Helsinki Metropolia University of Applied Sciences
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Fredrick Ngumbuke

Gender impact and mobile phone solutions in rural development: A case study in rural Iringa in Tanzania

Helsinki Metropolia University of Applied Sciences   **Abstract**

In rural Tanzania, the acceptance of mobile phone technology is skewed more to male gender than women; women are still the untapped market, which means they are not able to fully receive the possible benefits of mobile phone technologies. The goal of this work was to present the reasons and effects of the disparity between men and women. There is a clear and wide gap between genders in the ownership and use of mobile phones.

The work especially looked at the reasons why women own and use less mobile phones than men do; the reasons for women owning and using phones; the benefits women perceive to gain from using and owning mobile phones; the attitudes towards ownership of mobile phones among women; and the impact of mobile phone ownership and usage in gender power relations.

The demographic data was collected via a structured survey, which was thereafter analyzed using simple descriptive statistics: means, frequencies, percentages and cross tabulations. An analysis of the data gave highlights to the stated problem. The findings show that men are culturally taken as main responsible persons in the family, they have more authority over women, men have more income than women and also men use mobile phones for business or work of any kind more than women.

The findings will be of great use to policy makers and developers and development organizations in which innovative, mobile phone-based systemic solutions could be developed or modified to reach as wide segment of the community as possible in less developed countries. The major focus could be in usability, applicability, feasibility and making the ideas transparent and transferable across different stakeholder groups.

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Abbreviations and terms

GDI   The Gender-related Development Index, introduced in Human Development Report 1995, measures achievements in the same dimensions using the same indicators as the HDI but captures inequalities in achievement between women and men. It is simply the HDI adjusted downward for gender inequality. The greater the gender disparity in basic human development, the lower a country's GDI relative to its HDI. [1]

GDP   The total market value of all the goods and services produced within the borders of a nation during a specified period.

HDI   The Human Development Index provides a composite measure of three dimensions of human development: living a long and healthy life (measured by life expectancy), being educated (measured by adult literacy and gross enrolment in education) and having a decent standard of living (measured by purchasing power parity, PPP, income). [1]

HPI   The Human Poverty Index focuses on the proportion of people below certain threshold levels in each of the dimensions of the human development index [1].

ICT   Information and Communication Technology (ICT) is the study, design, development, implementation, support or management of computer-based information systems, particularly software applications and computer hardware to convert, store, protect, process, transmit, and securely retrieve information.

ISP   An Internet service provider, also sometimes referred to as an Internet Access Provider (IAP), is a business company that provides its customers access to the Internet and other related services [2]. It connects to its customers using a data transmission technology appropriate for delivering the Internet Protocol datagram. These technologies include a dial-up, Digital Subscriber Line (DSL), cable modem, wireless or dedicated high-speed connections.

ITU   International Telecommunication Union is the leading United Nations agency for information and communication technologies issues. The global focal point for governments and the private sector in developing networks and services. For nearly 145 years, ITU has coordinated the shared global use of the radio spectrum, promoted international cooperation in assigning satellite orbits, worked to improve telecommunication infrastructure in the developing world, established the worldwide standards that foster seamless interconnection of a vast range of communications systems and addressed the global challenges of our times, such as mitigating climate change and strengthening cybersecurity. [3]

NGO   Non-Governmental Organisation (NGO) is a legally constituted organization created by private persons or organizations with no participation or representation of any government. In the cases in which NGOs are funded totally or partially by governments, the NGO maintains its non-governmental status insofar as it excludes government representatives from membership in the organization [2].

M-Pesa	M stands for mobile, and Pesa is a Swahili word which means money. It is the product name which involves a mobile-phone for money transfer service. Its mechanism is easy for ordinary user to manage, to load money into one's M-PESA account one needs to go to a registered M-PESA Agent, typically a local network airtime reseller or other retail outlet, and make a cash deposit which results in electronic money moving into one's account. One can then send money to another mobile phone user via a phone instruction. When anyone wants to get cash out of his or her M-PESA account he or she needs to go to an M-PESA agent and make an electronic transfer to the agent who will exchange this for cash. [4]
Off-Net	Phone calls that are carried over the public switched network. The origination and/or termination of the calls are carried by a local service provider. Calling between different operators.
On-Net	Phone calls that are carried over Long Distance (LD) dedicated private facilities. Calling within the same operator.
PBX	A telephone exchange serving a single organization, with a switchboard and associated equipment, usually located on the customer's premises; provides for switching calls between any two extensions served by the exchange or between any extension and the national telephone system via a trunk to a central office.

SIM   Subscriber Identity Module (SIM card). A component, usually in the form of a miniature smart-card, that is theoretically tamper-proof and is used to associate a mobile phone subscriber with a mobile network subscription. The SIM holds the subscriber's unique phone number along with secret information such as a private encryption key and encryption/digital signature algorithms. Most SIMs also contain non-volatile storage for network and device management, contact lists, text messages sent and received, logos and in some cases even small Java programs.

SMEE   The definition of what constitutes small and medium enterprises (SMEs) varies from country-to-country. SMEs. have been shown to contribute significantly to country and regional economic growth, increased employment levels and locally relevant product and service innovation.

TCRA   Tanzania Communication Regulatory Authority (TCRA) established by the TCRA Act no. 12 of 2003 is an independent Authority for the Postal, Broadcasting and Electronic communications industries in the United Republic of Tanzania. [5]

Tsh   Tanzanian Shillings is a national currency. One Euro (1€) is equivalent to about 1,800Tshs (Tanzanian Shillings) as of last quarter of 2009

UN   United Nations (UN) is an international organization composed of most of the countries of the world. It was founded in 1945 to promote peace, security, and economic development.

UNDP The United Nations Development Programme (UNDP), the United Nations' global development network, is the largest multilateral source of development assistance in the world. The UNDP is an executive board within the United Nations General Assembly.

VPN A Virtual Private Network is an intelligent aggregation of telephones. In the computer world, the VPN is a private computer network over a public network. It is a means of having a secure channel between the local computer and a computer at a remote location. However for telephones, VPN is well beyond what a local PBX offers. It is offered by the provider and can be set up as a nationwide, or even worldwide system. All the digital phone stations that are connected into the VPN have special connection features with every other station on the VPN. To be part of the VPN, dedicated connections to the long-distance carrier are normally required.

1 Introduction

This study explores the gender impact and the mobile phone solutions in rural development: A case study in rural Iringa in Tanzania. Being a member of the society where the research was conducted, I could see a clear gap between genders in their ownership and use of the mobile phone that motivated me more to find out the underlying factors.

The scope of my study is to find out how much the mobile phone can contribute to women development in rural areas using rural Iringa as a case study. The major focus is why in less developed countries women are not utilizing the opportunities posed by the mobile phone equally to men. The second focus was the particular challenges that gender inequality poses to the mobile phone solutions in development and how to meet them.

The specific goals were to identify why the number of women owning/using the mobile phone is smaller than that of men, which group of women, when grouped on the basis of the marital status, owns/uses the mobile phone more than the other, reasons for having mobile phones among women, and suggesting possible connections between the mobile phone use and gender inequality, hence highlighting some specific areas for future research on the topic.

The study findings could be of great use to policy makers, developers and development organisations in which innovative, mobile-based systemic solutions could be developed or modified to reach as wide segment of the community as possible in rural societies of the developing countries. The major focus should be in usability, applicability, feasibility and making the ideas transparent and transferable across different stakeholder groups.

2　Background to the project

2.1　Overview

The aim of this research project is to explore the role of the mobile phone to women groups in the less developed countries of the Sub-Saharan Africa using rural Iringa in Tanzania. Rural Iringa is a predominantly rural area where the situation might be different in cities such as Dar es Salaam or Nairobi, for instance; Dar es Salaam and Nairobi are Tanzanian and Kenyan larger cities respectively in East Africa.

There are a number of researches done on mobile phone communication and development for less developed countries. In many of these researches women are patterned as the group that lags behind in many aspects. In a survey on "Mobile Phone and Poverty Alleviation: A Survey Study in rural Tanzania" [5], of 400 interviewed adult persons, 311 (77.75%) were men owning/using mobile phones while only 89 were women (22.25%). The survey states that it was more difficult to find women who own/use a mobile phone than men. The obvious question here is; what causes this difference? In the article "Mobile Communication and Society, ICTLogy" [6], the argument is that, in less developed countries the mobile phone is the first private telephone available to the family. It is a collective device for incoming and outgoing family calls, and thus all members of the family use it. Due to its nature, being mobile, sometimes this phone gets out of the house under the mother's supervision. Therefore, the expectation would have been, more women own/use phones than men.

Women are involved yet simultaneously excluded from user groups and their households endowments due to traditional practices and established norms of gendered exclusion, formal rules of membership, social perceptions regarding women's ability to contribute, a process referred to as "participatory exclusions" [7]. In an article titled "Gender and Social Complexities in Natural Resource Governance" [7], the authors stated that "Poverty may ensure that women from the poorest social classes (and lowest castes) are particularly resource-dependent, but at the same time, their social position

excludes them from participating in the management of that resource." This was the case of natural resources. These said scenarios were observed in some parts of Asia (Vietnam) and Latin America. In most parts of Africa, food production is the major activity of rural women and their responsibilities and labour input often exceed that of men [8]. This is also reflected in an article by Foeken, et al:

> Traditionally in most parts of Africa, women are responsible for household food provision, and farming is relatively easy to combine with the care of children. Women also often have lower educational levels than men, so it is difficult for them to compete in a shrinking labour market [9].

Therefore, women are stereotypically taken as a group that is not a contributor to the social developmental cluster in Sub-Saharan Africa while the reality at ground is not.

The stereotypical difference shown here suggests that women in the less developed countries may not receive the benefits the mobile phone technologies can provide. Therefore this society is imbalanced, which suggests that mobile telecommunication may be used to amplify gender inequalities. Some literature argues that mobile phone communication increases the information flow and reduces the costs of travelling and distances while other studies have associated the mobile phone with social economic development, poverty alleviation and reduction of digital divide [10]. In many regions of less developed countries there may not be an alternative to wireless communication because of high costs of deploying a fixed-line telecommunication infrastructure [11]. In that case the value of mobile phones to an individual is greater because they provide a point of contact and enable users to participate in the economic systems. One of the aims of this research is to identify the particular challenges that gender inequality poses to mobile phone solutions to development and how these can be met.

Another role of this research is also to suggest possible connections between mobile phone use and gender inequality, and highlight specific areas needing future research on the topic. An interesting question is how we can ensure that mobile phone communication technologies in less developed countries do not deepen gender inequalities, leading to long-term negative consequences for economic growth and

human development, but instead empower women and girls and benefit communities as whole.

2.2   Problem statement

Due to its higher acceptance to most societies in less developed countries, mobile telecommunication invention is assumed to have more positive than negative impacts. In Tanzania, it is estimated that over eight million Tanzanian's own/use more than one mobile phone [5]. As of 2009, the estimated population of Tanzania is 43,739,000 [12]. Figure 1 shows the growth curves of mobile phone subscribers and the fixed phone line in Tanzania as of year 2000 to September 2009. The fixed line phones stayed almost constant after the introduction of mobile telecommunications. It is a clear sign of the acceptance of the mobile phone. Fixed phone lines remained almost constant for the last eight years while the mobile phone showed a steady increase.
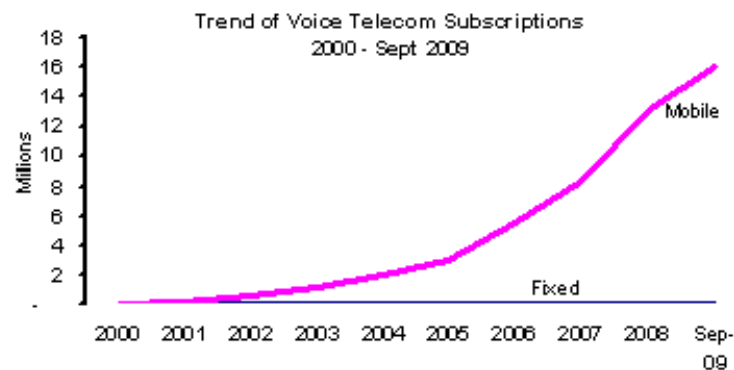
Figure 1: Fixed and mobile voice telecom subscriber's trend in Tanzania [13].

Mobile phone solutions are now becoming a necessity which gives a person flexibility and puts the world into one's pocket. Mobile phone manufacturers are trying to cater for the need of each class of people. The problems that this research is trying to address are:

Why in less developed countries women are not utilizing the opportunities posed by the mobile phone equally to men?

What are the particular challenges that gender inequality poses to mobile phone solutions in development and how to meet them?

Also the research tries to suggest possible connections between the mobile phone use and gender inequality, and highlight specific areas needing future research on the topic. The issue of assurance that the mobile communication technologies in less developed countries do not deepen gender inequality is also going to be dealt with this research. The general idea is that the mobile communication technologies should lead to long-term positive consequences for economic growth and human development, and empower women and girls to benefit the community development as a whole.

In a survey done by Vodafone on "Impact of mobile phone in Africa [10]", the mobile phone can improve economic growth, quality of life and social capital. According to the study 62% of the small business surveyed in South Africa and 59% in Egypt said they had increased profits as a result of mobile phones, in spite of the increased call costs. Overall, the respondents said increases in profits attributed to the use of mobile phones were due to a combination of reduced travelling time and costs, increased customer numbers and higher turnover. According to the study 85% of those surveyed in Tanzania and 79% in South Africa said they had more contacts and better relationships with family and friends as a result of mobile phones.

2.3   Objectives of the study

2.3.1   Main objective of the study

The purpose of this study is to weigh up the impact of the mobile phone on to gender inequalities among the less developed countries specifically in the southern highland of

Tanzania-Iringa. The study will try to reveal the problems in the inequality in the usage of the mobile phone in Iringa as a model for other Sub-Saharan African rural areas. However it must be taken into consideration that this is not a general trend applicable everywhere due to the fact that some of the less developed societies utilize the opportunity posed by the mobile phone equally or even more women being involved than men, as noted in the Jamaica case discussed in chapter 3.

2.3.2   Specific objectives of the study

This research is based on the exploratory approach. I will explain and clarify the preliminary concepts over the course of this study. Below are the four objectives of this research:

i.   To identify reasons why the number of women owning/using mobile phones is smaller than that of men

ii. To identify which group of women when grouped on the basis of marital status (married, single, divorced, widowed) owns/uses a mobile phone more often than others

iii. To identify reasons for having phones among women

iv. To suggest possible connections between mobile phone use and gender inequality, and highlight specific areas needing future research on the topic

2.4   Justification and significance of the study

The research findings could be useful in the mobile phone business aspects. Africa is a huge mobile phone market currently. The research findings could sharpen mobile phones business focus. The mobile phone business industry will be able to deploy new strategies to capture the women's mobile phone market segment in the less developed countries. For policy makers, the findings could be useful, that they will understand the impact of mobile phone to women for the development of the society. In the article titled "Mobile Communications in South Africa, Tanzania and Egypt [10]" the

argument is that understanding how people use mobile phones is important in informing policies that are seeking to increase access to such services.

This research will generally raise awareness among societies, about the reasons of why women in less developed countries are not practicing equally in this new era of mobile information flow. The findings could be of great use to policy makers. They are also important to developers and development organisations in which innovative, mobile phone-based systemic solutions could be developed or modified to reach as wide as possible segment of the community in less developed countries. The major focus should be in usability, applicability, feasibility and making the ideas transparent and transferable across different stakeholder groups.

2.5   Conceptual framework of the study problem

The conceptual framework (theoretical framework) refers to a type of intermediate theory that attempts to connect all aspects of inquiry (e.g., problem definition, purpose, literature review, methodology, data collection and analysis). It represents a map that gives coherence to the empirical inquiry as illustrated in figure 2.

There are various studies that recognize and agree on the importance of addressing the problem of women as a lagging group in utilizing the opportunities the mobile phone poses to society.   They also agree on the context of eliminating and reducing the economic and social factors influencing the problem. There are however, different ways of dealing with the problem. This study explores and highlights some of the factors which influence the existing situation in rural Iringa.

