual state of mobile telephony in Kenya in order to come up with informed recommendations as well as formulate pragmatic policies to improve the current performance of this important technological infrastructure. Through this kind of research teething problems can be identified and arrested before they become chronic and expensive in the future.

CHAPTER TWO

2.0 Literature Review

The immense contribution of the technological infrastructure in transforming the society in fundamental ways was of particular keen attention in this study. Lately this new field of communication has been attracting the deserved interest in research by communication scholars.

Salvaggio (1989) argues that 'among the more common orientations to the information societies are those that focus on the diffusion of computer and telecommunications technologies.' This is actually the heart of the new information and communication technologies under which the mobile phone falls.

Dizard (1984) 'was sensitive to the social economic and political realities surrounding the diffusion of computer and communication technologies' basically he viewed the 'information society in terms of the spread of communication networks and information machines.' This is apparently the development we are experiencing in Kenya today and shall be the focus of this study.

Dizard (1984) aptly explains that 'information societies come about in three stages, namely:

(i) First, both large and small innovative companies create the technological infrastructure.

(ii) Secondly, all segments of the economy and government become dependent on information technology and communication networks.

(iii) Finally, the mass consumerization of information technologies and services affords all lifetime access to information.'

Anything that falls short of perfection or its full positive potential can be said to face problems of one sort or another. It is important that potential problems be discovered and addressed before they become ingrained in the developing social structure, so they might be reduced or resolved by the formulation and implementation of directed policies. This is another endeavor of this research.

This field (especially in the rural areas of Kenya), partly due to its newness, is relatively unexplored in research studies. It is the aim of this research project therefore to provide some groundbreaking pathfinder on the emerging implications of introducing the mobile phone in the rural areas of Kenya.

This study will predominantly dwell on the implications of this new communication innovation in the rural communities of Kenya, with special reference to Igembe South West Division.

The diffusion of this innovation to the rural areas of Kenya has been prompted by several interrelated factors.

Most prominently, the rapid diffusion and adoption of the mobile phone communication gadget, has been catalyzed by the current sweeping revolution in the information and communication technologies (ICTs) in the world. These ICTs have facilitated tremendous transformations in the telecommunications and mass media sectors, among other areas. More transformations are still imminent due to the fast rate at which ICTs are changing.

Significantly, it must be appreciated that these information and communication technologies are imports, especially from Europe and Asian countries. Hence their relevance in this diffusion of innovations research study. Another factor to bear in mind in this regard is the national policy and legislative changes in Kenya, occasioned by several internal and external issues.

The two mobile service providers in Kenya (Kencell and Safaricom) are currently spreading their services to the rural areas. This study is interested in exploring the reception of these innovations in the rural villages, as well as the resulting effects.

2.1.1 Mobile Phone Policy Issues

Liberalization of the telecommunications sector was initially envisaged in 1991 when four phases were identified. The first phase, involved the supply, installation and maintenance of terminal equipment, external cabling and wiring. The second phase include the licensing of the of service providers for services such as

Internet, e-mail and data transmission. Phase three relates to paging, mobile phone services, trunk radio networks, public data systems, and Very Small Aperture Terminals (VSATs) installation and maintenance. Phase four is the licensing of a new network operator to compete with Telkom Kenya.

The African Technology Policy Studies Network (ATPS), a communications research organization based in Nairobi in one of their regular publications, 'African Response to the Information Communication Technology Revolution', have discussed some broad ICT based policies in Africa that are of significant import to this study.

"In May 1995, the 21st meeting of the Economic Commission for Africa (ECA) conference of ministers which consists of the 53 African ministers of social and economic development and planning adopted resolution 795 (XXX) entitled 'Building Africa's Information Highway'".

The aim was to effectively utilize the ICT infrastructure to speed up the social-economic development of the people of Africa. A document entitled "Africa's Information Society Initiative (AISI) was drawn and adopted by all the planning ministers of this continent in May 1996.

All African countries were thus expected to develop a National Information and Communication Infrastructure (NICI) plan to execute national development priorities.

It is felt that by developing "AISI will help Africa to speed up development plans, stimulate growth and provide new opportunities in education, trade, healthcare, job

creation and food security, helping African countries to leapfrog stages of development and raise the standard of living".

"In order to develop and upgrade present communication facilities on the African continent, the following programs are suggested for all member countries, including Kenya.

1) Developing and upgrading national telecommunications infrastructure.
2) Continental interconnectivity through the development of national data communication hubs, provision of data communication gateways to link Africa to the rest of the world and establishing the necessary interconnectivity between telephone and data network in Africa.
3) Implementation of a number of small, quick impact pilot demonstrations projects in some African countries.
4) Integrated rural development through the sharing of rural public access telecenters, mobile computing and telecommunications resources will be established at selected locations with support from international donors." (Olalere Ajayi 2002).

Another related policy issue is the fact that there are plans to privatize Telkom, in the ongoing spirit of liberalization. By so doing it is felt that telecommunications services in Kenya will be improved. Telkom Kenya has a five-year exclusive period in Nairobi, expiring in 2004, before the doors are opened to competition. Therefore there are advanced plans to

establish a second fixed line telephone operator in Kenya. Presently Telkom Kenya enjoys monopoly in this sector. The fixed line operator, Telkom Kenya, plans a major project to expand its capacity and upgrading the existing facilities. The plan is to increase exchange capacity by 430,000 lines.

Structural Adjustment Programs (SAPs) also had a bearing on the rapid diffusion and proliferation of mobile phones in this country. These policy stipulations encourage the concept of liberalization and privatization of public institutions with the underlying aim of encouraging competition through the free market forces. This is meant to streamline service delivery from the private sector; hence Kencell Communications limited and Econet Wireless Company were licensed.

A third mobile service provider is tipped to join the market soon. The aim is to attract private sector capital and increase efficiency by allowing competition in certain crucial areas. The process is in line with the targets set by the government and the enactment of the Kenya Communications act in 1998.

2.1.2 Characteristics of the market

The fixed telephone network has the capacity of 492,222 lines, out of which 328,116 lines have been installed. The government plans to improve services penetration from the present 4 lines for every 100 people to 20 lines in urban areas by 2015. The plan is also to increase the penetration in the rural areas from 0.16 lines for every 100 people to

one line during the same period. This translates to around 300,000 new lines in the rural areas and 2.4 million new connections in the urban areas, respectively.
At an average cost of 2000 US dollars per line, the total investment required is 5.4 billion US dollars or 270 US dollars annually during the period of 1995-2015. The government has been moving in earnest to achieve this goal but the process has been slowed down by limited funds. One of the key objectives of the stalled privatization process was to attract private capital to realize the above tele-density targets. (http://www.tradepartners.gov.uk/telecom/kenya/profile/overview.shtml).

2.1.3 Mobile Phone and the Internet

Another major contribution made by the mobile phone revolution in Kenya involves reliable internet connectivity using mobile phones. Unfortunately this opportunity has not been exploited in the rural areas due to a variety of reasons. Largely due to lack of technological awareness on the part of the rural populace and lack of supporting infrastructure such as power installations in the rural areas among other factors.

By and large in a country where internet usage has not been fully exploited because of poor infrastructure, mobile phones can play a very crucial role in connecting more Kenyans to the net. It must be appreciated that in this information age, the internet information superhighway is very important to the development of the rural areas. That

is if we are to move at the same pace as the outside world in the current spirit of globalization.

There are many untapped development opportunities in the internet that can significantly help the people in the remote rural areas to improve their living standards for the better.

The two mobile service providers-Safaricom and Kencell-enable their subscribers to browse the internet where there is network coverage. Connection can be made through a laptop, desktop computers or personal digital assistants (PDAs). To access the internet on any of the networks subscriber's needs to use data or wireless application protocol (WAP) enabled mobile phones. With a WAP enabled phone subscribers don't need a computer as they can access the internet directly on the handset. Internet connection can be made through wireless or cable connection.

Safaricom mobile office uses General Packet Radio Service (GPRS) technology a high speed data transmission technology. The technology supports applications such as web browsing, e-mail, files transfers, SMS and downloads. This can be done using direct connection to the internet using GPRS enabled phone or using a GPRS phone as a modem to connect via the computer.

Kencell's Access 350 enables subscribers to send and receive e-mails or surf the internet over their Kencell lines at a discounted rate. It requires no contracts, no cash deposits and no ISP subscription. Access 350 gives digital, reliable and efficient connection and is ideal for

remote places where Telkom Kenya's infrastructure is not available or problematic analogue exchanges hamper connection.

This service comes in two categories, namely, WAP service where a WAP and data enabled phone is configured to access WAP enabled mail and internet. The other category is Dial-up service-where you use your phone as a line and modem to connect to the computer, in which case a data enabled phone is needed, a RS cable to connect to the computer and a computer or a laptop.

In the last four years internet usage in the country has doubled from 200,000 users to 400,000 users today. The mobile phone revolution has been particularly instrumental in this drastic rise. In this respect mobile phones can increase internet penetration especially in areas where landline infrastructure is unavailable, especially in the rural areas. Mobile connectivity is reliable and cost effective service. Mobile phone subscribers don't have to pay high installation charges to ISPs.

It is also worth noting here that Telemedia has recently been licensed by the Communications Commission of Kenya (CCK) as the national service provider for Thuraya Satellite Telecommunications Company. The Thuraya phone is the custom built handset offering a range of services which include voice, data, fax and SMS messaging via satellite network.

This is the versatile answer for people whose work lifestyle takes them beyond the reach of land based telecommunications in rural and urban settings. Thuraya's

uninterrupted communication assures excellent clear, reliable, quality voice telephony. Thuraya has a roaming facility that compliments Kencell and Safaricom GSM networks. Thuraya phone roams on either of the home networks whilst in coverage area and automatically switches to satellite network in areas of no signal. This development is however yet to be felt since it is newly launched and has not taken root in the country. It is bound to be particularly beneficial in rural areas where land based transmissions technologies are ineffective.

2.1.4 Diffusion of Information Technologies in Rural America

Robert La Rose and Jennifer Mettler (1989) in Journal of Communication Vol. 39 No. 3 have discussed a research that was carried out in rural America by the U. S. National Telecommunications and Information Administration. The contents of this study are contained in the 1988 Telecom Report.

