

**THE IMPACT OF MOBILE TELEPHONY ON KENYA'S
INFORMAL SME SECTOR: A COMPARATIVE STUDY OF
NAIROBI AND RACHUONYO DISTRICTS**

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DECLARATION

I hereby declare that this project is my original work and has not been presented for a degree award in any other university.

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BASIC CONCEPTS/ GLOSSARY

- *Digital divide*

Researchers often define the term, 'digital divide' as the result from differential access to telecommunications comprising the accessibility and availability of communication infrastructure, technologies, applications and services.¹ More generally, the term is translated as the gap between nations that can and cannot afford technology; and between businesses and consumers enjoying the advantages of the information age and those still awaiting its benefits. It is also interpreted as the divide that separates the haves from the have-nots in the sphere of information or as the exclusion of those who are poor, illiterate, rural or non-English speaking from accessing and using information technology.²

- *Leapfrogging*

Whilst the developed world begins to move from industrial to information-based economies where the trend is now towards third generation Global Systems for Mobile phones (GSM) network and wireless technologies, African countries like Kenya are facing constraints in the development of even the fixed line infrastructure. It is, however, generally perceived that these countries have the opportunity to leapfrog the development of fixed-line network into new technologies, such as the third generation GSM with its massive potential for communication and data transmission.

¹ World Bank/Pyramid Research, Information Infrastructure Indicators, 1990-2010

² WITSA , Digital Planet 2000: The Global Information Economy, June 2000,

<http://www.witsa.org/DP2000sum.pdf>

UNCTAD, Building Confidence: Electronic Commerce and Development,

<http://www.unctad.org/ecommerce>

Center for Democracy and Technology, Bridging the Digital Divide: Internet Access in Central and Eastern Europe, <http://www.cdt.org/international/ceeaccess>

Leapfrogging is when nations and businesses build on already established and effective technologies to meet their own needs and create new technologies — or new uses for old technologies. In developed economies, newer versions of technology are often used to upgrade older versions, but in developing economies where older versions of technology are often prevalent, if they exist at all, the opportunities for leapfrogging over the successive generations of technology to the most recent versions are that much greater. The emergence of new technologies paradigm can provide opportunities for catching up with advanced countries.

Perez and Soete (1988) described how the catching up country, not being bound by existing costly investment in capital goods and infrastructure can "leapfrog" into a new technological paradigm if the country's institutions and people are sufficiently innovative to invest in the emerging technology and develop technological competence. Thus according to the International Labour Organization (ILO 2001):

[A]cceleration of development can occur through the leapfrogging potentials inherent in the technologies, where leapfrogging is defined as the ability to bypass earlier investments in the time and cost of development. Leapfrogging has first of all a technological foundation: through wireless applications, developing countries can bypass more costly and time-consuming investments in fixed-wire telecommunication infrastructures.

The development path into third generation GSM is clearly mapped out and brings with it possibilities for new age data and multi-media applications useful for developing economies. This system will enable users of current second-generation GSM wireless networks to migrate easily to the new generation services with minimum disruption. African countries

require more than simply developing mobile networks. Failure of African countries to adopt new technologies will lead to further marginalization from the world economy with the danger that the current digital divide between Africa and the rest of the world and between urban and rural economies will be further widened.

- *Defining small and medium scale enterprises*

For the purposes of discussions, the terms business, enterprise and *jua kali* are used interchangeably. There is no generally accepted definition of a small business because the clarification of business into large-scale is a subjective and qualitative judgment. In countries such as USA, Britain and Canada, small-scale business is defined in terms of annual turnover and the number of paid employees. In Japan, small-scale industries are defined according to the type of industry, paid-up capital and number of paid employees. Consequently, small and medium-scale enterprises are defined as those manufacturing with 100 million yen paid-up capital and 300 employees, and those in the retail and services trades with 100 million yen paid-up capital and 50 employees.

The terms informal, micro, cottage and medium enterprises are commonly used in small and medium enterprises internationally. In Kenya, the term *Jua Kali* enterprises has been coined to join the repertoire. This term simply means hot or harsh sun in Kiswahili. *Jua Kali* refers to businesses that are conducted in open air because the operators lacked resources to set up working facilities.

Classification of enterprises in Kenya is primarily by the number of employees. The Government of Kenya's Sessional Paper No.1 on Economic Management for Renewed Growth (Republic of Kenya, 1986), Sessional Paper No.2 on Small Enterprises and *Jua Kali*

Development in Kenya (Republic of Kenya, 1992), and the 1989 –1993, 1994 –1996 and 1997 – 2001 Development Plans (Republic of Kenya, 1989; Republic of Kenya, 1994; Republic of Kenya, 1997) provide the basis for classification of enterprises in the country. Those firms that engage less than five employees are referred to as micro-enterprises. Those that employ 5-49 workers and 50-99 workers are respectively classified as small-scale enterprises and medium scale enterprises. The firms with 100 or more are categorized as large-scale enterprises. The research will adopt the terms *jua kali*, informal, micro and small and medium-scale enterprises synonymously and interchangeably.

- *Mobile telephony terminologies*

Global System for mobile communication

Global System for mobile communication (GSM) is a globally accepted standard for digital cellular communication. GSM is the name of a standardization group established in 1982 to create a common European mobile telephone standard that would formulate specifications for a pan-European mobile cellular radio system operating at 900 MHz. It is estimated that many countries outside of Europe will keep joining the GSM partnership.

Global Packet Radio Service

The General Packet Radio Service (GPRS) is a radio data transmission service using packet switching and provided by a GSM-type, cellular telephony network aiming at offering the subscriber a bandwidth theoretically able to reach 115 Kilobits per second instead of the 9.6 Kilobits per second limit found in the current system

Prepaid telephone calls

This is a popular way of making telephone calls that allow the caller to control spending and not be tied into ongoing commitments with the telephone operator. Types of prepaid calls include:

- *Telephone prepaid calling cards* that are available from nearly every shop, telephone booths and newsstands worldwide. They are often the cheapest means of making long-distance or even international calls. Moreover, they offer complete anonymity.
- *Prepaid mobile phones* are offered by most operators around the world. Typically all the usual mobile services are available to prepaid users, except that they have to top up their balance in advance before they can be used. This is done through a variety of mechanisms including vouchers, scratch cards, debit cards and credit cards.

Roaming

This is a general term in wireless communications that refers to the extending of connectivity service in a network that is different from the one with which a station is registered. Roaming in the context of mobile phones is when you take your phone to an area where your service provider does not have coverage, for example, another country and your provider must have an agreement with the other provider to maintain a temporary subscriber record for your mobile to enable you to receive calls.

Subscriber Identity Module (SIM)

This is a component of GSM-type mobile telephony systems that has the function of identifying the user-subscriber in a cellular network. This module is integrated into a microprocessor card that is inserted in the handset of a GSM-type mobile telephone.

Short message service (SMS)

Short message service (SMS) is a service available on most digital phones that permits the sending of short messages between mobile telephones, other hand-held devices and even landline telephones. SMS was originally designed as part of the GSM digital mobile standard, but is now available on a wide range of networks, including 3G networks.

ABSTRACT

Performance of small and medium enterprises (SMEs) is affected by such factors as weak infrastructure network, limited capacity to identify, seek and use appropriate technology; and weak institutional arrangements for providing access to technology and their imperatives. Urban locations, therefore, may have a positive effect on enterprise performance because of the more developed infrastructure. Enterprises located in urban areas, therefore, may have greater access to business, services and enjoy larger local demands than those located elsewhere, and therefore, perform better purely on this account.

It is argued that in remote areas, including in Kenya, the disadvantages that arise from isolation can be significantly lessened through access to rapid and inexpensive communication and mobile telephones have been touted as the “leapfrogging alternatives” that can close or at least narrow the “digital divide” between rural and urban SMEs, and consequently between developing world and developing nations.

There are views that assume that the digital divide will increase because of infrastructural disparities and, therefore, SMEs, especially in rural areas will face even greater disadvantages relative to their competitors in the urban areas, thus widening the digital divide. However, mobile telephony is touted to be one of the most rapidly growing information communication technologies (ICTs) in Africa and may even offer greatest benefits to rural and urban SMEs where the majority of the world’s poor reside.

The study seeks to establish the impact of mobile telephony in enhancing performance of SMEs in Rachuonyo District, Nyanza Province compared to those in Nairobi given the infrastructural problems that are caused by inadequacy of their fixed-line equivalent. In particular, the study reviews:

- The role mobiles telephones play in the operation of SMEs in urban and rural areas
- The extent that SMEs have accessed the mobile telephony
- The determinants to accessing mobile telephones
- Factors that influence ownership, use and non-use of mobiles

- The impact of ownership and use of mobile telephones on business (turnover, profits, number of employees, capital investment)
- The prevailing policy framework on the adoption of mobile telephony

To achieve the objectives, the study employs the following methodology:

- Literature review - desk study to gather secondary material that may be relevant to mobile telephony
- Administration of semi-structured questionnaire to entrepreneurs
- Telephone interviews to gather information from various ICT operators

The sample size consists of 100 respondents from Oyugis and Kendu Bay divisions of Rachuonyo District SME clusters; and the Kariobangi North, Kariobangi South and Kamukunji clusters of Nairobi area. The cluster sampling method is used to identify the four SME clusters, followed by random sampling to select 50 respondents from Nairobi (25 from Kamukunji and 25 from Kariobangi North and South); and 50 respondents from Rachuonyo District (25 from Oyugis Division and 25 from Kendu Bay Division). Large SME clusters are found in areas such as the Kariobangi light industries and Kamukunji area in Nairobi and in Oyugis and Kendu Bay shopping centres in Rachuonyo District. It is for this reason that the cluster sample method is used. Data is processed and analyzed using Excel and Ms Word software.

The results suggest that mobile phones have brought considerable benefits to small businesses in rural and urban areas. People at all income levels are able to access mobile services by owning a phone, using a relatives or friends or using other channels including cyber cafes and simu ya jamii booths. Gender, age and education do not seem to constitute barriers to access. While income certainly explains the low level of usage, for example, it does not prevent mobile telephone use. Even the absence of electricity does not present an insurmountable barrier.

There is every reason to believe that economic and social returns to mobile phones will be highest to rural areas, which are consistently less well provided for with telecommunications

and other infrastructure including roads. Mobile phones substitute for fixed lines in rural economies, but complement fixed lines in urban economies, implying that they have a stronger growth impact in rural areas.

The study recommends that the government takes regulatory measures to provide universal access and rural communications development funds to bridge the true access gap that cannot be covered on a commercial basis, even if the regulatory framework and conditions are supportive to operations in rural and low-income areas.

CHAPTER ONE

1.0 INTRODUCTION

In many developing countries, small and medium enterprises (SMEs) account for a significant share of production and employment and are therefore directly connected to poverty alleviation. The 1999 Baseline Survey in Kenya found that there were 1.3 million SMEs countrywide employing 2.3 million and contributing to 18% of the Gross Domestic Product (GDP). The enterprises fell into broad categories of commerce and trade, manufacturing, and services. Most of them (710,509) were based in the rural areas, while Nairobi and Mombasa accounted for 70,411 and other towns for 129,535.

The Kenya Labour Force Survey Report of 1998/99 indicated that this sector covers all semi-organized and unregulated activities that are small in scale in terms of employment. The report noted that self-employed persons or employees largely undertake the activities with few workers in open markets, market stalls, in developed and undeveloped premises, in residential houses or on street pavements (ROK, Labour Force Survey, 2003).

However, SMEs are challenged by the globalization of production and the shift in the importance of various determinants of competitiveness. Through the rapid spread of information and communication technologies (ICTs), and ever decreasing cost of communication, markets in different parts of the world have become more integrated. One basic question is whether the use of ICTs as information-processing technologies can help the SMEs cope with the new challenges.

The spread of ICTs has led several commentators to argue that these technologies are creating a new economy – an information economy - in which information is the critical resource and basis for competition. It is argued that in remote areas, the disadvantages that arise with isolation can be significantly lessened through access to rapid and inexpensive communication (Torero, 2000). ICTs could increase the competitiveness of SMEs as they enable the creation of more flexible links with trading partners because of faster and more reliable communication channels.

Limited telecommunication infrastructure is seen as one of the principal causes of low levels of ICTs penetration. In 1999 the ITU estimated that Africa had about 18 million telephone lines – about one phone for every 15 people. Access to public phones is similarly restricted, with about one for every 15,000 people, compared to a world average of about one for every 600. Aside from limited penetration, telecommunication costs are high.

One of the primary constraints of SMEs in rural and peri-urban areas is limited capacity to identify, seek and utilize appropriate technology; and weak institutional arrangements for providing access to technology. These limitations stem from their low levels of education, limited financial resources, limited managerial skills, low marketing skills and regulatory constraints.

Most SMEs have no options than to remain in the informal sector and this influences the kind of ICT they are willing to invest in. Usually, it begins and ends with ownership of a mobile telephone. Mobile telephony using the Global Systems for Mobile phones (GSM) is one of the most rapidly growing ICT development in Africa. An increasing number of

countries, including Kenya, have built cellular networks that are equal in subscriber base to the fixed-line network. The number of cellular subscribers now surpasses the number of fixed lines in Africa, largely because the fixed-line operators are often unable to provide services; so mobile phones often substitute for their fixed-line equivalent.

In addition, cellular operators provide a rapidly growing number of added services, such as data transmission, short message sending (SMS) and Internet access. Mobile telephony may even offer greatest benefits to rural and urban SMEs where the majority of the world's poor reside. Information on market price, credit and financing opportunities, and access to new technologies or government services is difficult to procure. For these people, access to even the most basic ICTs can make a significant difference. In remote areas, the disadvantages that arise with isolation can be significantly lessened through access to rapid and inexpensive communication (Torero, 2000). The Kenya Agricultural Commodity Exchange (KACE), in conjunction with mobile telephone company Safaricom, has developed a system to keep farmers better informed of commodity market prices. Short Message System (SMS) technology is behind the system, which will cost farmers only 15 shillings (about \$0.20 USD) per use, giving them access to price information that was previously available only directly at the market. The system includes prices for all major agricultural commodities and their prices at markets throughout Kenya. KACE is encouraging farmers of the same crop to check prices in a shared-use model, spreading the cost of the SMS over more people. The SMS system allows farmers to bypass exploitative middlemen, who often charge below-market rates to farmers with few other options in terms of crop sales. In addition, the system will help farmers manage their trips to market, which can become expensive in terms of travel costs and lost time in the fields.

Performance of SMEs is affected by such factors as infrastructure and their imperatives. Urban locations, therefore, may have a positive effect on enterprise performance. Enterprises located in urban areas may have greater access to business, services and enjoy larger local demands than those located elsewhere, and therefore, perform better purely on this account. There are views that assume that the digital divide will increase because of this disparity and therefore SMEs, especially in rural areas will face even greater disadvantages relative to their competitors in the urban areas, thus widening the digital divide. The focus of this study is to compare how the proliferation of mobile telephony has influenced competitiveness of SMEs in Rachuonyo District and Nairobi.

1.1 Problem Statement

SMEs are often seen as the backbone of the private sector in the developing world, creating jobs and providing a tax base for local government. Today's information society requires that most SMEs have some level of ICT use integrated into their business, yet many developing countries fail to create and maintain the favourable environment needed to foster SME development and ICT use, especially in terms of infrastructure and policy. ICT will only have real impact on the way that SMEs do business when SMEs have real access to it. E-trade or e-commerce will only be a reality for SMEs when:

- they have a physical access to ICT
- the ICT is appropriate to the needs of the business and local conditions
- the ICT is affordable to own or to use
- the SME is able to sustain the use of the ICT within the local economic conditions

- the applications, content, services of the ICT are relevant to the business in terms of language and simplicity
- the ICT is integrated into the business to make transactions faster, easier and cheaper instead of adding burdens onto doing business

Different types of SMEs have different information needs. Smaller SMEs with little working capital rely mainly on informal information from known sources where personal relations and trust plays a major role. For these enterprises, ICTs are of minor relevance and only telephone can help increase access to this kind of information. Telephones can help to extend social and business networks and in some cases substitute for journeys and business intermediaries. Access to telephone services should be given priority. Without doubt, mobile telephony offers enormous advantages – added convenience, greater personal security, and the ability to take advantage of ‘dead’ time to do business on the move.

Despite the general consensus in appreciation and acceptance of the advantages of efficient mobile telephony network to leapfrog infrastructure problems experienced with the fixed lines, enterprises located in urban areas may have greater advantage and access to business and services and enjoy larger local product demands than those located in the rural areas, hence better performance. Thus the adoption of mobile telephony to bridge the gap is yet to get rural SMEs across the ‘digital divide’.

1.2. Goal Statement

The objective of this study is to establish the impact of the increase of mobile telephony in enhancing performance of SMEs in Rachuonyo District, Nyanza Province compared to

those in Nairobi given the infrastructural problems associated with inadequacy of their fixed-line equivalent.

1.3. Project Objective

To determine how SMEs in urban and rural areas can use mobile/cellular telephones as tools to empower themselves through access to productive information, the creation of content that is relevant to them or through opportunities to communicate and better organize business.

The objective of the research will be achieved through the following measures:

- What role do mobiles telephones play in the operation of SMEs in urban and rural areas?
- To what extent have SMEs accessed the mobile telephony?
- What are the determinants for access?
- What are the factors that influence ownership, use and non-use of mobiles?
- What is the impact of this to business (turnover, profits, number of employees, capital investment)?
- Does the prevailing policy framework provide a conducive atmosphere for adoption?
- Based on the findings, therefore, what can we conclude?

1.4 Hypothesis of the Study

H1: Information poverty makes SMEs isolated, uncertain and risk averse

H2: There is a close link between ownership and use of mobile telephones by SMEs in both rural and urban areas and increased productivity of SMEs

H3: SMEs located in urban areas have greater access to business and services because of better developed infrastructure, especially availability of fixed landlines, hence perform better purely on that account

H4: In remote areas the mobile telephone offers SMEs the alternative technology to leapfrog and catch up with those in urban areas

1.5 Expected Benefit of the Study

In developing countries, the SME sector is a major source of income, breeding ground for entrepreneurs and provider of employment. New perspectives for the development of SMEs are opened by the recent mobile electronic technology applications that in principle make it possible to do business anywhere on the globe – independent from the usually inadequate fixed telecommunication networks of the rural areas. Technically it is possible for the rural areas and their SMEs to skip a stage in development but the conditions at firm level and in the business are rarely inadequate to exploit the vast opportunities. The “digital divide” between the rural areas and the cities where m-commerce has become part of every day enterprise operations may widen further if the conditions for participating in the mobile telephone-based economy revolution is not improved. If SMEs in urban areas can benefit from the new economy that has been opened by the introduction of mobile commerce, then the rural SMEs should also share the enormous benefits. The study, therefore, will help in identifying specific cultural, technological, economical, political and regulatory factors that could be improved to help the SMEs in rural areas to leapfrog and close or narrow the income divide.

CHAPTER TWO

2.0 LITERATURE REVIEW AND THEORITICAL FRAMEWORK

2.1 Introduction

The informal sector in Kenya and the small and medium enterprises (SMEs) sub-sector within it constitutes the fastest growing and most dynamic segment in the Kenyan economy. The sector is growing at a rate of 18% p.a. in contrast to the formal sector whose growth averaged 3.2% in 1996-97.

The importance of SMEs is underscored by its potential to deliver major and socio-economic benefits in terms of employment creation and poverty alleviation. In 2000 the sector was accounted for the employment of approximately 4,465,118 people. This is a major contribution to Kenya's job sector considering the number of unemployed persons that stood at 15 million in 2000.

The lack of physical infrastructure, like roads, electricity and telephone is often the main reason why business and financial services are unavailable to SMEs, particularly in rural areas, hampering business growth. The mobile phone industry has flourished in Kenya in the last few years. Mobile teledensity now stands at 4%, while the fixed line density lags behind at 2%. The technology solves some of the communication problems by offering instant and affordable connection.

However, some areas are still not covered by mobile telephones and access to electricity for charging phones is still a problem. It is imperative, therefore, that current efforts towards alleviation of poverty through SMEs study the contribution of mobile telephones in the informal sector to creating wealth.

2.2 Small and Medium Scale Industries in Kenya

2.2.1 An overview of SMEs in Kenya

The Kenyan *Jua Kali* sector is made up of small self-employment ventures and dynamic enterprises covering a wide variety of activities that concentrate mainly in urban areas but are also evident in rural areas. There are about 900,000 establishments employing 2 million Kenyans and generating 14% of the Gross Domestic Product (GDP) (Mullei and Bokea, 1999).