In this conceptual framework factors that might contribute to the existing problem are categorized into three: basic factors, underlying factors and the outcome. The basic factors are demographic factors e.g., age, occupation, gender and marital status. These are the basic factors that I will work on to find out if they are the building blocks to the problem. These factors are taken into consideration due to my long experience in

society where the research was done. Being a member of that society, I believe that these are probably the main building blocks to the said problem.

The underlying factors are the outcomes of the basic factors. The first underlying factor is mobile phone applications. They may be favouring one gender, be difficult to use or unfit to their society needs or they use a foreign language. The second underlying factor is the mobile phone model. May be some model's usability is more complex than another, it costs more than another or is more available than another. The third underlying factor is whether the mobile phone is for family or private use. If a mobile phone is for family, then it means that either the mother or father will use it more than the other. The fourth underlying factor is gender restrictions. Gender restriction is taken as one of the underlying factors because in some small rural societies, women are the assistants of their men. That means they will follow the orders that are given by their men. In this respect, it is possible that, the mobile phone is a social and economic bridge tool, and thus women will probably be given restrictions on the practices of using it. The outcome of all these factors is that fewer women utilize the opportunities the mobile phone poses to society as illustrated by figure 2.

Basic Causes	Underlying Causes	Outcome

Demographic Factors

Age

Occupation

Gender

Marital Status

Mobile Applications
- Favours one gender
- Difficult to use
- Unfit to their society needs
- Language

Mobile Model
- Usability
- Costs
- Availability

Personal or Family phone
- Freedom of use
- Air time costs

Gender restrictions
- Favours males
- Motivates dishonesty
- Family problems

Less women who utilize the opportunities mobile phone poses to society

Figure 2: Conceptual framework of the study problem

3 Literature review

3.1 Overview

This chapter aims at examining and analysing the previous studies on gender and mobile phone for rural development in the less developed countries.

In the world of telecommunications, the year 2002 marked a new historic turning point worldwide. In that year a new telecommunications historic era was marked when mobile phone subscribers overtook fixed-line subscribers, as indicated by Feldmann et al [3]. This new historic turning point brought with it a remarkable number of implications, mostly on the access to both basic telecommunication services and the information and communication technology (ICT), as a new tool for social and economic development. International Telecommunication Union (ITU) in their report about "Mobile overtakes fixed: Implications for policy and regulation", noted the following:

> It is also noteworthy that the phenomenon of the mobile cross-over has taken place across geographic criteria such as countries, regions, and continents, across socio-demographic criteria such as gender, income, or age, and across economic criteria such as price premium for mobile (micro) or GDP per capita (macro) [3].

Increased access to telecommunication services has a direct impact on the socio-economic development of a society. There are many positive impacts on increased access to telecommunication services in rural societies, for example rural societies which had difficulties accessing medical services information due to poor road infrastructures, can now get that information through mobile phones. Rural societies with their backbone economy basing on agribusiness, can now enquire the price of their products from one point of sale to another and hence decide where to sell before travelling to the selling point. A rural society can now save some money and time to travel from one place to another in search of relatives and friends, by maintaining their

social relationships by calling or writing text messages [14]. Mobile telecommunication has brought a totally new culture to almost every society on the planet.

The survey on "Mobile Phone and Poverty Alleviation: A Survey Study in Rural Tanzania [5]" which involved 400 respondents, reported a few factors that forced rural residents to thrive towards buying mobile phones. The factors were: the majority of the respondents (74%) purchased mobile phones for maintaining social relationships, 13% of the respondents purchased mobile phones for keeping in contact with friends and spouses, 7% was for business purposes, emergency situations 5% and other reasons, such as prestige, 1%.

3.2 Mobile phone penetration and teledensity

Figure 3 illustrates mobile and fixed telephone subscribers worldwide, between 1982 – 2005, and countries with more mobile than fixed telephone subscribers in 2001.
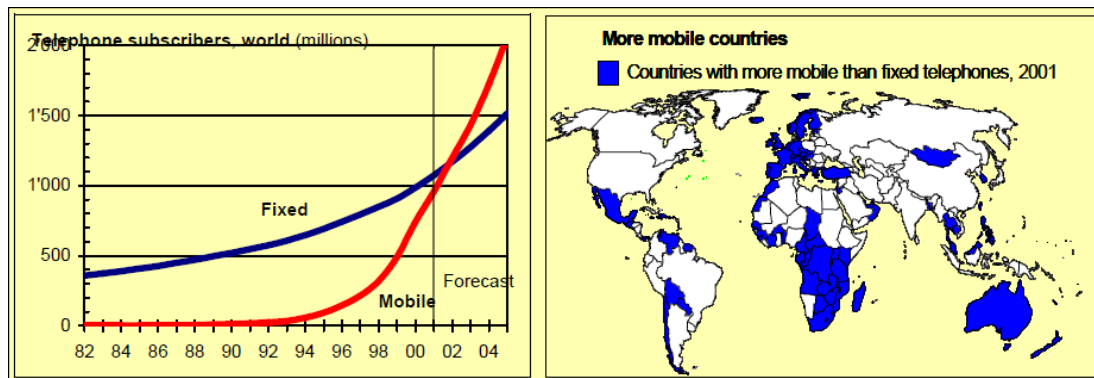
Figure 3: Mobile as the new global network [3].

Note: In the left-hand side chart of figure 3, 1982-2001 is based on real data whereas 2002-05 on projections made in 2002. In the right-hand side figure, countries that are shaded had more mobile users than fixed lines, as in late 2001.

Tanzania was one of the first countries in Africa which responded to this historic turning point in telecommunication history as seen in figure 3 right-hand side. The mobile phone subscription growth rate has been remarkably increasing to date. In

Africa, the landline telecommunication infrastructure was very slow. That is why it was remarkable when this fast alternative came.

Figure 3 shows an indication of the vigorous subscription rate as the number of subscribers started to shoot visibly in the year 2002. This indication predicts a great acceptance of this technology among Tanzanians. For most Tanzanians this technology has been accepted and become part of their culture. It has proven to be a helping tool in many aspects, especially in the rural areas. The mobile phone penetration rate is illustrated in figure 4. The growth rate has been steady as of 2001 until September 2009, and the prediction is that there will be a further steady growth in the future.

The voice subscriber's growth rate and teledensity are reported annually on the Tanzania Communication Regulatory Authority [13] website. Figure 4 illustrates the overall growth rate of both the number of fixed network subscriptions and that of the mobile phone network subscriptions. The effect of the growth rate for fixed network subscriptions is small compared to that of the mobile phone network subscriptions as illustrated by table 2.
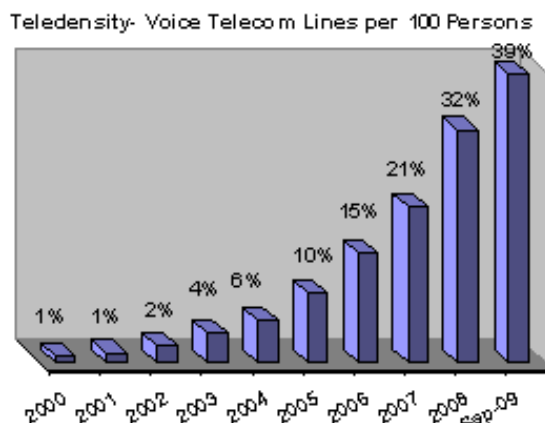
Figure 4: Fixed and mobile phone penetration in Tanzania [13].

Table 1 shows the steady increase of licensed telecommunication operators in Tanzania as of 2000 to September 2009. Due to the existence of the potential market the number of telecommunication operators is increasing in the country. The number of Internet Service Providers (ISP) has been increasing as well.

Table 1: Licensed telecommunication operators in Tanzania [13].

Years	Number of Voice Mobile Operators	Number of ISP/Data Operators
2000	5	11
2001	6	17
2002	6	20
2003	5	22
2004	5	23
2005	5	23
2006	6	25
2007	6	34
2008	6	60
Sept 09	6	62

The increase of voice subscribers and teledensity (table 2 and figure 4), could be attributed firstly to the affordability and the ease of maintenance of mobile phones. The second reason could be the introduction of value added services in the mobile phone services such as caller number display, voice mail, call forwarding, call waiting, conference calls, long-distance Internet Protocol (IP) telephony and short message services (SMS) [15].

Table 2: Fixed and mobile phone voice subscriptions in Tanzania [13].

Years	Number of Fixed Network Subscriptions	Number of Mobile Network Subscriptions	Total Number of Subscriptions	Teledensity (Penetrations)
2000	173,591	126,646	300,237	1%
2001	177,802	275,560	453,362	1%
2002	161,590	606,859	768,449	2%
2003	147,006	1,295,000	1,442,006	4%
2004	148,360	1,942,000	2,090,360	6%
2005	154,420	3,389,787	3,544,207	10%
2006	151,644	5,614,922	5,766,566	15%
2007	163,269	8,322,857	8,486,126	21%
2008	123,809	13,006,793	13,130,602	32%
Sept 09	181, 671	16,051,647	16,233,318	39%

Figure 5 shows the pricing rates of On-Net call i.e., calling within the same operator and Off-Net call i.e., calling between different operators. The prices are for East Africa and

International calls as of 2000 to September 2009. The On-net calls and Off-Net calls are the two terms which differentiate customers that are directly connected and indirectly connected to a voice (switched) network, as discussed in abbreviation and terms section.

According to figure 5, prices are generally falling down over time. One explanation for this could be more service providers who are targeting the same market. That scenario has been natural in many aspects. Consumers have a higher possibility of benefiting when many suppliers are supplying a common product. This is not fully true because customer care is inadequate, the interconnection charges are still high when compared to other similar markets, and these operators collude due to lack of clear government regulations [15].
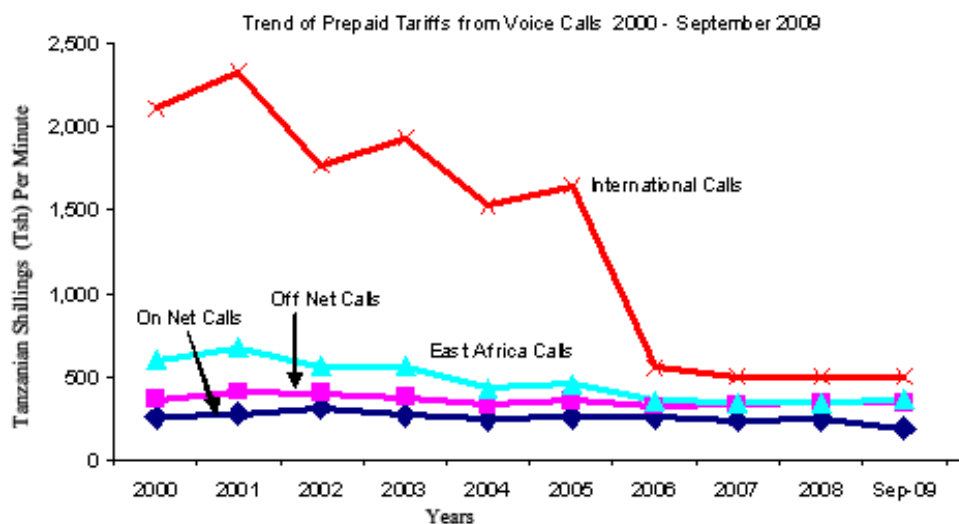
Figure 5: Trend of prepaid tariffs (Tsh)[1] from voice calls in Tanzania [13].

Therefore, there is no doubt that the mobile phone historic turning point was well accepted by most of the Tanzanian societies. It was also noted by Feldmann et al [3] (in their report on "Mobile overtakes fixed: Implications for policy and regulation", that):

> It is also significant that the greatest impact of mobile communications on access to telecommunication services in other words, increasing the number of people who are in reach of a telephone connection of any kind can be seen in developing countries. This is partly because cellular networks can be built

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[1] One Euro (1€) is equivalent to about 1,800Tshs (Tanzanian Shillings) as of the last quarter of 2009

faster than fixed-line networks and can cover geographically challenging areas. Mobile services have served to boost competition, and prepaid models have opened access to mobile cellular for those who would otherwise not qualify for telephone subscription plans [3].

The citation is a reality in less-developed countries such as Tanzania. The mobile phone took a remarkable pace from the beginning due to its implementation flexibility. The mobile telecommunication infrastructure has proved faster to implement compared to the fixed line in less-developed countries. In general the mobile phones become accepted also in rural areas due to its affordability. They are cheap compared to PCs and they do not require a certain level of technological literacy for users. Mobile phones are used by even those who are not able to read or write. Further-more they are easy to carry, which means one can have communication literally wherever. Being reachable literally wherever, is a very important factor for rural residents.

Millions of mobile telecommunication subscribers have inspired researchers who can be categorised into different groups, those who find out function of market mechanism underpinning the spectacular spread of the new technology across the planet, those concerned with the economic development and who see the mobile phone as an enabler of broad-based prosperity and those concerned with describing the social and cultural implication of its use [16]. All of these researcher categories together contribute to a wider understanding of the implication of mobile phones and personal communication technologies. My study focuses on the latter category, a category of those who are concerned with describing the social and cultural implication of the mobile phone use. I believe this is the major aspect that will foster the economic development if well understood among stakeholders, in this case the people of rural Iringa.

In most eras of technological breakthrough in the past decades, the mobile phone era has proven to be the most accepted era. This is measured through its highest penetration rate in most of the societies regardless of economic, social, geographical or political boundaries.

The mobile phone demand across Africa is huge and its expansion is rapid. The mobile phone access growth rate in 2001 was 3%, but in 2004 the number of subscribers had

grown up to 50 million, which was 7% of the entire African population [17]. Recently, the African News website reported that; "The International Telecommunication Union (ITU), an agent of the United Nations said; Africa has the highest growth rate of mobile subscription." Further in its report, the agent said; "two thirds of the world's cell phone subscriptions are in developing nations and a quarter of the population is in Africa". The report noted that "while just 1 in 50 Africans had a mobile in the year 2000, now 28 percent have a cellular subscription" [18]. Therefore, Tanzania's penetration rate (39%) is higher than that of the entire African continent.

There is no doubt about the rapid expansion of the mobile phone subscription rate in African countries and specifically Tanzania. The two sources have indicated a potential growth rate of the mobile phone subscription in Tanzania. One problem that is obvious and needs further research is the fact that this massive growth rate is not gender balanced in Tanzania. I am interested in finding out why.

There is a common fact that has made women to be the group that lags behind in formal economy as stipulated by Pigato below:

> Gender inequality for access derives from the relatively higher levels of illiteracy among the female population and from the lower level of female participation in the formal economy. In most developing countries the vast majority of the female labor force remains confined to rural areas partaking in predominantly subsistence agriculture, while men tend to dominate in industrial and service-based employment. Women have a number of relative disadvantages compared to men that inhibit their access to ICTs including the competing demands on their time both as homemakers and workers [19].

This old fact still prevails among most of the less developed countries. The situation has been improving in recent years when compared to the last century. The question that I would like to raise here is: Are women's traditional roles a cause for modern-day gender inequality even in the case of mobile phones, which are said to be gender neutral tools?

The percentage distribution between women and men in the case of owning/using mobile phones in Tanzania is revealed by the survey on "Mobile Phone and Poverty Alleviation: A Survey Study in Rural Tanzania [5]". The survey was conducted during

the same time when the "Quantity versus quality" survey was done. The survey reported that the number of women who own/use mobile phone is less to that of men, but it must be taken into consideration that in some developing societies the number of mobile phone owners might be small but because they share the few mobile phones, and then the number of users will is bigger. Therefore, wherever one finds "own/use" phrases in this thesis, I have taken it as a generalization factor and it is not specific. Below is one of the statements that prove the presence of a visible gap in the using/owing of mobile phones between women and men.

> Although the study aimed at having equal number of men and women among respondents, we were able to find much fewer female who own/use mobile phones than males who own/use mobile phones. For our sample we finally got 311(77.75%) men who owned/used mobile phones while we only found 89 women (22.25%), [5].

The total number of respondents was 400. This is a very serious issue that needs further research. There must be some explanations especially of the massive mobile phones penetration rate in Africa. Therefore, one of the major aspects of this research is to find out the factors that contribute to this clear gap. For the Jamaicans the scenario is different, since for them the usage has achieved 94% while the prevalence is 96%. These percentages span users of different groups such as age ranges, gender and social status [20].