This was a large-scale survey of seven geographically and demographically diverse rural areas. They sought to investigate how rural inhabitants used information and communication technologies in their work.

In summary, each respondent was asked how much he or she used a variety of common information technologies and communication products and services.

These information and communication technologies included the following: Telephone answering machines, telephone credit cards, personal computers, and cellular phones among others.

The research investigated the following major questions. "First, are rural residents using fewer information technologies than non-rural residents? Second, how do the socio-economic status, personal attributes, and socio-cultural factors associated with rural residency affect which information technologies are used? Third, do the general attitudes of rural residents toward information technologies mediate the effects of other influences on information technology use?" (Journal of Communication, summer 1989/Vol. 39 No. 3 Pg 49).

In this study, the independent demographic variables were rural residency, age, sex, education, occupation and income. The availability of information technologies in the home was assessed by asking, "Which of the following do you have in your home? Telephone answering machine; cable telephone; home satellite receiver; personal computers; cellular phone and weather radio among others.

Their findings, "suggested that the rural residents are not disadvantaged members of the information society. They found out that with the exception of cable television, rural residents are just as likely as non-rural residents to have a variety of telecommunications technologies in their homes. And with the exception of automatic pagers and automatic teller machines, they are as likely to use information technologies". (Journal of Communication Summer 1989 Vol 39 No. 3 Pg 56).

These exceptions involved those technologies most likely to be subject to variations in the telecommunications infrastructure.

These findings in the US pose a challenge on this research project in establishing whether or not the same findings could be found to exist in the environment of a developing country like Kenya.

2.2.5 Historical Development of Wireless Communication

Before clearly understanding where one is going, as the adage goes, it is important to understand where one is coming from in the first place. It is prudent therefore to give a vivid account of the historical development of the mobile phone, tracing the paths it took before reaching the rural areas in Kenya.

Essentially, the historical evolution of the mobile phone cannot conclusively be discussed without delving into highly technical and scientific detail. Often, the fine demarcation between the terms science and technology is blurred by the amazing overlapping results the two keep producing with the lapse of time.

The wireless Advisor Glossary defines the cell phone as a type of wireless communication that is commonly known as the mobile phone. For purposes of this study we shall stick to the latter term, since it is most used in our environment.

The telephone was invented by one Graham Bell in 1976. Nikolai Tesla on the other hand invented wireless radio communication in 1880. It was however modified later by an Italian named Guillermo Marconi.

However Dr. Martin Cooper of Motorola is reputed to have invented the first modern portable handset. (There were crude attempts before this date though). Notably to this date Motorola Company still produces mobile phone handsets. Cooper made the first mobile call on April 1983.

This communication gadget is actually called "cellular" because the system uses several base stations to divide a service area into numerous "cells". In operation, cellular calls are transferred from base station as the user moves from cell to cell. Put simply, the mobile phone is a sophisticated two-way radio. In Kenya it is regarded as a mobile phone probably because it is portable.

The most fruitful concept of a mobile phone emerged in 1947 when researchers modified crude car phones. They found out that by using small cells range of service area with a frequency, they could use the traffic capacity of the mobile phones substantially. This allowed persons sending and receiving simultaneously in a process called full duplex operation. It further enabled permanent interconnection of mobile radios and local telecom systems.

Over the years the Federal Communication Commission (FCC) of the United States offered various frequencies to various companies that were testing and trying to develop this

technology. This is the equivalent of Kenya's Communication Commission of Kenya (CCK). These are government bodies vested with the responsibility of managing the electromagnetic spectrum used to transmit varied communication signals.

However, the first commercial cellular telephone service was launched in 1979 in Tokyo, Japan. The second commercial mobile telephone services followed in USA in 1981. This was a joint venture between Motorola and American Radio Telephone.

The first mobile phone services used analog signals. Analog sends signals using continuous stream or wave. Later date entrants adopted digital technology instead of analog. Digital wireless mobile phones employ one of the following digital technologies: CDMA, TDMA and GSM. Mobile phones are only restricted to one of the particular technologies.
CDMA - (Code Division Multiple Access) is based on a form of spectrum technology that separates voice signals by assigning them digital codes within the same spectrum.

TDMA - (Time Division Multiple Access) uses frequency bands available at the wireless network and divides them into time slots with each phone user having access to one time slot at regular intervals.
GSM- (Global System for Mobile Communication). This is an improved version of TDMA technology.

Kenya uses the GSM technology. This system has three entities, namely:

- Mobile station;

- Base station;
- Mobile Switching Center (MSC).

Mobile station is the equipment that a subscriber has which enables one to communicate. It stores subscriber data (Name, telephone number and services that the subscriber is to access) in a subscriber identity module (SIM) card.

Base station BS and MSC are owned by the network provider. BS is the link between subscriber MS and MSC. The MSC controls all the functions of GSM and acts as a link between subscribers in the same network and among other networks.

2.1.6 Technologies Used by the Mobile Phone

Everett M. Rogers (1995 pg 12) defines technology as "a design for instrumental action that reduces the uncertainty in the cause effect relationships involved in achieving a desired outcome".

He further explained that a technology usually has two components:

i) Hardware.
ii) Software.

Hardware consists of the tool that embodies the technology as a material or physical object. In our case it will be the mobile phone handsets.
Software on the other hand consists of the information base of the tool. For example the content we receive from the screen of the mobile phones.

The mobile phone operates through a wide range of technologies that broadly fall within the realm of the new information and communication technologies (ICTs). These technologies are combined together and function simultaneously. Most paramount of them all is the computer technology, which encompass electronic data processing systems. Miniaturization of the electronic hardware has also contributed in the development the mobile phone.
Other transmission technologies used in relaying mobile phone signals are similar to those used in radio transmission. Cellular phones operate with radio frequency, a form of electromagnetic spectrum.

Another transmission technology that can be used in mobile phone signal transmission is the satellite technology. This technology is extensively used in the developed world where there are satellite cell phones. Mobile phone signals are beamed into space where satellite vehicles are installed, whereupon the signal is amplified and re-transmitted back to earth. This mode of transmission is more effective than the microwave technology. Cable technology can also be used to transmit mobile signal.

Indeed the mobile phones can be classified as some form of small computers in their own right. They extensively use all the basic of a computer in their operations.

2.1.7 Technological Dilemma in the Developing Countries

Technological innovations open up new vast opportunities. This not withstanding, a word of caution is necessary: They are not instant miracles, but tools to be introduced and used only after careful consideration is given to all possible ramifications.

MacBride (1980) in his book Many Voices One World warns that, "Technological innovations can often have negative effects both economic and social, and may distort directions and priorities for overall development activities". He therefore recommends, "Introduction of some new technologies should be seriously considered and perhaps delayed, in certain development situations".

This word of caution is particularly relevant because of the fact that the control of the production and utilization of these information processing and telecommunications systems is at present mainly in the hands of industrialized countries and in some instances, a few transnational commercial companies inspired by maximum profits.

This brings into sharp focus the question of perpetual technological dependence and the eventual sustainability of these technologies by the developing countries, and more specifically in the remote rural areas.

2.2 Theoretical Framework

2.2.1 Classical Theory of Diffusion of Innovation

The study was mainly based on diffusion of innovation theory. The proponent of this theory is Everett Rogers, formerly of Stanford University.

The theory essentially seeks to explain how new products and ideas find their way into new societies and environments.

It is prudent to give conceptual and operational definitions of the major terms used in this theory.
First, diffusion is defined as the act of dispersion or transfer from one part of a medium to another.

For purposes of this study, diffusion as defined by Everett Rogers (1995) in his book Diffusion of Innovations meant "The process by which innovation spreads to members of a social system." This study was concerned with new ideas, as the mobile phone technology is a new idea in the rural areas in Kenya.

Innovation is another significant term in this theory. Innovation is defined as "something newly introduced, such as a new method or device." "It can also be recognized as the act of innovating which means to invent or begin to apply".

Within the framework of this study, innovation was taken to mean an idea, practice or object perceived as new by an

individual. In this case the mobile phone is new in the rural areas.

Everett Rogers gave four crucial elements in the diffusion of innovation research. These critical elements in the diffusion of new ideas are:

1) Innovation;
2) Communication through channels;
3) Time;
4) Members of a social system.

The rate of diffusion of an innovation was another important factor in this study. The rate of adoption as defined by Everett Rogers (1995 pg 22), "is the relative speed with which an innovation is adopted by members of a social system".

This rate of adoption is measured by the length of a time required for a certain percentage of the members of a social system to adopt an innovation.

The rate of adoption is affected by the following attributes among others. Relative advantage; compatibility; trialability and observability. Other attributes that affect the rate of adoption include; the type of innovation, nature of communication channels diffusing the innovation at various stages in the decision process, the nature of the social system and the extent of change agents efforts in diffusing the innovation. All these attributes were taken into account in this research project.

2.2.2 Related Theoretical Dispositions

- Abraham Maslow's theory of motivation is another theoretical framework within which this research project can be viewed. Briefly outlined, this theory is based on the assumption that human behavior is goal directed and originates from unfulfilled needs. These needs create some tension, which in turn motivates human beings to act in given ways.

  Maslow conceptualizes a hierarchy of human needs. These are: basic (food, drink, shelter etc); safety (financial, protection, avoidance of pain etc); social (love and acceptance); self esteem; (prestige, status, respect); and self actualization (absolute development). Each level of need must be fulfilled before the next level manifests itself. This research study also sought to reveal which needs the mobile phone fulfills.

- The two-step flow theory developed by Elihu Katz and Paul Lazarsfeld is another theory that has a bearing to this study. In a nutshell this theory says that opinion leaders receive information from the mass media first and relay it to other members of the society through interpersonal communication. This theory is particularly significant in this study because people usually engage in consultations prior to the purchase of mobile phones. Opinion leaders who frequently travel outside the village bring information about mobile phones.

This information is disseminated through interpersonal communication.