Informal employment in Kenya has grown at more than twice the rate of formal employment in the recent decade because of the limited opportunities in the latter. The sector is also attractive to skilled persons who either lose their jobs in the formal sector or are debutantes into self-employment, taking advantage of the failures of the formal sector to offer some competitive goods and services. The small enterprise provides the unskilled rural migrants with skills needed to survive in the more challenging urban environment.

The two key labour force components in the SMEs are entrepreneurs and apprentices. The total labour force varies widely across business establishments and activities, informal garages absorbing appreciably more apprentices and workers, relative to the service sector that is dominated by proprietors.

SMEs are generally young ventures but age varies across locations and activities. The first two years are critical for survival. Lack of entry barriers creates severe competition that leads to the death of the less efficient and poorly managed enterprises. Higher capital and skills in

construction and vehicle garages act as effective barriers for less competition in the sub-sector.

The Kenyan *jua kali* sector is a mixture of small self-employment efforts and dynamic enterprises covering a wide variety of activities that concentrate mainly in urban areas but are also evident in rural Kenya. It is estimated that the micro and small-scale enterprise (MSE) sector contributed some 13% of GDP in 1994 (Daniels, 1999, p. 57). A third of the enterprises operate from homes. Elsewhere, the majority of the enterprises is home based, generally employs only one worker and are women owned. In Kenya, MSEs with a single employee are a minority, only a third is home based, and less than half are women owned. On these accounts, the Kenyan micro and small-scale enterprises are maturer than those found in the rest of the continent. Women account for less than a half of the MSE entrepreneurs, 40% of the sector's employment and dominate commercial and textile activities. Women enterprises also start smaller, use less start-up capital, grow slower, show uniquely different credit use patterns and are more likely to operate from homes (Parker and Torres, 1994).

2.2.2. Characteristics of SMEs in Kenya

Informal employment has grown at more than twice the rate of formal employment in the recent decade. Some of this employment results from decreased demand for products by rural artisans, which forces the artisans to shift production from rural to urban areas. The sector is also an avenue through which unskilled persons that move from rural to urban areas acquire skills that enable them to survive in a more challenging urban environment. Urban informal employment also results from the limited formal sector employment opportunities and the presence of young graduates from vocational training institutions,

whose curriculum is conventional and offers little specialized skills and, therefore, limited opportunity for penetrating the saturated formal labour market. The graduates end up picking up apprenticeships in the *jua kali* sector to develop specific skills necessary for direct employment in the sector.

The sector is also attractive for skilled persons who either lose formal sector jobs or are debutantes into self-employment, taking advantage of the failures of the formal sector to offer some goods and services on competitive terms. But the sector is a second best choice for those unable to find or keep positions in the formal sector. Detailed analysis of the garments sector revealed that while making extensive use of casual workers, the *jua kali* sector employs skilled workers for direct deployment in production. Most *jua kali* firms require workers with skills that school leavers do not have, so that the sector is unlikely to solve Kenya's unemployment problem (Ongile and McCormick, 1996).

The largest proportion of proprietors is found in the food and service sectors and the largest proportion of apprentices in garages (Aboagye, 1986). Studies have shown that the period of apprenticeship in the sector can go on for as long as three years in the vehicle garages. Some of the apprentices successfully seek government trade test certificates for technician, which are handy for both *jua kali* and modern sector employment.

Aboagye (1986) demonstrated that the average age of the *jua kali* enterprises is less than six years. This age varies decisively between location and activities, those in Nairobi and Mombasa being relatively younger than those in the smaller towns. This suggests that most *jua kali* entrepreneurs move toward the larger towns. Metal working firms and vehicle garages are older than others, and the first two years of a *jua kali* enterprise seem critical for survival. Mortality is greatest within this age. Absence of entry barriers creates severe

competition that leads to the demise of the less efficient and poorly managed enterprises. Most of the enterprises are sole proprietorships except a few partnerships in for example garages and metal fabrication.

Earnings by entrepreneurs are highest in the sectors with higher entry costs such as vehicle garages and metal fabricators. Such earnings are also closely correlated with entrepreneur's educational attainments, which are highest for proprietors of garages and metal fabricators (Daniels and Mead, 1998). *Jua kali* activities concentrate in specific parts of the cities drawn by availability of services and proximity to markets. Some operate from fixed locations and other from variable locations to obviate official harassment. The majority is tenants, a few are landlords, while others are squatters who neither pay nor own the space they use. Informal food processing, woodworking and metal fabricating enterprises typically operate from make shift shades. Local authorities often destroy the structures to relocate them. Due to the temporary nature of the premises, infrastructure services such as water and electricity are difficult to supply, limiting the technological choices available to the enterprise.

Most of the output from the *jua kali* sector satisfies demand for food and other basic needs by the low and middle income rural and urban Kenyans. Prices are lower than for modern sector products, but the quality is also often lower. Nevertheless, some of the high quality furniture sold in the formal sector is supplied by *jua kali* enterprises providing an important interface between the two sectors. Contracts with *jua kali* enterprises are often more flexible and customer relationships more personal than in the formal sector. A significant part of the informal entrepreneurship results from straddling between formal sector jobs and informal activities. It is also the case that some of the informal entrepreneurs initially gathered their skills while working in the formal sector, although skills also flow in the opposite direction.

In a few cases, formal retail and wholesale stores contract informal enterprises to make specified products, facilitated through prepayments to the informal workshops for procurement of raw materials. Incidences of extension of supplier credit from formal to informal firms are evident although this is limited to firm with established trading relationships.

2.3 Mobile Telephones Background

2.3.1. The mobile telephone: an introduction

A mobile phone is a portable electronic device that behaves as a normal telephone whilst being able to move over a wide area (compare cordless phone which acts as a telephone only within a limited range). Mobile phones allow connections to be made to the telephone network, normally by directly dialing the other party's number on an inbuilt keypad. Most current mobile phones use a combination of radio wave transmission and conventional telephone circuit switching, though packet switching is already in use for some parts of the mobile phone network, especially for services such as Internet access and WAP. Some of the world's largest mobile phone manufacturers include Alcatel, Audiovox, Kyocera (formerly the handset division of Qualcomm), LG, Motorola, Nokia, Panasonic (Matsushita Electric), Philips, Samsung, Sagem, Sanyo, Siemens, SK Teletch, and Sony Ericsson. There are also specialist communication systems related to, but distinct from mobile phones, such as satellite phones and Professional Mobile Radio.

Mobile phones receive or make calls through a cell site, or transmitting tower. Radio waves are used to transfer signals to and from the cell phone. Large geographic areas (representing the coverage range of a service provider) are split up into smaller cells to deal with line-of-sight signal loss and the large number of active phones in an area. Each cell site has a range

of 3-15 miles and overlaps other cell sites. All of the cell sites are connected to one or more cellular switching exchanges which can detect the strength of the signal received from the telephone. As the telephone user moves or from one cell area to another, the exchange automatically commands the handset and a cell site with a stronger signal (from the handset) to go to new radio channels. When the handset responds through the new cell-site, the exchange switches the connection to the new cell-site.

With Code Division Multiple Access (CDMA) technology, the process is slightly different. Multiple CDMA handsets share a specific "channel"; the signals are separated by sending each bit using a pseudo-random code sequence specific to each phone. As the user moves from one cell to another, the handset actually connects to both sites simultaneously. This is known as a "soft handoff" because, unlike with traditional cellular technology, there is no one defined point where the phone switches to the new cell.

Modern mobile phones use cells because radio frequencies are a limited, shared resource. Cell-sites and handsets change frequency under computer control and use low power transmitters so that a limited number of radio frequencies can be reused by many callers with less interference. CDMA handsets, in particular, must have strict power controls to avoid interference with each other. An incidental benefit is that the batteries in the handsets need less power.

However, almost all mobile phones use cellular technology, including Global System for Mobile Communications (GSM), CDMA and the old analog mobile phone systems. Hence, many people use the term "cell phone" to mean any mobile telephone system. The exception to mobile phones using cellular technology are the satellite phones.

Due to their low establishment costs and rapid deployment, mobile phone networks are rapidly spreading throughout the developing world, outstripping the growth of fixed telephony. Such networks can often be economic, even with a small customer base, as mobile network costs are mostly call volume related, while fixed-line telephony has a much higher subscriber related cost component.

2.3.2 The history of the mobile telephone

Any history of mobile telephones starts with Samuel Morse. He conceived of an electromagnetic telegraph in 1832 and constructed an experimental version in 1835. Then, on October 18, 1842, Morse laid wires between Governor's Island and Castle Garden, New York, a distance of about a mile. Part of that circuit was under water because Morse wanted to show that an underwater cable could transmit signals as well as a copper wire suspended on poles. But before he could complete this demonstration a passing ship pulled up his cable, ending, it seemed, his experiment. However, undaunted, Morse proceeded without the cable, passing his telegraph signals through the water itself. This introduced the concept of wireless by conduction. Samuel Morse's telegraph was the first device to send messages by electricity.

With the know-how to send messages, possibilities of exactly how to do this were abounding. Since water could conduct electricity and carry messages, other conductors were sought out. In 1843, a skilled analytical chemist by the name of Michael Faraday began exhaustive research into whether space could indeed conduct electricity, using the principles already established by telegraphy.

In 1864, James Clerk Maxwell released his paper "Dynamical Theory of the Electromagnetic Field" which concluded that light, electricity, and magnetism, were all related. All of these worked hand in hand, and all electromagnetic phenomena traveled in waves. Then, in 1865, Dr. Mahlon Loomis of Virginia, a dentist, may have been the first person to communicate through wireless via the atmosphere. Between 1866 and 1873 he transmitted telegraphic messages at a distance of 18 miles between the tops of Cohocton and Beorse Deer Mountains in Virginia. He developed a method of transmitting and receiving messages by using the Earth's atmosphere as a conductor and launching kites enclosed with copper screens that were linked to the ground with copper wires.

Over the next thirty years, most inventors and developers concentrated on wire line telegraphy, suspending wires between poles, which eventually became what we know as telephone poles. Few tinkered exclusively with wireless since a basic radio theory had not yet been worked out. Several experiments conducted on a trial and error basis produced no results. Telegraphy, however, did produce a good understanding of wireless by induction since wires ran parallel to each other and often induced rogue currents into other lines. So now they knew that electromagnetic messages could travel through the air. Anything to do with broadcasting and sending a radio or television message out over the airwaves comes under a Federal Communications Committee (FCC) regulation that a cell phone is actually a type of two-way radio. In 1947, AT&T proposed that the FCC allocate a large number of radio spectrum frequencies so that wide-spread mobile telephone service could become feasible and AT&T would have an incentive to research the new technology. Because of the FCC decision to limit the frequencies in 1947, only twenty three phone

conversations could occur simultaneously in the same service area - not a market incentive for research.

The FCC reconsidered its position in 1968, and stated "if the technology to build a better mobile service works, we will increase the frequencies allocation, freeing the airwaves for more mobile phones." AT&T - Bell Labs proposed a cellular system to the FCC of many small, low-powered broadcast towers, each covering a 'cell' a few miles in radius, collectively covering a larger area. Each tower would use only a few of the total frequencies allocated to the system, and as cars moved across the area their calls would be passed from tower to tower.

Dr Martin Cooper, a former general manager for the systems division at Motorola, is considered the inventor of the first modern portable handset. Cooper made the first call on a portable cell phone in April 1973. He made the call to his rival, Joel Engel, Bell Labs head of research. Cooper commented, "As I walked down the street while talking on the phone, sophisticated New Yorkers gaped at the sight of someone actually moving around while making a phone call. Remember that in 1973, there weren't cordless telephones, let alone cellular phones. I made numerous calls, including one where I crossed the street while talking to a New York radio reporter -probably one of the more dangerous things I have ever done in my life."

This first cell phone call caused a fundamental technology and communications market shift toward the person and away from the place. It also created another vision for Martin Cooper. His vision was for personal wireless communications. "People want to talk to other people - not a house, or an office, or a car. Given a choice, people will demand

the freedom to communicate wherever they are, unfettered by the infamous copper wire. It is that freedom we sought to vividly demonstrate in 1973," he said.

Martin Cooper started the 10-year process of bringing the portable cell phone to market. Motorola introduced the 16-ounce "DynaTAC" phone into commercial service in 1983, with each phone costing the consumer \$3,500. It took seven additional years before there were a million subscribers in the United States. Today, there are more cellular subscribers than wire line phone subscribers in the world, with mobile phones weighing as little as 3 ounces. By 1977, AT&T and Bell Labs had constructed a prototype cellular system. A year later, public trials of the new system were started in Chicago with over 2000 trial customers. In 1979, in a separate venture, the first commercial cellular telephone system began operation in Tokyo. In 1981, Motorola and American Radio telephone started a second U.S. cellular radio-telephone system test in the Washington/Baltimore area. By 1982, the slow-moving FCC finally authorized commercial cellular service for the USA. A year later, the first American commercial analog cellular service or AMPS (Advanced Mobile Phone Service) was made available in Chicago by Ameritech. Despite the incredible demand, it took cellular phone service 37 years to become commercially available in the United States. Consumer demand quickly outstripped the 1982 system standards.

The first generation of analog cellular systems included the Advanced Mobile Telephone System (AMPS), which was made available in 1983. A total of 40MHz of spectrum was allocated from the 800MHz band by FCC for AMPS. It was first deployed in Chicago, with a service area of 2100 square miles. AMPS offered 832 channels, with a data rate of 10 kbps. Although omni directional antennas were used in the earlier AMPS implementation, it was realized that using directional antennas would yield better cell reuse. The smallest reuse

factor that would fulfill the 18db signal-to-interference ratio (SIR) using 120-degree directional antennas was found to be seven. Hence, a 7-cell reuse pattern was adopted for AMPS. Transmissions from the base stations to mobiles occur over the forward channel using frequencies between 869-894 MHz. The reverse channel is used for transmissions from mobiles to base station, using frequencies between 824-849 MHz. 1G was introduced to Africa in the early 1990s and is gradually being phased-out and replaced by 2G technology. Due to its affordability for consumers, it is still available in Ghana and is gaining more popularity.

In the 1990s, second generation (2G) mobile phone systems such as the Global Systems for Mobile Communications (GSM), IS-136 Time Division Multiple Access ("TDMA"), iDEN and IS-95 Code Division Multiple Access ("CDMA") were introduced. The first digital cellular phone call was made in the United States in 1990, in 1991 the first GSM network opened in Europe. 2G phone systems characterized by digital circuit switched transmission and the introduction of advanced and fast phone to network signaling. In general the frequencies used by 2G systems were higher though with some overlap, for example the 900MHz frequency range was used for both 1G and 2G systems in Europe and so such 1G systems were rapidly closed down to make space for 2G systems.

Coinciding with the introduction of 2G systems were trends, which meant that the larger "bricks" disappeared and tiny 100–200g hand-held devices became the norm. These trends included technology improvements such as better battery technologies and lower power electronics, but also are largely related to the higher density of cellular sites caused by increasing usage levels. Mobile networks in Africa mainly deploy well-known systems like GSM (900/1800MHz band and CDMAOne. This is the most common deployment of

mobile phone technology in Africa. GSM networks are widely available in many African countries though actual coverage can be wide-spread as in South Africa, or scant as in Mali, Sudan, and Burkina Faso.

High data requirements amongst consumers necessitated the improvement of the available technologies. Engineers tried to figure how they could 'squeeze' more data (information) through the available mobile network infrastructure. This saw the advent of technologies like GPRS, HSCSD, EDGE, CDMA2000. These improved versions of the 2G systems have brought much more improved functionality, possibilities and real-life applications.

Most mobile phone networks in Africa are still on the plain 2G system of GSM and CDMA. Some though are now aggressively migrating to the higher 2.5G platforms and even 3G. Much of the rapid developments are witnessed in South Africa, Egypt and to some extent, Nigeria. The most common of the 2.5G technology deployment in Africa is GPRS. This is more because of its affordability with deployment. More GPRS-enabled handsets are widely available in many of Africa's fast growing mobile phone market. South African networks MTN and Vodacom had launched GPRS by 2002. GPRS has long been available on Egypt's mobile phone networks Mobinil and Vodafone Egypt (Click GSM). It is currently still being deployed in Nigeria by the mobile phone networks. Nigeria's glo mobile took the lead by launching Nigeria's first GPRS network in August 2004 followed by MTEL in April 2005. Kenya's Safaricom followed suit in April 2005. Other networks are quiet about time of deployment.

Not long after the introduction of 2.5 G networks, projects began to develop third generation 3G systems. Inevitably there were many different standards with different contenders pushing their own technologies. Quite differently from 2G systems, however, the

meaning of 3G has been standardized in the IMT-2000 standardization process. This process did not standardize on a technology, but rather on a set of requirements (2Mb/s maximum data rate indoors, 384Kb/s outdoors, for example). At that point, the vision of a single unified worldwide standard broke down and several different standards have been introduced.

During the development of 3G systems, 2.5G systems such as CDMA-2000 1X and General Packet Radio Service (GPRS) were developed as extensions to existing 2G networks. These provide some of the features of 3G without fulfilling the promised high data rates or full range of multimedia services. CDMA2000-1X, for example, delivers theoretical maximum data speeds of up to 307 Kbps. Just beyond these is the Enhanced Data GSM Environment (EDGE) system which in theory covers the requirements for a 3G system, but is so narrowly above these that any practical system would be sure to fall short. At the beginning of the 21st century, 3G mobile phone systems such as Universal Mobile Telephone Systems (UMTS) and CDMA-2000 1xEV-DO have now begun to be publicly available. The final success of these systems is still to be determined.

Third generation of mobile telephony (3G) is the latest form of mobile telephony technology that is currently gaining widespread deployment globally, especially in Europe and the Far East. It was designed to provide the best platform for mobile communication and can support features like video telephony, high speed Internet access (burst speed of 384kbps), real-time audio and video broadcast and more. This is still a relatively new technology and as such has witnessed very limited real-time deployment in Africa. The earliest entry into this arena was EMTEL, a mobile phone company based in Mauritius. They launched Africa's first 3G-capable network in November 2004. Following closely is South Africa's Vodacom

which deployed the first 3G network in South Africa in December 2004. MTN South Africa is also gearing up to launch an EDGE-capable network in early 2005, taking the lead from Spacefon Areeba who announced that they would be launching Africa's first EDGE-capable network as way back as April 2004.

The Fourth Generation of Mobile Telephony (4G) promises high-speed mobile wireless access with a very high data transmission speed, of the same order of magnitude as a local area network connection. It is still under-going development and tests are only currently running in Japan. It promises much more possibilities and applications and needless to say that this technology is currently not available anywhere in Africa.

2.4 The Growth and Adoption of Mobile Telephones

2.4.1 Growth and adoption of mobile telephones in Africa

Africa has been the fastest growing mobile market in the world during the past five years. The first mobile call in Africa was made in Zaire in 1987; the operator was Telecel. Today, there are more than 52 million users in the continent compared to about 125 fixed lines. In 19 African countries, mobiles account for three quarters of all telephones.³ Africa as a whole lags far behind richer regions of the world. Nevertheless, the rapid spread of mobile telephones in many countries is as remarkable phenomenon, especially in the context of their huge economic and social challenges.

At the end of 2003, there were 6.1 mobile telephone subscribers for every 100 inhabitants compared with 3 fixed line subscribers per 100⁴ are forecast to grow to 67 millions by the end of 2005. Access to mobile telephony in Africa is almost as certainly far more extensive

³ ITU 2003, ITU 2004, Kirkman and Sachs, World Bank 2000; World Economic Forum 2003)

⁴ ITU 2004

than the subscriber figures suggest, as each handset and subscription has many users. In just the first few years of the new millennium, Africa has added more telecommunication users than in the whole of the previous century. Africa is currently the world region with the highest level of mobile communications growth. The vast majority of mobile users use GSM technologies.

Investment in total communications in Africa has been about 5 to 6% of the total fixed investment spending on the continent in recent years, although with wide variations between countries. Mobile network coverage is most extensive in North African countries and South Africa, where coverage has improved dramatically. Continuing improvement of telecommunications infrastructure is a priority area of policy for African governments and organizations, such as the New Partnership for Economic Development (NEPAD) and the international community. As ITU has pointed out, the phenomenon of the rapid spread of mobile cuts across many of the characteristics distinguishing one country from another, such as GDP per capita, socio-demographic or geographic criteria⁵. In most of the continent's biggest economies, penetration lies in the 20 to 40% range, although with exceptions, such as Egypt (8.26%) and Nigeria (2.55%).