The imbalance that Tanzanians are experiencing is thus different from the situation in Jamaica. More discussion on mobile phone situation in Jamaica is presented in subsection 3.3.

In most societies, less developed or developed societies, the highest priority between information technology and basic needs (i.e., food, water, shelter and health care) is given to the latter. Information technology is often considered to be a low priority. A study on "Impact of Cell Phones on Grain Markets in Niger [14]" criticises this pattern: Information technology is favoured instead. If information technology can be well integrated between these basic societal needs, it can become an important tool for speeding up the development progress between farmers, traders and consumers.

According to research findings, information technology, if well utilized results in positive outcomes as stated:

> The results provide evidence that cell phones reduce grain price dispersion across markets by a minimum of 6.4% and reduce intra-annual price variation by 10%. The primary mechanism by which cell phones affect market-level outcomes appears to be a reduction in search costs, as grain traders operating in markets with cell phone coverage search over a greater number of markets and sell in more markets. The results suggest that cell phones improved consumer and trader welfare in Niger, perhaps averting an even worse outcome during the 2005 food crisis [14].

The findings give another proof of how the mobile phone technology is important for development. Society development activities are achieved by both men and women, technological innovations such as the use of mobile phones should also be equally utilized between the two groups. In Niger the grain market occurs only once a week, so therefore, traditionally traders had to travel long distances to potential sales market to obtain information on supply, demand and price. These practices were phased out in 2001 – 2006 when the mobile phone technology came into place as an alternative and cheaper method to grain traders and other market actors.

One idea that comes from this research is that, traditionally, men were mostly involved in the grain business chain. The activities that involved long distance travelling in Africa were mainly for men. Therefore, the mobile phone technology invention should involve both groups now. The travelling activities are not necessary anymore for the grain business chain. The research does not reflect the actual involvement of gender in the business, but the assumption is that there could be an improved situation after the mobile phone technology when compared to previous practices. The remaining question is: to what extend the utilization of technology balanced between men and women?

Some authorities argue that the mobile phone generally is a gender neutral tool due to the way it is used. A survey done by Scott et al [17] on "Impact of Mobile Phone in Africa", a report prepared for the Commission of Africa, states:

It is interesting to note that this research recorded remarkably few differences between the way men and women use phones - both in terms of patterns of use (where they access, and how intensively they use), and purpose (what they use them for). This indicates that the phone appears to be a gender neutral tool [17].

The report reflects that there is a need to consider constraints that are facing women in access to and use of mobile phones. The preliminary evidence from Scott's findings shows that a mobile phone is a gender-neutral tool. This being the idea, the expectation for the Tanzanian case needs further research highlights.

3.3 Gender and telephony in Jamaica

Gender and the mobile phone in Jamaica takes a different face when compared to Tanzania. Tanzania and Jamaica are taken into account because both countries have one common group of their people, people who are said to be living at "the bottom of the pyramid". It should be understood that the comparison is not one to one. Jamaica's mobile penetration rate exceeds 94% for both women and men [20]. A national household research on the mobile phone (DIRSI), which was conducted in Jamaica by UWI's Telecommunications Policy and Management Programme (TPM), reveals that women enjoy a 2% higher level of mobile phone usage than men.

94.9 % of women and 93.1% of men used a cell phone in the last three months. The data suggest mobile telephony constitutes a common, long standing, and constant feature in the lives of a large majority of Jamaicans. This is supported by 69% of the respondents who report that they have used the mobile phone for a period of four years or more, which is consistent across both genders: 67.5% and 71.6% of male and female users respectively [20].

For me, this is a very interesting aspect. What makes these differences? According to "Mobile Phone and Poverty Alleviation: A Survey Study in Rural Tanzania [5]" the findings suggest that in Tanzania the number of women owning/using a mobile phone is roughly 1 to 3 of their counterpart men while the Jamaica case is totally different. One idea that comes into my mind is that, even if some determining factors between the two countries are the same, there are significant differences between the different societies of the different cultures that need to be researched. This research will contribute to this

topic by comparing these two cultural contexts, i.e., Tanzanian culture and that of Jamaican, in subsection 6.6.

3.4 Information supply deficit

There are clear variations between the information demand between urban and rural societies and the appropriate technological methods for providing them. The outcomes of the survey which was done in the households of Nepal and India suggest that poor societies trust information given from their trusted family members, friends and the local leader but do not trust formal sources of information such as from a Non-Governmental Organisation (NGOs), newspapers or politicians [19].

Only 2% of low-income urban societies use advanced Information and Communication Technology (ICT) i.e., Internet, fax and computers in both countries, which means the rural society is digitally divided in the aspect of advanced ICTs. The reasons for the division are obvious: the infrastructure is always from urban to rural, literacy and many of the like and therefore rural societies will be the last to be considered, and that will be possible if the demand allows. One problem of relying on informal network for poor societies is that, the information supplied is not sufficient for their needs. The general groups of information categories are the following: the urban poor would such as information regarding employment or job trainings while the rural poor societies will require extra information regarding agricultural practices, market and prices.

Similar studies of Small Medium Enterprise Development (SMEEs) conducted in Tanzania and Botswana show the same trend that poor societies depend on informal networks for information needs. Access to ICT is very low for various reasons. For example on the Internet, the provided content is mostly not relevant to the information needs of the society. Secondly, the off-the-shelf software is not well contextualized for the local SMEEs. [19]

However ICT is not only Internet, fax and computers. Mobile telecommunication is also in the same category. The latter has proven to meet the information demand of both societies. Most mobile telecommunications service providers start their services in urban societies. Due to its high demand the urban market becomes saturated very fast and then the next target group is the rural society. This is taken from the experience that I have got in Tanzania where almost all the new telecommunication service providers started their services in big cities. After they were well established, they started to layout infrastructures into rural areas along the main road network throughout most parts of the country. My parents are the victims of this situation. They live in a remote village. They started to use the mobile telecommunication services in the second quota of 2009.

It is evident that access to ICT can have a direct impact on improving the living standard and quality of life of the poor. The direct impact on poverty alleviation, through growth and productivity, has long been recognized [19]. Therefore, the mobile phone technology seems the most probable solution to the digital divide between different societal groups. Many countries have experienced a real revolution in mobile networks particularly where fixed wire networks are underdeveloped mainly due to factors such as lack of business innovations, unreliability of fixed lines, common fixed line faults, wrong bills (people are billed incorrectly or overcharged for their phone use) and poor maintenance [15]. However tariffs for mobile cellular access represent a considerably higher proportion of Gross Domestic Product (GDP) per capita at present.

The mobile phone is well accepted invention between the two groups of societies. In Tanzania the technology started first in most urban cities due to the presence of infrastructures such as roads and electricity. However, due to easier and faster deployment of the technology even to the remote areas driven by demand, service providers started to spread the mobile phone access points all over the country. They started mainly on the highways that connect the regions. The access points are powered by generators which use fuel. This is one factor that makes the whole business expensive for the subscribers, but still the subscription growth rate is increasing.

According to "Mobile Phone and Poverty Alleviation: A Survey Study in Rural Tanzania", the airtime cost does not seem to be an obstacle to those enthusiastic rural subscribers who get extra trouble by owning a mobile phone [5]. Apart from airtime costs, the running cost is a considerable factor as well. In most villages of Tanzania, many households do not have electricity in their homes. Therefore they need to face extra running costs which include maintaining and charging the phone batteries. This requires one to travel a distance of several kilometres to get to the place where there is electricity for recharging their phone batteries and that requires some payment for the charging service. The survey studied the villages located within or close to the mobile phone network coverage and came out with the following figures:

> The study revealed that 62% of the respondents fund their mobile phone use through business or agribusiness, 28% get their airtime and recharge fees as gift and 15% pay their airtime from their salary. Interestingly, our result revealed that 48% of the respondents reported that they sometimes substitute important needs (eg., education, buying food and clothes) for mobile phone ownership/usage [5].

These findings give me more motivation to continue further with the analysis of the gender imbalance in the mobile phone. I am interested in finding out whether the extra cost of time and inconveniences for maintaining phones in rural Iringa are among the factors that create the present gender inequality to the use of the mobile phone, a gender-neutral tool.

May be women in the rural societies are not able to cope with the owning and maintaining the mobile phone due to poor infrastructure conditions and living standards. Perhaps due to these circumstances the household decides that the man will be responsible for having the mobile phone and the woman not; if so, why not the other way around? Just to mention a few of my doubts, there are many competing explanations that need to be evaluated, and that is possible through this research.

I am also motivated by the fact that neglecting these differences between men and women in technology will continue to affect the economic growth of the society. A research done by World Bank 1999 suggested that a higher rate of the economic growth of a certain society is associated with the increased rate of gender equality [21]. If the

equality of man and woman is a developmental aspect, then the economic growth rate as one measure of development will be increased. Therefore, there is a great need to find out why the Tanzanian society, especially those in the southern highlands, have that big gap between women and men in owning/using mobile phones.

4 Research methodology

4.1 Area of study

This research was conducted in the Iringa region located on the southern highlands of Tanzania. Tanzania is in East Africa. As of 2009, the estimated population of Tanzania was 43,739,000. The economy is mostly based on agriculture, which accounts for more than half of the Gross Domestic Product (GDP). Agriculture provides 85% (approximately) of exports, and employs approximately 80% of the workforce. Its main exports are Sisal, cloves, coffee, cotton, cashew nuts, minerals, tobacco. Tanzania has an area of 945,087 square kilometres. Its GDP Per Capita was 1,400 United States Dollars (USD), an estimate for the year 2009. [12] [22]

The Iringa region is bounded by the Ruvuma region in the south, Mbeya region in the west, Dodoma and Singida in the north and northwest and Morogoro region in the east. The region has six administrative districts namely urban Iringa, rural Iringa, Njombe, Ludewa, Makete and newly established Kilolo district. The study was conducted in rural Iringa, as illustrated by figure 6.

Sketch Map of Tanzania
showing Iringa region

Sketch Map of Africa showing Tanzania
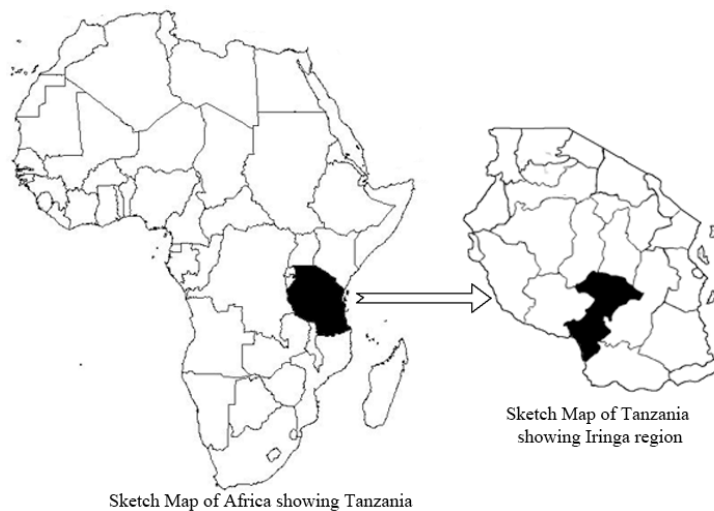
Figure 6: Map indicating the research area of this study in Tanzania

This area was selected on purpose because I am an employee of Tumaini University -
Iringa University College, which is situated in the region, and currently studying in
Helsinki Metropolia University of Applied Sciences in Finland. The research was done
during the summer of 2009.

This was a quantitative research based on exploratory data. A quantitative research
measures how many people from the selected sample population (usually more than 50
respondents), react, feel or think in a particular way. Therefore, a structured
questionnaire was used which comprised mainly of closed questions i.e., questions with
a set of responses to choose from. The open ended questions were also included in order
to get some general input from the respondents. Using the common concepts that come
from the open ended questions, coding was done for their quantitative analysis
procedure.

4.2   Population, sample and sampling procedure

4.2.1   Population

The population of this study comprised of households living in 10 randomly selected
villages in rural Iringa. These households were also randomly selected in those villages.
The main focus was on women, but a small sample group of men were also involved to
give a different angle of perspective to the research problem at hand. The questionnaire
and general survey were randomly distributed to the residents of the randomly specified
villages for responses and later in the day they were collected.

4.2.2   Sample size

In order to get large enough samples, I visited 10 villages that are within the mobile
network coverage in rural Iringa. There are more than 20 villages in rural Iringa, and
almost all are in the mobile network coverage area. I believe 10 villages are optimal for

an optimal result. The data from the 10 villages would give highlight to the stated problem but could not prove the statistical validity because the sample size is tested for various dimensions. Most of these villages are located along the main roads, such as Dodoma road, Mbeya road, Morogoro road and the main road to Ruaha National park.

Using the random procedure, 20 small papers with village names written on them, were folded and put into one container mixed, then blindly and randomly, 1 - 10 papers were picked and their names listed. Those were the villages that I used for data collection. Therefore, the selected villages were: Ifunda, Isimila, Kalenga, Kidamali, Kikombwe, Lyamgungwe, Malagosi, Ugwachanya, Ulete and Wenda. Chapter 5 depicts all the analytical outcomes of the study.

4.2.3   Sampling procedure

The sample in the 10 selected villages included more women than men, both those who own and those who do not own a mobile phone. The total sample population was 160 participants. The sample included women of different age groups, from teenagers to adults. The occupation and family status was the other sampling strategy that was used in this research. I am optimistic that with this kind of population sample groups the results will be representative of the situation in the region (rural Iringa) as a whole.

4.3   Research design

In this study, a descriptive quantitative research approach was employed. In short a descriptive approach means to describe phenomena as they exist. Descriptive studies generally take raw data and summarize it in a usable form. Data are collected from questionnaires, interviews or observations. This is the approach that I used in this research that allowed me to employ various research techniques during the course of the study, i.e., starting from questionnaires, discussions and interviews. One of the advantages of this method is that it is less expensive than other methods and it is time-efficient.

4.4   Data collection procedure

The data collection procedure involved getting permission from the district officials to go to the randomly selected villages. I was given a letter of recognition which was handed to the ward leaders who gave permission to enter their villages. When in the village I randomly selected two local volunteers who became my research assistants. I gave them a short training of what I wanted to be accomplished and how the questionnaires were to be filled. The test to them was to fill each one questionnaire. When I was satisfied, I gave them more questionnaire papers to have them filled by randomly selected households. I together with one of the volunteers went house by house asking people to fill the questionnaire papers and a few for verbal interviews. The idea of getting local volunteers seemed to work well because respondents had no problems filling and responding to the survey. They had trust in the people that they knew were from within the village.

Some questionnaire papers were left in some villages to be filled by respondents themselves due to the distance and time to leave to the Iringa town where I was residing and were collected the next day by the two volunteers. The problem of leaving some of the questionnaires in the villages unattended resulted in difficulties to collect them, but the general turnover was very good.

4.5   Data analysis methods

The questionnaires were analyzed by means of descriptive statistics such as means, standard deviations, frequencies, percentages, and cross tabulations. The items of the questionnaires corresponding to the respective specific objective were put together and the frequencies of the questionnaire response options selected were tabulated. The percentages of the frequencies were calculated and graphed using bar charts. The statistical Package for Social Sciences (SPSS) [23] application was used to make the task of this quantitative analysis of the data collected easier.

4.6 Questionnaire design

The main aim of the questionnaire was to find out the differences between men and women in utilizing the opportunities posed by mobile phone solutions in rural Iringa-Tanzania. The questionnaire included closed ended questions and open ended questions. It was categorized into 5 categories:

- General Information: village name, gender, age and mobile phone ownership.
- Occupation and mobile phone ownership/usage: specialization, mobile phone applications, men versus women in mobile phone ownership, percentage of women owning/using mobile phone in the village, mobile phone model and network providers.
- Marital status and access to mobile phones: marital status, duration of own/using mobile phone, options used to get a mobile phone, and if the mobile phone is for family use.
- Reasons for having mobile phones among women: why buy or own a mobile phone and the influence of the mobile phone on the income generation for women.
- Influence of the mobile phone on gender and power relationship is the last category. Appendix 1 shows the questionnaire design in detail.

It was expected that the data from the general information section of the questionnaire would show a logical relationship pattern between villages that were connected to the mobile network coverage earlier and those that had just joined. The gender was the main research issue and the age was used for getting different views from different age groups.