2.3 Operational Definition of Terms

- Mobile phone will refer to the new small portable wireless digital electronic telephones. Two licensed mobile service providers in Kenya, namely Kencell Communications limited and Safaricom limited, currently operate them.
- Rural area will be used to refer to a region or place characterized by country life. The countryside is characterized by farming, poor infrastructure and has no urban traits. A place manifesting rustic conditions.
- Implications in the context of this study will mean the effects brought about by the adoption of the mobile phone. These are the empirical resulting changes.
- Adoption will imply accepting and beginning to use the mobile phone. It entails accepting new innovations that are not native in one's culture.
- Utilization in this study means the practical use of the mobile phone. This is through the consumption of mobile phone services, for example through making calls, sending SMS (Short message Text), and accessing the internet among other uses of the mobile phones.
- Development will mean advancement from a less favorable state of affairs to a more superior and convenient level. It is seen in the context of

progress. Forward achievement in the desirable direction. This leads to improved living standards. Effects imply the resulting outcomes following the diffusion and adoption of the wireless mobile phone communication technology in the rural areas. As manifested by the resulting changes experienced by the rural inhabitants. This is in the form of manifested differences observed between when people did not have the mobile phones before and now they have began using them for communication.

CHAPTER THREE

3.0 Research Methodology

3.1 Site

This study was carried out in Igembe South West Division. This site was purposely selected because of the following reasons. Most prominently, it is located in a rural setting. Secondly, because the mobile service providers, Kencell Communications limited and Safaricom limited have recently started to offer their services in this area. In this sense therefore the mobile phone communication innovation is new in the area.

The innovation is newly diffusing in the rural community since it was not homegrown in the area. Subsequently many people in the area have enthusiastically acquired mobile phones in the recent past that they use for their communication needs. In the sense of this study, they can be said to be adopting the new communication innovation by the virtue of accepting to buy and begin using this innovation. Notably, not all new innovations are readily accepted in new communities or environments. But the mobile phone communication technology appears to be winning the favor of many people in the rural areas as well for some good reasons.

The selected site is a typical rural area. It manifests the characteristics of a rural setting. This site is located in the rustic countryside. The place is remote and lacks the typical urban infrastructure such as electricity, tarmac roads, heterogeneous cultures, institutional headquarters and other advanced social amenities characteristic of urban

landmarks. Most of the residents are lowly subsistence peasants. It is therefore interesting to find out how they fancy and use an advanced technological communication gadget that was only recently a status symbol of the rich in the urban areas. They represent the so-called 'common man' in the grassroots level. In order to achieve meaningful development in the society priority must be given to those majority populations in the rural areas.

There is a sudden proliferation of the mobile phones in this area. Mobile telephony bureaus have emerged in various trading centers where people willing to make phone calls are charged some fees for these services. 'Simu ya Jamii' telephone booths are fast finding their way in trading centers in the area as well. This is a new phenomenon in the area. Emerging related businesses include battery charging for mobile phone owners who do not have electricity in their homes or work places. So the mobile phone technological euphoria has gripped the residents of this region by storm. Apparently everybody is talking about it with awe. Mobile introduction to this rural community is thus prompting palpable transformations that deserve investigations.

This division is located in Meru North district that was formally known as Nyambene. It is one of the thirteen districts that make up Eastern Province of Kenya. It borders Meru Central District to the west and Tharaka District to the south. To the northeast is Isiolo District while Tana River District and Mwingi Districts border the district to the northeastern side.

3.1.1 Location

The district lies within latitudes 0 00' and 0 40' north, and Longitudes 37 50' and 38 50' east, with the southern boundary lying along the equator. Igembe South West Division covers an area of 77.6 Sq Kms.
The district has thirteen administrative divisions that are further subdivided into 56 locations and 139 sub-locations (including the Meru National Park).

3.1.2 Socio-Economic Activities

Meru North is the native district of the Meru people. It largely depends on agriculture for economic activity. Both food crops and cash crops thrive well in this district. The following cash crops are grown in this area: Tea, coffee, sisal, cotton, miraa (khat) and macadamia, among others. The following examples of food crops are also grown in this area: Maize, beans, sorghum, millet, yams, arrowroots and cassava, among others.

3.1.3 Population

According to the last national population and housing census conducted in 1999, Igembe South West Division had a population of 21,791. With an annual growth rate of 3.4%, the current projected population stands at about 24,000.

3.2 Research Design

The study was an exploratory research. The purpose of this research project was to provide an initial understanding of this subject of introducing mobile phones in the rural areas. This is so because the concept of mobile phones is new in the rural areas in Kenya. The ground is new.

The results of this study can thus be used to cultivate initial better understanding of this subject. The study can be used as a basis for further research.

3.2.1 Sample Design

A sample was drawn from the population of 24,000 people. The justification of using a sample instead of studying the whole population was because the entire population is too large to address all the individual members. Such an attempt would be downright clumsy and draining.

Secondly, the limited time allocated for the study would not be adequate for dealing with everybody in the population. The period of the study was restricted within the university academic calendar. The researcher thus did not have all the time in the world.

Financial considerations also justified the use of a sample. A carefully selected sample is still capable of yielding equally correct results that can be generalized to stand for all members of Igembe South West Division, as

well as hint on the possible trend manifested by other rural areas.

Both Probability and Non-probability sampling techniques were used. This gave every member in the population an equal chance of being selected in the final sample. To establish a representative sample, multistage cluster sampling methods were also used. In the process of making selections at various stages, simple random sampling methods were used as well.

The first primary sampling units were picked at the location level. Next stage, the secondary-sampling units were selected at the sub-location level. The final sampling units were derived at the individual level.

Purposive sampling was then used. The justification for this was to specifically establish those people who possessed mobile phones. In order to find out the proportion of mobile phone utilization, those people around one who owned a mobile phone were also interviewed. This is because people use borrowed mobile phones, from friends or relatives. Others hire these services from telephone bureaus, such the newly introduced 'Simu ya Jamii' facilities. Others though they do not own mobile phones are still affected since some call mobile phone subscribers through fixed lines. Therefore even those without mobile phones are stakeholders in the industry since they can consume these services anytime as need arise.

3.2.2 Sample Size and Unit of Analysis

A sample of 120 respondents was drawn. The reason was that this sample would be manageable within the limited time allocated for the research project. 80 mobile phone owners and 40 other respondents who did not own mobile phones were interviewed.

The unit of analysis was individuals, both who owned mobile phones and those who do not own them, since they can still use them from other quarters. They were analyzed with the ratio of 2:1. That is for every two mobile phone owners interviewed one respondent without this gadget was also interviewed.

Key informants from the major stakeholders in the mobile phone industry were also consulted. These included 2 officials from the mobile service providers: namely Kencell Communications Limited and Safaricom Limited. Other stakeholders that were also involved included 2 officials from the government institutions, namely: the Communications Commission of Kenya (CCK), and Telkom. One official from the Ministry of Tourism and Information was also interviewed. This made a total of 5 key informants.

Data Collection Methods

The study was field survey research. The researcher moved out to the field at the cited site to gather information. The predominant mode of data collection was the administration of the interview schedule. This document had carefully framed questions aimed at answering the objectives of the study, as well as other concerns of the research.

The interview schedule had both open-ended and close-ended questions. Open-ended questions were used where there was need to probe for further information and give the respondents enough room to reveal their own objective perceived effects brought by the mobile phones in their area.

Observation was also used to register some relevant issues that had a bearing on this study. An observation checklist with predetermined features to observe on the ground was used for this purpose.

Key informant guides were also used to collect information from the major stakeholders in the mobile phone industry. This was for the mobile phone service providers and other government institutions, such as Telkom Kenya and the Communications Commission of Kenya (CCK).

The aim of employing all these data collection methods simultaneously was to get an all round conclusive picture

of the subject. This way, all the relevant data was harnessed together for critical analysis.

Data Analysis

Both quantitative and qualitative data analysis techniques are used. Quantitative techniques deal with numerical oriented data while qualitative techniques respond to textual information. Both data categories are significant in this study to capture comprehensive information on the topic under scrutiny.

Presentation of the Results

The previous chapter described how the relevant data was collected from the sampled respondents in the field. The following data was duly collected from the systematic investigations.

The following quantitative data analysis techniques are used in the organization, presentation and interpretation of the data in this study; frequency distribution tables and percentages.

Distribution of the Respondents According to the Main Variables of the Study

In this section, frequency distribution tables for different variables are run and interpreted accordingly. The first 5 tables in Section A represent respondents' personal background information. Section B contains various

aspects that are relevant to the diffusion, adoption and utilization of the mobile phone among the respondents.

Section A

Table 4.1.1 Frequency distribution table for respondents according to their gender

Gender	Frequency	Percent	Cumulative Frequency
Female	60	50	50
Male	60	50	100
TOTAL	120	100	

The sample was stratified to include the same number of gender categories.

Table 4.1.2 Frequency distribution table for respondents according to their marital status

Marital Status	Frequency	Percent	Cumulative frequency
Single	26	21	21
Married	88	73	94
Divorced	2	2	96
Window	2	2	98
Windower	2	2	100
TOTAL	120	100	

Majority of those interviewed were married with a frequency of 88 and highest percentage of 73%.

Table 4.1.3 Frequency distribution table for respondents according to their respective occupation

Occupation	Frequency	Percent	Cumulative Percent
Farming	28	20	20
Farming & Business	4	3	23
Business	30	25	48
Formal Employment	42	38	86
Other	16	14	100
TOTAL	120	100	

Majority of the interviewed respondents were engaged in formal employment as their sources of income with a frequency of 42 and highest percentage of 38%.

Table 4.1.4 Frequency distribution table for respondents according to their highest formal education attained

Education Levels	Frequency	Percent	Cumulative Percent
None	4	3	3
Primary	30	25	28
Secondary	48	40	68
Tertiary	38	32	100
TOTAL	120	100	

Majority of the interviewees had attained highest secondary school level of education with a frequency of 48 and highest percentage of 40%.

Table 4.1.5 Frequency distribution table for respondents according to their age

Age Class	Frequency	Percent	Cumulative Percent
15-20	2	1	1
21-25	22	19	20
26-30	24	20	40
31-35	18	15	55
36-40	24	20	75
41-45	14	12	87

46-50	8	8	95
51-55	4	3	98
56-60	2	1	99
61-65	2	1	100
TOTAL	120	100	

Majority of the interviewed respondents fell in two age groups 26-30 and 36-40, both with frequencies of 24 and highest percentages of 20%.