The business and operating climate in the African telecommunication sector has radically shifted. Firstly, market liberalization has helped shape an environment which fosters competition. Regulatory bodies are being established, to oversee the introduction of services, resolve disputes, and support competition. A glance across Africa's mobile landscape illustrates the benefits of competition. The only countries with less mobile than fixed telephone subscribers in Sub-Saharan Africa at the end of 2003 were either those without

⁵ ITU 2003

mobile networks or without mobile competition. Mobile competition has benefited even the poorest countries. The Democratic Republic of Congo and Ethiopia both have per capita incomes of around US\$100, yet the Democratic Republic of Congo has a mobile penetration of around 2% - some 15 times greater than Ethiopia's, which stood at 0.13% at the end of 2003. The difference? Whilst Ethiopia has only 1 GSM operator, the Democratic Republic of Congo has 3 GSM networks, in addition to non GSM cellular networks.

The emergence over the last 3-4 years of African based, pan-regional mobile operators, is another significant reason behind mobile's growth. The spheres of mobile influence of these strategic investors now reach across the continent. It is these operators, such as Vodacom, Orascom Telecom and MTN who have been able to apply uniquely African approaches onto the markets on which they operate. They also provide competition - not just any competition, but their presence ensures that competition is of a suitable quality to help stimulate market growth. "Operators such as MTN or Vodacom have the knowledge of operating in different African markets which they can then duplicate onto other markets in the region," explains Michael Minges, Head of ITU's Market, Economics and Finance Unit and lead author of the 2004 African Telecommunications Indicators report. "But crucially they also possess a vital zeal to spread the benefits of mobile communications across the region, and with this enthusiasm they have helped created a mobile revolution in Africa."

As Africa's telecoms investment climate has shifted, in turn, potential investors in the region are becoming more willing to make concessions which they would not have done 10 years ago. Vendors, looking to grow in new markets as they face saturation elsewhere, are increasingly tailoring their approach to the region, developing special lower-cost solutions to suit the needs of the region.

Mobile operators in Africa have been quick to see the benefits of prepaid services. In a region where per-capita incomes are low, and payment upfront in cash is generally the preferred means of payment, prepaid services are ideally suited. They reduce the risk of bad credit to operators while exposing a whole new consumer group to telecommunications services; those who would not normally have qualified for postpaid mobile services or fixed lines. A growing number of African networks operate only as prepaid, and four out of every five African subscribers - almost twice the global average - use prepaid services. Prepaid services have been further adapted to offer mobile 'payphone' services. It is tapping into these regional specific approaches, and accessing new sectors of the population who have not previously been exposed to telecommunications, which have helped to drive up mobile usage in recent years, and will continue to do so.

Despite its suitability for the African market, levels of mobile penetration vary considerably across the region, ranging from under 1% in Ethiopia to 74.7% in Réunion at the end of 2003, indicating that, for much of the region there is still huge scope for growth. Mobile technology has, however, gone further than any other communications technology in Africa in terms of bridging the digital divide. Mobile's ease of payment means that services extend to segments of urban and rural populations who previously would not have been able to afford them, and where demand is high. Mobile infrastructure also extends way beyond that of fixed-line, into rural and 'universal access' markets, something to which wireless technology is innately more suited than the traditional fixed-line. Nevertheless, network coverage remains low with only an estimated 50% of Sub-Saharan Africa covered by a mobile signal, indicating that there is still a large untapped market, provided operators can be encouraged to extend network coverage.

Mobile technology has also spawned a number of new employment possibilities. Prepaid card sellers or mobile resellers, such as Nigeria's 'umbrella people' so called as they use umbrellas to provide shade whilst plying their wares - are now commonplace. Mobile reselling is a boom business - umbrella people, for example, have reportedly been able to exhaust 2-3 MTN prepaid cards, each valued at roughly USD11.60, per day.

Affordability of service is still a key issue - if services are unaffordable for potential new users, then this sector of the market cannot offer prospects for expansion. After a period of rapid mobile uptake, the mobile growth curve is set to continue. ITU forecasts mobile subscriber growth of 17% during 2004. To maintain the momentum of growth however, operators - as elsewhere in the world - will need to look to new areas of growth to attract new users.

Applications such as WAP are beginning to surface. One of the most publicized examples is of Senegal's Manoni, which launched a service to enable farmers to query databases on pricing information, utilizing WAP. The service is used by over 1 000 users. Meanwhile, SMS (short message service) usage is showing signs of a fast uptake in Africa. While the majority of SMS traffic tends to be for mundane communications, SMS has also been harnessed for a number of innovative, region-specific applications. In Zambia, mobile operator Celtel has launched a mobile payment system whereby users can make payments using SMS, with a code identifying the payee. Applications such as mobile banking have the potential to make a major impact in Africa, a region where cash payments are preferred and where people do not generally carry credit cards.

A lack of fixed-line infrastructure as well as low PC penetration means that the potential for mobile Internet is considerable. Indeed 3G services have already been launched in a number of African countries, including Angola. Although there are no 3G networks in operation on the continent, network upgrades have enabled service launches. Recently Ericsson was awarded Africa's first EDGE (Enhanced Data Rate for Global Evolution) contract, to provide the technology to Ghana's Scan COM. Deploying EDGE will provide a migration path toward 3G, and enable Scan COM to assess demand for enhanced data services. High speed or not, mobiles can still allow users to access the Internet "We are seeing users using regular GSM networks to gain access to the Internet, " says Minges "It is certainly slow, but in areas where no alternative exists it is the only way to gain Internet access." Given this, a logical technology to deploy would be GPRS (General Packet Radio Services), which could provide a higher speed access solution. Yet operators have still to embark on a large-scale rollout of the technology - by the end of 2003 GPRS had only been launched in three African markets. "Operators should be exploiting the potential of GPRS " explains Minges "Given the obvious thirst for Internet access, GPRS could provide users with Internet access at speeds equivalent to dial up access as well as new revenue streams for operators."

The universal service market offers some surprisingly vibrant growth opportunities. Cautious of extending the reach of mobile services into rural areas, where service uptake may not be as rapid as in urban areas, operators have been slow in seizing the prospects these markets offer. "Operators should see these markets as a growth opportunity" says Minges. "Providing a service such as a community payphone can generate over 3 times the monthly revenue of a conventional user." While services such as community payphones clearly do not

provide a boost for handset sales, they do mean that levels of mobile traffic are kept high. Mobile initiatives in the universal services area include the Grameen Phone initiative. This initiative replicates the Grameen Telecom's village phone programme running in Bangladesh, which currently has over 40 000 village phone operators. The Grameen initiative in Uganda operates in partnership with MTN Uganda and provides low cost mobile services into poor rural areas.

Providing that operators maintain a focus on service affordability, as well as looking to new growth areas, the future for mobile looks very positive. Total numbers of fixed lines are forecast to reach 30 millions by the end of 2005, according to ITU. Although by this point the number of fixed lines will be dwarfed by mobile, fixed-line growth will nevertheless have been steady, increasing by around 6-10% each year. The key to fixed-line's growth lies with wireless technologies, and it is only through these technologies that fixed-line can 'fight back'. Offering fixed-line services over fixed wireless access (FWA) networks offers all the advantages of mobile - they are cheaper to install than conventional copper wire networks - but are also attractive in their ability to provide high data speeds. It is this ability to provide broadband which needs to be exploited, to leverage the one advantage fixed-line services has over mobile.

Formal competition policies are at their infancy in Africa, with only Kenya and South Africa having a clear framework in place. Many countries still have dominant telecommunications operators, with sufficient political power to ensure that the regulatory framework is designed to their own interest. Given their typical history of inefficiency and corruption, their dominance is counterproductive, inhibiting the rapid spread of mobile communication networks.

2.4.1.1 Mobile telephones and economic growth in Africa

The most significant area of growth in ICTs has been the mobile revolution. Mobile telecommunication networks have been touted as “leapfrogging alternatives” that can allow developing nations to close, or at least narrow, the digital divide between the developed and the developing world, and within themselves.

The spread of telecommunications is expected to improve growth and consumer well-being in poor countries. The existing evidence on impacts of mobile indicates positive correlations between teledensity and quality of life indicators – allowing for GNP per capita – such as longer life expectancy, lower infant mortality and illiteracy. Economic and social returns to mobile are perceived to be highest in rural areas, which are consistently less well provided with telecommunications services. Serving rural areas is also consistently linked to anti-poverty efforts. Half the world’s population – 3 billion people – lives in rural areas, and there is a substantial overlap between poverty and rural dwelling. Telephone connectivity appears to be highly correlated with the extent of the non-farm sector, and consequently average incomes, in rural areas.

To the extent that mobile communications are reaching some rural areas with little or no fixed line availability, rural people are able to stay in contact with family members and relatives working elsewhere; access improved medical or educational benefits; allow farmers to access to information on price of produce, reducing monopsony power in agricultural markets; and saves time and enables efficiencies in business.

Until a few years ago, mobile phones diffused more rapidly in high-income countries and widened the digital divide between developing and developed countries (UNDP 2001). The mobile phones were a luxury and only the rich owned one. Though the technology was not that developed, the costs were exorbitant. In recent years, mobile communications are experiencing higher growth rates in low-income countries and communities. For instance, during 1995-98, mobile subscribers in low-income countries registered an annual growth rate of 117% compared to 47% in high-income countries during the same period (ITU 1999a). As a result, from 1990 to 99, the developing countries' share in the world mobile market increased from 5% to 20% and that of the Asia-Pacific region rose from 15 to 20% (Wai 2001). More importantly, a large proportion of the newly added mobile phones in developing countries are getting in the hands of the relatively poor people (Economist 1999).

The growth of mobile cellular telephones has been most rapid in countries with low populations and poor existing infrastructure and difficult geographical conditions,⁶ despite tariffs that are considerably higher than those of fixed line connections. Mobile telephones offer many advantages (ITU, 1999). While the above statistics suggest that mobile networks are reaching regions where fixed line network are slow to emerge, the ultimate success of these mobile e-development will depend on a variety of contextual factors shaped by specific aspects of technology, economy, politics, regulation and culture. A deeper understanding of the mechanisms by which these environmental factors influence the degree and types of mobile phone uses would help formulate appropriate policies to increase the mobile penetration in developing countries and narrow the urban –rural digital divide.

⁶ The top ten countries in Africa for mobile penetration are: Rwanda, Guinea, Cote d'Ivoire, Lesotho, Uganda, Democratic Republic of Congo, Tanzania, Malawi, Madagascar and South Africa – all of which had penetration rates above 20% infrastructure in 1998. Apart from South Africa, all these countries are classified as low-income, have poor pre-existing infrastructure and difficult geographical conditions.

Fixed lines were never available to most Africans and only 1% of the population in most African countries was covered. Globally, cellular technology is growing at a faster rate than fixed lines and the number of mobile subscribers has grown from less than 100,000 in 1990 to approximately 3 million now.

Since the launch of commercial cellular phone service in the United States in 1983, the adoption and use of the technology has increased exponentially; similar patterns of use can be seen worldwide (Carlson, Kahn and Rowe, 1999). However, few academic studies have examined why and how cellular telephones are adopted and used.

Mobile technologies are having a big social and economic impact in many developing countries. Farmers, fishermen, small business owners and ordinary people are using mobile phones to perform a number of activities and several m-business (mobile business models are evolving. First and foremost, mobile telephones have enabled small business owners in developing countries to promote their products and communicate with their customers effectively. In Johannesburg, South Africa, for instance, one can see many homemade signs in the streets with mobile telephone numbers that offer services ranging from house painting to gardening (The Economist 1999). As Lopez (2000) observes, "huge billboard ads in Africa have mad mobile telephones as popular there as Coca-Cola."

Mobile telephones have lowered the risk of the profit margins of farmers and small business owners in developing countries being squeezed by larger firms or firms from developed countries. Farmers in developing countries are using mobile telephones to eliminate or reduce the role of intermediaries in the value chain. Mobile telephones, for example, have

enabled Bangladeshi farmers to find the proper prices of rice and vegetables in the global market. Similarly, groups of small farmers in remote areas of Cote d'Ivoire share mobile telephones to follow hourly fluctuations in coffee and cocoa prices (Lopez 2000). Likewise, fishermen in India use mobile telephones to get information about prices of fish from various neighbouring ports before making decisions on where to land their catch (Rai 2001).

The mobile telephone has contributed to the efficiency and competitiveness of small business owners. For instance, mobile telephones have made taxis in Kampala, the Ugandan capital more efficient. Similarly, tradesmen travelling on bicycles in Jamaica use mobile telephones to communicate with their suppliers and customers (The World Bank 2000b).

Mobile telephones have reduced the cost of doing business and helped increase the yields of farmers by providing safety. ITU (1999b) documents how some garment traders were involved in an accident in Chitagong Bangladesh and they used their mobile telephone to avoid the risk of their consignments being looted. Similarly, in Lubumbushi, in the Democratic Republic of Congo, maize farmers give mobile telephones to their security guards as a measure against theft thus increasing the yields significantly (Lopez 2000).

Mobile telephones have been used in e-government and civic participation. During the 2000 elections in Senegal, for instance, FM radio reporters used mobile telephones to improve their coverage (Lopez 2000).

Mobile sets in developing countries are being used for e-commerce activities thus increasing the convenience of shopping at home. For instance, mobile telephones are more popular than fixed lines connected to the Internet for buying and selling stocks online in some Chinese cities.

Mobile telephones are delivering and have the potential to deliver a number of other social benefits. They can help families and friends stay in touch, improve education and medical benefits in rural and remote areas through telemedicine (Hammond 2001). In Uganda, despite limited bandwidth, GSM telecommunications are being used to provide Internet access and even high frequency radio is used to provide e-mail connectivity (Ernberg 1998).

Several characteristics of mobile technology make it an attractive option for narrowing the urban-rural digital divide. These include:

- Ability to overcome geographic barriers caused by rugged mountains, wet swampy grounds, deserts, among other others. In Kenya, many areas once considered remote and therefore not candidates for telecommunications now have signals. This calls for the redefinition of rural telecom
- The cellular signal is now widely available for a large population, both rural and urban (for example, to rural communities within 30 km of urban centres and main roads). The key issue now is largely one of empowerment of the consumer to acquire the terminal and use of service.
- The telecom sector can now raise local capital for part of its capital costs. Safaricom has raised Kshs. 6.5 billion from local markets for expansion. It is thus conceivable that well-designed rural programmes can attract funding locally.
- A number of technologies and service concepts have been piloted and accepted by consumers. These include the GSM payphones, information retrieval over SMS, as well as prepaid Internet services and innovation of pricing such as prepaid cards.

- Cellular telephones have dismantled the notion that ICTs and telephones are for the rich. Indeed informal sector businesses are mainstream users due to their mobility.
- Shorter payback period of mobile telecom projects compared to fixed line projects
- Lower installation costs than fixed telephones
- Scalability (mobile telephones can be deployed gradually as new customers are added simply by adding an antennae as needed)
- No requirement for electricity
- Lower social barriers than computer-based Internet
- Less proneness to vandalism, theft and natural disaster than fixed telephone infrastructure
- With the present rate of development, any future programmes on rural telecommunications will have to run on the GSM cellular platform.

2.4.2 Growth of Mobile Telephony in Kenya

The mobile telephone services in Kenya started in 1992 with the analogue system that was widely known as the Extended Total Access Communication System (ETACS), which was commercially launched in 1993. During this entry period the services were so expensive that it was only a few within the upper echelon of the society could afford them. The cost of owning a mobile handset was so high that one would cost as much as Kshs.250, 000. This resulted in a marginal mobile subscriber growth of less than 20,000 for a period of seven years (from 1993 -1999).

The enactment of the Kenya Communications Act, 1998 led to the introduction of competition in the cellular mobile industry. CCK licensed the newly privatized Safaricom

Limited, and a new market entrant, Kencell Communications Limited. This has witnessed a phenomenal growth in the number of subscribers, as well as the geographic expansion of the cellular mobile service in the country.

Both Safaricom and Kencell have realized tremendous growth in subscriber rollout over the last three years which has seen the combined subscriber base of the two operators surpass the 3.4 million subscribers that is unprecedented even in the world standards. The two operators have not only covered most of the areas as required by their respective licences but have also added new areas as dictated by business considerations and industry growth.

Safaricom

Safaricom was Kenya's first licensed GSM operator and began offering services in 1997. The network currently has approximately 2 million subscribers, although its subscriber growth did not take off until the year 2000 after the combination of government action and the Vodafone investment provided cash for network expansion. The operator offers three prepaid and one postpaid service option that range from Kshs 10 to Kshs 30 per minute calls to other Safaricom customers. The prepaid options contain a combination of peak and off peak rates. Peak hours are 8 am to 8 pm of Monday to Friday. The postpaid option charges Kshs. 12.60 per minute for calls at all times to Safaricom customers and also has a Kshs. 550 monthly fee. Activation fees are currently between Kshs. 2000 to 2,500 depending on the service option chosen. The firm offered service in the following 39 towns as of January 2005. Safaricom plans to focus on improving the quality of coverage in the areas that it is already present and completing coverage of the country's major highways.



Source: Safaricom website

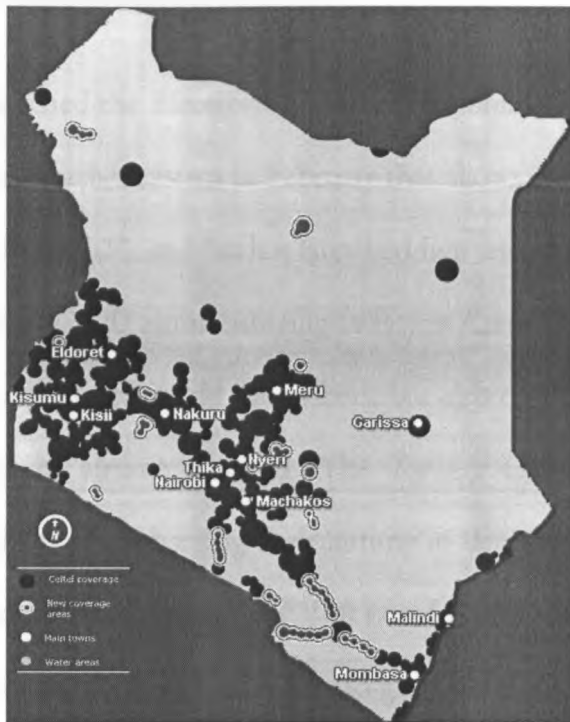
KenCell

Kencell was licensed as the country's second GSM network operator in January 2000 and in two and a half years of operation, has signed up 1.4 million customers. Kencell launched its Yes! Postpaid service in August 2000 and added a Yes! Card prepaid service three months later. To counter competition from Safaricom in the sector of user costs, the activation fee for a Yes! Account was lowered by two thirds from Kshs 2,500,000 to Kshs 900 towards the end of 2001. Calls made with the postpaid service to other KenCell users are charged at Kshs. 10 per minute, while the charge for the same call with the prepaid service is Kshs. 15 per minute. Incoming calls are free. In May 2004, Celtel International acquired Kencell.

While the prices of mobile services are still expensive to most Kenyans compared to the tariffs rates of fixed line calls, the recent interconnection agreements and the planned licensing of a third operator should help to ensure that prices for these services continue to fall over time. While the mobile is beginning to address the needs of rural users, the other element of the equation is of course to try to improve the situation in the fixed line infrastructure in rural areas.

The steep fall in the cost of mobile telephone user, combined with the rapid roll-out of the network coverage rate by Kencell and Safaricom, the two operators, has made telephony service a realistic option for many rural dwellers for the first time. Unfortunately, despite this significant progress, a large part of this boom is bypassing the rural areas because the service, especially the start-up cost of acquiring a telephone and paying the activation fee, are beyond the means of most rural Kenyans. Officials of the two mobile telephone operators estimate that 70-80% of their customers are located in the main cities of Nairobi and Mombasa.

Kencell/Celtel Network and Coverage Map



Source: Celtel website

Mobile telephony competition in Kenya

Over the past two years, room for uptake of new subscribers has become narrower moving quality of service centre stage as the key determinant of growth in what is arguably Kenya's fastest growing sub-sector. This has seen the protagonists -- Celtel and Safaricom -- spend more of their time and resources in product development with quality improvement as the primary driver of the industry's activities.