The occupation category had a question that aimed at knowing whether different categories of occupations, such as being a famer, an employee or a business person affected the mobile phone usage and ownership. In the marital status and access to mobile phones, most questions aimed at finding out whether marital status controled access to the mobile phone while the remaining two categories aimed at finding out

what the driving force to having mobile phones was and what influence the mobile phone had on the gender power relationship.

5 Data analysis

5.1 Overview

According to Kothari, [24] "data analysis refers to the computation of certain measures along with the search for patterns in relationships that exist among data groups". In this study, I am therefore interested in measuring the four objectives as stated in chapter 2.

Therefore, the study presents and discusses variables such as age and mobile phone ownership, occupation, gender and marital status as among many factors that contribute to the intended study problem in rural Iringa.

At the beginning of this chapter general information on the respondents will be provided and the presentation of data will follow. The questionnaire was translated from English into Swahili language; this was due to the fact that Swahili is the official language used for communication in Tanzania while English is an academic language. In the sample population group that I was working with, the majority did not go through advanced education levels, which mean they could not respond to the survey in English. Most of them had primary and basic secondary school education and therefore Swahili was the right language to use.

Being an exploratory research most of the findings from this research are presented in tables and figures to give a wider view of the problem. Some of the contradicting ideas are highlighted to leave room for further researches. Therefore, this research contributes partly to the larger idea of finding critical reasons that fits as explanations for specifically rural Iringa society on the issue of mobile phone use among women.

5.2 General information of the respondents

The research data were collected using research instruments mentioned in chapter 4 (questionnaires and interviews). The total number of respondents was 153. My main

interest was to get more views from the women group, and therefore that was the main group but I thought also that men could be used as a reference group to bring another angle of perspective and hence come up with logical findings. Therefore, the number of women surveyed was larger than that of men.

The survey had a total of 160 questionnaires that were given to interviewees in all 10 villages. The total response rate was 95.6% which means 7 respondents did not participate in the survey. The number of women was 104 (67.97%), and that of men was 49 (32.03%), of all whom participated in the survey. Table 3 shows the values in detail.

Table 3: Gender distribution of respondents

		Frequency	Percentage
Valid	Female	104	67.97
	Male	49	32.03
	Total	153	100.00

5.2.1 Age of respondents and mobile phone ownership

It was also in my interest to understand if age was one of the background variables. Different age groups were an important factor for getting various opinions on the factors that hinder women from utilizing the mobile phone opportunities. The age between 18-25 years (49.7%) had more respondents followed by 26-35 years (37.3%). The remaining groups had fewer respondents as indicated in table 4 and figure 7.

Table 4: Age distribution

	Frequency	Percent
< 18	1	.7
18 – 25	76	49.7
26 – 35	57	37.3
36 – 45	11	7.2
46 – 55	7	4.6
> 56	1	.7
Total	153	100.0
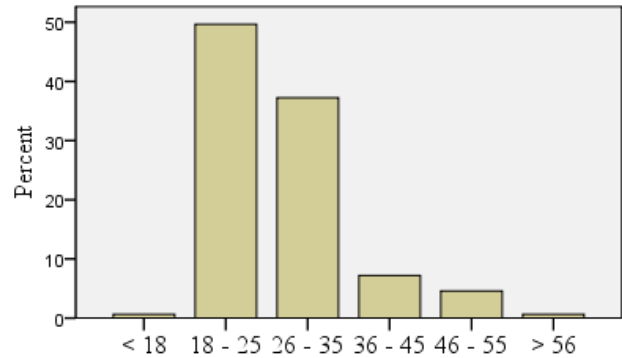
Figure 7: Age distribution

The age groups and mobile phone ownership are presented in table 5 and figure 8. The trend reveals that mobile phones are mostly for young people. In this case every age group is taken as a small sample size group. Each age group will have its varying sample size (n). Therefore, the percentages are calculated in reference to total respondents in every age group.

The age group less than 18 years had only one respondent who owned/used a mobile phone. This group had a very small sample size that I did not use in this analysis. If this group is taken into account the whole outcome will not give any logical explanation. The remaining groups with tens of respondents were used instead.

The majority of the respondents aged 26-35 years (75.4%) are owned/used mobile phones more often than the other groups. The next group is that of 18-25 years (61.8%), followed by 46-55 years (57.1%). The last group with respondents aged more than 56 years have 0% because the old respondent did not own/use the mobile phone. See table 5 and figure 8 for details.

Table 5: Age distribution and mobile phone ownership rate

Age distribution versus Mobile phone Ownership			
Age groups		Count	Percentage
	< 18	1	N/A
	18 - 25	47	61.8%
	26 - 35	43	75.4%
	36 - 45	7	63.6%
	46 - 55	4	57.1%
	> 56	0	0.0%
Total		102	
Average penetration rate (excluding the < 18 age group)			**51.6%**
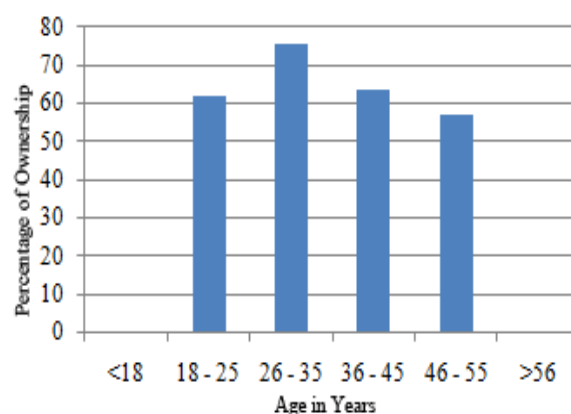
Figure 8: Age distribution and mobile phone ownership rate

The average penetration rate was about 51.6%. This is the penetration that was observed in August to September 2009 in rural Iringa. The penetration is higher compared to that of the entire nation during the last quarter of 2009 (39.0%) [13]. The rating variation is probably due to unclear registration regulations of mobile phones (handsets) and the SIM cards. The handset and SIM card module are not one to one. Therefore, it might be that the number of registered SIM cards that the national counting is based on, is lower compared to their real number in the field. The actual penetration rate in Tanzania will be possible to achieve after the national phone registration programme that is in progress [13].

However, these data reflects the reality of rural Iringa societies. It must be understood here that the result is, however, not conclusive because of various possible sample errors that can affect this result and many demographic and cultural explanations can be offered to this phenomenon. One explanation for this could be that the young age group is the one that enters the work force and labour market. According to my experience, in rural Iringa, most families are not capable of buying their children mobile phones. The majority of young girls and boys who get some income generating activities are then capable of buying their own phones. At this young age, they do not have much of family

commitments yet. Therefore they have some extra income to own and use mobile phones. This is a group that is normally active in exploring new things including the new technologies that come with mobile phones.

In the following subsection, the presentation of data follows the specific objective themes. Thus, all questions that address the respective specific objective are going to have their data tabulated and also presented into bar chart form for easy understanding.

5.2.2   Male versus female in mobile phone usage

Objective 1: *To identify reasons why owning/using mobile phones number of women is less than that of men*

In this specific objective, 8 questionnaire items were used. The results highlight the general reasons that contribute to making the number of women who own/use a mobile phone smaller than that of men. Therefore items 2, 5, 6, 7, 8, 9, 11 and 12 from the questionnaire list were used, see Appendix 1.

Item 5: *What is your specialization/occupation?*

Respondents to this question were 153 (100%) and the responses required were "farmer", "business", "employee" or "other". The "other" category was given for whatever occupation that one had. The respondents who responded to having "other" specialization/occupation apart from those in the list were mainly students. Table 6 and figure 9 show the outcomes.

Table 6: Occupation of the respondents

	Frequency	Percentage
Farmer	71	46.4
Business	14	9.2
Employee	44	28.8
Other	24	15.7
Total	153	100.0
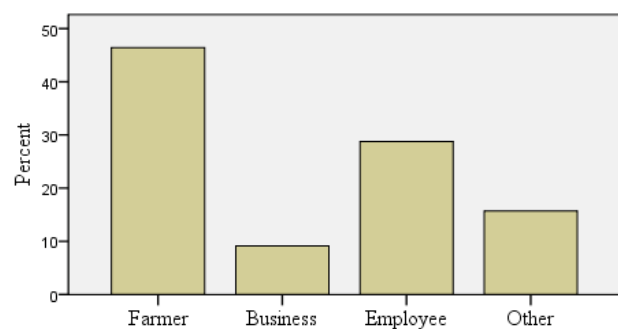
Figure 9: Occupation of the respondent

The distribution of how many women and men are diversified into different occupations is illustrated in table 7. The outcomes from the survey data show that most of the women that were surveyed in rural Iringa were specialized in farming activities. This is a common practice for most women in the rural areas of Tanzania. Farming is the possible activity which has a direct impact on their family's wellbeing and some economic aspects of life. In most cases the money that they earn from farming activities is not sufficient to cover all the necessary requirements including having a mobile phone.

Table 7 shows respondents in two small sample groups: the group of women in their respective categories i.e., "farmer", "business", "employee" and "other" while the second sample group is that of men also in their respective categories. The percentages were calculated using the total number of sample size i.e., *n=104* and *n=49* for women and men respectively.

As table 7 illustrates, the majority of women (50.0%) dealt with farming activities followed by 28.8% who were employed. The common formal employment options in rural Iringa are teaching and being a dispensary nurse. In Kidamari village, most women are employed by the "*safe bottled drinking water factory*". The "other" group (11.5%) comprised mainly of students.

Table 7: Occupation of female and male respondents

			What is your specialization / Occupation?				
			Farmer	Business	Employee	Other	Total
Gender	Female	Count	52	10	30	12	104
		% of Total	50.0%	9.6%	28.8%	11.5%	100.0%
	Male	Count	19	4	14	12	49
		% of Total	38.8%	8.2%	28.6%	25.5%	100.0%

For the male group, 38.8% of men were involved in farming activities, followed by 28.6% of the employed. The third category is that of "other" with 25.5% and the last group is that of business with 8.2%. The percentage values for the male group have some logical pattern as that of women, except for one, the business category. According to my experience men are the leading group in doing different types of businesses as a source of income in rural Iringa. However the result showed that in this society, women are mostly doing business. The explanation for this could be the sample size selection. In my opinion the sample is too small to draw a conclusion on its basis. Statistically, I expected to have some logical reality trend.

Item 6: Are the mobile phone applications gender-specific?
Respondents to this question were 153 (100.0%) and the responses required were "Yes" or "No". 95.4% answered "No" advocating that mobile phone's applications are not specifically meant for one gender. The remaining 4.5% agreed that mobile phone applications are gender specific. In this case, the fact that people view mobile phones as a gender neutral tool was confirmed. Table 8 and figure 10 show the results.

Table 8: Mobile phone applications are gender specific

	Frequency	Percentage
No	146	95.4
Yes	7	4.6
Total	153	100
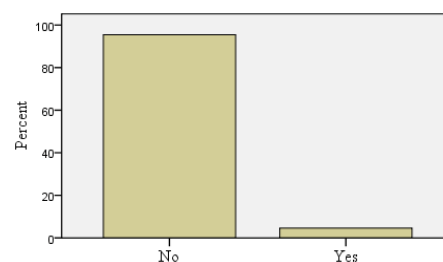
Figure 10: Mobile phone applications are gender specific

Item 7: Is there any specific mobile phone application that will suit more to women than men in Tanzanian context?

In this open end type of question the following were the commonly suggested applications:

i. Food types and how to prepare them
ii. Application specific to fight Sexual Corruption
iii. Agricultural practices
iv. Sexual relationships applications
v. Maternal and Child health applications
vi. Livelihood strategies applications
vii. Application specific to fight Sexual harassment
viii. Clothing fashions
ix. Child growth Education applications
x. Beauty applications
xi. Peer education applications
xii. Economic Self reliance
xiii. Marriage Education Applications
xiv. Automatic battery charging system using solar energy
xv. Swahili Language based applications
xvi. Match for cigarette smoking
xvii. All phones must have a radio application
xviii. Business skills application
xix. Application for wedding, meeting or related occasion decorations
xx. Application for technological advancement

A total of 20 suggested mobile phone applications were given. Therefore, this showed that there is a need to explore the mobile phone applications market in rural Iringa. I felt there is a strong need for application developers to do a thorough research on which application to be used in which market. Although it seems the built-in (off-shelf) mobile phone applications are not of great importance for rural Iringa, still the number of mobile phone owners and users is remarkable. This means that a mobile phone can have a great impact on society if the right applications for a specific society are employed.

Item 2 & 8: Gender and the question of "Do you believe that more men own/use mobile phone than women"?

In these two items the idea was to compare the opinions between women and men on the belief of who owns/uses mobile phone more than the other. There is a general understanding that more men own/use more mobile phones than women in rural Iringa. In this cross tabulation of the two items, the two groups of female and male are taken as a separate small sample groups. Their sample sizes were *n=104* and *n=49* for female and male respectively.

The following were the percentage outcomes as table 9 shows: 70.2% of women answered "Yes" accepting that more men own/use mobile phone. Therefore, the majority believed that more men own/use mobile phones than women. The majority (79.6%) of the men answered "Yes" as well, accepting that more men own/use mobile phone in rural Iringa.

Table 9: Gender and belief of mobile phone ownership

			Do you believe that more men own/use mobile phone than women?	
			No	Yes
Gender	Female	Count	31	73
		Total percentage	29.8%	70.2%
	Male	Count	10	39
		Total percentage	20.4%	79.6%

As a follow-up question to the belief in table 9, table 10 shows the rationale between women and men who own mobile phones in rural Iringa. Fewer women (57.7%) own/use mobile phones while 85.7% of men own/use mobile phones. Therefore, it is true that more men own/use mobile phones in rural Iringa than women.

The difference in the average penetration rates in table 10 (66.7%) and that of table 5 (51.6%) is because one age group (age group less than 18 years) was excluded in table 5 for analysis. The group had only one member who own/used mobile phone i.e., 100% group penetration rate. This figure was left because it would give wrong interpretation of the findings.

Table 10: Gender and mobile phone ownership

			Do you Own a Mobile phone?	
			No	Yes
Gender	Female	Count	44	60
		Total percentage	42.3%	57.7%
	Male	Count	7	42
		Total percentage	14.3%	85.7%
Total		Count	51	102
		Total percentage	33.3%	66.7%

Item 9*: If the answer for item 8 is "Yes" or "No" why? Item 8 asked if one believes that more men own/use mobile phone than women*

This was an open-ended question, where respondents answered freely expressing their opinions on why they believe that more men own/use mobile phones than women. There were mixed feelings about this and some agreed while some of them disagreed. Of all the 153 respondents, 75.2% of respondents participated in this item, giving a majority response while 24.8% of the respondent did not participate. Below is a list of filtered responses from the respondents who participated:

i. Men are mostly involved in family production activities. They possess the house economy. Our society puts man as the main responsible person in the family. They can do many difficult tasks such as packing heavy sacks of maize, potatoes for transporting them which brings family income. They also have more authority over women.

ii. Most rural women have no ability to buy and control mobile phones.

iii. Family mobile phone is mainly used by father, mother uses very rarely, only when she communicates with her relatives.

iv. Men have more income than women.

v. Most women who have phones, their husbands bought for them.

vi. They think if a woman gets a phone, she will use it for infidelity activities.

vii. Because most women have no employment.

viii. Use of mobile phone by a woman often brings up bad effects.

ix. Because of the ongoing entrepreneurship education, more and more women are now capable of buying their own phones and control them.

x. Men use telephone communication for business or work of any kind more than we women.

xi. For we younger girls who are still depending on our parents (not married yet and have no job), our parents feel that mobile phone will be used for hooliganism.

xii. Men buy their phones favouring themselves using the phones for infidelity activities.

xiii. Most women who have employment also have mobile phones.

xiv. Village economy is not very good here and mobile phone is very important for communication, therefore, if a family has to decide to have one phone, obviously this phone will be for the men of the house.

xv. Because men have more money than women, they will first buy a mobile phone for themselves and later buy for their wives.

xvi. Because I have been selling voucher (prepaid card from various telecommunication service providers) and discovered that 70% who bought were men and I used to charge mobile phone batteries too, and discovered that 60% of my customers were men.

xvii. It is because men are mostly involved in finding money and wealth than we women. We can find wealth and money but cannot be like men.