Section B

Table 4.1.6 Frequency distribution table for respondents according to their initial sources of information on mobile phones

Information source	Frequency	Percent	Cumulative Percent
Friends and relatives	54	67	67
Mass media	24	30	97
Experience in travel	2	3	100
TOTAL	80	100	

Table 4.1.7 Frequency distribution table for respondents according to their respective reasons for buying mobile phone

Initial reasons	Frequency	Percent	Cumulative percent
Improve work	16	20	20
Interaction with relatives away	30	38	58
Arising communication needs	22	27	85
Business	10	13	98
Other	2	2	100
TOTAL	80	100	

Respondents who possessed the mobile phone were distributed according to their felt reasons of buying the mobile phone as shown in Table 4.1.7. The table shows that most of the respondents bought the mobile phones to keep regular contact with their relatives living far away from home with a frequency of 30 and highest percentage of 38%.

Table 4.1.8 **Frequency distribution table for respondents' response categories on the full satisfaction of their respective communication needs and problems**

Satisfaction Levels	Frequency	Percent	Cumulative Percent
Yes	18	22	22
To a certain extent	56	70	92
No	6	8	100
Not Sure	0	0	100
TOTAL	80	100	

Respondents who possessed the mobile phone were distributed according to their perceived satisfaction of one's communication needs and problems as shown in Table 4.1.8. The response categories were broken down as shown above. The table shows that majority of the interviewed respondents were not fully satisfied with the mobile phone in meeting their communication needs and problems, with a frequency of 56 and highest percentage of 70%.

Table 4.1.9 Frequency distribution table for respondents according to their availability of enough credit in their mobile phones

Valued Credit	Frequency	Percent	Cumulative percent
Yes	36	45	45
No	44	55	100
TOTAL	80	100	

Respondents who owned the mobile phones were distributed according to their availability of enough credit on their phones as shown in Table 4.1.9. The table shows that majority of the respondents did not have enough credit in their phones regularly, with a frequency of 44 and highest percentage of 55%.

Table 4.1.10 Frequency distribution table for respondents' response categories according to their perceived rate of use

Rate of Use	Frequency	Percent	Cumulative Percent
Everyday	28	35	35
Once a week	18	22	57
Rarely	30	38	95
Very Rarely	4	5	100
TOTAL	80	100	

Respondents were distributed according to their regularity of utilizing the mobile phone to make calls as shown in Table 4.1.10. The table shows that majority of the mobile phone owners rarely used it to make calls, with a frequency of 30 and highest percentage of 38%. This state of affairs could be attributed to a variety of factors as will be expounded in the discussion section.

Table 4.1.11 Frequency distribution table for respondents according to their perceived and observed hindering factors

Hindering Factors	Frequency	Percent	Cumulative Percent
Expensive	42	53	53
Poor Network	26	32	85
Both expensive and Bad Network	10	13	98
Illiteracy	2	2	100
TOTAL	80	100	

Respondents who possessed the mobile phones were distributed according to their perceived factors that hindered effective utilization of the mobile phones as shown in Table 4.1.11. These factors were categorized as shown above in the table.

This table shows that majority of the respondents cited high costs as the most hindering factor with a frequency of 42 and highest percentage of 53%.

Table 4.1.12 Frequency distribution table for respondents without mobile phones according to their reasons for not having the mobile phones

Lack of mobile phone	Frequency	Percent	Cumulative Percent
Cannot afford	24	60	60
No network	6	15	75
No use for it	10	25	100
TOTAL	40	100	

Majority of the interviewed respondents who did not have mobile phones could not afford them with a frequency of 24 and highest percentage of 60%. This means that the mobile phone is rather expensive to many rural dwellers, most of them placed at the lowest strata of the socio-economic status.

Table 4.1.13 Frequency distribution table for respondents according to their perceived and observed changes in communication habits

Effects in communication	Frequency	Percent	Cumulative Percent
More expensive	20	25	25
Dropped traditional methods	18	23	48
Reduced Distance.	42	52	100
TOTAL	80	100	

Majority of the interviewed respondents cited reduced distance as the most experienced changes in communication as shown above. The second majority had their communications budget increased by the adoption of the mobile phone innovation.

Table 4.1.14 Frequency distribution table for respondents according to their work patterns

Work changes	Frequency	Percent	Cumulative Frequency
Use mobile phone in work	64	80	80
Does not use	16	20	100
TOTAL	80	100	

Majority of the respondents here used the mobile phones in there work. This shows that the mobile phones also have the effect of revolutionizing peoples' work patterns.

Table 4.1.15 Frequency distribution table for respondents according to their use of mobile phones to access the internet

Internet Access	Frequency	Percent	Cumulative percent
Yes	0	0	0
No	80	100	100
TOTAL	80	100	

All the interviewed respondents did not use the mobile phone to access the internet.

Discussion of the Results

Section 1.01 The following discussion is objectively derived from the respective answers provided by the respondents to the set questions that were contained in the administered interview schedules, key informant guides and the observation checklist.

Parts B (see appendices II AND III) of the interview schedules administered to both respondents who possessed mobile phones and those without categorically sought to provide answers to the key concerns of this study. This contention however does not necessarily slight the equally vital information received on the

respondent's respective personal background. This is because ones personal background can also fundamentally determine an individual's ability or inability to adopt and utilize the mobile phone.

One of the key elements in the diffusion of innovations research as stipulated by the proponent of this theoretical disposition, Everett Rogers is the initial diffusion of information about the innovation itself. The sources of this information could be from the mass media, opinion leaders during interpersonal communication, and experience. For example observations made during one's course of traveling.

This research project recognized the importance of this information diffusion process since the source and initial provided information can determine the decision making process among the potential adopters of a new innovation. They could opt to adopt the new innovation or not based on the first impression they get. Accurate or misleading information about a new idea is bound to have either effect, positive or negative.

The researcher therefore inquired about the initial source of information about the mobile phone from the respondents. A wide range of these sources was mentioned as shown in Table 4.1.6. These sources included the mass media, other people, and experience during travel and those who could not remember.

According to this study it was duly established that majority of the respondents who possessed the mobile phone had received the initial information from other people. The second majority in this variable was the mass media.

This shows that some traditional community structures are still at play in the rural areas, whereby there is always the communal approach to issues as opposed to individualism. People interact, dialogue and consult regularly on life matters that they encounter daily. Opinion leaders who happen to be more informed facilitate these interpersonal interactions. The mass media, as two-step flow theory of communication by Elihu Katz and Paul Larzasfeld explains is best at disseminating the very initial information, ostensibly to the opinion leaders, who in turn pass the information to the larger masses.

Another significant factor in the diffusion, adoption and utilization process is the initial reasons that compelled one to buy a mobile phone, which in itself is quite an investment by the standards of poor rural peasants at the low class of the socio-economic strata.

This study thus sought to investigate the motivating reasons that propelled mobile phone owners into investing in the new communication technology and in effect adopting a new idea.

The interviewed respondents respectively gave their desired motivations for adopting the mobile phone technology for communication. Several categories of responses emerged as analyzed in Table 4.1.7.

According to this study, most of the interviewed mobile phone owners stated that they bought the mobile phone to maintain a constant communication link with their relatives who lived far away from home, especially in bigger urban centers.

It can therefore be aptly deduced that the mobile phone is fundamental in enhancing interpersonal interactions, albeit across far distances. These communication gadgets have the ability to unify people easily.

The second majority category of respondents declared arising communication needs as their reasons while those who bought the phone to streamline communication needs in their respective work came third. Others were categorical that the mobile phone was meant to enhance their businesses. This is also another form of work however, except that this is specifically trade based. From this we also realize that the mobile phone is revolutionizing and transforming different patterns of work. For example it is possible for one to make an official decision even from the streets away from the office.

These first two factors can be attributed to adoption decisions while the following attributes have to do with the practical utilization of the mobile phone.

A follow up question to this attribute sought to find out the perceived levels of individual satisfaction of one's communication needs and problems as a consequence of adopting and utilizing the mobile phone. Basically the researcher sought to find out whether or not the mobile phone conclusively satisfied the communication needs and problems of those possessing it. This was important because mobile phone owners bought it to satisfy their respective communication needs and problems.

The response categories for this question are shown in Table 4.1.8. It since emerged that majority of the interviewees lamented that the mobile phone innovation they so excitedly

embraced did not fully satisfy their respective communication needs and problems effectively.
This frustrating state of affairs to many mobile phone adopters provides some discrete pointers to the effect that some stumbling blocks hindered the effective utilization of the mobile phone communication technology among these rural adopters. Follow up questions and revelations to this effect are discussed in the ensuing paragraphs.

The next significant attribute that is bound to critically influence trends of mobile phone utilization among the consumer fraternity that possess this gadget has to do with financial servicing. This entails the exclusive ability of the mobile subscribers to pay airtime bills well as other consumer related charges, such as internet charges.

To this effect the study questioned the availability of enough useable credit (money) on their phones. This data is contained in Table 4.1.9 in the previous sections.

From the mobile phone owners who were interviewed it was duly found that majority of them did not have enough credit in their phones.

Needless to say, this lacking state of affairs is certainly bound to curtail mobile phone owners' needs and desires of using the phone during some desperate hours of need. Many mobile phone owners barely strife to finance their accounts to avoid loosing their lines.

Again, prolonged prevalence of this financial plight is bound to present unfulfilled utilization problems and frustrations to

those mobile phone owners who cannot afford mobile services, despite having adopted the innovation at a price.
There are however the well to do mobile phone owners who accepted having constant enough credit in their phones. For all inclusive and conclusive effective and fruitful utilization of mobile phone services, those who cannot afford credit regularly should also be brought on board.

The rate of mobile phone use was also investigated as shown in table 4.1.10. It was since established that majority of those interviewed rarely used their mobile phones to make calls. This is partially explained by the fact that majority of them hardly had enough credit in their phones. This is probably what gave rise to the notorious habit of 'flashing' to request or invite a call from the other end.

Another utilization aspect explored in this study had to do with the major hindering perceived and observed hindering factors. This information is presented in Table 4.1.11.
From the mentioned response categories, majority of the interviewed respondents mentioned expensive costs of running and maintaining the mobile phones as the major factor hindering satisfactory adoption and utilization of the mobile phone among rural residents.

They complained that consuming mobile phone services was too costly to majority of the rural folk who are perversely plagued by their erstwhile impoverished status.

