ICTs and access to health care in Kenya

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Finally, I would like to thank all my informants in Kenya for taking their precious time to answer my questions and taking part in my fieldwork.
### LIST OF ACRONYMS AND ABBREVIATIONS

<table>
<thead>
<tr>
<th>Acronym</th>
<th>Full Form</th>
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<tr>
<td>CCK</td>
<td>Communication Commission of Kenya</td>
</tr>
<tr>
<td>CDMA</td>
<td>Code Division Multiple Access</td>
</tr>
<tr>
<td>CHMI</td>
<td>Center for Health Market Innovations</td>
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<tr>
<td>CMHIL</td>
<td>Changamka MicroHealth Insurance Limited</td>
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<tr>
<td>EC</td>
<td>European Commission</td>
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<tr>
<td>ESFIM</td>
<td>Empowering Smallholder Farmers in Markets</td>
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<tr>
<td>GDP p.c.</td>
<td>Gross Domestic Product per capita</td>
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<tr>
<td>GSM</td>
<td>Groupe Spéciale Mobile</td>
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<td>GSMA</td>
<td>Groupe Spéciale Mobile Association</td>
</tr>
<tr>
<td>HDI</td>
<td>Human Development Index</td>
</tr>
<tr>
<td>HIV/AIDS</td>
<td>Human Immune Virus/ Acquired Immune Deficiency Syndrome</td>
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<tr>
<td>ICT</td>
<td>Information and Communication Technology</td>
</tr>
<tr>
<td>ILO</td>
<td>International Labour Organization</td>
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<tr>
<td>IRIN</td>
<td>Integrated Regional Information Networks</td>
</tr>
<tr>
<td>ITU</td>
<td>International Telecommunications Union</td>
</tr>
<tr>
<td>KimMNCHIp</td>
<td>Kenya Integrated Mobile Maternal, Newborn and Child Health Information Platform</td>
</tr>
<tr>
<td>KSh</td>
<td>Kenyan Shilling</td>
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<tr>
<td>LOC</td>
<td>Library of Congress</td>
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<tr>
<td>MDG</td>
<td>Millennium Development Goal</td>
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<tr>
<td>mHealth</td>
<td>Mobile Health (Programmes)</td>
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<td>MNCH</td>
<td>Maternal, Newborn and Child Health</td>
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<td>Abbreviation</td>
<td>Full Form</td>
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<tr>
<td>MMR</td>
<td>Maternal Mortality Ratio</td>
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<td>MoIC</td>
<td>Ministry of Information and Communication</td>
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<tr>
<td>NGO</td>
<td>Non-Governmental Organization</td>
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<tr>
<td>NHIF</td>
<td>National Health Insurance Fund (in Kenya)</td>
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<tr>
<td>RIA</td>
<td>Research ICT Africa</td>
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<tr>
<td>SIM</td>
<td>Subscriber Identity Module</td>
</tr>
<tr>
<td>SMS</td>
<td>Short Message Service</td>
</tr>
<tr>
<td>TBA</td>
<td>Traditional Birth Attendant</td>
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<tr>
<td>THE</td>
<td>Total Health Expenditure</td>
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<tr>
<td>UN</td>
<td>United Nations</td>
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<tr>
<td>UNAIDS</td>
<td>United Nations Programme on HIV/AIDS</td>
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<tr>
<td>UNDP</td>
<td>United Nations Development Programme</td>
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<tr>
<td>UNCSTD</td>
<td>United Nations Commission on Science and Technology for Development</td>
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<tr>
<td>UNFPA</td>
<td>United Nations Population Fund</td>
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<tr>
<td>UNICEF</td>
<td>United Nations Children’s Emergency Fund</td>
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<tr>
<td>USD</td>
<td>U.S. Dollar</td>
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<tr>
<td>WB</td>
<td>World Bank</td>
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<td>WHO</td>
<td>World Health Organization</td>
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1. **CHAPTER 1**

1.1 **The Purpose**

Good health is fundamental to leading a healthy and productive life and healthcare is one of the basic requirements of citizens of any country in the world. A well functioning healthcare system is crucial to both the individual and the public and “The positive correlation between health and income per capita is one of the best-known relations in international development” (Bloom & Canning 2000:1207). Economic development increases life expectancy and well-being and generally improves health. Better physical and mental health increases labour productivity, healthier people are more likely invest in their education, and a healthier public decreases medical spending, just to name some of the advantages. While chronic, non-communicable diseases are a major problem in developed countries, communicable diseases and maternal mortality remain the most problematic situation in developing countries. In 2000, world leaders agreed on eight concrete Millennium Development Goals (MDGs) to be achieved by 2015. Many are directly or indirectly related with solving major health problems. Reducing child mortality (MDG4); improving maternal health (MDG5); and combating HIV/AIDS, malaria, tuberculosis and other major communicable diseases (MDG6) are supposed to meet the needs of the world’s poorest people, specifically relating to health (UN 2013a).