Item 11: If you own a mobile phone, which model?

To this item 103 (67.3%) respondents responded while 50 (32.7%) did not participate. In order to get the logical computation, the sample population size was (*n=103*), neglecting those who did not participate.

Table 11: Most owned/used mobile phone model

	Frequency	Percentage
Flash Lite	1	1.0
Mitsubishi	1	1.0
Motorola	11	10.7
Panasonic	2	1.9
ReignCom	1	1.0
Nokia	**75**	**72.8**
Siemen	5	4.9
Sumsung	5	4.9
Sony	1	1.0
Other	1	1.0
Total	103	100.0
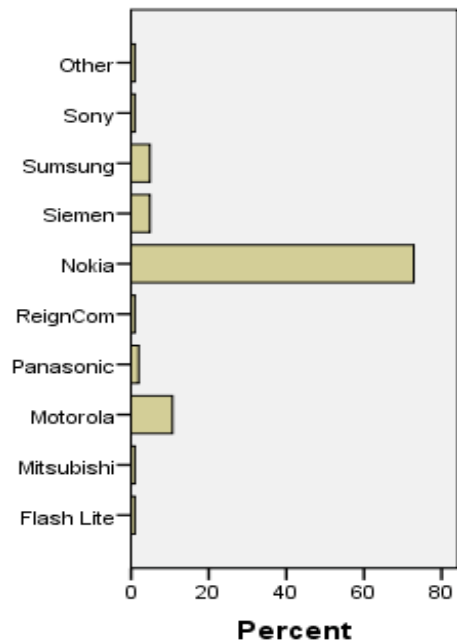
Figure 11: Most owned/used mobile phone model

Therefore table 12 and figure 11 show that the most accepted mobile phone model in rural Iringa is Nokia (72.8%). Most respondents were of the opinion that the Nokia model was expensive but easy to use and reliable.

Through discussion with most of the respondents, the main reasons for having the Nokia model as their first choice was that it is easy to use and it has a longer battery life. The concept of longer battery life was mostly stated. The reason for this in most of these villages is that, phone battery recharge means travelling to a nearby town where they have electricity and are doing phone battery charging services. Money is paid and time is consumed. Some models have a torch which is a good feature for village life. They a have long life span, liability is very good. They are mostly available in the market and some of their spare parts such as audio speakers, keypads etc., are possible to get in Iringa or Dar es Salaam. The problem for now is the counterfeit/fake Nokia products that are entering the market very vigorously.

Item 12: *Which Network Provider or Telecommunication operators do you use?*

This questionnaire item was asked due to varying prepaid tariffs from voice calls among various telecommunication operators. I decided to ask this question in order to find which telecommunication operator most rural voice subscriber's favour. This turned to be a very interesting aspect. All telecommunication operators in Tanzania use the stress pre-paid concept. Most of the subscribers had more than one telecommunication operators. They had more than one Subscriber Identity Module (SIM card). The main reason was that the charge of Off-Net calls i.e., calling between different operators was tens of percent higher than within the operator. Therefore, it is better to replace the SIM card in order to call a subscriber of the respective telecommunication operator. In other words, the trick makes the two ends be in the same telecommunication operator, hence attending an On-Net call. The On-Net calls i.e., calling within the same telecommunication operator is cheaper than Off-Net calls.

The other alternative that was observed in urban Iringa was that most subscribers had more than one mobile phone, and each phone with a different SIM card, and all these were to avoid the extra costs incurred by calling to another telecommunication operator. Table 12 and figure 12 show the results.

Table 12: Mobile phone network providers

	Frequency	Percentage
Not answered	50	-
TIGO	14	13.6
TIGO, VODACOM	9	8.7
TIGO, ZAIN	1	1.0
TIGO, ZANTEL	1	1.0
TTCL	1	1.0
VODACOM	50	48.5
VODACOM, TTCL	1	1.0
ZAIN	14	13.6
ZAIN, TIGO	4	3.9
ZAIN, TIGO, VODACOM	1	1.0
ZAIN, VODACOM	5	4.9
ZANTEL	2	1.9
Total	103	100.0
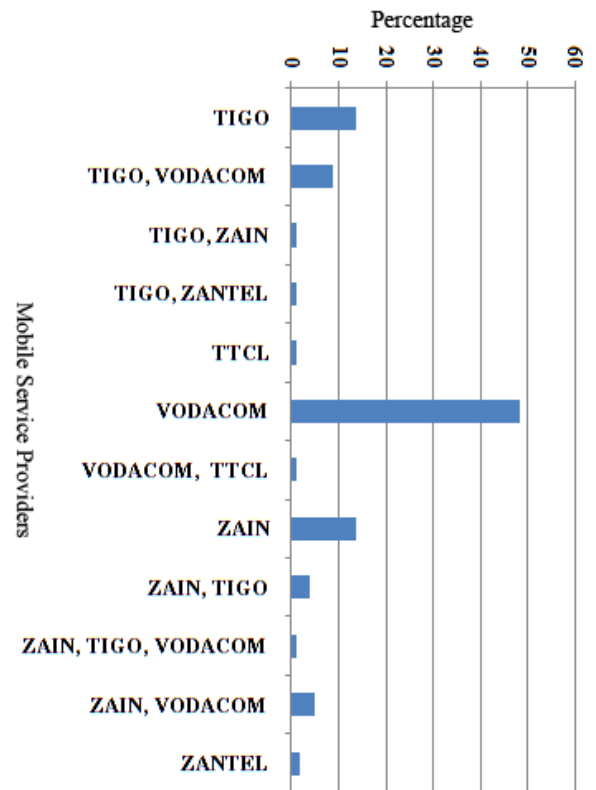
Figure 12: Mobile phone network providers

As table 12 shows, most prepaid rural Iringa subscribers have more than one SIM card, the reason being the inter-connection mobile telecommunication charges are relatively high, therefore the On-Net calls are performed that way.

5.2.3   Mobile phone usage among women groups

Objective 2: *To identify which group of women (married, single, divorced, widowed) own/use mobile phones more than the other*

In the specific objective two, 5 questionnaire items were used. The items results highlighted which group of women uses/owns mobile phones more than the other. Items 4, 13, 14, 15 and 16 from the questionnaire list were used, see Appendix 1.

Item 4 &13: *Marital status versus mobile phone ownership*

In these two items, 153 (100%) respondents participated. The idea is to study whether marital status had any contribution to mobile phone usage or ownership. Table 13 and figure 13 illustrate the results. In this questionnaire item, the "separated/divorced" and "widow" groups had few respondents, too few to take their results into consideration. Therefore, their results are not going to be discussed.

Using the remaining two groups, i.e., "married" and "single", the single group had the majority of the respondents who owned/used mobile phones (68.4%), followed by the married group with 65.7%.

Table 13: Marital status versus mobile phone ownership

		Do you Own a Mobile phone?	
		No	Yes
Marital Status	Married	23	44
		34.3%	65.7%
	Single	25	54
		31.6%	68.4%
	Separated / Divorced	2	2
		50.0%	50.0%
	Widow	1	2
		33.3%	66.7%
Total		51	102
		33.3%	66.7%
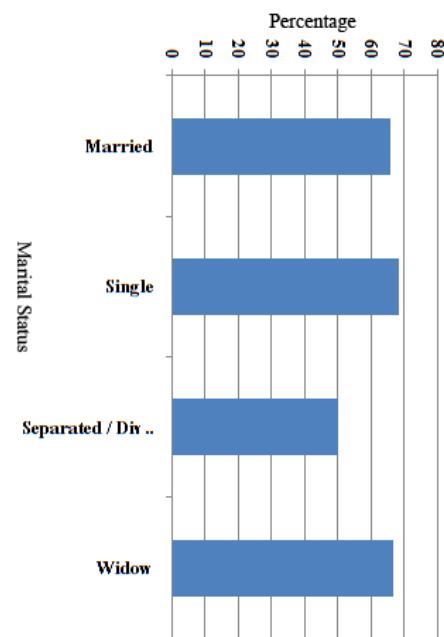
Figure 13: Marital status versus mobile phone ownership

As illustrated in table 7, these finding are not to be the final conclusion of this case due to various explanations that might be logical to this society and illogical to the next society. For example, in most Tanzanian cultures young women or men are considered free persons without much of society commitments. Therefore, that might be a reason to why most single persons use/own mobile phones. This scenario might be very different in another society.

Item 14: *How long have you used a mobile phone?*

In this questionnaire item, 102 (66.7%) of respondents participated while 51 (33.3%) did not participate. The sample size in this case was *n=102*. The majority had had mobile phones for approximately 25–49 months (40.2%). The next group is those who had had mobile phones for approximately 0–24 months (37.3%). This shows that mobile phones were just introduced in rural Iringa and the response to this new innovative technology had been remarkable. Table 14 and figure 14 show the results.

Table 14: Mean duration of owning/using
mobile phone

		Frequency	Percentage
Time in Months	0 - 24	38	37.3
	25 - 49	41	40.2
	50 - 73	17	16.7
	74 - 98	3	2.9
	99 - 123	2	1.9
	174 - 198	1	1.0
	Total	102	100.0
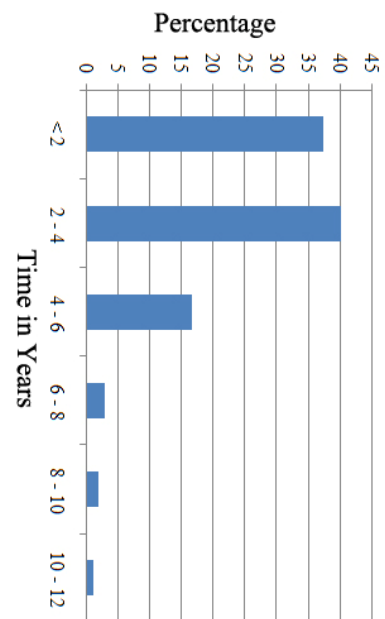
Figure 14: Duration of owning/using
mobile phone in years

Item 15: *How did you get the mobile phone?*

In this item 103 (67.3%) of respondents participated while 50 (32.7%) did not participate. Therefore, the sample size in this case was *n=103*. The respondents were required to select from the list of options which were "I bought", "from my husband", "from my boyfriend/girlfriend", "from parents/relatives". The "other" category was another option to write any other means in which they got the mobile phone. The majority (80.6%) of the respondents said they bought their mobile phones. About 4.9% got them from their husband/wife. 3.9% got them from their boyfriend/girlfriend. 9.7% got from parents/relatives while the other category had only 1.0%. Table 15 and figure 15 show the outcomes.

Table 15: Options to get a mobile phone

	Frequency	Percentage
I bought	83	80.6
From my husband/wife	5	4.9
From boyfriend/girlfriend	4	3.9
From parents/relatives	10	9.7
Other	1	1.0
Total	103	100.0
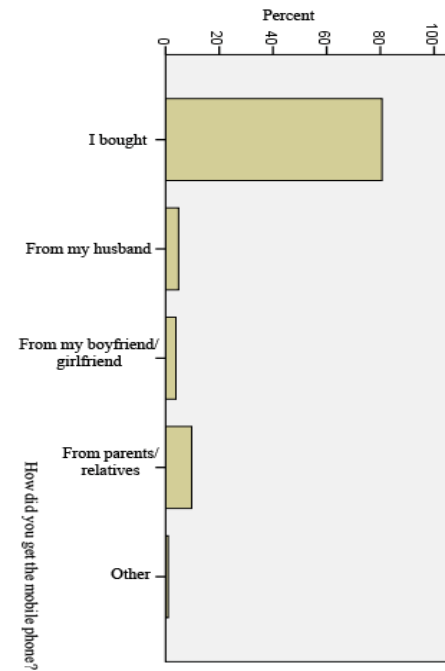
Figure 15: Options to get a mobile phone

This result indicates that the majority of young people, who own more mobile phones than any other age group, get these phones through their earnings.

Item 16: Is the mobile phone that you own for family use?

In most rural societies the mobile phone is a collective device for incoming and outgoing family calls [6]. Therefore all members of the family use it. The purpose of this item was to find out if there was any correlation to the stated argument. In this item respondents were required to opt for "Yes" or "No". The number of respondents who participated in this item was 105 (68.6%) while 48 (31.4%) did not participate.

Therefore, the sample size for this item was *n=105*. Most mobile phones in rural Iringa (61.0%) were used for family purposes. The remaining group of owners (39.0%) had mobile phones for their personal or business use. This outcome coincides with that of López [6]. The majority of mobile phone owners in rural Iringa had them for the use of their whole family. Table 16 and figure 16 show the results in detail.

Table 16: Family mobile phone

	Frequency	Percentage
No	41	39.0%
Yes	64	61.0%
Total	105	100.0%
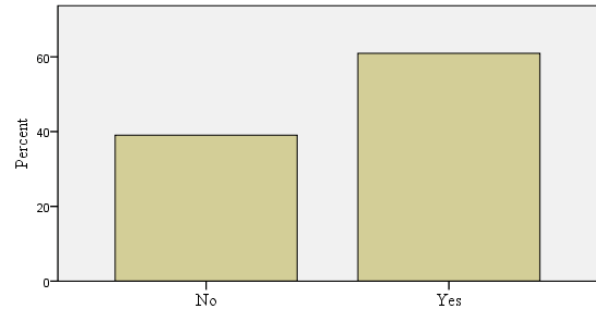
Figure 16: Family mobile phone

5.2.4 Reasons for having mobile phones

Objective 3: *To identify reasons for having mobile phones among women*

In the specific objective three, 2 questionnaire items were used. The results of the items highlighted the general reasons which are used as the driving force for women to own/use mobile phones. Items 17 and 18 from the questionnaire list were used, see Appendix 1.

Item 17: *Why did you buy or own your mobile phone?*
In this item a total of 110 (71.9%) respondents participated while 43 (28.1%) did not participate. The sample size is therefore *n=110*. The respondents were asked to select from the list of possible reasons, one to purchase a mobile phone. Those reasons were; "to communicate with relatives/friends", "fashion/style", "to maintain relations", "for business" or "other" reasons. As many as 90.9% of respondents said they bought a mobile phone for communication with relatives or friends. The second category with a high percentage was maintaining relations (5.5%). Then 2.2% of the respondents said they bought it for business purposes while fashion/style category had 0.9%. Table 17 and figure 17 show these results in detail.

Table 17: Reasons to buy or own a mobile phone

	Frequency	Percentage
To communicate with relatives/friends	100	90.9%
Fashion/style	1	0.9%
To maintain relations	6	5.5%
For business	3	2.7%
Total	110	100.0%
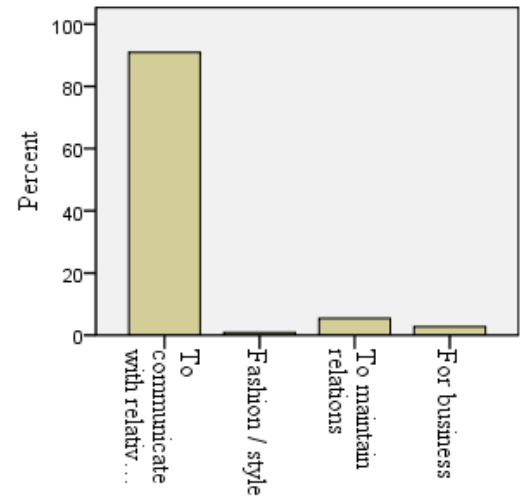
Figure 17: Reasons to buy or own a mobile phone

The two categories might seem the same, "to communicate with relatives/friends" and "to maintain relations". In rural Iringa context, to communicate with relatives/friends is at the official level, but maintaining relationships means keeping an active link between people who are very close friends. The friendship can be in terms of future life together, economical relationship or the like. In this case the majority of the respondents bought their mobile phones for communicating with relatives and friends.

Item 18: *Do you think the mobile phone has helped women to improve their income?*

In this item a total of 151 (98.7%) respondents participated while 2 (1.3%) did not participate. Therefore the sample size is *n=151*. The majority of the respondents (83.4%) said the mobile phone helps women in rural Iringa to improve their income while (16.6%) of the respondents said mobile phones do not improve women's income; instead they reduce the income. In this case a general consensus is that mobile phones are helpful in the case of income generation. Table 18 and figure 18 show the outcomes of this item in more detail.