Notably from the previous paragraphs of this discussion, it has since been established that the mobile phone does not fully satisfy the communication needs and problems of a big percentage

of the adopters. It was also found that they rarely called with their mobile phones, a scarcity that can also be partially attributed to the fact that their accounts remain for protracted spells of time without useful credit (money).

This is because they cannot satisfactorily afford, despite their earnest desire to fulfill their respective communication needs and problems by consuming appropriate mobile phone services.

Besides the adopter's inability to afford these services, another hindering factor mentioned by the respondents was poor network and unclear reception. Respondents located in two of the sampled sub locations extensively echoed this woe. They are Tiira and Ugoti.

Again many potential and willing mobile phone would-be adopters are restricted from adopting and utilizing this communication technology and its accruing advantages because of poor or no signal.

Another substantial percentage of the interviewed respondents compounded both expensive costs and network problems as their hindering impediment.

A minor percentage cited illiteracy as a restricting factor. This position though rightly valid to the minority group, serves to show that literacy levels did not significantly affect the actual adoption and utilization of the mobile phone. Indeed many respondents with low education levels had already adopted the mobile phone technology for communication.

Another related inquiry was carried out on respondents who did not possess the mobile phone. These can otherwise be regarded as those people who have not yet adopted this communication innovation.

This information can be referred in Table 4.1.12 under the immediate data presentation section. Similarly as depicted in this table, an overwhelming majority of the respondents without the mobile phones cited lack of sufficient money as the greatest impediment on their way to embracing this new communication technology. Some claimed they would afford the initial cost of the handset but feared the expensive consumption charges.

The minority respondents who decried lack of network were located in Tiira and Ugoti sub locations. A sizeable chunk of the population in these areas would otherwise adopt and proceed to utilize this innovation had it not been for this stated technological hitch.

The last category in this question is those that admitted no need of the mobile phone. This group of respondents felt that they had no significant use of the mobile phone. These are those who did not have any work that directly or regularly needed the employment of mobile phone services. They also did not have meaningful relatives based in far locations.

The last major component of this research project was to explore the initial implications of the adoption and utilization of the mobile phone in the rural areas. This entails perceived and observed effects arising from the adoption and utilization of this new technology.

All along it should however be appreciated that the current effects are only preliminary and could change or increase with time. This is largely because this innovation is still new among the adopting rural inhabitants. The early adopters in the rural areas have not yet used this communication technology extensively over a long time.

In this light, the study sought to find out any changes in communication methods experienced by the respondents who possessed the mobile phones after adopting the new technology. Table 4.1.13 contains the data collected from the respective respondents over this issue as well as their mentioned response categories. The most prominently experienced changes in communication methods was reduction of distance as said by majority of the respondents. They were grateful they no longer traveled many kilometers to Maua town to make calls as they could make calls from the convenience of their homes. Notably there were no fixed line telephone connections in the area prior to the onset of the mobile phones.

The second largest category in the same question cited increased communication budget as their perceived changes in their former communication methods. Now they used more money in communication unlike before. Again this is supported by the fact that majority of the respondents found mobile phones expensive. Other respondents mentioned dropping traditional methods of communication such as writing personal letters as to family members residing in towns. Now they write short message texts (SMSs) or call directly.

Another potential effect in the rural areas born of the adoption and use of the mobile phone involved the changes experienced in

respondents' work patterns. The study thus inquired about these effects as manifested in the nature of work as presented in Table 4.1.14.

Majority of the respondents claimed that they now used the mobile phones in their work regularly unlike before. There those who worked even from home while business people or traders made purchases from the comfort of their business premises. Therefore mobile phones have also changed peoples' work patterns even in the rural areas. There is enhanced efficiency in work through the use of mobile phones.

The last frequency distribution table run concerned the use of mobile phones in accessing the internet. Considering the important role played by the internet today as a great source of development information, the rural inhabitants can also use it to access valuable information that can help them in their lives.

It was unfortunately found out that none of the interviewed respondents used the mobile phone to exploit the rich information source. Some did not even know the service existed in their phones while others felt it was too expensive to access the internet via the mobile phones. In order to use the mobile phone for development in the rural areas, accessing the rich internet opportunities can provide a good starting point to reach valuable development information. The internet is not meant only for the town dwellers. The rural folk too have a stake in the opportune information even though they reside in remote regions of the world. Otherwise they are being by passed by this information age superhighway gravy train!

From the open ended questions the following issues about mobile phones emerged as well. This is where respondents were given a lee way to offer their own objective observations and comments about the mobile phone. These questions were aimed to capture other information not reflected in the close ended questions. Respondents were thus given a slight lee way to express other factors about the mobile phones they deemed important to raise.

A couple of respondents said they used the mobile phones to call the mass media radio and television stations to make their contributions in call in talk shows. In this regard mobile phones are increasingly being used to enhance interactive democracy in the land. This way the views of the people in the remote rural areas are voiced through the mass media and hence their grievances are communicated to the relevant authorities. This way therefore the mobile phones have the effect of giving voice to the otherwise previously voiceless masses in the rural areas.

There are many radio and TV call in talk shows that address as number of topical themes and issues that affect the society on social, political and economic affairs. For example some deal with political themes where politicians of national stature are invited to the studios and interviewed. Callers from all over the country are then invited to make their contributions by asking questions, presenting their grievances as well as making other relevant comments about issues affecting them. This enhances democratic space in the country as callers speak their own hearts without any restrictions.

Examples of these programs include the third opinion on KTN Television and Up Close and Candid on Nation Television. Wambe

Citizen is another radio program in Citizen Radio aimed at exposing corruption in the society. Again mobile phones are frequently used to report cases of corruption in the rural areas as well. This way the mobile phone has the effect of promoting development in the society by discouraging corruption in the country.

Citizen Radio too has a call in program on security whereby callers are encouraged to call the station and report cases and areas of prevalent crime and insecurity. This way the public is warned of danger zones to avoid as well as alerting the police. Criminals in the society are exposed this way and several crime prone areas have been streamlined through these means. Mobile phones are used to expose insecurity in the rural areas in remote areas that were previously inaccessible or unknown to the outside world. This way security in the rural areas is boosted. This state of affairs can be explained by the knack of criminals to snatch mobile phones as they commit crime to cover themselves against swift reprisals from their victims. Using mobile phones it is easy to call in reinforcements immediately from the police or community neighbors in the event of a criminal attack.

Similarly however, mobile phones have also been used for the converse purpose of plotting crime among the criminals. They have been known to use mobile phones to communicate their criminal motives among themselves. They use them to trail their victims by reporting their whereabouts to their colleagues stationed at strategic points. One respondent in this area narrated how thugs used the mobile phones to track one neighbor whom they murdered later. Either way it is the hope of this study that mobile phones be used for development as opposed to propagation of crime.

Empirical Observations from the Observation Checklist

Prior to the commencement of the field activities, the following factors that might impact on the adoption and utilization of the mobile phone in the environment of the site were earmarked for critical observations.

These observations included:

1) Availability of electricity in the sampled regions of the site-Igembe South West Division.

2) Presence of and number of fixed (landlines) in the site. Both for public and private use, in homes or trading premises.

3) Mobile phone repair shops in the area.

4) Mobile phone service providers' establishments in the area, such as shops, booths and other mobile phone related infrastructure.

5) Evaluate the reception power and presence of network in various regions of the site.

6) Transport and other communication infrastructure.

The following respective observations were duly made during the data collection process as the researcher visited the sampled areas meeting the respondents.

On the first issue of electricity, which is a fundamental development infrastructure that is also an important reinforcement of the mobile phone technology, the following observations were made.

Power installations were only found to exist in only one of the sampled sub locations. This was Amwamba sub-location. There is absolutely no electricity supply in the other sampled sub-locations, namely; Ncheeme, Tiira, and Ugoti.

Indeed, even in Amwamba sub-location where power installations reach, electricity supply is only restricted within one institution: A secondary school called St Rita's Secondary school. Only a handful other well to do homes around the school are supplied with power. Otherwise majority of the residents in the sub-location live without electricity and depend on other sources of relevant energy for their daily needs.

This important infrastructure deficiency in the area can impair effective adoption and utilization of the mobile phone innovation in many other similar rural areas in Kenya. This is so because it is used to charge the mobile phone batteries. Secondly, incase the mobile phone service providers' intended to spread their advanced technological equipment to these similar remote regions, their efforts could be curtailed by lack of power. This is so because most of their hardware such as computers requires electrical energy to function.

Indeed, a good number of the respondents cited this major hiccup, noting that they traveled long distances-as far as 20 kilometers away to Maua town-to charge the batteries of their phones. Others depend on cell batteries, which are not as reliable as electricity.

When the mobile phone battery remains for a long time without power, they get ruined and the phone can not be utilized effectively, despite the owner's earnest willingness to adopt the new communication innovation.

The other observed attribute also involved an equally important component of the development infrastructure, namely the telecommunications networks of the fixed lines, otherwise regarded as the landlines.

It was duly observed that there are absolutely no telephone connections at all in the sampled sub-locations in the division. This is another major development infrastructure deficiency that characterizes most of the rural areas of Kenya.
The eventual arrival of the mobile phone in these remote rural areas is therefore welcome news to the telecommunications starved inhabitants of these regions that actually contain majority of the country's population.

Indeed a good number of the interviewed respondents earnestly lauded the mobile phone technology for favorably connecting them in the in the telecommunications networks and in effect opening up these marginalized remote areas to the distant outside lands from where desirable development opportunities can be accessed.

previously inhabitants of these areas who seriously needed to make calls had to travel 15-25 kilometers to Maua town paying fares of up to 100-150 shillings. There are only four Telkom public booths in Maua town that are always congested. Often they break down, occasioning people in need of these services to great hardships and frustrations.

The next attribute related to the adoption and utilization of the mobile phone in the rural areas that was also to be observed is the presence or absence of mobile phone repair shops in these areas.

This is also important because mobile owners whose handsets fail to work can get quick repairs and proceed to utilize their gadgets appropriately. Again it was observed that no such repair shops existed in the sampled site areas.

This can be another factor that would restrict satisfactory utilization of the mobile phone as a communication tool in these areas. Failure of the mobile phone to work occasions mobile owners to substantial looses of money as well. Traveling long distances to big towns like Nairobi to repair the phones is another added cost of servicing the mobile phone.

The presence or absence of mobile phone service provider's shops in the area was also earmarked for observation. It was similarly observed that there are no such establishments in the study site.