The battle for consumers' hearts has particularly intensified over the past eight months following the acquisition and re-branding of the country's second mobile service phone provider, Celtel. During this period, the two service providers have introduced a total of 18

new products that are mainly geared towards adding value to what consumers have been getting from their mobile phones.

In January, Celtel launched the Electronic Voucher Denomination (EVD), and followed it through with an open voucher system in February that allows subscribers to buy airtime for any amount starting from Sh50. In March it launched five sets of new airtime denominations and backed it up with the M2U airtime-sharing facility in April. These basic consumer-driven initiatives have not only locked in old subscribers, but also captured new ones enabling the company to increase its airtime turnover. The *Top Up Chap Chap* for instance offers subscribers the flexibility of recharging their airtime in denominations of Sh50 and Sh75. The Electronic Voucher Denominations (EVD) transfer of airtime method also spares the remote location subscriber the agony of failing to get airtime after walking a distance to the nearest shopping centre only to find the dealer has run out of cards.

Safaricom has defended its dominance of the market with a wide range of new products including a flat roaming tariff for East Africa. The company's biggest coup over its rival however remains its introduction of the GPRS technology that gives subscribers wireless Internet access from any part of the country that is covered by its network.

Although its use is still restricted to Safaricom's post-paid clients, the GPRS has struck a rapport with many high-spend subscribers whose lifestyles involve frequent travel. The introduction of GPRS in Kenya makes the company the third country in Africa to use the technology that adds a whole new dimension to communication with emphasis on high speed data.

Safaricom has also introduced the *Sambaza* airtime sharing system that matches Celtel's M2U product and the MMS or Multimedia Messaging Service that allows its subscribers to send short 'presentations' such as still or animated postcards, pictures, screensavers, greeting cards, maps, cartoons and business cards. The firm is also in discussions with providers in Europe, US and Canada over the possibility of signing agreements that will open the way for its subscribers to enjoy an uninterrupted access while they are in Kenya.

The competition appears to have risen a notch higher with both companies signing agreements with Nakumatt hypermarkets for sale of their airtime at the supermarket's tills. Celtel has since followed this up with the launch of the "Who's called" facility that enables subscribers to switch off their phones without worrying over missed calls." The facility allows one to retrieve all missed calls and messages through an SMS that comes once the handset is switched on. The service is offered free of charge. Telephone industry analysts say the two operators cannot afford not to listen to their subscribers if they hope to make a future impression on the market.

There is an emerging correlation between the number of handsets dealers are selling and value added services offered by the two GSM companies. High-end consumers for instance prefer handsets with multimedia services that can send voice, picture, text and movies on a real time basis. They are also looking for mobile data services-enabled handsets, known as the General Packet Radio Services (GPRS). This is a service that Safaricom already has and is better known among users as the small office. Celtel is expected to launch a similar product before the end of this month. With a GPRS and multimedia services, subscribers can access the Internet on transit and at the same time watch television in their vehicles through MMS -
- subject to a proper regulatory environment.

Value addition competition has become so stiff that Safaricom and Celtel are running neck to neck in the number of new subscribers. Whereas two years ago, the new subscription ration was 70:30 in favour of Safaricom, it has come down to one for one. But even as they roll out, there is an element of cost saving, especially on the Me2U or *Sambaza*. The service also minimizes the cost of printing airtime cards for the mobile phone firms. Less scratch cards are printed because airtime can be sent through an SMS that does not attract duty.

Besides, the mobile phone service firms have spent colossal amounts of money on network expansion and capacity improvement over the past 12 months. In the past one year, Safaricom, for example, spent a total of Sh12.4 billion on network upgrade and expansion and plans to spend additional Sh14.7 billion on a similar programme bringing the total amount of money the company has spent on capital development to Sh52 billion.

Celtel has also been on an aggressive network expansion programme that has seen it penetrate clientele in rural towns where Safaricom has been predominant. Analysts say the continuation of this level of competition can only be to the advantage of the subscribers and that the rivalry could intensify with the expected entry of a third service provider in the market.

2.4.2.1 Mobile telephony and economic growth in Kenya

The mobile telephone boom in Kenya has underpinned activity in the small business sector, which employs most workers in the nation of 32 million people. Last year, the sector created about 437,900 new jobs, according to the government's 2005 Economic Survey.

The community payphone — known in local Swahili as *siruu ya jamii* — has helped bring telecommunications to those who cannot afford to own a handset. By the end of 2004, the country had 5,000 community payphones, according to the CCK. These phones are connected to Safaricom and Celtel, Kenya's two mobile phone companies. The payphones are easy to operate, since they require no physical connections to the phone network operated by Telkom Kenya, the country's own landline operator that has seen its subscriber base drop in recent years. They can be used even where there is no electricity, as they can be powered by either solar or car batteries, making the most remote parts of the country accessible.

Since the rural telecom market presents an opportunity to provide services commercially and profitably, fairly rapid progress into many areas without external help is expected over the next few years. However, there will still be areas where demand is not met. Key factors include:

- **Huge unmet demand despite capacity to pay:** Despite the generally low national per capita income, the top 20% of Kenyan society – many with strong links to rural areas – control over half the economy and have the capacity to pay. At 1% and 3% penetration of fixed and cellular services respectively, there is still a huge unmet demand. Cellular operators already project capturing a 10% penetration in the next 4 years. This will still leave an unmet margin, with high potential for spillover into currently unreached rural areas. Hence a proportion of the investments in the above scenario will be met without any intervention to encourage the investment.

- **Growing entrepreneurship:** Entrepreneurs are already exploiting the infrastructure to provide services. Such services include news, directory services, and general information using the SMS platform. An example is 411 that provide airport flight information, vehicle traffic, etc. With improved cellular terminals now with predictive text input and graphics, SMS is an accepted utility for diverse services throughout the country.
- **Huge informal sector:** A contracting economy since 1995 has spawned a huge informal sector to eke out a living during hard times. The informal sector lacks capacity to hire and assemble all the information they need for their operations. A prepaid platform to provide information is an important opportunity.

It is against this back ground of rapid adoption that the research seeks to evaluate the way micro entrepreneurs are using mobiles telephones to enhance productivity where landlines are inadequate. Previous studies have shown that telephones can help small enterprises in the developing world in a number of ways, including increased productivity and lower transaction costs by reducing travel; better knowledge and avoidance of middlemen; and access to markets and information.

2.5 Theoretical Background to Adoption of Mobile Telephony

Motivation Theory as articulated by Deci (1975; 1972; 1971) argues that behavior is determined by intrinsic as well as extrinsic motivation. While extrinsic motivation precipitates actions because of external rewards such as improved job performance or advancement (Vroom, 1964), intrinsic motivation refers to the performance of an activity for no other reason other than the satisfaction derived from the activity itself (Davis, Bagozzi,

and Warshaw, 1992). Davis et al. elaborate further that perceived usefulness is an extrinsic motivator, while enjoyment is an intrinsic motivator. Thus, the decision to adopt a new technology— such as cellular phones— will depend on people's motivation, both intrinsic (level of enjoyment) and extrinsic (expectation of external rewards).

In contrast, the Theory of Reasoned Action (TRA) articulated by Fishbein and Ajzen (1975) explains people's actions by identifying the causal connections between various components: beliefs, attitudes, intentions, and behavior. The theory is concerned with the determinants of actual and intended behavior: It reasons that behavior is determined by intention that in turn is determined by a person's attitude toward behavior and the subjective norm concerning that behavior. According to TRA, the attitude toward a behavior is determined by the person's beliefs that the behavior will lead to certain outcomes and the evaluations of these outcomes. Subjective norms refer to the social pressure exerted on the person to perform (or not perform) the behavior.

Most studies of cellular telephone use focus on the needs of business users (e.g., Carlson et al., 1999). These studies suggest that most mobile communicators have to deal with business on the road, changing time schedules, making appointments, or serving the urgent needs of clients. Given the focus on business use, a number of studies of cellular telephone use have examined the question of utility and the impact of task-related attributes (e.g., Hsu, 1992). Less attention has been paid to other factors such as individuals' perceptions of and intrinsic motivations to use cellular phone technology. A growing number of studies suggest that people are likely to adopt cellular telephones not just as a business tool, but also as a result of social pressure, as a perceived security device or even as a source of enjoyment (Kwon, 1994; Davis, 1993).

Davis' study (1993) about the social impact of cellular telephones reports that cellular telephones are useful for maintaining interpersonal relationships, i.e., binding family ties and providing frequent connections, and are a powerful medium for decision making. The Davis study also identified the motivations for early adoption of cellular telephones as being internal (such as gaining social status or exploring new "toys") and external (such as job requirements or potential for career advancement).

Furthermore, a survey of cellular subscribers in the U.S. (Telecommunications Reports, 1995) found that nearly two-thirds of the respondents subscribed to cellular services for personal uses rather than business. Another study (James, 1992) also reported that while cellular telephones were an important business tool, "personal use" was the fastest growing sector of the market. Reasons cited for the growth in use ranged from better safety to reduced stress to increased productivity. The study also suggested that in areas where long commutes were common, a cellular telephone made it possible to use the time for business or other needs. Articles in the popular press also report that many people use cellular telephones for a variety of reasons including security, safety, and convenience (e.g., The Honolulu Advertiser, June 4, 1995).

Other studies suggest that user acceptance of new technology is affected directly and/or indirectly by: (1) individual characteristics (2) perceived ease of use (3) perceived usefulness (i.e., extrinsic motivations) (4) enjoyment/fun (i.e., intrinsic motivations) and (5) social pressure. In addition, since apprehensiveness about technology was found to be an important factor in moderating usage in other contexts (Davis, 1994), it was included in this model as well. Each of these factors is explained below.

Studies have shown that individual differences (e.g. gender, age, education, and professional orientation) play an important role in the how information technology is used (Zmud, 1979). Studies in the area of marketing have also confirmed the importance of demographic variables in studying adoption (Assael, 1981). In an analysis of diffusion research, Rogers (1995) found that early adopters of an innovation had higher socioeconomic status than later adopters. Status was typically indicated by such variables as income, education and occupational prestige.

Perceived ease of use is defined as "the degree to which a person believes that using a particular system would be free of effort" (Davis, 1989). A construct that is the opposite of perceived ease of use is perceived complexity which is defined by Rogers (1995) as "the degree to which an innovation is perceived as difficult to understand and use." Rogers suggests that his research and experiences lead to the conclusion that the more complex a technology is perceived as being, the slower will be its rate of adoption.

Apprehensiveness refers to anxiety about using a new medium or technology (Dordick and La Rose, 1992). The concept of apprehensiveness is similar to "computer avoidance" (Moore, 1989) which results in individuals avoiding the use of computers due to their innate fear of the technology. Even telephones in the early days of their adoption aroused apprehension. McLuhan (1964) explained such apprehension by labeling the telephone an "irresistible intruder in time and space." Similarly, Mitchell (1984) noted, "a ringing telephone is an intrusion into personal privacy and individual predictability." Pool's (1983) previous assertions, indicated that the telephone can increase apprehension in some ways while it can decrease apprehension in other ways.

Extrinsic motivation refers to the source of behavior prompted by a person's need for external rewards, such as how useful the technology would be (Igbaria, 1993). According to Rogers (1986), relative advantage and compatibility are two important attributes of innovations that affect adoption. He suggested a number of sub-dimensions of relative advantage such as the degree of economic profitability, a decrease in discomfort, and savings in time. A study by Tannenbaum (1991) found that people perceived cellular phones as advantageous when they wanted to exert more control over their work environment or to manage their family responsibilities. In a related finding, cellular adopters indicated they had more opportunities to "deal with others" than did non-adopters (Hsu, 1992).

Intrinsic motivation induces activities where "there is no apparent reward except the activity itself" (Deci, 1975). Intrinsically motivated behavior arises from people's need to feel competent and self-determining in dealing with their environment (Deci, 1975). Previous research on traditional phone use suggests that telephones can reduce loneliness and anxiety, promote a sense of security and well being, increase social interactions, and maintain cohesion within family and friendship groups (Dordick and La Rose, 1992; Williamson, 1993). Other studies (e.g., Pool, 1977) also confirm that intrinsic motivations such as increased freedom and a reinforced sense of existence are instrumental in people choosing to use telephones.

Social pressure includes the motivations of individuals who believe they should use cellular telephones for obtaining a higher social status or a more important position in their society. The study of microcomputer usage by Igbaria (1993) reports that social norms have significant effects on system usage, Rogers (1995; 1986) also indicates the importance of

social norms on the rate of the diffusion of innovations. He defines a norm as "the most frequently occurring pattern of overt behavior for the members of a particular social system. "Thus, an important motivation for individuals to adopt an innovation is the desire to gain social status. For certain innovations, the social prestige that the product conveys to its user may be the sole benefit that the adopter receives (Rogers, 1995).

2.6 Policy Issues on ICTs and the Informal Sector

2.6.1 Government policies towards the jua kali sector

The assortments of heterogeneous trade, manufacturing, transport and service activities that constitute the informal sector and peculiarities that bind them were first recognized by the East African Royal Commission in the early 1950s. At the time, they were viewed as urban settlements that were important for African commerce and as growth centres that embodied local talent. Twenty year later, an ILO mission synthesized the myriad issues surrounding informal industry and commerce and brought them out for public debate. The mission recommended elimination of official harassment, increased legitimacy, development of informal technology and promotion of linkages between the sector and the rest of the economy.

Subsequently, policy proposals concerning the sector were dominated by the need to address its credit and extension needs of the sector. But it was in the second half of the 1980s that the policy needs of the sector become part of Kenya's political agenda as evidenced by repeated visits by the head of state to areas of Nairobi known for their concentration of informal activities. During such visits, construction of shades, formation of networks, security of tenure of informal premises, sub-contracting and inclusion of informal sector concerns in the country's industrial policy become part of the policy debate (Kimuyu, 1994).

Formally, the 1986 Sessional Paper on economic management and growth paid tribute to the virtues of the sector, including its ability to conserve foreign exchange, create jobs, develop skills and promote local entrepreneurship (Kenya, 1986). The paper also underscored the need to improve the sector's image, which was hitherto poor. Issues touched on by the Sessional Paper were picked up by the 1989-93 development plan (Kenya, 1989). The government had put together what was referred to as the Centre Project in 1987, which in turn led to the Small Enterprise Development Project of 1989, which was the precursor to a sessional paper on small scale and *jua kali* enterprises considered a blue print for the future development of the sector.

The Government of Kenya's policies towards small and medium size enterprises (SMEs) are indicated in Sessional Paper No.1 of 1986 on Economic Management for Renewed Growth; A Strategy for Small Enterprise Development in Kenya: Towards the Year 2000 (Republic of Kenya, 1989); and the Sessional Paper No. 2 on Small Enterprise and 'Jua Kali' Development in Kenya (Republic of Kenya, 1992) and three development plans.

In these documents, the government stresses the critical role of small enterprises in the national economy and outlines policy interventions required to enhance their growth. The first Sessional Paper singles out the small enterprise sector and the rural economy as future generators of employment. Major impediments and critical barriers are identified as:

- difficulty in raising capital
- limited managerial skills
- regulatory constraints

- low marketing skills
- limited extension services
- difficulty in accessing technology

(Source: Sessional Paper No.1 of 1986 on Economic Management for Renewed Growth)

The second Sessional Paper outlined the major contributions of the small enterprise sector to the national economy as:

- creating employment
- enhancing the participation of indigenous Kenyans in the economy
- promoting local savings and investments
- promoting the development of entrepreneurship and managerial skills among local Kenyans
- engendering the acquisition of skills among workers
- policies for improving the performance of the sector included measures geared towards, among others:
 - promotion of exports from small enterprises by furnishing them with information on the standards demanded by foreign markets
 - promotion of training of small enterprise owners, managers and workers
 - provision of extension services to the small enterprise sectors
 - establishment of business centres in rural areas to provide information to small enterprises

The general policy orientation towards the informal sector in recent years embraces the overall privatization and liberalization thrust of structural adjustment in which the small business sector is encouraged to meet its own needs. The government's role is limited to the creation of an enabling environment through the development of infrastructure, provision of technical information, facilitation of linkages between large and small enterprises, promotion of networking and development of appropriate laws and regulations (McCormick, 1999).

2.6.2 The ICT policy framework in Kenya

The overall objective of the ICT sector in Kenya is to optimize its contribution to the development of the economy and poverty reduction by ensuring the availability of efficient, reliable and affordable services throughout the country. The ICT sector has witnessed several reforms over the last few years. Key amongst them are liberalization, privatization and tariff reform. However, more remains to be addressed, for example, issues concerning technological convergence. The government recognizes that full benefits and gains from developments in the sector can be realized but that there is a need for a comprehensive policy to govern the orderly development. The government is therefore currently preparing a national ICT Policy. Due to the dynamic nature of the ICT sector, the Telecommunications and Broadcasting policies are currently under review to address issues such as the use of VSAT technology, universal access; and equity share ceilings.

High rates of taxation on telecommunications equipment have impacted negatively on the cost of delivery of ICT Services to consumers thus compromising the objective of universal access. Consequently, the Kenyan government will during 2002-2007 consider an optimal tariff policy that will make costs of imported information and communications technology equipment affordable.

The stated specific ICT objectives and targets of the Kenyan government are: -

- Secure and efficiently manage frequency spectrum resource in public interest
- Attain an adequate ICT infrastructure that is effective in supporting the country's development needs
- Create an ICT empowered small and medium scale enterprises sector to participate in provision of value-added services, increased participation of the private sector and the growth of backward and forward linkages and use of local products by the sector
- Strengthen the sector to position Kenya as strategic regional and international ICT hub
- Ensure reasonable price access for the social sector particularly public education and training institutions, and other public service institutions
- Formulate and implement of a comprehensive policy including provision of Government services
- Increase utilization of services through creation of widespread public awareness of the potential benefits of ICT among Kenyans.

During 2002-2007 the ICT sector strategies will include the following:-

- Systematic and comprehensive expansion and diversification of services
- Encouraging competitiveness through further liberalization
- Research and development to enhance the application of technology
- Development of a dynamic and innovative human resource base
- Upgrading rural ICT facilities
- Encouraging active small and medium enterprises participation
- Review of tariffs and non-tariff barriers

- Strategic international interaction

(Source: National Development Plan of Kenya 2002-2008)

CHAPTER THREE

3.0 METHODOLOGY AND STUDY AREA

3.1 Study Area

3.1.1 Rachuonyo District

Rachuonyo District is one of the twelve districts constituting Nyanza Province. It is was carved out of Homa Bay District in July 1996. It is located in south western part of Kenya and borders Nyando District to the north east, Kisii and Nyamira Districts to the south east, Homa Bay District to the south east and south west, Kericho District to the east, and Lake Victoria whose waters from part of the district to the north and west.

The district lies between longitudes 34°25' and 35°0' East and latitudes 0°15' and 0° 45' South. It covers a total area of 945.2 km² out of which 365 km² is under water, mainly Lake Victoria. Administratively, the district is divided into four divisions, namely, Kabondo, Kasipul, East Karachuonyo and West Karachuonyo; forty locations and ninety-nine sub-locations. Politically, the district has two constituencies and three local authorities with a total of 43 wards. Rachuonyo District is an ethnically homogeneous district inhabited mainly by the Luo-speaking people. However, there are a few pockets of Kisii-speaking people along its borders along the Kisii and Nyamira districts. Other ethnic groups live in Oyugis, an emerging town in the district.

Kasipul Division has the highest population, which stood at 129,854 in 1999 accounting for 42% of the district's population. The population of Kasipul Division is projected to reach 160,111 by the end of this plan period. The high population in this division can be attributed

to Oyugis Town, which is situated in the - division, as well as the fact that the division falls in a high agricultural potential zone. The division also has the highest population density, which currently stands at 381 persons per km² and is projected to reach 437 persons per km² by 2008. The high density is putting pressure on the land holdings resulting into sub-division into uneconomical units.

Kabondo Division recorded the lowest population size in 1999, standing at 49,934 and is projected to reach 60,467 by the end of the plan period. However, due to its location in a high agricultural potential zone, its density is high at 353 persons per km² and is projected to reach 434 persons *per* km² by the year 2008. Overall the district's average density was 325 persons per km in 1999 and is projected to reach 400 by the year 2008.