Table 18: Mobile phone improves women's income

	Frequency	Percentage
No	25	16.6
Yes	126	83.4
Total	151	100.0
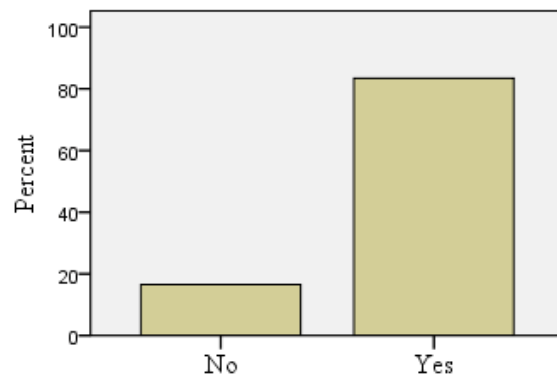
Figure 18: Mobile phone improves women's income

5.2.5 Mobile phone use and gender inequality

Objective 4: *To suggest possible connections between mobile phone use and gender inequality, and highlight specific areas needing future research on the topic*

In the specific objective four, 9 questionnaire items were used. The result of the items highlighted the general connections between mobile phone use and gender inequality. Using results from these items, some specific areas will be highlighted for future research on the topic. Items 24, 25, 26, 27, 28, 29, 30, 31 and 32 from the questionnaire list were used, see Appendix 1.

Item 24: *Do you think a mobile phone is helpful in your family?*
This was one of the questions asked to find out if a mobile phone is at all of any help at the family level. The respondents were required to answer "Yes" or "No". A total of 151 (98.7%) respondents participated in this item while 2 (1.3%) did not participate. Therefore *n=151*. The majority (98.7%) agreed that the mobile phone is helpful in the family matters, only 1.3% of respondents disagreed. This shows very clearly that mobile phone is an important communication tool for residents of rural Iringa. Table 19 and figure 19 show these results.

Table 19: Mobile phone is usefulness for family

	Frequency	Percentage
No	2	1.3%
Yes	149	98.7%
Total	151	100.0%
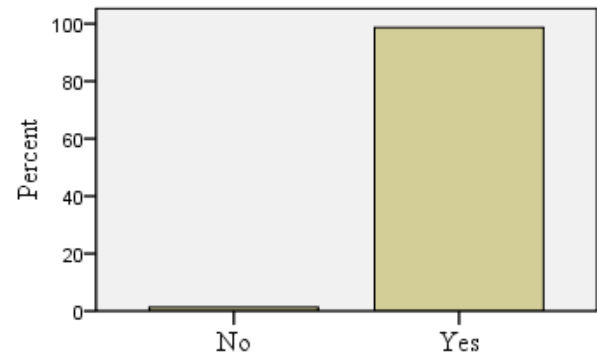
Figure 19: Mobile phone is usefulness for family

Item 25: *Are there any restrictions for a woman to use a mobile phone in your family?*
In this item the respondents were asked to select "Yes" if there were any type of restrictions for a woman in their family to use or own a mobile phone. The second option was to select "No" if there were no restrictions. All in all, 146 (95.4%) of the respondents participated in this item while 7 (4.6%) did not participate. Therefore *n=146*. Most of the respondents (77.4%) said there were no restrictions. The remaining (22.6%) said there are some restrictions. In general there was a majority agreement that there were no restrictions. Table 20 and figure 20 show the results.

Table 20: Women are restricted to use mobile phones

	Frequency	Percentage
No	113	77.4
Yes	33	22.6
Total	146	100.0

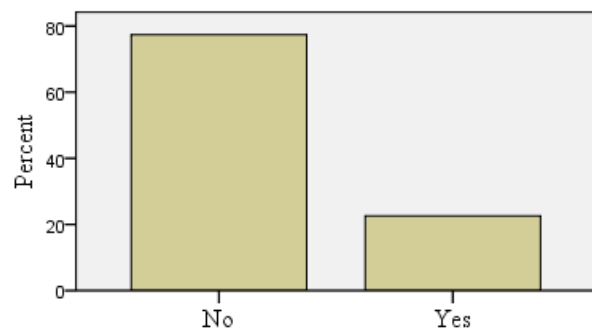Figure 20: Women are restricted to use mobile phones

Item 26: *If the answer for question "25" is "Yes" why? (Question 25 asked if there are any restrictions for a woman to use a mobile phone in their family)*

This was a follow-up question which wanted to get some examples of the existing restrictions that were posed against women in owning/using a mobile phone. Therefore, this was another open-ended question. The respondents were able to respond either positively or negatively depending on how they had seen happening or practiced in the society. A total of 25 (16.3%) responded to this item while 128 (83.7%) did not participate in this item, *n=153*. I am of the opinion that this was because most families did not have restrictions for women to use/own mobile phone.

The families that had restrictions had something to say. Below is a filtered list of the responses:

i. You are given a list of people to call, especially they should be married

ii. To show all the messages that she writes and receives and not allowed to have phone when out of home premises

iii. Women are not trustworthy

iv. Many married men do not want their wives to use or own mobile phones

v. Mobile phone should be used only when there is something very important, such as some family member is admitted at the hospital, death, some marriage ceremony etc

vi. It can be used by girls who are young and still depending on their parents, only when they have travelled far or when their parents have travelled

vii. Girls should not take their phones to school

viii. If for some reasons, man calls home and the phone is not answered, then many marriage problems starts from there

ix. If the phone rings and I am not at home (woman) or a new number rings in front of my husband, then quarrel starts

x. Do not distribute your mobile phone numbers to others, my husband is very violent in that

xi. All new numbers are given to me by my husband, I have to report who has called and where am I sending a message, who has send me a message, something like that!

xii. Because women do not know how to use mobile phones

xiii. Communicate with only relatives and a few friends

Item 27: *If a mobile phone is for the family, who uses it most, the father or mother?*

In this item the respondents were required to select either "Mother" or "Father". A total of 74 (48.4%) respondents participated while 79 (51.6%) did not participate. Therefore *n=74*. In this case 55.4% said that the father uses it most while 44.6% said the mother uses it most. One explanation for the result is the imbalanced gender of the sample group members. Most of the respondents were women; therefore, for this kind of question, it is possible to get result that naturally favours a larger group. Generally, they said that if the phone was for family use, then the father uses it most. Table 21 and figure 21 illustrate the outcomes in detail.

Table 21: Family mobile phone usage between mother and father

	Frequency	Percentage
Mother	33	44.6
Father	41	55.4
Total	74	100.0
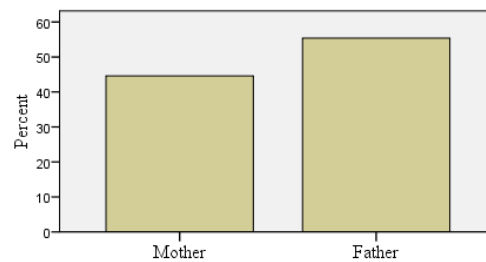
Figure 21: Family mobile phone usage between mother and father

Item 28: *Did the mobile phone bring any problems to your marriage?*

A total of 102 (66.7%) respondents participated in this questionnaire item while 51 (33.3%) did not participate. Therefore *n=102*. The majority (77.5%) of the respondents said the mobile phone did not bring any problems to their marriages. The remaining group (22.5%) of the respondents said the mobile phone did bring some problems to their marriages. Table 22 and figure 22 show the details.

Table 22: Mobile phone brings problems to the marriage

	Frequency	Percentage
No	79	77.5
Yes	23	22.5
Total	102	100.0
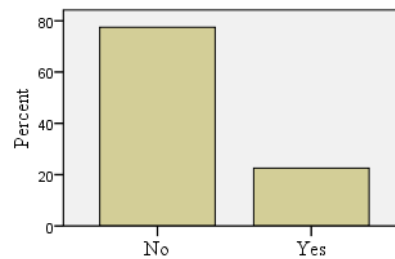
Figure 22: Mobile phone brings problems to the marriage

Item 29: *If the answer to question 28 is "Yes", what are those problems in general? (Question 28 was asked if the mobile phone brought any problems to their marriage)*

As a follow-up question, this was meant to capture those problems that arose as a result of the introduction of the mobile phone in the family. This was an open-ended question. The respondents answered freely telling about the problems that faced their families as a result of the mobile phone. A total of 28 (18.3%) of the respondents participated in this item while 125 (81.9%) of the participants did not participate in this item, *n=153*. One explanation here is that most of the family did not experience any problems. That is why they left this item unanswered. Another reason could be that the question is very sensitive, and therefore the respondents did not want to write it down or talk about it. Below is a list of the responses:

i. It has caused some women not to get married

ii. Jealousy in marriage (mother checks father's mobile phone recent calls and text messages, the same is done by the father) and in case of misunderstandings, then quarrel starts

iii. Creates no trust to the married couples, for example someone sends a wrong message (say love message) to a wrong number (my number) and my husband realises that, then already trust scale level goes down

iv. Mobile phone as a tool for lying between the married couples

v. Increases family budget (it needs maintenance, airtime and battery charging costs)

vi. Causes divorce

vii. A tool that is used for betrayal

viii. Integrity can be reduced especially if you are unsure of your woman

Item 30: *Who do you think raises more problems in marriage due to the use of phones?*
In this item the respondents were required to opt for "Women" or "Men" and a total of 145 (94.8%) of respondents participated while 8 (5.2%) did not participate. Therefore *n=145*. Most of the respondents, 56.6% said men raised more problems due to phone usage while 43.4% of respondents said women caused problems associated with phone usage. In general, the outcomes showed that a man caused more marriage problems due to the mobile phone. This outcome was imbalanced due to female/male ratio in the surveyed group. More women blamed men and fewer men blamed women. In the end the bigger group wins. Thus, the majority of the women said men were the trouble makers, for troubles which are the result of mobile phone usage in their families. Table 23 and figure 23 show the response distribution between men and women.

Table 23: Problems raised due to mobile phone between women and men

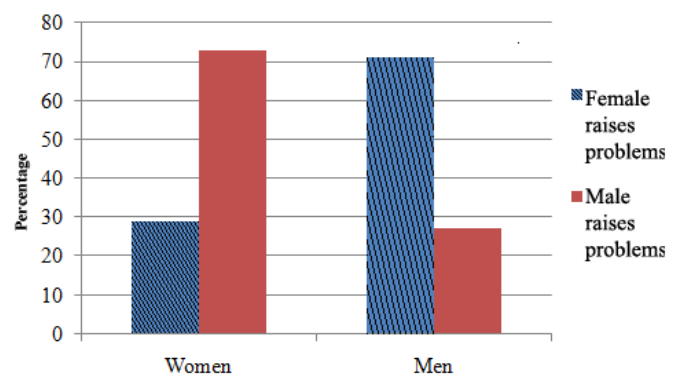|	Frequency	Percentage
Women	63	43.4
Men	82	56.6
Total	145	100.0

Figure 23: Response distribution of problems raised due to mobile phone

There is a small percentage in both groups that blamed themselves, but the majority blamed the other gender. This is one clear indicator of jealousness as a result of introduction of the mobile phone in the gender disparity.

Item 31: What are the advantages brought about having a family mobile phone in general?

This was an open ended question where respondents were asked to list down the advantages or benefits brought about by mobile phones. In this item 92 (60%) of the respondents participated while 61 (40%) did not participate, *n=153*.

Below is a filtered list of the responses:

i. Facilitates communicating many issues such as sickness, death, marriage and any family news to my family members who live far from our village

ii. Used to organise and follow-up easily family developmental activities even if the supervisor is travelling

iii. Reduces costs of transportation and time

iv. Sending and receiving money in a faster way (M-Pesa) for users who are subscribers of Vodacom telecommunication provider when this research was surveyed

v. Used for my family business, this has improved my income. I do not need to travel to Iringa town from here if I am not sure that the commodity that I am looking for is in Iringa. I call to those wholesalers in Iringa town if the commodity has arrived, then I go.

vi. It makes our family more close together even though geographically we are separated

vii. Reduces the letter writing practices which is not very reliable due to our bad road and railway infrastructures

viii. Mobile phones are used to solve many family problems

Item 32: Do you think that continuing to have a mobile phone in the family will contribute to increase or decrease those problems (in Item 29)?

This was another question that aimed at measuring if the mobile phone had any contribution to solving family problems. This is a very general aspect, but the main idea was to get general view from the respondents. In this questionnaire item, 145 (94.8%) of respondents participated while 8 (5.2%) did not participate. Therefore *n=145*. Most of the respondents (66.2%) said that continuing having a mobile phone in their families

will decrease the number of problems that the family had. The next group of the respondents (33.8%) said it will increase the problems.

Therefore, in a summary the majority of the respondents were of the opinion that the mobile phone was a tool that should be used in their families. It is helpful when it comes to solving family problems. This research did not go further to find specific problems that are solved using the mobile phone. Table 24 and figure 24 show the outcomes.

Table 24: Mobile phone and its effect on family problems

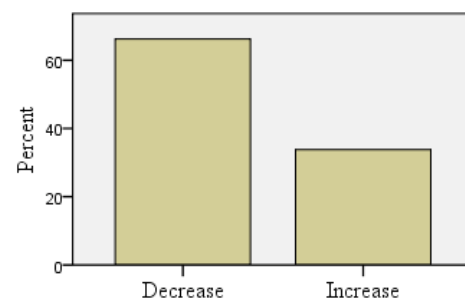|	Frequency	Percentage
Decrease	96	66.2
Increase	49	33.8
Total	145	100.0

Figure 24: Mobile phone and its effect on family problems

6 Discussion and interpretation of findings

6.1 Overview

In general the findings show that gender disparity is easily observable in the ownership of, access to and use of mobile phones. Thus, this research is crucial at this point of time since it helps to identify how women in this part of Tanzania are involved in the much-publicized mobile phone "explosion" in the country with the penetration rate of 39% during September 2009 [13] and the growth has higher expectations to come.

In this exploratory phase, there are varying results that give mixed feelings about what would be a clear conclusion to draw. All in all, there are some visible truths found that calls for further attention. In this chapter these general findings will be discussed and some recommendations given, but these discussions are going to be taken as a building block to finding clear and concrete reasons for the problem at hand.

UNDP Human Development Report [1], which is based on the 2007 data, has published the human development index (HDI). The index looks beyond GDP to a broader definition of well-being. HDI is a summary of the three countries basic human development aspects. The aspects are health, which is measured by life expectancy at birth. The second is knowledge, which is measure by a combination of the adult literacy rate and the combined primary, secondary and tertiary gross enrolment. The third aspect is a decent standard of living, measured by the GDP per capita.

The Human Poverty Index (HPI) focuses on the proportion of people below certain threshold levels in each of the dimensions of the human development index. The Gender-related Development Index (GDI) was introduced in the Human Development Report in 1995. It measures achievements in the same dimensions using the same indicators as the HDI but captures inequalities in achievement between women and men. It is simply the HDI adjusted downward for gender inequality. The greater the

gender disparity in basic human development, the lower a country's GDI relative to its HDI. [1]

The higher the index number, the higher the country is ranked in the list. Tanzania's index rankings are as follow:

- Human Development Index (HDI), its index value is 0.530
  - 151st out of 182 developing countries. There are one 150 countries ahead of it.
- Human Poverty Index (HPI), its index value is 30.0
  - 93rd out of 135 countries for which the index has been calculated. There are 92 countries ahead of it.
- The gender-related development index (GDI), its value is 0.527. This value is compared to its HDI value of 0.530. Its GDI value is 99.4% of its HDI value.
  - Out of the 155 countries with both HDI and GDI values, 53 countries have a better ratio than Tanzania. [1]

This highlights the presence of gender disparity, which in any case will hinder a full nation's development capacity if this issue not addressed. The gender disparity in this case is found in various aspects, such as empowerment dimensions, social and economical dimensions such as labour markets etc.

The Tanzanian Poverty and Human Development Report (2007) reports that "Overall, gender disparity in employment persist, particularly in urban areas, a larger proportion of urban women are unemployed compared to men". This was found differently in rural Iringa: most of the women who are in the working labour force age i.e., 15+ years are much involved with farming. Although in this research the focus was only in rural Iringa, it is generally known that Tanzanian women are fully involved in agricultural production, harvesting and storage in most rural areas. This produce in most cases is not sufficient for business, but mostly only for family food. When they come to urban areas, they are the victims of unemployment for reasons that need further research.