This study is dedicated to understanding broadly how mobile phones play a role in a health system and the impact of mHealth programs on the lives of people in Kenya. The thesis focuses on the provision of better access to health care to vulnerable sections of the country’s population through mobile devices. I examine some of the challenges and opportunities related to the use of information and communication technology (ICT) to promote human development and social change and combat poverty. The emphasis is on the potential of mobile phones in improving maternal health outcomes in developing countries. I believe that usage of mobile health programmes (mHealth) can
potentially reduce maternal and infant mortality in developing countries.

Communicable diseases and maternal mortality are currently some of the biggest concerns of the developing world. The number of communicable diseases is growing within developing countries and the maternal mortality ratio is still, in some places, acutely high. At the same time, developing countries are experiencing shortages of doctors, nurses, and other qualified medical care. Approximately 287,000 girls or women die every year from preventable causes related to pregnancy and as a result of complications in childbirth (WHO 2012a), although most of the deaths can be easily avoidable and preventable by delivering crucial information or being helped by trained assistance. The rate of maternal mortality differs significantly across the whole world, but 99% of all maternal deaths occur in developing countries, with nearly half of the maternal deaths are taking place in sub-Saharan Africa (Ibid.) The situation of maternal health in developing countries is urgent and therefore improving maternal health is one of the eight MDGs. Maternal mortality worldwide dropped by almost 50% between 1990 and 2010, but there is still a long way to go to achieve the goal especially in developing regions, where maternal mortality is still 15 times higher than in developed regions (UN 2013b). At the same time when the world has been fighting maternal mortality, non-communicable and communicable diseases the world has been experiencing a revolutionary development in the field of ICT.

ICTs have become useful tools in our everyday life providing not only information or communication, but also providing banking services, learning, or monitoring health in a cheap, easy and fast way. New terms such as mCommerce, mBanking, mLearning, mAgriculture have become parts of our vocabularies and carry huge potential for faster development. The ability to tackle health issues in developing countries is meeting many barriers such as underfinanced health sectors, strict terms and conditions of insurance not affordable for the poor, or lack of trained medical health workers. These factors influence the number of communicable diseases as well as the high maternal mortality ratio within developing countries. There are many different fields in
what mobile technology help tackling daily issues. The lack of trained medical personnel and the access to health care is a major problem in many developing countries, particularly in rural Africa.

Most maternal deaths can be eliminated with a set of proven interventions delivered by skilled assistant. mHealth programmes examined in this study can potentially help Kenyans to save, plan and pay for quality antenatal, delivery and postnatal care. It is urgent to tackle the problem of maternal mortality because there is still a very low percentage of births attended by skilled personnel and most maternal deaths can be avoided if complications are identified early. Antenatal care and treatment in the first days and weeks post-partum are very essential as well and can prevent at least two thirds of newborn deaths.

The particular focus of this study is on the role of ICTs in health outcomes in Kenya. This study focuses on two running mHealth programmes in Kenya that promise to enable middle and low-income population to save up through electronic platform in mobile devices for good quality health care services. The reason why I have chosen to study health services provided with the help of ICTs is that health outcomes have direct and growing relationship to poverty alleviation in developing countries.

Kenya is a country with acutely high maternal mortality ratio; lack of qualified personnel and where the access to health care services remains difficult in most parts. Conversely, Kenya has one of the highest mobile phone penetrations in sub-Saharan Africa and Kenyans has recently experienced enormous success in mobile banking services called M-Pesa, which is frequently used in every day’s lives of majority of Kenyans. The Kenyan Government’s attempts to bring affordable health care services to Kenyans haven’t changed the alarming situation and the high ratio of maternal mortality remains acute in most parts of Kenya. I discuss that there can be a possibility how to tackle current health care problems in Kenya through innovative services and I suggest that ICTs can be advantageous and beneficial not only in Kenya, but in most developing countries
with high penetration of ICT. I suggest that mobile phones, which are currently crucial tools of every day’s lives of Kenyans and are commonly used for innovative financial services, can help to tackle the current general problem in health care services and assist Kenyans to access affordable and good quality health care.