Rachuonyo District is basically a rural district with only two major trading centres, Oyugis and Kendu Bay. Oyugis Town has the highest population, which stood at 65,894 in 1999. The population is projected to increase at an average growth rate of 6.8% annually to reach 121,516 by the end of the plan period. Kendu Bay on the other hand had a population of 22,048 in 1999 and is projected to increase at the same rate to 40,658 by the 2008. This increase in urban population is likely to put a lot of strain on the social utilities like water, housing, and sanitation. It will also swell the numbers of the unemployed. Oyugis Town, for example, experiences water shortage and there is poor sanitation. Kendu Bay faces the same problem and is not served by the electric national grid. To streamline this situation, proper town planning will be necessary. Comprehensive physical development plans for these two towns must be put in place to take cognizance of industrialization, housing, recreation and other social infrastructure.

According to the Second Report on Poverty in Kenya of June 2000, Rachuonyo District had a total of 230,000 persons or some 77% of its total population living below the absolute poverty line. At the same time an estimated 200,000 or 67% of the district's population were estimated to be food poor. The district's contribution to the national overall poverty was 1.66% while its contribution to the national food poverty was 1.3%. In the last (PRSP) District Consultative Forum held in the year (2001) it was estimated that the incidence of poverty in the district has risen and now stands at over 250,000 persons. The causes of poverty in the district are diverse and vary from place to place in their intensity. However, the general causes include poor soils and inadequate erratic rainfall, which lead to low crop yields and thus low food intake. In addition, the presence of water hyacinth in Lake Victoria has greatly contributed to the high poverty levels in the district as it has affected fishing, which contributes over 20% of the district's GDP. Cotton farming, which was a major activity in the district has also collapsed due to poor marketing systems leading to loss of incomes to the people and hence contributing immensely to poverty.

Lack of access to basic services like education, health and communication has also contributed to the high incidence of poverty in the district either due to their inadequacy, low quality or lack of incomes to access them. There is therefore, low quality of education coupled with low transition to secondary school. The district also experiences frequent outbreaks of water related diseases.

The high prevalence of HIV/AIDS is also a major contributor to poverty in the district. The pandemic is killing the most economically active people and at the same time depleting the meager resources available through the treatment of opportunistic diseases associated with it.

Capital being one of the factors that affect the production process has a very low base in the district. Lack of credit for the district's upcoming entrepreneurs has greatly affected the commercial sector, lowering the incomes, thus leading to poverty.

The poverty situation is spread across the district and its severity varies from division to division and among each individual socio-economic group. The worst hit divisions are West and East Karachuonyo while the most affected socio-economic groups are the unemployed, the widows, orphans and the illiterates.

The district has a road network of 1,717.4 km out of which 388.2km are classified roads while 1,329.2 Km are unclassified. Of the classified roads, Kasipul Division has the largest share of 189 km followed by East Karachuonyo 105 km, while Kabondo Division has the least coverage of classified roads. East Karachuonyo Division has the longest length of unclassified road while Kasipul Division has the least.

There is a total of 78.2 km of bitumen roads of which 41.6 km. is International Trunk Road passing through parts of Kasipul and Kabondo Divisions and connecting these parts of the district to Kisumu and Kisii Towns as well as the neighbouring countries Tanzania, Uganda and Sudan. The other bitumen road is the C 19 Kendu Bay- Katito connecting East Karachuonyo and West Karachuonyo Divisions to the neighbouring districts of Kisumu and Homa Bay. The Government through the Ministry of Public Works maintains all roads.

Water transport facilities are also available within the district on Lake Victoria waters. Regular passenger and cargo services are offered by the Kenya Railways Corporation as well as by private boat operators. This mode of transport links the district with Homa Bay, Kisumu, and Siaya, as well as Tanzania and Uganda. While water transport is very important

for the industrial and commercial development of the district, poor and inadequate maintenance of berthing facilities, high incidence of accidents and the emergence of water hyacinth weed which blocks the entrance to the landing beaches hindering better communication on the lake. There is only one small airstrip at the Kendu Mission Hospital in East Karachuonyo that is used by the Flying Doctors service. There are no air passenger services in the district.

The Kenya Posts and Telecommunications Corporation offer both postal and telecommunications services in the district. Although the postal services are adequate for the current and immediate future needs the district still lacks modern telecommunications facilities in all the divisions except Kasipul Division. This has STD facilities.

Only 5% of the population has access to electric power in Kasipul and Kabondo Divisions. The Karachuonyo rural Electrification Program, which commenced about eight years ago has supplied power up to Ringa market in Kabondo Division, while the Kenya Power and Lighting Company supplies Oyugis town and its environs. This includes shops, jua kali kiosks, garages, posho mills, administration blocks, health centres, schools and homes within the supply area. The Karachuonyo Rural Electrification Scheme will be extended from Ringa to Kendu Bay and West Karachuonyo divisions.

The district's industrial activities are basically in the informal sector. There are potentials for establishing food processing and animal feeds using local agricultural raw materials. Due to constraints such as inadequate water, lack of electricity supply and non-availability of land for industrial activities industrial development has lagged behind. Some cottage industries are found around Oriang' Centre in East Karachuonyo where the local women groups engage in organized pottery and handicraft projects.

Except for Oyugis Urban Centre, low levels of economic activities characterize the district. Fishing serves as the most important source of income in the district. Most of the retail and wholesale consumer outlets are confined to Oyugis Town because of better infrastructure such as STD, electricity, piped water system and an inter-district road.

The informal sector is quite weak due to a common bias in favour of white collar employment by the local people. However, there are few informal businesses such as barber shops, shoe radio and watch repairs, sale of second hand and new clothes, hawking, motor vehicle repairs, carpentry and tailoring at such divisional centres and major trading centres as Oyugis, Kendu Bay, Kosele and Oriang'.

Electricity supply in the district is inadequate. The 11 KV line from Kisii serves only a small percentage of the district. It is currently only available in parts of Oyugis and Kasipul divisions. Less than 5% of the district is connected to electric grid. This is a major impediment to faster industrial development, as important urban centres like Kendu Bay and Kosele, which would otherwise witness industrial expansion have no electricity. The lack of electricity has, therefore, retarded the development of urban areas with potential investments in small-scale industries and *jua kali* activities.

Rachuonyo District has an elaborate road network which covers the entire district. The major constraint is that the majority of these roads are poorly maintained. During the long rains, roads in Kasipul and Kabondo divisions are impassable making it difficult to transport farm produce to and from the markets and as well as to access social services in these areas. The district has varied suitable soils for cultivation of agricultural and horticultural crops. The poor road conditions in Kabondo Division and some parts of Kasipul makes it difficult

for farmers to develop and expand their farm activities, as they know that it will be difficult and expensive to get their produce to the market.

The Rachuonyo DDC and the local authorities have not set aside land for industrial development both for the short and long run requirements in major centres such as Oyugis, Kosele and Kendu Bay. Potential investors cannot, therefore, acquire industrial plots easily. This is a major constraint to development as potential investors often choose to make their investment in neighbouring districts where industrial land is more readily available. To ensure that industrial development takes root in the district, particularly in the small town and market centres, the DDC and local authorities will have to provide industrial land and ensure that they are properly serviced with water and sanitation as well as roads and other basic infrastructure.

Marketing of agricultural produce such as sorghum, maize cotton, sunflower pineapples and citrus fruits in the district is still very poor. The on farm storage facilities for maize beans sorghum and millet are inadequate in the high potential divisions of Kabondo and Kasipul. Farmers sell their produce immediately after harvest at very low prices to avoid post harvest losses, especially of pineapples and citrus fruits that are grown in large quantities in Kabondo and West Karachuonyo Divisions. Poor harvest storage have also constrained the marketing of fish in the district leading to heavy losses by the fishermen. Lack of cold storage facilities along the fish landing beaches and absence of local fish processing facilities makes fishermen sell their produce at throwaway prices to the traders. Marketing of fish is further hampered by failure of fish co-operatives. For local small-scale and open air traders of agricultural produce there are no sheltered markets in the major towns like Oyugis. Kendu Bay, Kosele

and Kadongo- Oriang. This restrains the expansion of business and hinders industrialization in the district.

3.1.2 Nairobi Area

The city of Nairobi owes its birth and growth to the Kenya-Uganda railway. The railhead reached Nairobi in May 1899 enroute to the present day Kisumu, part of what is now Uganda. The moving of the railways headquarters from Mombasa to Nairobi by the Chief Engineer, Sir George Whitehouse, resulted in the subsequent growth of Nairobi as a commercial and business hub of the then east Africa protectorate.

Nairobi lies at the southern end of Kenya's agricultural heartland, 1.19° C south of the equator and 36 .59° C east of meridian 70. Its altitude varies between 1,600 and 1,850 metres above seal level. The climate is generally temperate tropical.

Apart from both the central business district (CBD) and industrial areas that contain low population densities and a low-income incidence of housing, Obudho and Aduwo (1988) indicated five residential areas of varying population density and social mix. These include:

- Upper Nairobi lying to the west and north of the CBD. This is an area of low density, high-income population (2-25 people per hectare in 1980) and comprises many of the former well-known expatriate residential areas, such as Woodley, Kileleshwa, Kilimani, Lavington, Bernard, Thomson and Muthaiga.
- Parklands, Eastleigh and Nairobi South, an area of medium income, medium density population (30-40 people per hectare in 1980) and consists mainly owner-occupier housing (many owned by Asians)

- Karen and Langata, to the south and south-east, are also high income, low density residential areas, typified by large housing and gardens
- Eastlands in the marginalized urban fringe to the east of and away from the CBD, is a low-income densely-populated areas (50-300 people per hectare in 1980) with core the core of old Nairobi City Council housing areas and new institutional housing estates, reaching densities of 200-300 people per hectare in 1980).
- Mathare Valley to the east of the city and Kibera to the west from the most famous, largest uncontrolled urban settlements in the city, reaching staggering densities of 1,250 people per hectare in 1980. Here there are rapid shifts and movements of the population, shortages of accommodation, high rents, overcrowding and under-developed amenities.

The livelihood of most inhabitants of Nairobi comes from informal economic activities, and formal wage employment has been decreasing, as the public sector continues to retrench its employees. The informal sector employment where most of the poor belong has been noted to generate more employment than the formal sector. The 2002 Economic Survey, (GOK, 2002) shows that the contribution of the informal sector to employment has grown by 17.6% compared to -0.43% from the formal sector.

The SME clusters selected for the study are the Kariobangi and Kamukunji in Nairobi. Kamukunji lies within the inner part part of Nairobi, 3 kms from the CBD. Comparatively poor people occupy this area and most work within the informal sector. The Kariobangi cluster is rapidly expanding and it is located 15 kms east of Nairobi. Enterprises in

Kamukunji have two workers on average but sophisticated workshops employ around five workers. Diverse small businesses, including vehicle repair, sale of second hand clothes and foodstuffs dominate this cluster. Kariobangi has an average of three to five workers per enterprise. The small scale industries specialize in a range of business activities including tailoring, panel beating, woodwork, shoemaking, food processing, building construction, motor wiring, motor repair, welding, painting and woodwork.

3.2 Document Sourcing

Extensive review of literature is a major activity in the study. The justification for this core activity is to get more focused on the conceptualization of the study; understand the state of knowledge in the global mobile telephony landscape and to provide a background for advancing a deeper understanding of the state of development in role of the explosion of mobile telephony and the performance/competitiveness of small and medium scale enterprises in Nairobi and Rachuonyo District.

The first method has involved a desk study to gather secondary material, both foreign and local that may be relevant to mobile telephony. Documents from ITU, UNRISD, UNDP, UNESCO, World Bank and the Government of Kenya and other researchers were consulted. A regular search in the Internet was instituted to identify other secondary data relevant to the study. Secondary data and policy documents from ICT operators-Safaricom and Kencell, government ministries and parastatals was also sought to enrich the study. Data from the various ICT operators and complemented those obtained from Telkom and CCK to examine the extent to which the objective of universal access to ICT services in the country is being achieved.

3.3 Population, Sampling Frame and Sampling Size

One interesting characteristic of Kenyan SMEs is that they are normally not evenly distributed nor are they clustered in one region. There are many areas that have many of these types of enterprises crowded together (Wakah, 1999). This geographical distribution could be a result of the informal sector's inability to gain access to strategic areas such as the industrial area (Abuodha, 1989). Benefits from clustering include identification, coordination and acquisition of skills. Identification is noted to be important for relating with both customers and other support agencies such as support donors. Clustering also encourages networks, especially through trade associations to solve collective problems, as opposed to each artisan working as an individual.

Large clusters are found in areas such as the Kariobangi light industries and Kamukunji area in Nairobi and in Oyugis and Kendu Bay shopping centres in Rachuonyo District. It is for this reason that the cluster sample method will be used. Samples will be taken from these centres which form larger clusters.

The sample consisted of 100 small businesses in Kamukunji area, North Kariobangi and South Kariobangi in Nairobi; and in Kendu Bay in Northeast Karachuonyo Division and Oyugis Division, West Kamagak of Rachuonyo District composed of different businesses including automobile mechanics, barbers, panel beaters, battery chargers, hawkers, chicken vendors, woodwork/carpenters, chicken sellers, timbers suppliers, charcoal dealers, hardware shops, paraffin sellers, second hand clothes dealers, tailors/dress makers, among others.

Cluster samples were obtained by selecting clusters from the different small and medium enterprises (SMEs) clusters in Nairobi and Rachuonyo districts. Selection of the population

from each of the four clusters was through a random sampling approach to identify a population of 25 small businesses in each cluster. Inclusion in the sample frame was based upon the SME having a mobile telephone or landline or other forms of communication to conduct business and currently employing 2 – 10 persons.

The draft questionnaire, upon which the subsequent questionnaire was based, was pre-tested through 10 interviews with various SMEs in Kamukunji and Kariobangi areas. Based on the feedback from the interviews, the content, ordering and terminologies on the questionnaire were subsequently revised.

3.4 Data Processing and Analysis

Data was processed and analyzed using Excel and Ms Word software. After data was collected, it was coded by giving value to the variables. The values were tabulated and analyzed for percentages. Tables, bar charts and pie charts were plotted to represent the data.

3.5 Problems, Constraints and Limitations

The major problem experienced was insecurity particularly in the Nairobi clusters. Theft of mobile telephones is common so the respondents were suspicious of the interviewers. Secondly, there was demand for bribes before some respondents agreed to be interviewed, making the exercise costly. It was also not easy to persuade some respondents to show their mobile telephones as proof that they actually own one.

CHAPTER FOUR

4.0 THE RESEARCH FINDINGS

4.1 Business Profile

4.1.1. Location of Small and Medium Enterprises (SMEs)

Fifty-six respondents were interviewed in the four small and medium scale enterprises (SMEs) in Nairobi and 59 in Rachuonyo District. The details are indicated in the tables below.

Table 4.1a: Interview location in Nairobi

Location	Frequency	%
Kariobangi North	14	25.0
Kariobangi South	12	21.4
Kamukunji	30	53.6
Total	56	100.0

Of the 56 respondents in Nairobi 25% were from Kariobangi North, 21.4% from Kariobangi South and 53.6% from Kamukunji (Table 5.1a).

Table 4.1b: Interview location in Rachuonyo District

Location	Frequency	%
Kendu Bay	31	52.5
Oyugis	14	47.5
Total	56	100.0

In Rachuonyo District, respondents from two divisions Kendu Bay – North East Karachuonyo and Oyugis- West Kamagak were interviewed. About 52.5% of the SMEs were in Kendubay – North East Karachuonyo and the remaining 47.5% from Oyugis- West Kamagak (Table 5.1b).

4.1.2 Sex of Respondent

In Nairobi 42 respondents (75%) were male while 14 (25%) were female. Forty-nine (81.7%) respondents in Rachuonyo District were male while 10 (16.9%) were female.

Table 4. 2a: Sex of respondents in Nairobi

	Frequency	%
Male	42	75
Female	14	25
Total	56	100

Table 4.2b: Sex of respondent in Rachuonyo District

	Frequency	%
Male	49	83.1
Female	10	16.9
Total	59	100.0

5.1.3. Types of Small and Medium Enterprises (SMEs)

Respondents in Nairobi are involved in diverse businesses. Of the people interviewed 24% were panel beaters, 19% metal welders, 18% automotives/mechanical dealers, 14% do woodwork/carpentry, and 7% were hardware dealers. Respondents occupying 2% of the rest of the businesses are involved with timber supplies, motor spares, electrical supplies and repairs, paint making, painting (spray painter, *jua kali* painter), supplying charcoal dealer. Some respondents are involved in more than one business and these occupy 2% of the total number of businesses including welding and painting (spray painter, *jua kali* painters, another group dealt with both timber suppliers and hardware, and the last one was of panel beating and hotel ownership (Fig 1a)

Diverse business firms were surveyed in Rachuonyo District. Most respondents were in woodwork/carpentry accounting for (24%) of the total SMEs sampled. A good percentage of people were panel beaters (12%) followed by welders (10%). Automotive/mechanical and

mini shop or ordinary shop shared the same percentage (7%). Bicycle repairers, barber shops, chemists and tailoring/dress making occupied only 3% while the rest of the percentage were of people from different sectors of business each taking 2%. The chart below (Fig 1b) shows the type of business firms surveyed in Rachunyo District.