These structures are significant since one can for example easily buy scratch cards and access airtime conveniently during moments of need. Presently mobile phone owners travel 15-25

kilometers to Maua town to buy scratch cards. In the event of an urgent emergence requiring urgent communication when the phone has no credit could present problems to those in need.

Another designated observation to be made was to find out the reception power in various regions of the division. This has to do with the presence or absence of network in the respective areas.

On this issue the following observations were made. First it was noted that the site is surrounded by a mountainous topography. This division is literally ringed by high and steep mountains and hills. These landscape features include Nyambene ranges. Since the current generation of mobile phones in Kenya use the microwave land based transmission technology, these environmental impositions bar some mobile signals from reaching desired destinations and hence occasioning a communication barrier. This certainly hinders effective adoption and utilization of this communication technology in similar rural areas.

Among the sampled sub-locations, only two-Amwamba and Ncheeme had good network and reception power. However there are still some sporadic pockets of network absence, especially those regions located right at the bottom of the high densely forested mountains.

Therefore mobile phone owners are forced to move around the area in search of suitable points where network reception is strong in order to make calls or send messages. Sometimes they climb some strategically elevated mountain and hill peaks to make clear calls.

The other two sub-locations-Tiira and Ugoti-are greatly starved of the mobile service providers' network since they are located further down hill. They are placed in very low altitudes such that the power of the present transmitters cannot effectively reach these marginalized remote areas. Most of these areas are not covered at all.

Indeed, most respondents in these areas cited lack of a strong network as a major impediment to the rapid diffusion, adoption and utilization of the mobile phone communication. Though many people could afford to buy and service the phones financially, the gadget would quickly be rendered useless in these areas for the discussed predicaments. Again under such deficient conditions, the mobile phone can hardly be utilized effectively as a communication tool in these similar rural areas.

Lastly, the other attribute to be observed was the nature of the transport infrastructure in the sampled rural areas. This includes the road networks and other available modes of transport used by these rural residents.

Again this important development infrastructure was also found to be inadequate and in pathetic state. The tarmac road ends at Maua town 15-25 kilometers away. Gravel weather roads penetrate deeper into the remote rural villages. Severely rough soil ruts drifts further into the rural interior. Hardly can vehicles reach some places in this area. These areas are inaccessible.

Though not directly related to mobile phone technology, good transport networks are crucial for opening up these remote areas to the outside world. With better accessible roads more people

with innovative ideas can interact with these deprived rural folk and import new ideas, including that of the mobile phone.

On the same cue, good accessible transport networks could make it easy for mobile service providers to transport their heavy communication equipment such as the transmitters and satellite dishes to improve delivery of services

There are no other communications facilities in these areas, such as post office, fax telex or internet cyber facilities.

Responses from the key informants guides

The following discussion is derived from the analyzed information gathered from the earlier mentioned key stakeholders. (Refer to the methodology section). The public relations officials and other employees of these companies and institutions provided this insightful information.

The mobile service providers expressed their determination to cover all rural areas of Kenya but they also cited a number of stumbling blocks that stood on their way to the achievement of these endeavors.

They noted the necessity of opening up the remote rural areas by incorporating them in the telecommunications networks. They however claimed that the government policies on the mobile phone industry were prohibitive.

They cited stringent demands by the government as one major restricting factor. This is because they are charged very exorbitant fees for the licenses. Since they are themselves business institutions and have to recover back their money and

make profits, their services become expensive for the poor rural folk.

They also decried tax increases on airtime by the government in the previous annual state budget as another factor that would hinder effective diffusion and utilization of mobile services among the poorer sections of the population in the rural areas. This is because this move would have the effect of increasing the burden of paying these taxes on the consumers themselves. The cost of airtime is relatively high.

Mobile service providers also recommended the use of satellite transmission technology to overcome problems presented by the hostile environmental impositions, such as very high mountains or where some locations are in very low altitudes. This they felt would also make these currently expensive services cheaper and more efficient, since the launched signals can beat these restrictive environmental features.

It was also recommended that the government reduce the exorbitant taxes on mobile phone products and services to make them cheaper and hence more accessible to the poorer sections of the rural populace who equally need and deserve these important communication services for their development.

Poor or inexistent reinforcing development infrastructures was also cited as another major source of frustration by mobile service providers in extending their much needed and desired services among the rural inhabitants.

This is because their equipment such as computers needed sufficient electrical power to function appropriately. So where

this important component of the infrastructure lacks, then they would experience difficulties extending to these places, however much rural friendly their expansion policies would be.

On the same cue poor transport networks in some remote rural areas would obstruct the movement of their heavy equipments such as transmitters and satellite dishes however hard they would be willing to penetrate deeper into these marginalized places.

Over and above the mobile phone was lauded as significant communication equipment that has the ability to open up these locked rural areas and in effect inspire some development opportunities among the rural dwellers.

This information communication technology should therefore not be viewed as a luxury like in the past but rightly as a basic communication item capable of steering development in the marginalized rural areas. The government should therefore not standing in the way of this significant communication technology by niking taxes on airtime and other related mobile phone equipments.

The other major involved key informants and stakeholders in this communications industry is the Communications Commission of Kenya. This government body plays a big role in the licensing of these mobile service providers as well as allocating them appropriate airwaves, especially now that the current players in the market use the microwave technology, the same used by radio.

However there is the prospect that the newly licensed mobile service provider, Econett Wireless Company could be using satellite technology in their transmissions. This is welcome

news for mobile phone service consumers in this country and especially those located in the remote rural areas where the current transmission technologies cannot penetrate.

On their part, the CCK also stressed as their policies to develop the mobile phone industry in this country including the rural areas by licensing more players in the mobile market like they have recently done with the new Econet Wireless.

They argued that strict licensing procedures must be in place because this is an important communication technology. Similarly it uses the electromagnetic spectrum which is a scarce form of energy. It must thus be managed effectively.

Caution must again be exercised on whom to license because Kenya does not have a satellite of its own in the space and has to rely on hiring these services which are expensive. This could imply massive flights of financial resources of this country. It is advised that these expensive technologies be adopted after careful planning, lest they backfired.

There is however plans to install a transmission cable from the coast to the interior. This will enhance the reception of the signal and clearer voice reception. This cable will also make internet services cheaper among other projected goodies in the sector. The dear prayer here is that the implementation of this noble project move faster.

Plans are also underway to harmonize mobile phone policies among the three East African countries. This is meant to have the overall effect of improving telecommunications networks in the region, with the underlying motive of enhancing development.

Basically it was learnt that there are policy willingness to expand mobile phone communication technology among the rural areas as well. For example licensing of the third mobile service providers who could use satellite transmission technology will greatly help rural mobile phone consumers because it will give them a variety to choose from, it will increase competition and make it cheaper and also it will go round the nightmares of poor reception in hilly regions.

Therefore despite the current problems experienced by the prospective mobile phone consumers in the rural areas of Kenya the future is bright as the communication innovation takes root in these areas following appropriate policy changes from the relevant government institutions.

On the part of Telkom, their role in developing this telecommunications industry is harmonizing policies on the fixed lines and those of the mobile phone industry. It is clear the mobile phone industry has fast overtaken the landlines, but the two telecommunications infrastructures should be used simultaneously to improve distance communications in this country including the rural areas.

For example mobile phone owners in the rural areas can always call Telkom lines in towns where they are concentrated. This way these two significant communications technologies can reinforce each other and have the desirable effect of opening up the erstwhile locked rural areas of this country.

Telkom was also scheduled to break its monopoly in the fixed line telephone services. This monopoly officially ended in July this year. With enhanced competition in this front it is

projected that their will be better service delivery and the cost of the phones will also go down. With the tipped widespread use of the satellite and cable transmission technologies, the future of the telecommunications infrastructure in the rural areas can only be bright.

Summary, Conclusions and Recommendations

This last chapter as the title aptly suggests will be sub divided into three major sections in the same logical order as they appear.

The summary section will highlight the initial purpose of the study, the process used to collect and analyze data and the major findings of the study.

The conclusion section will endeavor to provide logical answers to the questions that prompted the collection and analysis of the gathered data. This will be a broader combination of the issues previously analyzed in chapter 4.

The recommendation section finally will formulate pragmatic strategies that can be implemented to chart the way forward for improvement. Appropriate steps and actions designed to provide workable solutions to exposed problems and deficiencies that curtail effective diffusion, adoption and utilization of the mobile phone communication technology in the rural areas are provided.

Summary

This research project was conceived with concerns about the widespread deficiency in the telecommunications infrastructure in this country in mind. This important communications infrastructure is particularly in pathetic lack in the rural areas of Kenya where majority of the population resides.

Many large rural areas are not connected in the telecommunications networks at all, especially the fixed lines. But lately, since mid 1990's, the inception of the wireless mobile phone communication technology has tremendously transformed the telecommunications infrastructure in this country, and more so in the rural areas that were previously not connected.

The mobile phone, which also falls within the broad spectrum of the new information communication technologies, has also had its impacts felt in other spheres of human life as well.

It is in these convictions that this research project is grounded. Essentially the purpose of this study was to systematically and critically explore how the current diffusion of the wireless mobile phone technology in Kenya is getting adopted and utilized by people who live in the rural areas as a new way of communication.

The investigations moved slightly further to find out the immediate felt implications arising as a result of adopting and starting to use the mobile phone in communication and by extension information dissemination. It should however be

appreciated that the mobile phone idea is new in the rural areas of Kenya and therefore the effects may not be so pervasive.

Questions have been raised as to why the mobile phone innovation which is an important tool of communication is taking too long time to penetrate and spread accordingly to those in need of it. The study was thus supposed to explore the major as well as minor factors that hindered the effective diffusion and use of the mobile phone.

Broadly the objective of the study was to find out the overall effects brought about by the adoption and use of the mobile phone in the rural areas in Kenya. The case study was based in Igembe South West Division in Meru North District.

Specifically the objectives were to determine the various felt and observed changes brought to the rural community as a result of adopting the mobile phone for communication. These could be in form of perceived improvements or even frustrations emerging from the adoption of the mobile phone.

Another equally important objective in this study was to explore the effectiveness of the mobile phone as a tool of communication in the rural areas. This is all because widespread and pragmatic utilization of the mobile phone technology, along with other related new information communication technologies have the positive potential of facilitating development initiatives in respective rural areas in Kenya.