My opinion is that women living in rural areas are a particular disadvantaged group in the advocated digital world. This is because that they face multiple barriers which are related to both gender and location. Their roles are found more at the consumer end of the information technology chain [25]. They have demanding challenges of managing a rural household that create a heavy daily workload for women, leaving them with hardly any spare time to become familiar with new technologies.

6.2   Male versus female ratio in mobile phone usage

In this specific objective the general results from the questionnaire items shows that most women that live in rural Iringa are farmers, and they are sure that the mobile phone applications that come already programmed in the mobile phone (from the shelf) are not gender-specific. They are of the opinion that the applications are suitable for either women or men, any of the two genders can use these applications. Therefore this is not a factor that creates disparity that exists between women and men in utilizing the opportunities brought about by mobile phones.

Although the mobile phone applications that come with the phone are not gender specific, women are still suggesting that some more specific applications be programmed to fit their specific needs in rural Iringa. Some of the applications that are suggested are:

- Applications that show types of African foods and how to prepare them
- Applications specific to fight sexual corruption
- Agricultural practices, to mention a few

A full list of the suggested applications is in subsection 5.2.2 in the questionnaire item 7. This tells that women in rural Iringa can more utilize the opportunities that mobile phones have if these special types of applications are embedded. These suggested applications are important to them due to difficulties that they face in rural daily life, which means their problems would have been lessened if these applications were in their phones, which have become a common tool.

I believe that most of these requested, so called mobile phone applications can be implemented as web applications. They can be delivered to their mobile phones via a mobile phone Internet access which is already available. The only obstacle for now is that Third Generation (3G) or Enhanced Data for Global Evolution (EDGE) networks are not employed yet for rural Iringa. Some of the telecommunication providers have the data service employed in some large cities. As a common trend in the country rural will follow (I believe) after market saturation in cities. Therefore, for now the implementation of the service and awareness for rural subscribers will be an obstacle.

The majority of the women in rural Iringa believe that more men own/use mobile phone. This belief was proved by the following item that demanded the respondents to say whether they owned/used a mobile phone. The outcomes proved that more men own/use mobile phones than women in rural Iringa.

The result of the following questions aimed at finding reasons for the disparity. Most respondents had the following opinions:

- Men are mostly involved in family production activities. They possess the house economy and our society regards men as the main responsible persons in the family.

- They can do many difficult tasks such as packing heavy sacks of maize, potatoes for transportation, which makes them as the main income generators and therefore have authority over women.

- Due to economic disparity between men and village women, most of the women are not able to buy and control a mobile phone etc., just to mention a few of the problems.

More of these opinions are listed in subsection 5.2.2 in the questionnaire item 9.

From the survey results, it is revealed that mobile phones were recently introduced in rural Iringa. The result shows that in most villages of rural Iringa mobile phones were introduced during the last three years. One interesting aspect here is how these mobile phones are being accepted. Everyone would like to have one, but cultural, economic and

social factors are the hindrances. To me and anybody else, the judgement is that there are more benefits that mobile phones give to society than the drawbacks.

For the case of the mobile phone model, I wanted to understand if the mobile phone model has anything to do with the disparity. The majority of the respondents used Nokia phones. It would be interesting to know the reason. My original idea was to see if usability, cost, availability, durability, reliability and other supporting factors are the reason that make people opt to use a specific model. This aspect was mainly done through face to face interviews, and the majority of the responded said Nokia is expensive phone, but lasts longer and is reliable and easy to use. Therefore, the basic factors that are used to test a product before taking it to a specific market seem well applicable also to rural Iringa societies.

Another aspect that I was interested in finding out was the issue of telecommunication providers. As stipulated in chapter 3, the number of voice mobile operators and that of ISP/Data operators has been increasing yearly. During the research time there were 6 voice mobile operators and 62 ISP/Data operators. These voice mobile operators have varying tariffs yearly, as table 25 shows. The table indicates that the prepaid voice telecom tariffs per minute in Tanzanian shillings (Tsh) are remarkably high. May be this is one cause for the disparity; women with their little incomes decide not to opt for this expensive but rather important service.

Table 25: Tanzanian prepaid voice telecom tariffs per minute in Tsh [13].

Year	On-Net calls	Off-Net Calls	East Africa Calls	International Calls	Average Tariff
2000	251	368	600	2,113	356
2001	278	410	671	2,337	396
2002	305	399	560	1,772	377
2003	270	375	569	1,940	359
2004	247	337	437	1,526	312
2005	256	356	449	1,651	328
2006	251	326	356	551	267
2007	233	330	342	499	256
2008	244	340	338	500	264
June 09	206	353	361	503	251

Therefore, the result shows that many respondents have more than one SIM card, to avoid intra voice mobile operator's tariff high costs. They say that if you are a ZAIN subscriber, for example, and your relative or friend is on Vodacom, calling the Vodacom number is more expensive than calling your friend/relative who has subscribed to ZAIN. This is true as the Off-Net tariff in table 25 shows. Therefore, the option is to have multiple SIM cards which allow this prepaid subscriber to change when calling to Off-Net. The other option is to have more than one mobile phone, but because it is a more expensive option than the previous, the previous is more favoured in rural Iringa, while the later is commonly seen in urban Iringa, according to my observations. I believe that due to the high mobile phone penetration rate in the region, the disparity between men and women in owning/using mobile phones is going to decrease.

6.3   Mobile phone usage among women groups

In this specific objective it was found that the "single" women group had mostly used/owned mobile phones while the "married" women group followed. The explanation could be that the younger group (unmarried, mostly "single") who are in the working group have less family commitments. They have an advantage to own and control mobile phones than the adult group. On the other hand, the married group needs mobile phones more than the unmarried group because the couples work as a team. That can be achieved better by the use of mobile phones. There are many explanations as a result of this outcome. I am of the opinion that there must be a clear statistical survey that will fade off this doubt of which group should own/use mobile phones and why.

The mobile phones usage in rural Iringa has an average of about 3 years since their introduction. The response to this new technology is very impressive, as seen in the results. Most of the respondents had mobile phones. These owners/users of mobile phones had bought the phones themselves. The result contradicts with some literature that report about women being given mobile phones by their husbands. It is true that there is still some small percentage of women in rural Iringa who got mobile phones via their men, or boyfriends, but the majority of them bought the phones themselves. In my

opinion that is a good sign; women know that mobile phones are good for their wellbeing. Although most of these phones were for family usage, still they were bought by the women themselves. Most of these phones in rural Iringa were stated as used by the entire family. Most respondents said that their phones are mostly used as a family phone and the father uses it slightly more than others (table 21).

There is still a visible disparity in the usage of family mobile phones; men are the main users. I agree that for a poor family in rural Iringa, if it has a possibility to purchase a family phone, it should be only one for family usage, but the problem is why should it be used mostly by the father of the house? I believe that the decision to buy it was done by the family, which means when it comes to usage, it should be well balanced between father, mother and the children, but this is not the case in rural Iringa.

Generally the results also show that cultural attitudes and norms within marriage and family (such as fears that infidelity will be aided by technology) affect to some extent women's access to mobile phones (in some families, not all, of course). These cultural attitudes (also such as the man is the head of the house, he is in charge of the money.) will surely impact women's adoption of mobile phones in the future. The point is not to judge whether these cultural attitudes are good or bad (I think at least non-Tanzanians have no right to judge this), but how, in an as objective-as-possible way, this will impact women's use of mobile phones (since we are assuming that mobile phone use, and economic/social development in general, is a good thing). An idea that is visible here is "bargaining power" within the household it seems that the husband has more of it, if he has control of the money.

6.4   Reasons for having mobile phone among women

The outcomes confirm that generally for all men and women in rural Iringa, a mobile phone is purchased for communication with relatives/friends. For them communication with relatives/friends was ranked high, followed by the group that bought mobile phones for maintaining relations. There was a small percentage of respondents who said that they bought a mobile phone for business and some for prestige/fashion/style.

This phenomenon of communicating with relatives calls for attention. The running costs for the mobile phone in rural Iringa are remarkably high. One has to think how to get the expensive air time, how to recharge the battery. Recharging a battery means travelling some distance to get to a mobile phone charging centre and pay some money for that. Then one has to incur general maintenance costs and these for communicating with relatives. To me this shows that this society appreciates family more than money and time. To them keeping their family ties is more important than the costs that come as its result; the same outcome was observed by a similar previous study [5].

One contradicting outcome from this was whether mobile phones have managed to improve women's income in rural Iringa. The majority of the respondents agreed that it has improved income generation for women. Howeve in the previous question the percentage of women who use a mobile phone for business is small; possibly this is the group that sees the improvement in income generation as a result of mobile phone usage. One explanation for the increase of income is due to the increased number of customers and reduced costs of travel. All in all, there was a majority response of 83.4% of all the respondents agreeing that mobile phones have improved the income generation of women in rural Iringa.

6.5   Mobile phone use and gender inequality

This specific objective aimed at finding out whether there is any connection between mobile phone usage and gender inequality. The results show the majority of respondents agree that mobile phone is very helpful when it comes to solving family matters. Most respondents (77.4%) said there are no restrictions for women to use these tools in their families.

Some said there are restrictions and mentioned some of these restrictions as:

- Some women are given a list of numbers to call, and most of these people are married.
- Some women are required to show all the messages that they receive or write and are not allowed to carry the phone away from the home premises.
- The mobile phone is used only when there is a very important issue and not any other way.

A full list of these restrictions is found in subsection 5.2.5 item 26. I believe that these restrictions will end as time progresses. This is because the majority of the family members already do not have these restrictions. This small group with some restrictions will fade out naturally.

I also wanted to know if the mobile phone had any negative impact on the family. Most of the respondents who participated in this item (77.5%) said there was no negative impact. The remaining group said mobile phones have brought difficulties into their family ties.

In a married couple a man is said to cause more marriage problems, problems that are directly connected to the use of the mobile phone in the family. This was the outcome of the question where I wanted to see who reacts more between man and woman in the family as a result of the family mobile phone. Together with these marriage problems that are caused by the use of mobile phones, there are more advantages that the mobile phone has brought to rural families in Iringa.

The majority of the respondents said that continuing to have these mobile phones in families will reduce family problems. The question that comes into my mind here is, how do they reduce these problems? I believe some further findings will come out with answers to this type of questions. For the purpose of this research, it is important to show that mobile phones are perceived to reduce family problems in rural Iringa among the people I surveyed.

6.6   Women and the mobile phone in Jamaica versus those in Tanzania

In this subsection, I would like to point out some similarities and differences that make the two societies interesting groups to compare and contrast. In the case of the population, Jamaica has a small number of her people. Her population is 2.6 million (Jamaica Census 2000) while Tanzania has over 30 million (Tanzania census 2002). Jamaicans GDP per capital is US$ 3,370 while that of Tanzania is US$ 1,400. Jamaica's economy relies most heavily on tourism, bauxite production for aluminium export and on the traditional export crops of sugar and bananas. Jamaicans economy is similar to that of Tanzania; farming products are the major export. With these factors the comparison shows that Jamaica is better off economically than Tanzania. The interesting scenario is that a common group of low income households, women in particular are found in both of these countries. See the GDI indicator comparison in table 26. This is the main focus point of comparison.

Table 26 illustrates the comparisons of basic human development factors between Tanzania and Jamaica. The indexes show that even if both countries have their people who are considered living at the bottom of the pyramid, one country can lead another county in some specific aspects. The main interest here is in the women's activeness towards utilizing the new empowerment tool, the mobile phone.

Table 26: Human development indexes: Tanzania versus Jamaica [1]

Factor	Tanzania		Jamaica	
	Value	Country Ranking	Value	Country Ranking
HDI	0.530	151 of 182	0.766	100 of 182
HPI	30.0	93 of 135	10.9	51 of 135
GDI	0.527	54 of 155	0.762	49 of 155
Penetration Rate	39%		> 94%	

According to the UNDP development report [1], Jamaica leads Tanzania in all basic human development factors (table 26). This could be one reason why more women

utilize the mobile phone opportunities. One specific reason here is how the Jamaican government takes the gender related development issue into account. The emphasis is on women to utilize the ICT as a tool for empowerment [20].

The policy shift from monopoly telecommunications service provision and increased foreign direct investment occurred around the same period of time (around year 2000) for both countries. In Tanzania, Tanzania Telecommunication Limited (TTCL) was the only company for decades while in Jamaica the incumbent Cable and Wireless Jamaica Ltd. The policy shift and direct foreign investments were the factors that facilitated the fast growth of mobile voice subscribers in both countries. For the majority of people in these two countries, mobile voice subscription was the only viable option available.

The cultural difference is another differentiating factor. Tanzanian women believe that more men own/use mobile phones. They cannot be like men, because men use the phone for business and other family income generating activities. The Jamaican women believe that the mobile phone is important for women due to its ability in improving small business turnover. The mobile phone is important for Jamaican women for its security. Women in Jamaica prefer cheaper phone models which they can call, receive calls, send messages and receive messages. The expensive models are a risk for them, because men can threaten their lives just due to expensive mobile phones [20]. The mobile phone priorities of the Jamaican women resemble those of Tanzanian women in several aspects.

Tanzanian women believe that the mobile phone can improve their income. However, according to the findings in this work, Tanzanian women have fear of unfaithfulness due to having a mobile phone while the Jamaican women feel it improves their security. Tanzanian women fall into different groups. Some would prefer an expensive mobile phone while some would prefer a basic mobile phone model which will do the required task, i.e., calling, receiving calls, sending messages and receiving messages. The differences are due to the varying status of these women.

Women in Jamaica are said to be on the phone call for a longer time than men, or sometimes it can be vice versa. The mobile phone costs as little as US$ 25, which is affordable to most women in Jamaica. There are some cheap mobile phone models also in Tanzania, but due to the economic situation, which is worse than that of Jamaica women are the probable group that cannot afford to be on the phone call for long.

Generally speaking, there are many differences and similarities between the two societies. The end result is that a similar research can be done on two different but rather similar societies and with varying outcomes. Therefore, every society has its special needs due to its cultural background and economy.

6.7   Summary

The goal of the study was to find out why in less developed countries women are not utilizing the opportunities posed by the mobile phone equally to men. Another goal was to explore the particular challenges that gender inequality poses to mobile phone solutions in development and ways to meet them.

A review of the literature explored what other researchers have found on the problem at hand. Most of the studies were done to find out which one between man and woman in rural areas mostly use/own mobile phones. In most of them man was found to be dominant. The literature gap is seen in the area of why there is this disparity, and if some literatures have addressed that, not specifically for rural Iringa in Tanzania. It was my interest to find out what the reasons for the disparity are in rural Iringa, so that these findings could be compared with other findings from a similar society but of a different cultural and geographical background.

According to the research on "Mobile Phone and Poverty Alleviation: A Survey study in rural Tanzania [5]" which was conducted in 2008, the disparity of mobile phone ownership between the two genders was higher than in my recent findings. The ratio of women to men in the previous study was about 1 to 3 while in my study (conducted

about one year later) was around 1 to 1.5 (table 10). This predicts a better future trend for women and mobile phone technologies in rural Iringa.

This study was carried in rural Iringa, Tanzania. The participants were randomly selected. I used questionnaires and interviews. The data collected from the study were treated by simple statistical methods such as means, frequencies, percentages and cross tabulations and then displayed as tables and bar charts.

The results revealed that the disparity is mainly due to various factors. First, in rural Iringa society, the man is the father of the house, he manages the entire house economy, he is considered the fully responsible person in all aspects of the family, i.e., he has to make sure that the entire well being of the family is fine. This makes men the main house income generators and therefore they have authority over women. Thus, due to this economic disparity between village men and women, most women are not able to buy and use mobile phones.

Second, technologically there is a need to have specific applications that will fit a specific society. In this research it was found that even though the built-in mobile phone applications are not gender-specific, still specific mobile phone applications are needed for rural Iringa the activities that rural women and men perform. Applications such as best agricultural practices, child-mother health applications, some African food types and the ways to prepare them, are their needs. These will make mobile phones even more valuable for rural Iringa.