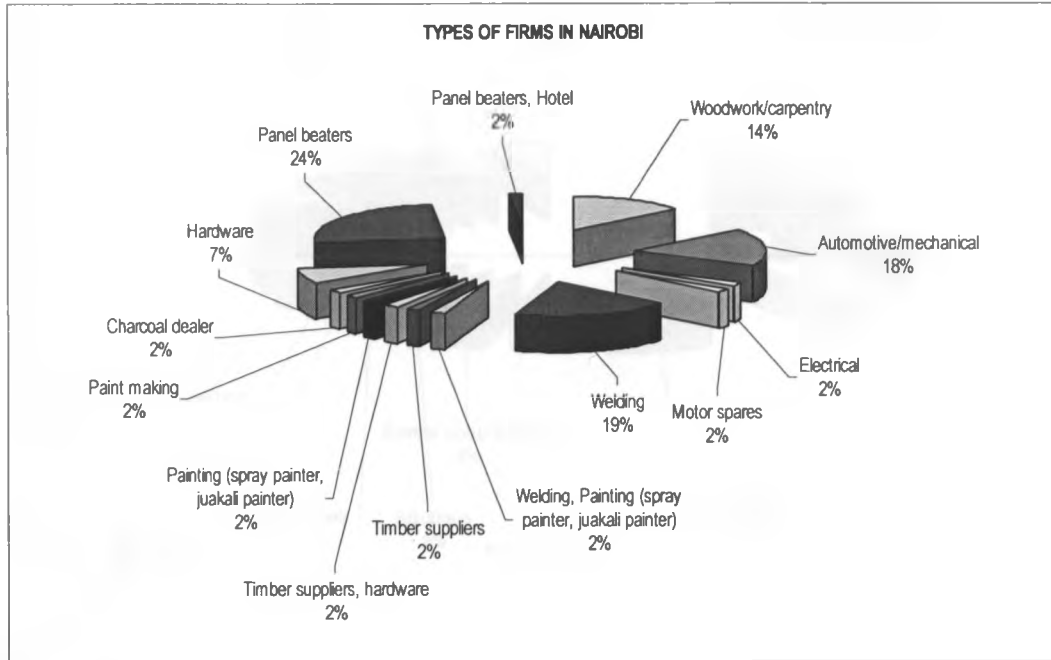


Fig 4.1a: Types of SMEs in Nairobi

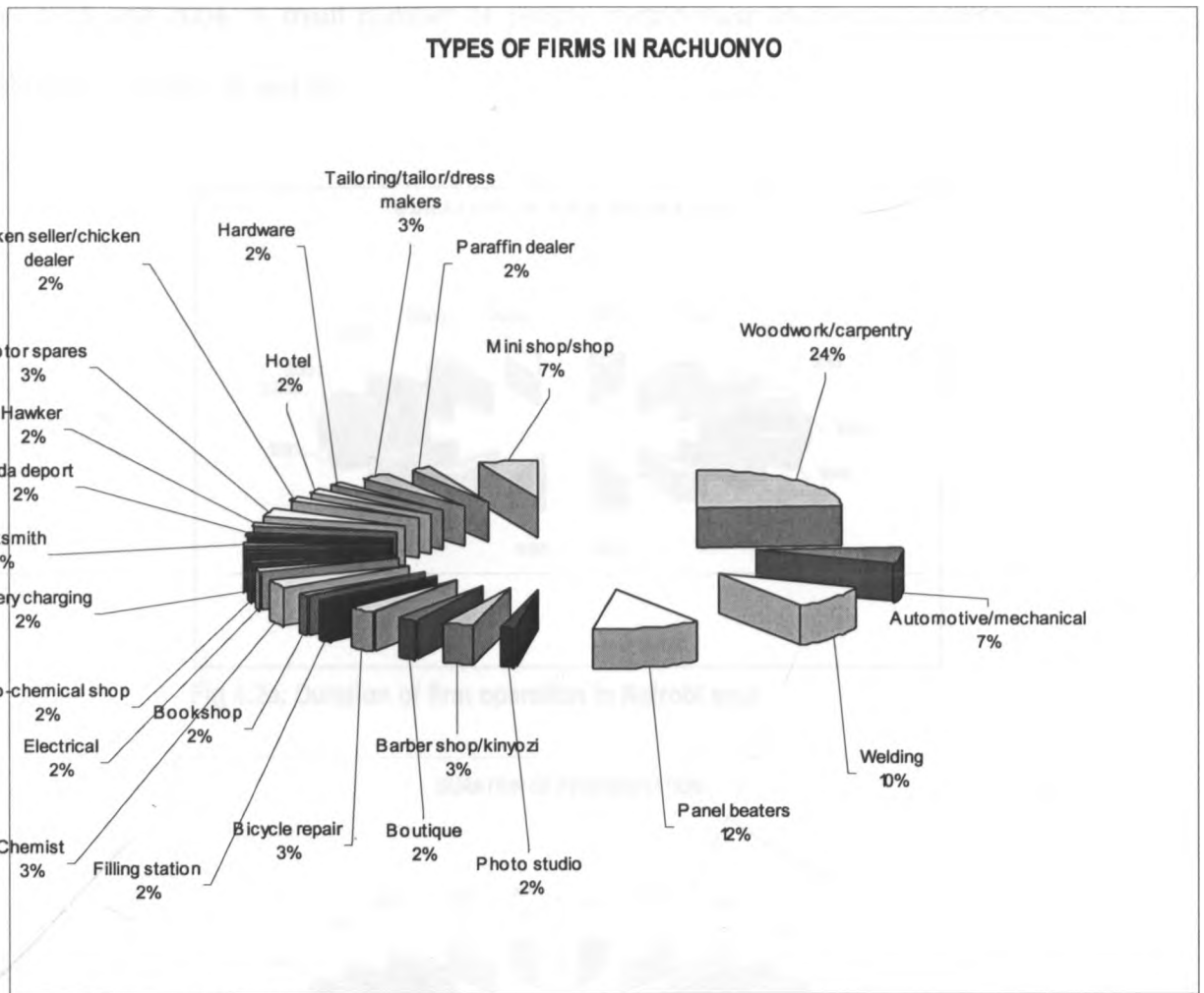


Fig 4.1b: Types of SMEs in Rachuonyo

4.1.4. Duration of Firm's Operation

In Nairobi the majority of SMEs (16.1%) were established in 1999. About 12.5% started in 1995, and 10.7% in 1990. In 1998 and 2002, about 8.9% SMEs were established. 2002 took 7.1%. The same number of people interviewed (3.6%) started their firms in the year 1988, 1993-1994, and 2004. 1.8% of people had their firms established in the years 1976-1985, 1997 and 2003. In Rachuonyo most SMEs were started in 1998 followed by 2000. A good number of SMEs were operational in 1997, 1993, 1996, 1987, 1994 and 1995 respectively. Most SMEs were established between 1990 and 1992 and the same growth rate was realized

in 1978 and 2004. A small number of people started their business in different years as shown in Figures 2a and 2b

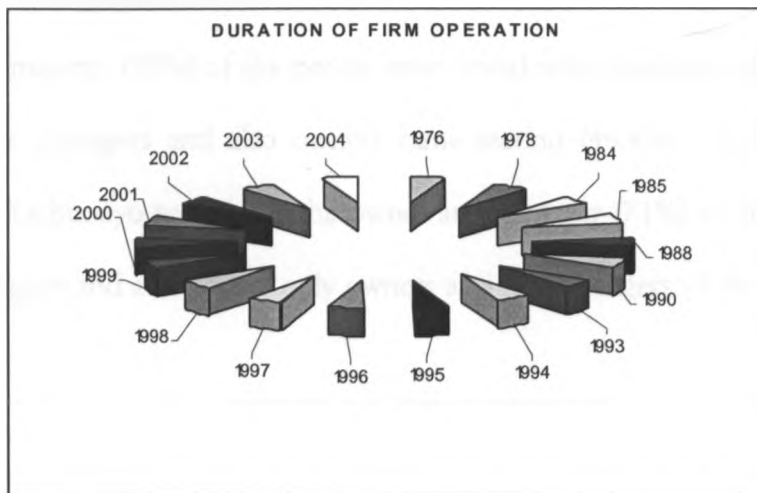


Fig 4.2a: Duration of firm operation in Nairobi area

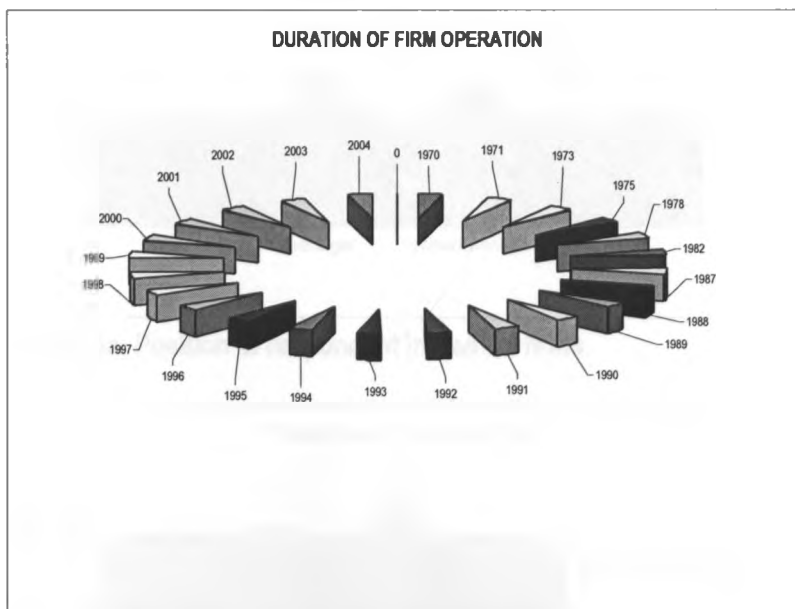


Fig 4.2b: Duration of firm's operation in Rachuonyo District

4.2 Biographical Data

4.2.1 Position of Respondents in the Firms

In Nairobi, the majority (50%) of the people interviewed were managers of the firms. Firms operated by the managers and also owners came second (46.4%). Most of the people interviewed in Rachuonyo were both the owner and manager (71%) of their firms. About 20% were managers and a few were only owners and not managers of the firm (Figures 3a and 3b).

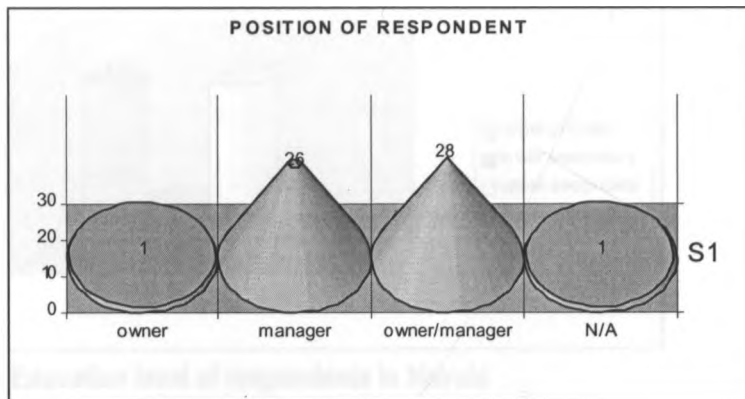


Fig. 4.3a: Position of respondent in Nairobi firms

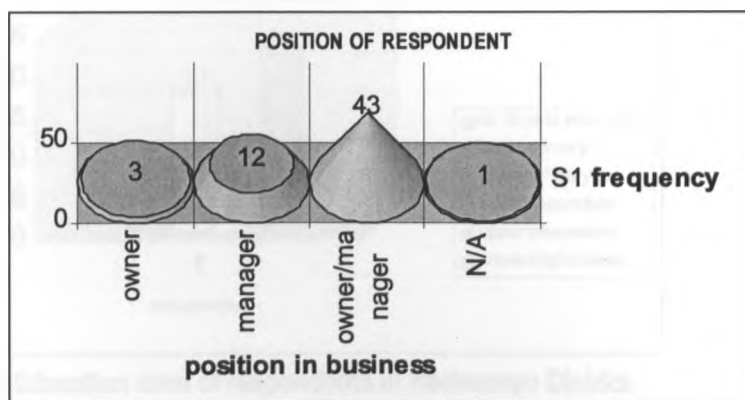


Fig. 4.3b: Position of respondent in Rachuonyo firms

4.2.2 Education Level of Respondents

Most respondents in Nairobi had attained upper primary (37.5%) and upper secondary level (37.5%) of education. The rest of the groups belonged to the lower secondary (12.5%) and university or college level cadres (12.5%) (Fig. 4a). In Rachuonyo most of the people interviewed had attained upper secondary level education (36.7%). A good number were graduates of upper primary (28.3%) and lower primary school (18.3%). The rest of the group were either university/college graduates (8.3%), lower primary (1.7%) or with no formal education (5%) (Fig 4b).

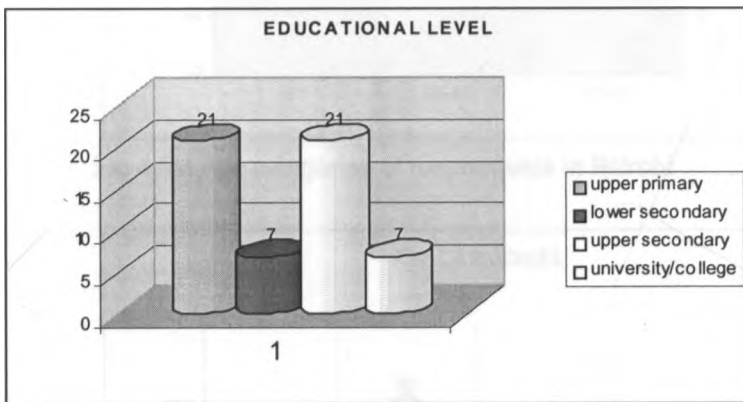


Fig 4.4a: Education level of respondents in Nairobi

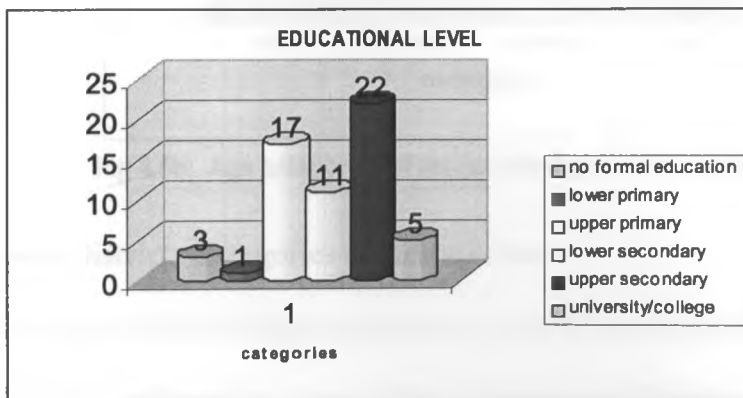


Fig 4.4b: Education level of respondents in Rachuonyo District

4.2.3: Age Categories of Respondents

In Nairobi area, 19.6% of the respondents were less than 25 years old, 55.4% were between 25 and 45 years old, 25.0% were between 46 and 55 years old. There was none above 55 years of age. In Rachuonyo District, 16.7% of the respondents were less than 25 years old, 63.3% were between 25 and 45 years old, 15.0% were between 46 and 55 years old, and 3.3% were 55 and above years old.

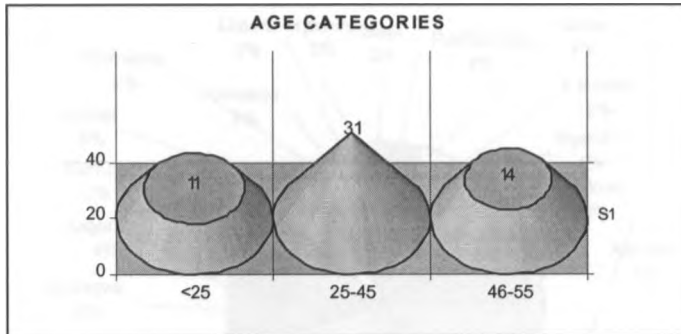


Fig 4.5a: Age categories of respondents in Nairobi

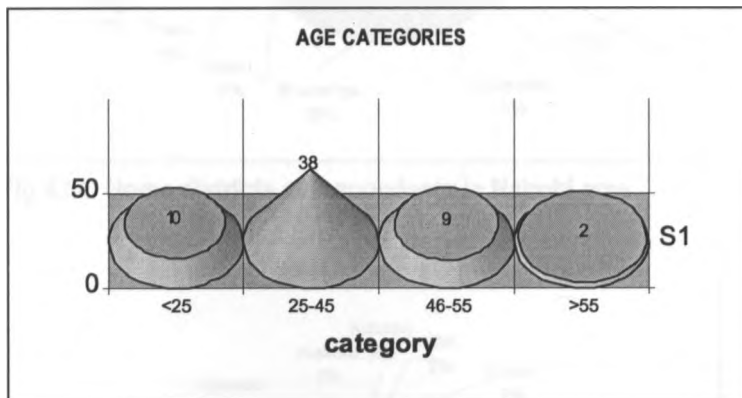


Fig 4.5b: Age categories of respondents in Rachuonyo District

4.2.4 Home Districts Categories of Respondents

The study revealed that the highest number of people operating SMEs in Nairobi came from Murang'a (16%) followed by Nyeri (13%). Kiambu and Kisumu accounted for 7% each, while Embu, Thika, Nakuru and Makeni occupied 5% each. Kangundo, Meru, Nyando, Rachuonyo and Suba occupied 4% each. Respondents who came from Mbita, Bondo, Siaya,

Nyamira, Limuru, Naivasha, Kirinyaga, Maragwa, Nyandarua, and Vihiga districts occupied 2% of the Nairobi sample population. Most of the people working for or owning SMEs come from Rachuonyo District (72%). Others come from districts within Nyanza Province, including Bondo, Suba, Homabay, Nyando and Migori. A few came from as far as Nakuru, Kilifi and Butere-Mumias to do business in Rachuonyo (Figures 6a and 6b).

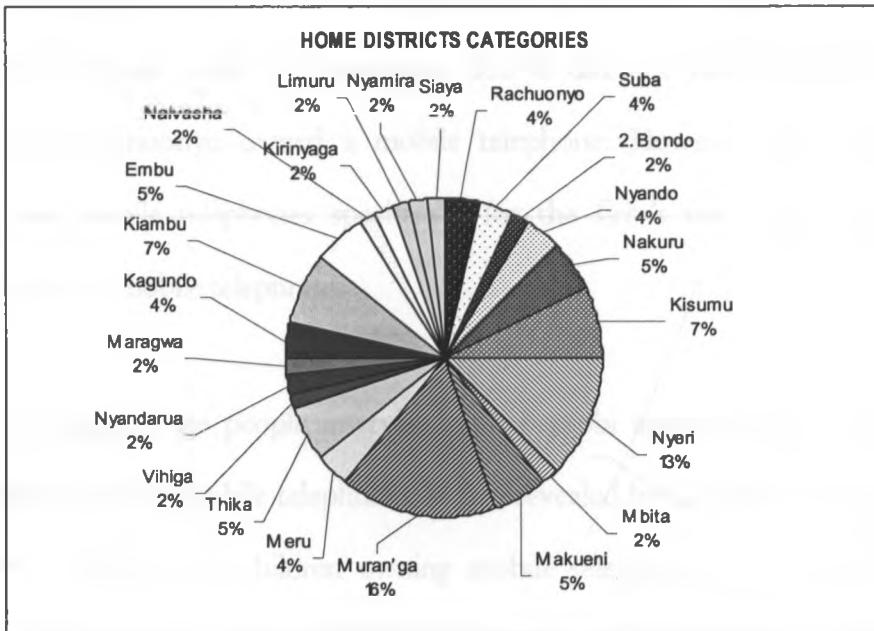


Fig 4.6a: Home districts of respondents in Nairobi area

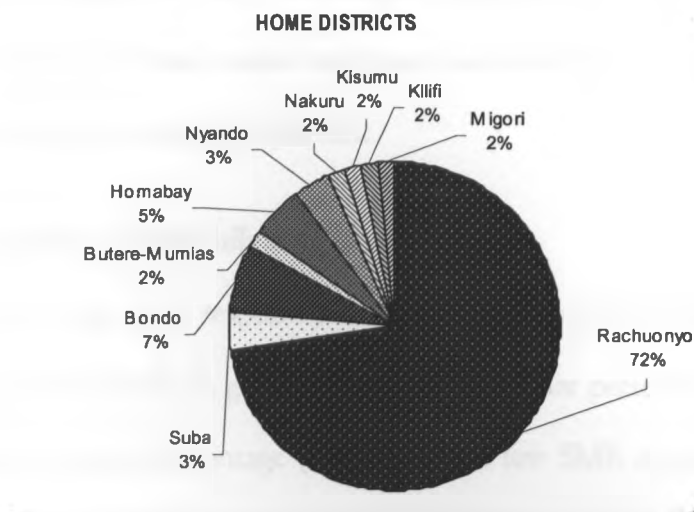


Fig 4.6b: Home districts of respondents in Rachuonyo District

4.3. Physical Access to Mobile Telephone

4.3.1. Ownership of mobile telephone

Almost all SME owners/managers who were interviewed in Nairobi owned a mobile phone except for one respondent. About 51.8% of the businesses surveyed owned mobile phones while the remaining 48.2% did not. Approximately 64.3% of employees in those firms owned mobile phones while the remaining 35.7% did not have mobile phones. All respondents in Rachuonyo owned a mobile telephone. However, only 23.7% of the businesses had mobile telephones specifically for the firm's use. About 33.9% of the employees owned a mobile telephone.

A good percentage of the people interviewed in Nairobi appreciated the importance of family members owning mobile telephones as was revealed by the high number of spouses (94.6%) and (5.4%) of the children owning mobile telephones. In Rachuonyo District spouses of SME owners/operators (23.3%) in Rachuonyo District owned mobile telephone but a very minor percentage (1.7%) of the children owned mobiles. Other family members in the two study areas who owned mobile telephones included sisters, brothers, children and mother in laws also owned mobile telephones.

4.3.2. Most frequently used mobile telephone

The survey revealed that most respondents (87.5%) in Nairobi use their personal mobile phones to make business calls. A group of people uses either personal or the firm's phone and both occupy the same percentage (5.4%). Only a few SME owners/managers (1.8%) used mobile telephones owned by family members mobile to make calls (Fig. 7a).

Most SMEs in Rachuonyo District (78.3%) use their personal mobile telephones to conduct business. About 10% use their handset or those of family members while (3.3%) use either the firm's or other employees' handset for business (Fig 7b).