In order to collect the relevant information required to answer questions and concerns raised at the conception of this research

project the following systematic processes were employed to collect and analyze the gathered data.

Right from the onset the study was designed to be a field survey. Appropriate established research methodologies were sought and applied accordingly as shown in the methodology section in Chapter 3.

Conclusions

These conclusions are launched from the premises that everybody is a potential stakeholder in the mobile phone industry. Key among them is the mobile service providers and the government. Others are the current mobile phone owners who consume mobile services from the mobile service providers.

Judging from the respondent's responses and general attitude, it is clear that the introduction of this communication innovation is good at enhancing communication among the people.

This communication technology has many advantages as well as shortcomings associated with it. Some immediate advantages that have been brought by this technology to the population entail easing communication needs and problems among the adopters. It is more efficient and fast compared to traditional communication methods. One who possesses this communication technology can easily be reached from any location, so long as there is network.

This enables the concerned parties to pass any relevant information accordingly and hence achieve the appropriate

desired actions. It has also fundamentally liberated people from sticking to the fixed locations of the landlines since it is conveniently portable.

The mobile phone is also imbued with a variety of other equally important communications related possibilities such as internet and news media among other applications.
With a mobile phone at one's disposal, one can even communicate across international borders from any networked locations.

From the interviewed respondents both who possessed the gadget and those who did not, there was a unanimous consensus that the mobile phone communication technology is good. Indeed everyone desired to possess and utilize it satisfactorily to solve their respective communication needs and problems through the appropriate consumption of the relevant mobile phone services.

This eventually leads us to the phenomenon of access as far as these new information communication technologies are concerned. One of the major issues that came to the fore of this study involves the broad concept of accessing mobile phone services among the various needy groups of the population living in the rural areas.

This big question of access is loaded with a number of factors that tend to hinder effective diffusion, adoption and utilization of the mobile phone communication technology among various classes of people in the population.

There are groups in the population that can readily access these new information communication technologies and the majority who

cannot reach these services despite the existence of this need in their daily lives.

This creates two distinct classes of people in the population according to their socio-economic classes. A class of information haves and information have nots. This dichotomous state of affairs based on the ability or inability to access mobile phone products and services arise as a result of a number of factors, namely; affordability in terms of financial resources and the presence or lack of appropriate network in various rural regions.

The big issue of financial affordability among the poor rural inhabitants emerged as a major factor hindering effective diffusion, adoption and use of this communication technology in the rural areas.

Many people cannot afford airtime satisfactorily to cater for their respective communication needs and problems. Thus, despite eagerly adopting this communication innovation through the acquisition of the mobile phones, many mobile owners hardly use the mobile phones, as they would otherwise want. Thus mobile services can only be effectively consumed by the rich who can significantly afford to service their gadgets financially.

Network problems also hinder appropriate access especially deep in the remote areas where the power of the current transmitters cannot penetrate. Rugged mountainous topography in some rural areas also presents problems to the current used microwave technology, where the launched signals hit these environmental features and fail to penetrate. The above two predicaments therefore are the key hindering factors to faster diffusion,

adoption and utilization of this important communication innovation in the rural areas.

Other hindering factors have to do with lack of appropriate reinforcing development infrastructures such as power and transport.

Another conclusion that can be derived from this study is the admission that indeed the mobile phone has changed the adopters' former communication methods. This is so because one can call from any networked location without having to move to the fixed lines.

These communication gadgets have opened up many rural areas that previously did not have any telecommunications links before. There are vast remote areas that never had a single telephone booth or line, but now people in these regions can utilize the erstwhile elusive telecommunications infrastructure.

This is indeed positive development to these areas as far as communication within and with the outside world is concerned. Today people need not travel long distances to towns to make desirable calls. Use of emissaries or messengers has also reduced among those who own and use this communication equipment in these areas.

However the adoption and utilization of the mobile phone products and services has also increased the communication expenses of the adopters. It also had the effect of shifting expenses where transport costs are used in the phones.

The mobile phone has also significantly changed the work patterns of many people, including those based in the rural areas. This has the effect of working away from one's base stations or work places. Today it possible for one to make official decisions from the road or from anywhere else as need arises.

Similarly one can be traced from any networked position to attend to arising work demands. In the business front, traders can order goods and services from the convenience of their business premises or anywhere else for that matter. These communication gadgets have thus greatly eased some types of work just as they have reduced distances and opening up these previously marginalized rural villages.

Though not so directly linked with the diffusion of this innovation to the rural areas, the mobile phone industry has emerged as a significant player in the national economy since it is actually a multimillion-dollar industry in itself.

It has created many employment and business opportunities for many people. It also immensely contributes to state revenue in form of taxes levied in airtime as well as the imported mobile phone hardware such as the handsets and other reinforcing equipment.

The diffusion and adoption of this communication equipment has also had the democratic and political implication of giving voice to the rural residents. They use it to air their views in the participatory interactive mass media call in talk shows.

Many people use mobile phones to call radio and television stations in Nairobi to present their views and grievances. For example there are talk shows in virtually all radio and television stations such as Citizen, KBC, Coro, Kameme and Kiss 100.

Some of the themes presented in these interactive programs are political and have to do with matters that present hardships to the grassroots communities based in the rural areas. People discuss their rights using the mobile phone and this gives voice to these people.

Due to its ability to reach mobile phone owners at any linked location, the mobile phone is also good at solving tragic emergencies where information dissemination aimed at seeking appropriate solutions and help is necessary.

For example when ugly accidents occur, relevant people can be contacted fast in search for succor. Mobile phones can also be used to boost security by seeking help fast when people are under attack like theft or other bad occurrences.

In a nutshell, the inception and subsequent utilization of the mobile phone communication innovation in the rural areas of this country heralds the introduction of a new communications culture among the adopting individuals and communities at large.

There is a widespread consensus that it is a good technology at the disposal of the rural residents who were previously not exposed to any form of telecommunications networks.

However, conclusive implications of the introduct on of this communication technology in the rural areas cannot be made at the moment since it is only too new. Hence the purpose of this research project was to explore the preliminary implications arising from the diffusion and adoption of this innovation among the rural residents.

More insightful lessons can be learnt later with further research when this technology takes deeper root and reasserts itself among the adopting rural populace.

Recommendations

From the previous sections of this report text, the following breakdown of points are hereby tendered to chart the way forward for improving the diffusion, adoption and utilization of the mobile phone communication technology for rural development.

The first major significant recommendation that is offered on this account is carrying out further descriptive and explanatory research studies on the treads of mobile phone technology spread and use.

This could be in areas of marketing, as well as its effects, both in the rural areas and urban areas. Other relevant research interests can be developed as need arise. Research in any discipline is crucial for the generation of insightful information and knowledge. These research undertak ngs should be carried out by the key stakeholders in the mobile phone industry. They should thus raise together in these activities

and move on to integrate their respective findings to understand more issues about the mobile phone industry better.

These said stakeholders should include the mobile service providers, namely; Kencell communications Limited, Safaricom Limited and Econett Wireless Company. Others include government departments and ministries such as the central bureau of statistics to establish the actual number of mobile phones in the urban and rural areas, the Communications Commission of Kenya and Telkom Kenya.

Other potential stakeholders are the academic institutions that deal with communication as a subject. This way they can establish trends of mobile phone adoption, use and levels of satisfaction of adopter's communication needs and problems. In this regard these stakeholders should provide the money needed for these research undertakings.

The next equally significant way forward would be for the authorized stakeholders to formulate an appropriate central and binding communication policy in this country. It is nonexistent presently. What we have are fragmented legislations and statutes which are executed from equally divided quarters.

For example ICT matters are run from three government ministries, namely; Information and Tourism ministry, ministry of Transport and Communications and ministry of Education, Science and Technology.

Setting up of an integrated government ministry dealing specifically with ICT issues would be more efficient. For example Rwanda they has a distinct ministry on ICTs. They are

progressing much faster than Kenya on this front. Trained communications experts should then be hired to run this ministry.

In this ideal communications policy, there should be binding and enforceable laws governing the use, licensing of the mobile service providers as well as all other finer details of the mobile phone industry. It should have the force of law, in form of an act of parliament.

The preparation of this communications policy should be done through systematic consultations from all stakeholders. Their inputs should be inspired by the insightful findings derived from the earlier mentioned research undertakings and findings.

To enhance adoption and utilization of this significant communications technology the key stakeholders should consider lowering the cost of the mobile phone products and consumption charges such as airtime and internet charges.

This will make these products and services more accessible to the many people of the lower social economic strata who cannot presently afford the current charges, yet they need and deserve these communication gadgets as well. Essentially money is the major handicap experienced by many mobile phone adopters as well as potential adopters. In a nutshell mobile phones and their services are downright expensive to the rural folk who largely comprise of subsistence peasants.

To achieve this, the government should lower the taxes on airtime, unlike presently when they hiked these charges during some previous annual state budget.

In the same spirit the government should also make a point of licensing more qualified mobile service providers to increase competition and better services. This way the current exorbitant airtime charges could come down to the benefit of the poor consumers. This will also give the consumers better freedom to choose from.

In this respect the government should end the monopoly enjoyed by Telkom Kenya. This will bring in another competitor in the fixed line telephones. Telephone charges will automatically go down as well as internet charges.

To increase matters of access where there is no network due to impositions such as big mountains, the government should allow greater use of satellite transmission technology or VSATS (Very Small Aperture Technologies).

This way the signal is launched to the space where satellite vehicles revolve, it is amplified and retransmitted back to earth to find the mobile subscribers anywhere, including those areas faced with restricting environmental features.

To reduce the current burden of technological dependence that plagues this country as well other less developed countries, the government should try to cultivate some homegrown communication technologies. This can be done by scouting for the innovative talents from the population, for example from academic institutions that deal with technology matters and those of higher learning.

This way the current financial drain to western and Asian countries that develop these technologies can be reduced. Again

we could also export these innovations to needy countries and earn some precious revenue for the government and the people of Kenya at large.

In the same light, the government should prioritize licensing local mobile service providers so that the vast amounts of money involved in this industry are ploughed back to the national economy. Only the qualified companies should however be licensed. Such favors need not be extended to local companies if they cannot offer standard services.