RESEARCH QUESTIONS

The risk of not realizing the full potential of mHealth programmes can be due to the fact that most of mHealth programmes are in pilot stages with limited reach. This study will help readers better understand the new phenomena of mHealth services in developing countries as well as offer suggestions for easier implementation and utilization of mHealth services within middle and low-income population in developing countries. I will analyse the opportunities, challenges and barriers to ICT usage faced by the poor, particularly in relation to mHealth services. This study is interesting and relevant for the following reasons: i) the lack of empirical evidence on mHealth programmes in sub-Saharan Africa; ii) urgency in tackling currently unaffordable health services for middle and low-income population in Kenya; iii) high maternity ratio within population in Kenya, which has not been tackled within recent years and remains acute; iv) promising ICTs services within sub-Saharan region; and v) lack of similar studies in sub-Saharan region. Research can play a vital role in critically assessing the factors that support the innovative applications of ICTs. And I will examine to what extent ICTs help to improve access to health care services by the poor in Kenya. The focus is on two mHealth programmes initiated by Changamka MicroHealth Insurance Limited (CMHIL) and I will study to what extent can mHealth programmes address the issue of high maternal mortality rates and contribute towards influencing and improving health services in Kenya in general.
This study addresses two sets of interrelated research questions:

1. What is the impact of technology on poverty reduction at the local level and what are the main sets of challenges in implementing mHealth programmes in developing countries?

2. To what extent have mHealth systems been successful in reducing maternal mortality in Kenya?

The above questions led me to using the case study approach as the appropriate research method. The study will focus on the analysis of two current mHealth projects initiated by CMHIL company called mKadi ya maternity in Nairobi and Linda Jamii in Mombasa.

I am interested in analysing how mHealth programmes can enable easier access to medical services and help in the maternal health sphere in urban areas. Kenya was chosen as a case study because for many Kenyans, a mobile signal is more likely to reach their home than a skilled attendant or community health worker. I believe that access to health information and saving platform through innovative services in mobile phones may be the way to improve the health situation in Kenya. I consider that high usage of mHealth programmes such as mKadi ya maternity or Linda Jamii, can reduce ratio of maternal mortality and reduce communicable diseases.

1.2 Background Information

Kenya, with a population of 44 million people (CIA 2013), is one of the most populous countries in Africa. It faces a number of serious problems, including widespread poverty and income inequality. Kenya has been struggling to provide access to basic health care services and medical treatment since its independence in 1963. Kenyans are also known for not visiting the health facility or seeing the doctor unless their health situation is very critical. The fact that approximately 45% of the population in Kenya is living below the poverty line (WB 2013a) and
is unable to meet their daily nutritional requirements partly explain this phenomena. Health expenses are not naturally the first priority in the life of the majority of Kenyans, who struggle to fulfil basic nutrition requirements. Some of the biggest problems of the Kenyan health system are the under-financing of the health sector leading to the lack of doctors and health facilities and the fact that approximately 38.8 million Kenyans or 97% of Kenyan people have no insurance coverage and lack access to affordable healthcare (Britam 2014). The lack of doctors and facilities is especially acute in rural areas, where around 80% of the Kenyan population lives (CIA 2013). These facts contribute among others to a high ratio of maternal mortality within the country, which is acutely high.

My particular interest lies in the specific and alarming challenges facing Kenya - a country where maternal health and development obstacles remain exceptionally acute. The maternal mortality rate in Kenya is 360 deaths per 100,000 live births in 2010 and this ratio is the 30 highest in the world (Ibid.). The devastating scale of the high maternal mortality ratio is undoubtedly, in combination with the lowest number of doctors per patient in the region and no insurance coverage for more than 90% population some of the significant threats of the country. The number of registered medical personnel in Kenya was 7,549 and there were 19 doctors per 100,000 lives in 2011 (Ibid.).

Hence, this thesis focuses mainly on maternal health; the possibilities and limitations to sustainable uses of mobile phones to support maternal health work in Kenya. I believe that mHealth programmes, such as mKadi ya maternity or Linda Jamii, have the potential to enable for low income Kenyans access for quality healthcare and save on delivery services with trained assistance.

According to Kenya’s communications regulator in their Quarterly Sector Statistics Report, Kenya has a mobile penetration of 77.3% (CCK 2013) and compared to the rest of the continent this figure is significantly higher than the average of 54% in sub-Saharan Africa (GSMA 2012). Kenya has also experienced enormous success in initiating a mobile banking programme called
M-Pesa since 2007 provided by Safaricom. M-Pesa had over 14 million active users by 2012 (Safaricom 2013b) and illustrates how the majority of Kenyans use mobile phones for accessing innovative financial services. The phenomena of sharing mobile phones by many users raise the number of M-Pesa users.