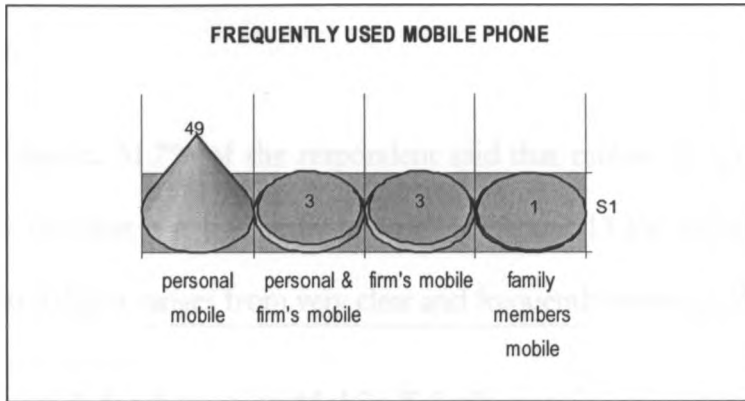


Fig 4.7a: Most frequently used mobile telephone for business calls in Nairobi

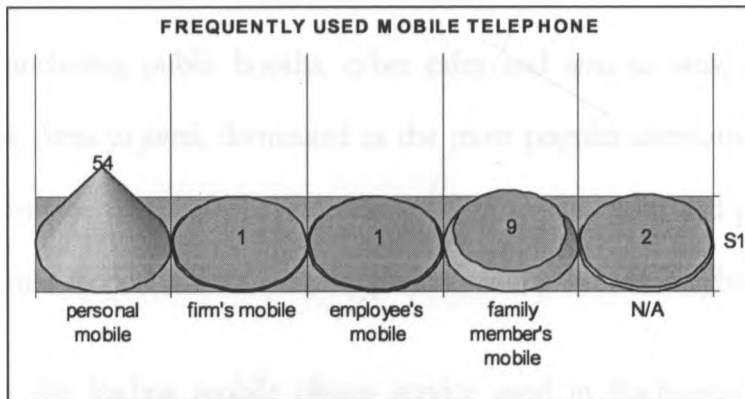


Fig. 4.7b: Frequently used mobile phone in Rachuonyo District

4.3.3. Telephone Service Providers and Reception

In Nairobi 78.6% subscribed to Safaricom, while 10.7% subscribed to Celtel. Another 10.7% subscribed to both Safaricom and Celtel. In Rachuonyo District, 36.7% subscribed to Safaricom, while 41.7% subscribed to Celtel. About 18.3% subscribed to both.

4.3.4 Mobile Reception

About 80.4% SME owners in Nairobi indicated that mobile telephone reception is often very clear, while 12.5% said that it is moderately clear. A few (3.6%) said that it is frequently interrupted; while a similar percentage of people indicated that the reception is clear to moderately clear.

In Rachuonyo District, 51.7% of the respondent said that mobile reception is moderately clear, while 30% said that it is frequently interrupted. About 13.3% said that it is very clear and 3.3% indicated that it ranges from very clear and frequently interrupted.

4.3.5 Other Channels for Accessing Mobile Telephones

Apart from personal handsets respondents in Nairobi have access to mobile phones from other channels including public booths, cyber cafes and *simu ya jamii*, a wayside mobile telephone booth. *Simu ya jamii*, dominated as the most popular alternative to the personal handset. A percentage of people have access to both *simu ya jamii* and public booth. The public booth comes second while a minority prefers writing e-mails in cyber café.

Simu ya jamii is the leading mobile phone service used in Rachuonyo District outside personal, business and family mobile phones. Other sources of mobile telephone communication include the public booth and friends' phones, which are rarely used. Cyber cafes are also not frequented.

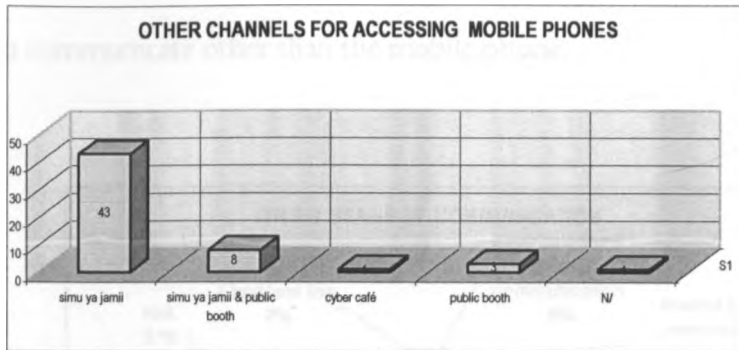


Fig 4.8a: Other channels of mobile telephones in Nairobi

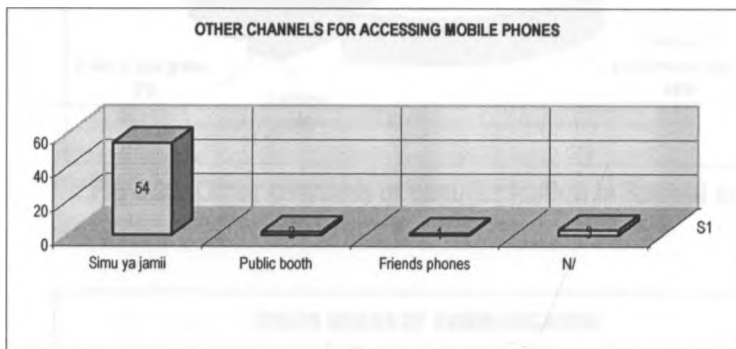


Fig 4.8b: Other channels for accessing mobile phones in Rachuonyo

4.3.6 Other Means of Communication for SMEs

About 49% of SME operators/owners in Nairobi still prefer passing business-related information through person-to-person communication. Approximately 4% use fixed landlines and personal communication, while 37% do not look for alternative means besides the mobile telephones. About 3.6% also use fixed land-line and personal communication and a similar percentage use the Internet and personal communication beside the mobile phone.

In Rachuonyo District most SME owners (36.7%) still rely on fixed landlines to communicate, besides the mobile telephones. About 15% of the local SME personnel still prefer personal communication, which they consider cheaper and more reliable. A small

percentage (1%) send and receive information by post while some are yet to establish the best way other to communicate other than the mobile phone.

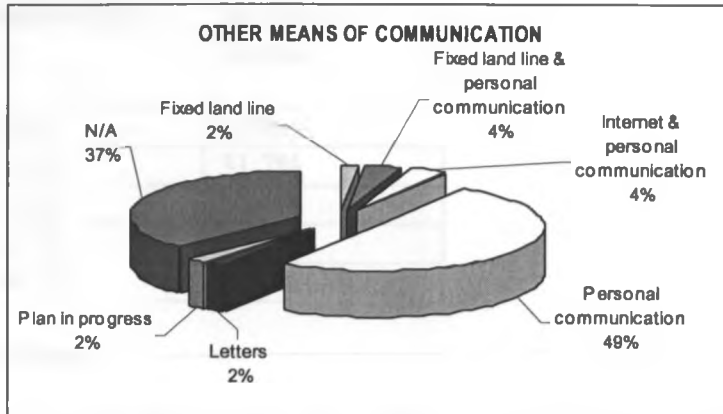


Fig 4.9a: Other channels of communication in Nairobi area

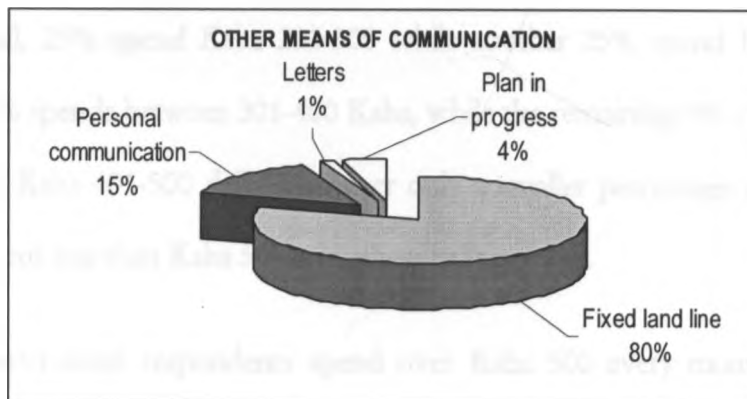


Fig 4.9b: Other channels of communications in Rachuonyo District

4.4 Time use of Mobile Telephony

4.4.1. Duration of Mobile Phone Ownership by SMEs

Mobile ownership among SME owners in Nairobi and Rachuonyo District has been growing, (Table 3) reaching peaks during the last 3-5 years (51.8% for Nairobi and 45.0% Rachuonyo). This shows the fast adoption of mobile telephony among SME owners/operators during the last 3-5 years compared to 6-8 years ago. Low ownership

during the last one year could be an indication that most people already own mobile telephones.

Table 4. 3: Duration of mobile phone ownership in Nairobi and Rachuonyo

Duration of mobile phone ownership	Nairobi Area	Rachuonyo District
<1 year	3.6%	8.3%
1-2 years	33.9%	31.7%
3-5 year	51.8%	45.0%
6-8 years	10.7%	13.3%
Total	100.0%	100.0%

4.4.2. The Cost of Calling

The cost of calling in Nairobi was assessed on a daily basis because of the high amounts of money spend by respondents. About 35% of the people spend between Kshs 51-100 per day making business call, 25% spend Kshs 201-300 while another 25% spend Kshs 101-200 every day. About 7% spends between 301-400 Kshs, while the remaining 4% spends slightly a higher amount of Kshs 401-500 daily. However only a smaller percentage of the people interviewed (4%) spent less than Kshs 50 on business calls per day.

In Rachuonyo District most respondents spend over Kshs 500 every month in making business calls. About 12% of them spend between Kshs 301-400 while 8% spend between Kshs 401-500 every month. 7% spend between Kshs 201-300. Only 2% spend between Kshs 101-200 and no one spends less than Kshs 50-100 per month.

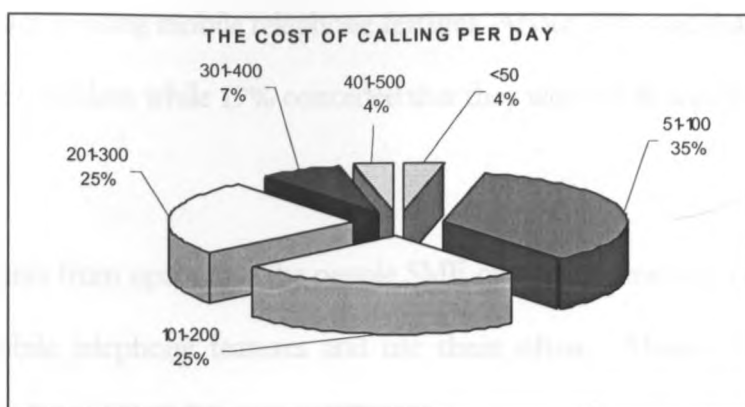


Fig 4.9a: Cost of Calling per Day in Nairobi

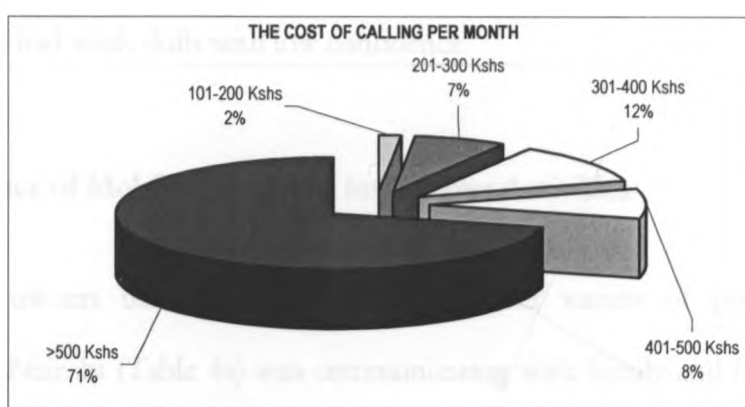


Fig. 4.9b: Cost of calling per month in Rachuonyo District

4.4.3. Skills in using mobile telephones

All the people (100%) interviewed had mobile phones with such features as the ability to call, to send and receive text messages, to have multiple cellular phone numbers registered and the ability to flash or buzz.

Most people in Rachuonyo District use their phone to make phone calls, send/receive text message, register phone numbers and to flash/buzz. Only 2% of people can only use their phones only to call and another 2% can only use their phone to call and to register phone numbers. Most respondents in Rachuonyo (54%) indicated that they have medium skills and

modest confidence in using mobile telephone features. About 27% said that they were skilled and quite confident while 19% conceded that they were weak and their confidence was low.

Unlike respondents from upcountry the people SME owners/operators in Nairobi were well versed with mobile telephone features and use them often. About 55% of the people interviewed indicated that they were skilled and quite confident in handling their phone features. Approximately 43% said they had medium skills with modest confidence. A small percentage (2%) had weak skills with low confidence.

4.4.4. Importance of Mobile Telephone for Various Activities

Mobile phone owners used their phones for a wider variety of purposes. Of most importance for Nairobi (Table 4a) was communicating with family and friends away from town and discussing work-related information. Respondents in Nairobi do not care much for using their mobile phones for entertainment and games. Education and learning, for example, subscription to breaking news and advertisement, among others was not ranked as important. In Rachuonyo District, entertainment and games; and education and learning were of minimal importance. Communicating with family and friends away and relaying work-related information away from the location was most important to SME owners/operators (Table 4b).

Table 4.4a: Importance of mobile phones for various activities in Nairobi

Type of activity	Most often	Least often	Not at all
Entertainment and games	10%	39%	51%
Education and learning	11%	31%	58%
Communicating with family and friends away	59%	39%	2%
Communicating with family and friends around	17%	74%	7%
Relaying work-related information to other locations	74%	23%	30%
Relaying work-related information within area	59%	38%	3%

Table 4.4b: Importance of mobile phones for various activities in Rachuonyo District

Type of activity	Most often	Least often	Not at all
Entertainment and games	5%	30%	65%
Education and learning	8%	30%	62%
Communicating with family and friends away	58%	34%	8%
Communicating with family and friends around	18%	69%	13%
Relaying work-related information to other locations	70%	28%	2%
Relaying work-related information within area	35%	60%	5%

4.5 Costs and Subsidies

4.5.1 Repairing Of Mobile Telephone

In Nairobi (81%) of the people interviewed said that the local fundi at the nearby shopping center repairs their mobile telephones. About 13% take the faulty handset to the Safaricom agency for repairs while 2% repair for themselves. Another 2% said they sell their mobile phones when they had problems, while the remaining 2% had never experienced problems with their phones.

Most people in Rachuonyo District (69%) repair their mobile phones at the Fundi at the shopping center. About 12% take their faulty phones to the Celtel agency and 8% do take to the Safaricom agency. 5% reported that their phones have not yet given them a problem while the rest 2% give their phones to children when spoilt and another 2% prefer selling to other than repairing.

4.5.2 Purchase of Scratch Cards

Scratch cards in Nairobi and Rachuonyo were readily available at the local shops, pharmacies, Safaricom or Celtel agencies, among other outlets.

4.5.3 Accessibility to Electricity

In Nairobi 70% of the people interviewed had access to electricity while 30% did not have access to electricity. Only 51% of the people interviewed, particularly in Oyugis, have access to electricity the rest in Kendu Bay do not have power.

In Nairobi, most people charge their mobile telephones at home but those who do not have power charge their mobiles at their places of work, neighbours houses or nearby kiosks. However in Nairobi most people have access to electricity and do charge their phones at home. In Rachuonyo, where there was no access to electricity, most people (45%) use car batteries at the shopping center to charge their phones. A small percentage (11.7%) take their mobile telephones to town for commercial charging because of lack of electricity in their vicinity.

4.6 Business Growth as a Result of Use of Mobile Telephone

4.6.1. Impact of Mobile Telephone on Business

In Nairobi almost all respondents (100%) indicated that they had experienced growth in business as a result of using mobile telephones. The coming of mobile telephone has seen positive growth in many types of businesses conducted in Nairobi. During the survey 46% of the people reported increased customers numbers. This was followed by 18% of respondents who had realized increased sales volume and customers. About 21% of SMEs reported increase in sales volume only, while 5% had increased customer numbers and also found the mobile a convenient channel for scheduling appointments. About 4% of those interviewed reported increased profits, while another 4% reported increased profits and customers. The remaining 2% had increased customers and saving of time and energy with use of mobile phones for business.

About 88.1% of respondents in Rachuonyo appreciated the growth of their business as a result of use of mobile telephone while 11.9% did not. About 43% of people reported increased customer numbers in their businesses since they started using mobile phones. 13% said that mobile phones help them get important business messages/information while 10% reported increase in sales volume, customer numbers and profits at the same time. About 8% said they use their mobile phones to request for stock and 6% enjoy the easier and quick communications with their customers. 4% Reported increased profits, 2% have increase in sales volume and customer numbers concurrently, another 2% have only increase in sales volume and another 2% appreciate general convenience in their undertaking with the use of mobile telephone. However 10% have not had any change in their business.

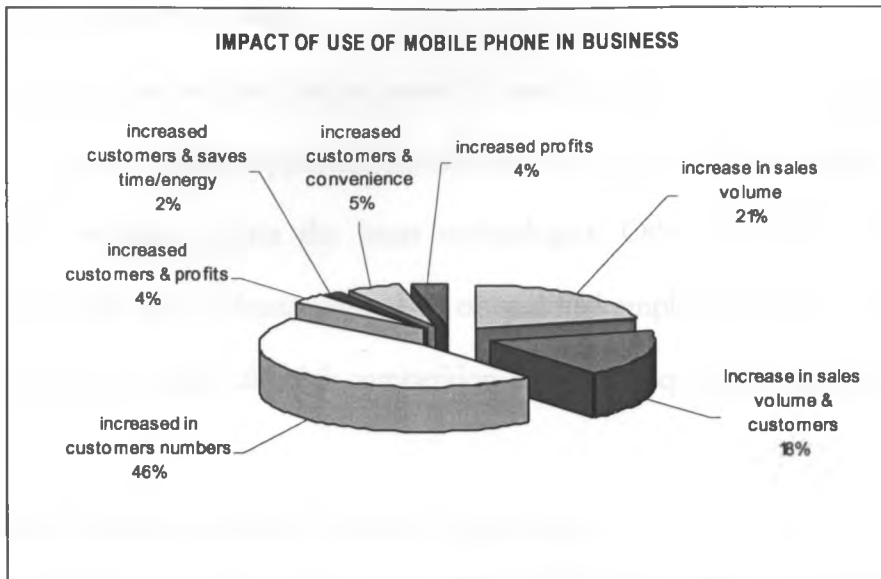


Fig 4.10a: Impact of mobile telephones on business in Nairobi area

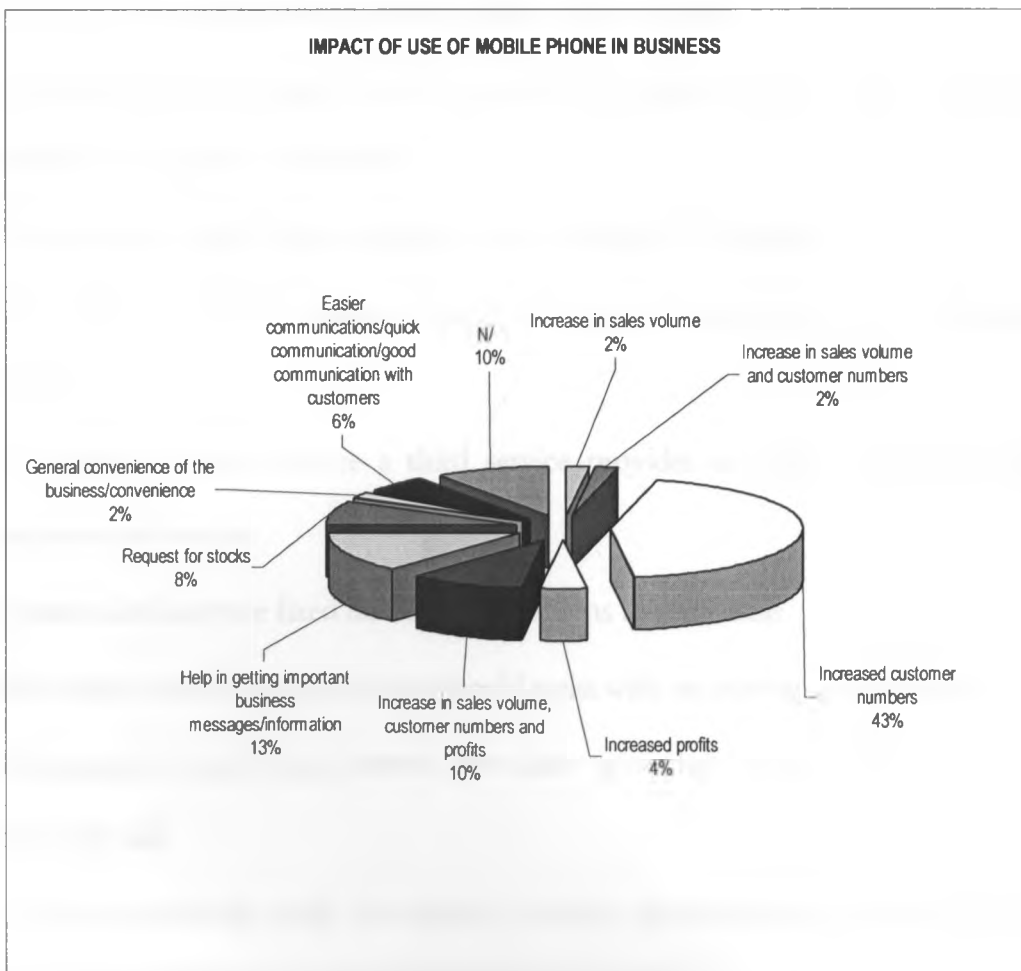


Fig 4.10b: Impact of mobile telephones on business in Rachuonyo District

4.6.1. Barrier to growth of SMEs

Highest among the factors that hinder growth of small business in Nairobi and Rachuonyo was lack of access to market opportunities and lack of capital. Also important was lack of transport and awareness about the latest technologies. Others that were cited by the respondents include poor infrastructure; lack of qualified employees; lack of electricity on-site; unstable prices of materials; high competition; and lack of qualified employees.