The government should establish e-training centers at strategic points in the rural areas to teach the people ICT issues. Like how to use the mobile phones to access the internet for development using conventional computers. Unfortunately it is still too expensive to access the internet using the mobile phones until such a time when the monopoly dominated by Telkom Kenya will be terminated.

Since most mobile phone languages are customized using foreign languages, the mobile service providers should consider including more accessible local languages like Kiswahili for the benefit of those illiterate populations in the rural areas that find English, French, Spanish, Arabic and all those other complicated languages too difficult to fathom. Kiswahili is relatively accessible to most people and many can read and understand it. This is important since majority of the rural dwellers do not have extensive academic knowledge to handle the complex foreign languages.

Limitations

There are a few hardships that emerged in the process of carrying out this research project. First is the availability of up to date data on the actual number of mobile phones in the area. This is because people are constantly buying the mobile phones and this number keeps fluctuating.

The limited time allocated for the research. This is because the study had to be conducted within the programmed university academic calendar, which had definite deadlines to be observed.

Scarce resources presented another limitation, especially those of financial nature since the researcher did not have a sponsor.

Some respondents refused to cooperate with the research by not answering the questions. Some respondents demanded money before responding to the questions thinking the research was a commercial venture. This amounted to bribery. No money was dished out and a few respondents withheld their information.

Another common shortcoming associated with exploratory research design is that they seldom provide exact answers to research problems. They however give resourceful hints at answers and can provide insights into the research methods that could provide more definitive answers in future investigations.

Ethical Issues

The following ethical standards were strictly observed in the process of carrying out this research project. First the respondents right of privacy and confidentiality was be respected. Their identities and respective responses were not adversely exposed to undeserving parties.

Another observed ethical consideration was that respondents were only interviewed on voluntary basis. No form of coercion, intimidation, blackmail or lies was used to induce compliance. In this regard, respondent's voluntary consent was kindly requested before the interview was carried out. This consent was sought after providing the respondent with the relevant information about the purpose of the research.

The respondent's actual response prevails. There is no biased manipulation of facts to suit some subjective predisposed position. There was no preempting of 'ideal' answers. An objective approach to issues was a guiding tenet.

Lastly the results of the study must never be used to undermine the community under study in any way.

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Appendix I

Letter of Transmittal

(Respective area administrators were alerted before visiting respondents for data collection. This was for formal introduction as well as seeking permission to conduct the research study in the area).

Salutation. My name is Mungania Martin Kaithia. I'm a student from the University of Nairobi, School of Journalism. I'm carrying out a study on mobile phones in this area.

My major aim is to find out how the new mobile phones have been introduced and received in this area and their general effects on communication.

Respondents are assured their right of confidentiality.

This interview schedule should be completed before _____

This deadline is important because the research project is restricted to fixed dates within the university academic calendar.

Your cooperation will be highly appreciated. Thank you.

Researcher's Signature _____

Appendix II

Interview Schedule for Mobile Phone Owners

Please answer the following questions correctly.

Background Information

Please provide the following information about yourself.

1 a) What is your name? (Optional) _____

b) Age _____

c) Gender _____

d) Highest level of education attained _____

e) Religion _____

f) What work do you do? _____

g) Are you married? _____

h) Native division _____

i) Location _____

j) Sub-location _____

2 a) What are your sources of income? _____

b) How much do you earn from the mentioned sources per month? (Approximately/exact) Ksh _____

Adoption of the Mobile Phone

3. a) Do you have a mobile phone? _____

i) Yes []

ii) No []

b) If yes, when did you acquire the mobile phone? _____

4. Where did you buy your mobile phone? _____

5. Are you on Ken Cell or Safaricom? _____

6. Where did you first get information about the mobile phone?

(Select the right answer by ticking in the appropriate box).

a) From the mass media. []

b) From other people. []

c) Cannot remember. []

d) Saw during travel. []

7. Why did you decide to buy a mobile phone? _____

_____

_____

8. Approximately how often do you use your mobile phone to make calls? (Select the correct answer below. Tick appropriately)

a) Everyday. []

b) Once a week. []

c) Rarely. []

d) Very rarely. []

9. a) Does your mobile phone fully serve your communication needs?

i) Yes []

ii) To a certain extent []

iii) No []

b) If your answer to 9 (a) is (ii) or (iii) or give reasons why your mobile phone does not satisfy your communications needs fully.

_____

_____

_____

10. a) Do you always have enough credit for your phone?

i) Yes []

ii) No []

b) How would you rate the amount of credit you normally have on your phone?

i) Enough []

ii) Just enough []

iii) Hardly enough []

c) Approximately, how much money do you spend on your mobile phone per month? Ksh _____

11. How has the mobile phone changed your communication methods?

_____

_____

_____

12. How has the mobile phone changed the way you work?

_____

_____

_____

_____

13. What changes would you consider have been brought by the mobile phone in this area?

_____

_____

_____

_____

14. What features of the mobile phone do you often use?

_____

_____

_____

_____

15 a) Have you ever lost a mobile phone?

i) Yes []

ii) No [✓]

b) If the answer to 15 (a) is yes, how did you loose your mobile phone?

_____

_____

_____

16. a) Where do you charge your mobile phone?

_____

_____

b) Do you pay for it?

i) Yes []

ii) No []

c) If the answer to 16 (c) is yes, at what cost do you pay for this service?

KSH _____

17. a) Do you know of any restricted areas and circumstances where one is not allowed or supposed to use the mobile phone?

i) Yes []

ii) No []

iii) Do not know []

b) If the answer to question 17 (a) is yes, mention these areas or circumstances.

_____

_____

_____

_____

c) Why do you think the mobile phone should not be used in these areas or under the mentioned circumstances?

18 a) What factors in your opinion hinder the adoption and utilization of mobile phones in this area?

b) What factors in your opinion promote the adoption of the mobile phone in this area?

Appendix III

Interview Schedule for those without Mobile Phones

Please answer the following questions correctly.

Background Information

Please provide the following information about yourself.

1 a) What is your name? (Optional) _____

b) Age _____

c) Gender _____

d) Highest level of education attained _____

e) Religion _____

f) What work do you do? _____

g) Are you married? _____

h) Native division _____

i) Location _____

j) Sub-location _____

2 a) What are your sources of income? _____

b) How much do you earn from the mentioned sources per month? (Approximately/exact) Ksh _____

Utilization of Mobile Phone Services for those Respondents without Mobile Phones

3. a) Do you have a mobile phone?

(i) Yes []

(ii) No []

b) If the answer to 3 (a) is no, why have you not acquired it?

_____

_____

_____

_____

4. a) Have you ever used a mobile phone or the mobile phone services?

(i) Yes []

(ii) No []

b) If the answer to 4 (a) is yes, how often?

(i) Rarely []

(ii) Often []

(iii) Very often []

5. a) Do you use the mobile phone in your work?

(i) Yes []

(ii) No []

b) If the answers to 5 (a) is yes, how?

_____

_____

_____

_____

_____

9. What should the government do to enable everybody in need of a mobile phone have one?

_____

_____

_____

10. What is your attitude towards the mobile phone technology?

_____

_____

_____

_____

_____

Appendix IV

Key Informants Interview Guide for Mobile Service Providers

1) Official name of the mobile service provider.

_____

_____

2) Official rank of the responding officer.

_____

_____

3) Ownership of the company?

_____

_____

4) When was your company licensed to start offering mobile phone service in Kenya?

_____

_____

5) When did you formally start offering mobile services in Kenya?

_____

_____

6) When did you start extending your services to the rural areas?

_____

_____

7) Which initial areas did you start with and why?

_____

_____

8) When did you start offering your services in Meru North district?

_____

_____

9) Why did you decide to extend your services to the rural areas?

_____

_____

_____

10) Which communication policies enhance the spread of mobile phone technology in the rural areas of Kenya?

_____

_____

_____

_____

11) Which communication policies hinder the spread of mobile phone technology in the rural areas of Kenya?

_____

_____

_____

_____

12) Outline your company's policies on mobile phone spread and use in the rural areas.

_____

_____

_____

_____

_____

13. a) Is your company satisfied with the current transmission technologies allowed by the Communications Commission of Kenya?

i) Yes [ ]

ii) No [ ]

b) If no, why?

_____

_____

_____

_____

_____

14) What would you recommend the government should do to make mobile phone services more accessible in the rural areas to those in need?

15) Do you carry out any research studies to evaluate mobile phone use in the rural areas?

16) How does the mobile phone technology enhance rural development?

Appendix V

Key Informant Interview Guide for Government Institutions

1) Official name of the institution.

_____

_____

2) Official rank of the responding officer.

_____

_____

3) Outline the policy changes that brought about the current proliferation of mobile phone technology in Kenya?

_____

_____

_____

_____

_____

4) What factors were considered before introducing these policy changes?

_____

_____

_____

_____

_____

5) What criteria do you use in licensing mobile phone service providers?

6) What policies do you have for expanding mobile phone utilization in the rural areas in Kenya?

7) How has the mobile phone affected other communication channels since it was introduced in Kenya?

8) a) What factors promote the diffusion of mobile phones in the rural areas in Kenya?

b) What factors hinder the diffusion of mobile phones in the rural areas in Kenya?

_____

_____

_____

_____

_____

9) a) Have you carried out any research studies on the trends of mobile phone adoption and utilization in the rural areas in Kenya?

i) Yes []

ii) No []

b) If yes, in which areas?

_____

_____

_____

_____

10) How is the mobile phone used for rural development in Kenya?

_____

_____

_____

_____

_____

11. What is the future of the mobile phone industry in the rural areas?

_____

_____

Appendix VI

Observation Checklist

The following attributes were observed empirically.

1. Availability of electricity in various regions of the division.

2. Number of landline telephone lines in the area, both public and private.

3. Mobile phone repair shops in the area.

4. Mobile phone service provider's shops in the area.

5. Evaluate the reception power in various regions of the division.

Appendix VII

Administrative Details of the Site: Igembe South West Division

	Locations	Sub-locations	Area in sq/Kms
1.	Akachiu	Amwamba	6.3
		Auki	18.6
2.	Giika	Ugoti	12.8
		Marega	16.7
3.	Athi	Kirindine	5.7
		Ncheeme	9.1
4.	Nduguto	Tiira	6.1
		Amunju	2.3