The third issue was the disparity caused by the restrictions posed to women in using/owning mobile phones. This was another factor that this research revealed; there are still some small percentages of households who pose restrictions to women. The main reason for these restrictions is based on the fear of unfaithfulness in marriage. The majority of the respondents, who participated in open ended question that required them to list these restrictions, answered that jealousy is the centre point. Men are jealous that if their wives get connected, their marriage will be in shake, and I believe that being in

command of the family, men have the power to stop women from owning/using mobile phones. This was a small group of men, the majority did not had these problems.

Fourth, employment opportunities for women were another reason for disparity. Most women in the village are victims of producing food for their families from farming. They do not get much money out of that. Therefore, for them owning/using a mobile phone is impossible, because mobile phone needs money to run.

Fifth, the research revealed that most of the mobile phones in rural Iringa are used as a family phone. In that case the father is its main user. Therefore, this still creates disparity in the owning/using mobile phone problem.

The advantages that the mobile phone has for rural Iringa residents can be listed as follows:

i. Important for emergency and general communication; cases such as sickness, death and family meetings can be easily organised.
ii. Reduces costs of transportation.
iii. Sending and receiving money faster, using the M-Pesa service.
iv. Used for small businesses.
v. Makes the family closer together.
vi. Replaces the letter writing option, which was slow and unreliable.
vii. Used to solve many family problems.

According the findings the disadvantages that the mobile phone has for rural Iringa residents concern only a small percentage of people, the disadvantages include the following:

i. Causes some women not to get married. This was reported as one of the disadvantages to young women who misuse their mobile phones while unmarried, mainly when these young women use the mobile phone as a tool for cheating in their relationships. Therefore, young men who are planning

marriage, take the unfaithfulness showed by girls due to mobile phones as a concluding fact for stopping relationships.

ii.   Jealousy in marriage.

iii.   Creates mistrust between husband and wife and as a result could cause a divorce.

iv.   Can be used as a tool for dishonesty.

v.   Increases the family budget if not used properly.

6.8   Recommendations

The first recommendation is to educational administrators. The Tanzanian educational system should consider having the mobile phone technologies incorporated in various education level curriculums. However they should not rush straight into teaching these technologies; instead, they should first overcome factors that affect technology implementation in Tanzania. I believe this can be achieved via investing in research. Some of the noted factors that hinder technology implementation are lack of infrastructures, lack of technical support, teachers discomfort with technology, lack of students' technological skills and lack of instructional vision for technology use [26].

Educational administrators should design a contextualized mobile phone applications programming curriculum. They have to implement the necessary professional development plans to ensure that teachers have the knowledge and skills to successfully teach these new technologies in schools. This way, achieving the desire for our societies to have their specific mobile phone applications for their specific needs will be possible. Otherwise we will have to use foreign-based cultural applications for our needs, which normally do not work very well.

My second recommendation is to the mobile phone manufacturers and application programmers. There is still a huge market to catch on this planet. A thorough research needs to be done in certain cultural segments and the mobile phones with applications specific for that segment need to be manufactured while keeping the general international or general applications intact.

My third recommendation is to future researchers. There is a great need for more research to be done on the effects that mobile phone has on certain specific societies. This study tried to consider the advantages and disadvantages which mobile phone technologies can bring to rural Iringa societies (as summed up in subsection 6.7). However   there are still more detailed studies that need to be done. A clear conclusion must be drawn to certain specific aspects which have been highlighted in this research, such as is it true that the mobile phone for a girl student could affect her studies concentration due to increased men's access to her? Is it true that the mobile phone for married a woman could endanger the marriage because the men could communicate with her easily? What is the truth between the mobile phone enhancing the family economy or increasing the family expenditure? There are endless questions that came as the results of this research and that study remain unanswered.

7   Conclusion

There are advantages and disadvantages that the mobile phone has brought about in rural Iringa. The advantages are more important than disadvantages. That is the reason for the majority of Iringa residents to accept the mobile phone technology. Advantages such as faster communication in cases of emergency (i.e., sickness or death), reduction of transportation costs, making the business practices easier, solving many family problems have made the mobile phone an accepted tool in rural Iringa. It has brought negative aspects as well, such as jealousness to married couples, mistrust between couples and a tool for dishonesty in some cases.

Therefore, based on the findings of this study it is important to note that the mobile phones cannot solve all – or even most of the problems faced by women (and people in general) in rural Iringa. There are many problems such as lack of infrastructure i.e water, electricity and poor transport possibilities. Other problems are such as lack of resources i.e., money, food and jobs, also problems related to cultural traditions i.e., women's position in the home.

However with new mobile phone applications such as the ones people suggested in my questionnaire responses, or perhaps mobile phone applications to teach and improve literacy for women in their homes, or mobile phone applications to tell people more about hygiene, health and AIDS, there could be small but important improvements. Based on the penetration rate that determines the acceptance of mobile technology to rural areas, the future expectation is that if the Internet on the mobile phones becomes cheap enough for even the poor to participate (even by sharing phones), then the skill of searching the Internet by the mobile phone could help people enormously to search for jobs and get the needed information. Information such as the best farming practices, projections of the food market, maternal and childhood, weather (as most farmers depend on natural rain), or any information that could be useful in their context would be easily accessible and thus improve life standards of the rural Iringa residents.

Integrating mobile phone's specific applications for specific society needs will make the mobile phone killer technology of all centuries. Women's abilities are undermined in rural Iringa. Women can do and contribute to many developmental aspects. I believe these men in rural Iringa are too much involved in everything which makes the rate of their family development slow. In order to get a higher development rate, women must all be involved not only at the house hold level but on the village and ward level and even in the high decision making organs. If the situation is left this way, it clearly shows clearly to be one aspect of poverty dynamics. Men and women must have equal opportunities to foster any society's social and economic development.

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Appendices

Appendix 1: General questionnaire

Dear Respondents,

Thank you for your interest in this study. The aim of this study is to survey the influence of the mobile telephone solutions to women in less developed countries, specifically for their social and rural economical development. I will be very happy for your participation in this study. These questions will take roughly about 10-15 minutes to answer them all. Your entire response will be absolutely anonymous, all the responses will be used for academic purposes only, and your name not going to appear.

The personal information section will be used to group responses into different categories for the analysis.

The bearer of this questionnaire is a postgraduate student pursuing Masters in Information Technology (Mobile Programming) at Metropolia University of Applied Sciences in Finland and an employee of Tumaini University – Iringa University College in Tanzania. The study is about **Gender and Mobile phone solutions for rural development: A case study of Iringa – Tanzania**.

Address:

Fredrick Daniel Ngumbuke

P. O. Box 200,

Iringa – Tanzania

Mobile: +255 784 799074

Emails: fredricn@metropolia.fi or fredricn@tumaini.ac.tz

Section A: General Information

1. Name of your Village: _____	2. Gender: *(please put a tick mark in the box of your choice)* ☐ Male ☐ Female
3. Age in Group Years: *(Please tick the box with your age range)* ☐ 18 – 25 ☐ 26 – 35 ☐ 36 – 45 ☐ 46 – 55 ☐ 56+	4. Do you own a mobile phone? *(please put a tick mark in the box of your choice)* ☐ Yes ☐ No

Section B: Occupation and the Mobile phone ownership / Usage

5. What is your specialization / occupation? *(Please tick the box with your occupation category)* ☐ Farmer ☐ Business ☐ Employee ☐ Other – Please Specify _____ _____	6. If the answer for question 8 is "Yes" or "No" why? _____ _____ _____ 7. How many percent of all phones are owned by women in your village? _____
8. Are the mobile application gender specific? *(please put a tick mark in the box of your* ☐ Yes ☐ No 9. Is there any specific application that will suit more to women than men in Tanzanian Context? *(please write a new application appart from the existing one below)* a. _____ b. _____ c. _____ 10. Do you believe that more Men own/use the mobile phones than women? *(please put a tick mark in the box of your choice)* ☐ Yes ☐ No	11. If you own the mobile phone, which model? *(Please tick the box with your mobile phone model)* ☐ Casio ☐ Mitsubish ☐ Nokia ☐ Flash Lite ☐ Motorola ☐ Siemens ☐ Fujitsu ☐ NEC ☐ Sumsung ☐ Kyocera ☐ Panasonic ☐ Sanyo ☐ LG ☐ ReignCo ☐ Sharp ☐ Other – Please Specify ☐ Sony ☐ Toshiba _____ _____ _____ 12. Which Network Provider or telecommunication operator do you use? *(please put a tick mark in the box of your choice)* ☐ ZAIN ☐ ZANTEL ☐ TIGO ☐ TTCL ☐ VODACOM

Section C: Marital Status and Access to the Mobile phone

13. Marital Status *(Please tick your respective marrital status)* ☐ Married ☐ Single ☐ Separated / Divorced ☐ Widowed 14. How long have you used mobile phone? _____ Years and _____ Months	15. How did you get the mobile phone? *(Please tick your respective option)* ☐ I bought ☐ From my husband ☐ From my boyfriend/girlfriend ☐ From parents/relatives ☐ Other - Please specify _____ _____ _____ 16. Is the phone that you own for family use? *(please put a tick mark in the box of your choice)* ☐ Yes ☐ No

Section D: Reasons for having the Mobile phone among women

17. Why did you buy or own your mobile phone? *(please put a tick mark in the box of your* ☐ To communicate with relatives / friends ☐ Fashion / style ☐ To maintain relations ☐ For business ☐ Others - Please specify _____ _____ _____	18. Do you think the mobile phone has helped women to improve their income? *(please put a tick mark in the box of your choice)* ☐ Yes ☐ No 19. How many people do you beep per day? ____ 20. How many people beep you per day? _____ 21. How many times on average do you call per day? ____ 22. How many calls on average do you receive per day? __ 23. How many text messages do you receive per day? ____

Section E: Influence of the Mobile phone into gender and power relations

24. Do you think the mobile phone is helpful in your family? *(please put a tick mark in the box of your choice)* ☐ Yes ☐ No	28. If answer for 28 is "Yes" what are those problems in general? _____ _____ _____
25. Are there any restrictions for a woman to use mobile phone in your family?*(please put a tick mark in the box of your choice)* ☐ Yes ☐ No	29. Who do you think raises more problems in marriage due to use of mobiles? *(please put a tick mark in the box of your choice)* ☐ Man ☐ Woman
26. If the answer for question "25" is "Yes" or "No" why? *(Type below your arguments)* _____ _____ _____	30. What are the advantages brought about having family mobile phone in general? _____ _____ _____
27. If a mobile phone is for the family, who uses most, a father or mother? *(please put a tick mark in the box of your choice)* ☐ Father ☐ Mother	31. Do you think to continue having mobile phone in the family will contribute to increase or decrease those problems? *(please put a tick mark in the box of your choice)* ☐ Increase ☐ Decrease
32. Did mobile phone bring any problems to your marriage? *(please put a tick mark in the box of your choice)* ☐ Yes ☐ No	33. What is your general opinion about having a mobile phone? _____ _____ _____

Thank you very much for your kindly participation

Appendix 2: Open ended questions – Questionnaire items (QI) sample results

S/N	QI - 7	QI – 9	QI – 26	QI - 29	QI - 31	QI - 33
1	- Food types and how to cook them - Application specific to fight sexual curruption			- They cause some women no to be married (mistrust)		- Mobile phones are good when used in the right way - Mobile phones inceases life expenses
2	-	-	-	-	- Facilitates communication	- Mobile phone is a very important tool because it facilitates communication
3	-	- Men are more involved in finding family's various requirements in the house -	-	-	- The main benefit is to facilitate communication - To know the status of those living far from our village	- Its good if used properly for the right specific aim - If used wrongly brings problems in the family
4	- Agricultural practices - Gender relationships	- Most village women do not have enough money to buy and manage mobile phones	-	-	-	- It very good if used properly following Tanzania customes
5	-	- Family phone is used by father, mother uses a few times when she wants to communicate with her relatives	-	-	- To know the status of relatives and friends who are living far from our village - For family's Information dissemination - Used to organise and follow-up easily family developmental activities even if the supervisor is travelling	- It is good if both man and woman owns mobile phone, because they have equal rights - It will bring development if there are no restrictions on using it

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144	- Cookery - Farming / Agricultural practices Appl	-	- Use phone only when there is death problem or sickness not otherwise	-	- Communication in case of death or sickness	-
145	-	- Because men are involved in finding family wealth and main owners	-	-	- To know the status of relatives and friends who are living far from our village	-
146	- Air time deduction costs	- Because women are not working, therefore, they do not have enough income to own a mobile phone	- My mobile phone should not ring infront of my husband - Do not distribute your mobile phone number to other people because my husband will be very furious	-	-	-
147	-	- Because women are not working, therefore, they do not have enough income to own a mobile phone	- My mobile phone should not ring infront of my husband - Do not distribute your mobile phone number to other people because my husband will be very furious	- No problems as a result of mobile phone because phone facilitates communication for example a child is sick or there is any alerting issue at it is easy to get information faster	- Facilitates communication, letter take too long to reach destination and sometimes they might not reach.	- My opinion is that everybody must agree that mobile phones have alot of benefits and has disadvantages too, but if used properly they mean alot to all of us
148	- Air time deduction costs	- Because men are involved more in finding some money than women	-	-	-	-

149	-	- Becaused I used to sell the prepaid ait time cards and found that 70% of my customers were men, and I was charging mobile phone batteries too, and found that 60% of my customers were men	-	-	- To know the status of relatives and friends who are living far from our village in case of death, sickness or happiness	- Mobile phone is a technology that helps to solve many problems which would have cost much if used properly
150	- Air time deduction costs	- Is because men are involved in money finding than we (women), we can find but we will not be like men	-	-	- I do business and communication with my family using mobile phonme	- Mobile phone is important to relatives and families and for business - My opinion is that more innovation is need to these phones and be used more,
151	- Cookery - Science	- Men are working hard to find money	- Because if a woman has mobile phone, she might give men her number and they will start disturbing her	-	- Facilitates communication	- If you have mobile phone is good
152	-	- Because men are working hard to find more money and especially men with mobile phone	-	-	-	-
153	- Air time deduction costs	-	-	- In some part, yes there are problems, I am not rejecting	-	- More education on mobile technology to users so that everyone will have a mobile phone and hence more use

Appendix 3: Closed questions – Questionnaire items (QI) sample results

S/N	QI – 1	QI – 2	QI – 3	QI – 4	QI – 5	QI – 6	QI – 8	QI – 10	QI – 11	QI – 12	QI – 13	QI – 14	QI – 15	QI – 16	QI – 17	QI – 18	QI – 19	QI – 20	QI – 21	QI – 22	QI – 23	QI – 24	QI – 25	QI – 27	QI – 28	QI – 30	QI – 32
1	Ifunda	Female	26 - 35	Yes	Employee	No	Yes	13	Nokia	ZAIN, TIGO, VODACOM	Single	29	I bought	No	To communicate with relatives / friends	Yes	4	5	5	6	12	Yes	No	-	No	-	-
2	Ifunda	Female	26 - 35	Yes	Employee	No	Yes	30	Nokia	ZAIN, VODACOM	Married	60	I bought	Yes	To communicate with relatives / friends	No	10	10	6	5	10	Yes	Yes	Mother	Yes	Men	decrease
3	Isimila	Male	26 - 35	Yes	Employee	No	Yes	30	Nokia	TIGO	Single	48	I bought	Yes	To communicate with relatives / friends	Yes	4	10	8	6	10	Yes	No	Mother	No	Women	increase
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149	Isimila	Male	26-35	Yes	Employee	No	Yes	45	Nokia	ZAIN, TIGO	Single	48	From parents/relatives	Yes	To communicate with relatives / friends	Yes	-	3	2	3	10	No	Yes	Father	Yes	Women	increase
150	Kidamali	Female	26-35	Married	Farmer	No	No	-	No	-	-	45	-	-	-	-	-	-	-	-		Yes	Yes	No	-	Men	decrease
151	Kidamali	Female	18-25	Single	Employee	Yes	No	-	No	-	-	70	-	-	-	-	-	-	-	-		Yes	Yes	No	-	Men	increase
152	Kidamali	Female	26-35	Married	Farmer	No	No	-	No	-	-	50	-	-	-	-	-	-	-	-		Yes	Yes	No	-	Men	increase
153	Kidamali	Female	26-35	Married	Business	No	No	-	No	-	-	50	-	-	-	-	-	-	-	-		No	Yes	No	-	Men	increase