4.6.2. General Recommendations From Respondents

The respondents were asked what they would like to see done differently in the telephone industry and the following responses, among others, were received:

- Government should urge the service providers to increase boosters especially in the rural areas to improve reception
- Government should reduce taxation/tariffs on mobile telephones
- The service providers should be urged to remove restriction on the minimum balance
- Government should licence a third service provider to stiffen competition and improve the services
- Improve and increase fixed land-line connections to rural areas
- Government and service providers should assist with recovering stolen handsets
- Government should urge service providers to reduce calling charges that are currently high
- Government should certify the quality of mobile phones imported into the country and ban refurbished/second hand sets that do not last

- Government should subsidize the cost of mobile hand sets to make them more affordable, especially to people with low income in the rural areas
- Government and service providers should look into ways of providing charging facilities for rural areas where there is no power

CHAPTER FIVE

5.0 DISCUSSION OF THE FINDINGS

5.1 Characteristics of the Study Population

The sample size consisted of 100 respondents from Oyugis and Kendu Bay divisions of Rachuonyo District small and medium enterprises (SME) clusters; and the Kariobangi North, Kariobangi South and Kamukunji clusters of Nairobi area. The cluster sampling method was used to identify the four SME clusters, followed by random sampling to select 50 respondents from Nairobi (25 from Kamukunji and 25 from Kariobangi North and South); and 50 respondents from Rachuonyo District (25 from Oyugis Division and 25 from Kendu Bay Division).

5.2 Business Profile

Respondents were asked to characterize their business in terms of age, sex, education, position in the firm and home district. Majority of the respondents in Nairobi were managers, followed by those who doubled as owners/managers. In Rachuonyo District most respondents were owners as well as managers of the firm. This reveals that SMEs in the rural areas has provided self-employment to a significant number of skilled people.

5.3 Biographical Data

Most SME owners/managers were male compared to females in both rural and urban setups. SMEs in Rachuonyo District had older respondents aged more than 55 years compared to Nairobi where there was none who was more than 55 years of age. This variation could be attributed to the practice of retirees moving from urban areas to rural

areas to start business. Perhaps not surprisingly, almost half the respondents who were mobile users in both Rachuonyo and Nairobi came from the 25-45 age group. The respondents in this age group are economically active and therefore may be more likely to own a mobile phone. However, respondents in age group 46-55 and over 55 were still well represented.

Educational attainment among SME owners/operators was generally high with 37.5% having attained upper secondary level of education and 10.8% having attained tertiary education. Secondary school education among the respondents in the two study areas was almost similar, while Rachuonyo had respondents with no formal education (5%). The implication is that the informal sector can absorb all levels of skills from apprentices with little or no formal education to college or university graduates who are skilled in various professions.

District of origin among the sampled population was diverse for Nairobi where a good number of the provinces in Kenya, except Coast Province and Northeastern Province were represented. This was in sharp contrast to Rachuonyo District where most respondents (72%) hailed from the area. Others came from neighbouring districts.

5.4 Physical access to Mobile Phones

Looking at access, most SME owners/operators in Nairobi and Rachuonyo stated that they could access a mobile phones from friends and relatives and from simu ya jamii booths, and cyber cafes. This indicates a very high awareness of the potential to use mobile telephones for communication, and very high perceived accessibility, even among poor rural communities. The research also revealed that there are users of mobile telephones among rural SMEs who have no or just primary level education.

Another potential barrier to ownership of a mobile phone among SMEs was lack of access to electricity. Clearly some form of energy is needed to recharge mobile batteries and so lack of electricity could form a barrier to mobile ownership. In Rachuonyo District, particularly Kendu Bay many SMEs had limited or no access to power. Respondents with electricity were more likely to own a mobile phone but they overcame the constraint by using car batteries or taking the phone for commercial charging. SMEs in Rachuonyo without electricity managed to almost achieve similar level of mobile usage to those in Nairobi, albeit with lower levels of ownership.

Other means of communication that could be accessed by SME owners/operators included the post office, landlines, the Internet and personal (face to face or word of mouth communication). Fixed lines were available in Nairobi and to a smaller extent in Rachuonyo District. However, the mobile phone was the communication tool that most people had easy access to. Mobile phones were by far the most frequently used means of communication for people interviewed, primarily for calls but also for text messages.

5.5 Time/Cost of Using Mobile Phone

Expenditure on mobile telephones can give some broad information on their importance and impact on business. In Nairobi, some SME owners spent more than Kshs. 500 a day on mobile telephones. However, it is interesting to explore the extent to which spending on mobiles may be substituting for other categories of expenditure, such as cost of transport or saving on travel time. Interestingly, none of the businesses in Nairobi and Rachuonyo suggested that higher spending on mobile telephones had dented their profits. This might

suggest that customer spending on mobiles has at least created additional business opportunities for any lost sales. Overall, respondents indicated that increases in profits attributed to the use of the mobile phone were due to a combination of reduced traveling time and increased number of customers.

An increase in efficiency was another widely cited impact. Specific examples included being able to run errands without closing the store, placing orders from the premises without having to visit supplier and keeping in contact with employees or clients while traveling and those in other locations.

5.6 Impacts of Mobile on SMEs

Respondents identified a large number of impacts from using mobile phones. Some were social in nature, while others concerned business. Greater contact with friends and relatives, family and friends was among one of the most significant benefits identified by the research. However, reduced travel time and transport costs were also highlighted.

The research also suggested that mobile phones played a part in small business start-ups. In Rachuonyo District most SMEs were started in 1998 and 2000, coinciding with the introduction of the Kencell and Safaricom providers. However, the research did not address this factor in depth. Most respondents in Nairobi also said their businesses started in 1999. Mobile phones also mean that small businesses can operate a 24-hour call-out service, which is important for tradesmen and non-professional service firms.

There is every reason to believe that economic and social returns to mobile phones will be highest to rural areas, which are consistently less well provided for with telecommunications and other infrastructure including roads. Mobile phones in less developed economies, for

example, in rural areas, are playing the same crucial role that fixed telephony played in the richer economies in the 1970s and 1980s. Mobile phones substitute for fixed lines in rural economies, but complement fixed lines in urban economies, implying that they have a stronger growth impact in rural areas.

CHAPTER SIX

6.0 CONCLUSIONS AND RECOMMENDATIONS

6.1 Conclusion

The research suggests that mobile phones have brought considerable benefits to small businesses in rural and urban areas. People at all income levels are able to access mobile services by owning a phone, using a relatives or friends or using other channels including cyber cafes and simu ya jamii booths. Gender, age and education do not seem to constitute barriers to access. While income certainly explains the low level of usage, for example, in lack of income does not prevent mobile telephone use. Even the absence of electricity does not present an insurmountable barrier because batteries can be recharged in the nearest town, or locally by using a car battery.

For SMEs in Rachuonyo District, and even outside Nairobi's central business district, mobile phones have had positive economic and social impacts, such as reduced travel needs and better access to business information. A large majority of SMEs in Rachuonyo and Nairobi said mobile phones have brought higher profits and turnover and increased efficiency, although they are also paying higher call charges. It is critical to note that SME operators are willing to spend money on their outgoing calls, both personal and business. This willingness to pay is the simplest and most compelling argument that mobile phones have improved business, hence the quality of life in urban and rural areas. This increase is a development impact hence proof for the theory of leapfrogging through bypassing technologies, like the fixed landlines and overcoming infrastructural barriers.

SME owners/managers use the mobile phone to converse with friends, relatives and business contacts. These friends and kins could also be customers. By allowing communication at relatively low cost and effort, the mobile may be allowing SME owners to maintain specialized relationships than they otherwise would be able to do.

6.2 Recommendations

In Rachuonyo District, the marginal mobile phone service is often more affordable than fixed phones. This applies to the actual cost and to the way in which the mobile service may be bought. The mobile offering is generally more flexible, and elements such as the ability to control expenditure through pre-paid services, and avoidance of credit are important. Mobile service has penetrated the low-income SMEs in Rachuonyo, just like they are useful to the informal sector in Nairobi. There is strong evidence that the mobile telephone has made a significant contribution to provide universal service and access, hence the leapfrogging of technology and diminishing, in a small way, the urban-rural divide among SME owners/operators.

However, the technology has limitation and some recommendations are drawn from the research.

6.2.1 Network coverage

Whereas the cost of incremental coverage in rural areas, such as Rachuonyo District decreases with expanding Safaricom and Celtel networks, there will undoubtedly remain areas that are not viable because of topography and socio-demographic elements, such as low income. Other difficulties are harsh environmental conditions and lack of power supply. The government should take regulatory measures to provide universal access and rural

communications development funds. These measures can bridge the true access gap that cannot be covered on a commercial basis, even if the regulatory framework and conditions are supportive to operations in rural and low-income areas.

6.2.2 Internet Access and Mobile Telephony

The dominance of mobile telephony among SMEs in Nairobi and Rachuonyo District inhibits the take-up of other communication technologies, such as the Internet. The Internet is increasingly seen as important for developing countries' participation in the information society. Whereas the mobile telephone can be considered a leapfrogging opportunity now, for SMEs in Rachuonyo District, it might restrict the uptake of the Internet. Mobile technology is already in performing simple functions, such as document attachments and transfer via fax. As mobile communications takes root in former unserved areas and parts of society, demand is likely to increase for document exchange and mobile technology does not currently meet those needs. The government needs to concern itself with measures that will encourage Internet infrastructure, besides the mobile and public access such as telecentres and cyber cafes.

6.3.3 Liberalization and Removing Technology Barriers

Competition in the mobile telephony sector and price flexibility was the prerequisite for its growth and outpacing the fixed landline as the basic service provider in some areas and customer groups. However, mobile expansion has not eliminated the need to liberalize the fixed sector. It has merely shown the way towards competition for all technologies including satellites, fixed landlines, among others. The government, therefore, should aim at developing a single regulatory regime for all types of networks to ultimately achieve

technology-neutral regulation. Mobile phone operators would then be free to use fixed network elements, satellite, fixed wireless or IP telephony. Similarly, fixed line operators could seek frequency rights to use mobile or wireless technology where that proves more economical. This would enable operators to be efficient and also enhance their ability to give attention to marginal users in the rural areas.

6.3.4.SMEs and Physical Infrastructure Needs

The informal sector is one of the fastest growing and most dynamic sectors of the Kenyan economy, yet infrastructure is a major constraint. Sound infrastructure is a major determinant of production costs, product quality and timely response to market requirements. Over two-thirds of SMEs in rural Kenya have no access to electricity in their work sites and this was witnessed in the Kendu Bay Cluster. Access to electricity, especially in manufacturing and service enterprises determines the type of technical processes that can be used. Access to telecommunications network, telephone and fax is extremely important to MSEs because it offers a channel for exchanging market information. Without access to telecommunication networks, SMEs in rural areas must incur costly travel expenses to obtain market information or rely on middlemen to link them with markets. In urban areas, such as Nairobi, without telecommunications SMEs are bypassed by the global information age. Measures to tackle various infrastructure constraints were taken as early as 1974 (National Development Plan 1974-78), and efforts were consolidated in the 1990s after the publication of Sessional Paper No.2 of 1992. There has been some achievements but past policies that address infrastructure development for SMEs have suffered from improper coordination of activities. The government should set up a body or authority that is responsible for conducting research to address specific regional infrastructural needs.

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g. university/college

7. In which age bracket do you fall?

- a. <25
- b. 25-45
- b. 46-55
- c. >55

8. Which is your home district _____?

C. PHYSICAL ACCESS TO A MOBILE TELEPHONE

9. Do you personally own a mobile telephone?

- a. Yes
- b. No

10. Does the business own a mobile telephone?

- a. Yes
- b. No

11 Do your employees own mobiles?

- a. Yes
- b. No

12. Are there other members of your family who own mobile telephones?

- a. Yes
- b. No

13. If the above answer is yes, who are they?

- a. spouse
- b. child
- c. friend

14. Which among the above do you use to receive calls?

- a. personal mobile
- b. firm's mobile
- c. employee's mobile
- d. family member's mobile

15. Which of the following options do you subscribe to?

- a. Safaricom

b. Kencell

16. How clear is the reception?

a. very clear

b. moderately clear

c. frequently interrupted

17. Thinking about the environment in which you work, is there any other place where you have access to the use of a mobile telephone?

a. *siruu ya Jaruu*

b. cyber café

c. public booth

d. other

18. Which other means of communication/access to information do you have?

a. Fixed land line

b. Internet

c. Personal communication

d. letters

C. TIME USE

19. How many years have you had your mobile telephone?

a. Less than 1 year

b. 1-2 years

c. 3-5 years

d. 6-8 years

20. How much do you spend on scratch cards every month (peak and off-peak combined)?

a. <50 Kshs

b. 51 – 100 Kshs

c. 101-200 Kshs

d. 201 – 300 Kshs

e. 301- 400 Kshs

f. 401 – 500 Kshs

g. > 500 Kshs

D. SKILLS

21. Please indicate whether your phone has each of the following features and

- a. ability to call
- b. ability to send/receive text messages
- c. ability to have multiple cellular phone numbers registered
- d. ability to flash/buzz

22. If so, do you use these features?

- a. has feature (a) and I use it
- b. has feature (b) and I use it
- c. has feature (c) and I use it
- d. has feature (b&c) and I use it

23. How would you describe your skills in handling different features of the mobile telephone?

	High	Moderate	Low
a. skilled and quite confident	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b. medium skilled and modest confidence	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c. weak skills and low confidence	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

24. How would you rank the importance of the mobile telephone for each activity?

	High	Moderate	Low
a. entertainment and games	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b. education and learning	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c. communication with co-workers	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d. comm. with family and friends in the area	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
e. comm. with family and friends away	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
f. exchange work-related information	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
g. for in-coming calls	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
h. for out-going calls	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

25. How often, on average, do you use the mobile telephone for each of the following activities?

	Most Often	least often	Don't use
a. for work related messages within the area	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b. for work related information in other locations	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c. to comm. with family and friends living in the same area	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d. to communicate with family and friends living far away	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
e. for entertainment and games	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

26. What proportion of your incoming calls would you classify as:

	Most Often	least often	Don't use
a. work-related conversation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b. private, social chat	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c. quick, instant message	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d. request for action	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
e. request for information	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
f. information for future reference	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
g. scheduling an event or an appointment	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

E. COSTS AND SUBSIDIES

27. Who repairs your mobile when you experience technical problems?

- a. Yourself
- b. Kencell agency
- c. Safaricom agency
- d. Fundi at the shopping center

28. Where do you buy your scratch cards?

- a. local shop
- b. Safaricom/Kencell shop in town
- c. Safaricom/Kencell booth in the vicinity
- d. other

29. Do you have access to electricity?

- a. Yes
- b. No

30. If the answer to the above is No, how do you charge your mobile telephone?

- a. I use a car battery at the shopping centre
- b. take it to town for commercial charging
- c. Other

F. IMPACTS OF USING MOBILE PHONES

31. Have you experienced any business growth since you started using your mobile telephone for the same?

- a. Yes
- b. No

32. If yes then tick one of the reasons below:

- a. Increase in sales volume
- b. Increased customer numbers
- c. Increased profits

d. others

33. What do you consider as a barrier to the growth of your firm?

- a. Access to market opportunities
- b. Appropriate technology
- c. Poor infrastructure
- d. Lack of qualified employees
- e. Other

GENERAL

34. What would you recommend to the government concerning the mobile telephone industry in general? Policy issue

ANNEX 2: Codes

Q1 - Location

0. Kendubay – North East Karachuonyo
1. Oyugis- West Kamagak
2. Kariobangi North
3. Kariobangi South
4. Kamukunji

Q8-Home district

- | | |
|------------------|---------------|
| 0. Rachuonyo | 15. Thika |
| 1. Suba | 16. Vihiga |
| 2. Bondo | 17. Nyandarua |
| 3. Butere-Mumias | 18. Maragwa |
| 4. Homabay | 19. Kisumu |
| 5. Nyando | 20. Kagundo |
| 6. Nakuru | 21. Kiambu |
| 7. Kisumu | 22. Yala |
| 8. Kilifi | 23. Embu |
| 9. Migori | 24. Naivasha |
| 10. Nyeri | 25. Kirinyaga |
| 11. Mbita | 26. Limuru |
| 12. Makueni | 27. Nyamira |
| 13. Murang'a | 28. Siaya |
| 14. Meru | |

6. Not yet destroyed/no problem yet

Q17- Other places with mobile telephone

0. *Sirru ya jamii*
1. Cyber café
2. Public booth
3. Friends phones
4. N/A

Q18- other means of communication

0. Fixed land line
1. Internet
2. Personal communication
3. Letters
4. Plan in progress
5. N/A

Q27- Repairing of mobile phone

0. Yourself
1. Kencel agency
2. Safcom agency
3. Fundi at the shopping center
4. Selling to others
5. Left for children

Q13- family members owning mobile phone

0. Spouse
1. Children
2. Friends
3. Brothers
4. Sisters
5. Mother in-law
6. N/A

Q34. General Recommendations to the Government on mobile telephone industry

0. Government to urge operating companies to put up network boosters all over the country for good network
1. Government to reduce tax/tariffs/V.A.T on mobile phones to reduce phone cost
2. Get rid of automatic voice mail charges
3. Safaricom/Kencell should not insist that customers maintain a minimum balance
4. Government to license a third mobile service provider
5. Provide free offer days for both calls and messages
6. Provide H.E.P. for phone charging
7. Strengthen telecom lines for personal communications to reach some rural areas
8. Train phone experts and sell spare parts throughout the country
9. Government to ensure there a mechanism of recovering stolen phones
10. Government to expand employment to many people so as to raise general income hence they can afford to buy mobile phones
11. Government should urge operating companies to reduce phone charges
12. Government to urge operating companies have uniform phone call charges & government to reduce subsidies/tax on imparted to operating companies that raise phone call charges (eg to reduce airtime charges)
13. Governments should ensure that mobile telephones coming into the country are of acceptable quality, and all have modern/advanced features and services. Most important is the Internet feature. The government should ban sell of fabricated phones because they are not durable.
14. Government to ensure maximum security e.g. cub theft
15. Government to diversify the market (sell) of mobile phones.

Q4. Duration of operation

0. 1970
1. 1971
2. 1973
3. 1975
4. 1976
5. 1978
6. 1980
7. 1982
8. 1984
9. 1985
10. 1987
11. 1988
12. 1989
13. 1990
14. 1991

15. 1992
16. 1993
17. 1994
18. 1995
19. 1996
20. 1997
21. 1998
22. 1999
23. 2000
24. 2001
25. 2002
26. 2003
27. 2004

Q30. How do you charge your mobile telephone

0. I use a car battery at the shopping centre
1. Take it to town for commercial charging
2. Electricity at home
3. Kiosk
4. Neighbors
5. N/A

Q32- Impact of mobile phone. If yes... ..

0. Increase in sales volume
1. Increased customer numbers
2. Increased profits
3. Saves time and energy
4. Easy to access customers far away
5. Help in getting important business messages/information
6. Exchange business ideas
7. Request for stocks
8. General convenience of the business/convenience
9. Easier communications/quick communication/good communication with customers

QNO. 33- Barriers to the growth of the firm

0. Access to market opportunities
1. Appropriate technology
2. Poor infrastructures
3. Lack of qualified employees
4. Lack of funds (especially low customer's income)
5. High competition
6. Lack of electricity
7. Unstable prices of materials
8. Lack of capital
9. Lack of knowledge eg fashions
10. Lack of resources eg land, room for expansion/shops located near the road
11. Lack of market
12. Government ban on charcoal selling
13. Lack of transport