It is not only Kenya’s health ministry, but also many NGOs and private organizations that view innovative easy and cheap mHealth services as the future of healthcare. The governments and NGOs understand the importance of implementing ICT to tackle health care challenges. Mobile technologies are widely accessible and reachable and can play a significant role in health care at the regional, community, and individual levels. Kenyans have been experiencing a vibrant innovation culture engaged to mobile devices in the last decade. Are Kenyans ready to face a new challenge and be able to save up and access good quality medical services over their mobile devices?

1.3 Methodology

1.3.1 The Case Study Approach

The design chosen for this study is qualitative research method: a case study approach. A case study is a qualitative research method, which allows for an in-depth examination of phenomena, or other observations within a real-life context and when “‘how’ or ‘why’ questions are being asked about a contemporary set of events, over which the investigator has little or no control” (Yin 2009:13).

“Qualitative analysis is the non-numerical examination and interpretation of observations for the purpose of discovering underlying meanings of patterns and relationships” (Babbie 2010:394). According to Moses and Knutson (2012), the case study technique remains one of the most frequently employed approaches in social-science research. According to Yin (2009:118), it is important when using case study approach to combine various data collection techniques in order to use multiple sources of evidence, because “without such multiple sources, an invaluable advantage of the case study strategy will have been lost.” In order to
obtain multiple sources, I combined various techniques: direct and participant observations, structured interviews with open-ended questions, collecting secondary sources of data, etc.

The Generalizing Case Study approach was chosen as a method for this study in order to answer research questions for following reasons: i) case study is a preferred strategy for ‘how’ and ‘why’ questions; ii) case study was chosen because the sample size was known ahead to be small according to the financial and time possibilities; iii) studying two case studies can illuminate and explicate the causalities of the phenomena within its real-life context; and iv) case study relies on multiple sources of evidence, which can be collected in the field. I considered that case study approach would be the most suitable for this study because qualitative research allowed me to get closer to my informants. People in sub-Saharan Africa are willing to talk with you about personal life and decisions only if they feel they know you and they can trust you. A very important part of my fieldwork was to gain this trust. The success of gained trust can be confirmed by emails and SMS received even few months after my fieldwork in Kenya.

Each research strategy has its own advantages and disadvantages. One of the main advantages of case study approach is that the case study approach “explains the presumed casual links in real-life interventions that are too complex for the survey or experimental strategies” (Yin 2009:19). Some of the main concerns about the case study approach are according to Yin (2009:14-15): lack of rigor; they provide little basis for scientific generalization and that “case studies take too long and result in massive, unreadable documents”.

1.3.2 The Case

Linda Jamii is one of the cheapest micro-insurance services in Kenya and focuses on providing affordable and good quality health care for middle and low-income population groups. Customers of Linda Jamii can save up for medical expenses for the whole family through a well-known and frequently used electronic platform called M-Pesa. The payment services are easy, fast, flexible and
affordable for majority of population in Kenya, which has been accused of lacking a culture of adopting insurance. Micro-insurance Linda Jamii is coverage for the annual premium of KSh12,000 (about USD140) in-patient and out-patient services, dental, maternal, optical and funeral services worth KSh 290,000 (about USD 3,500) (Okutoyi 2014). Linda Jamii covers the whole family - one principal member, one spouse and all children. Safaricom initiated the service Linda Jamii in Kenya in 2012 in partnership with CMHIL, PSI and investment firm Britam. Linda Jamii is currently in the first pilot phase and has 8,000 customers (Ibid.).

mKadi ya maternity is a service using mobile based savings card that allows middle and low-income Kenyans to save up for good quality maternal health care services. mKadi ya maternity uses the same electronic platform M-Pesa as the Linda Jamii programme and similar to Linda Jamii, mKadi ya maternity was initiated in Kenya in 2012 by CMHIL with the support of UNDP, Ken Invest and M-Pesa. Any Changamka agent can register expecting women for free and start saving up money for maternal services in diverse medical health care clinics approved by CMHIL. The saving system is very flexible and suitable even for low-income population and mKadi ya maternity offers maternal health services packages with savings up to 50% on maternal services. mKadi is also in its pilot stage.

1.3.3 Fieldwork

The fieldwork for this study was conducted within a period of six weeks during the months October and November 2013 in urban areas of Kenya (Nairobi, Mombasa, Malindi). Two running mHealth projects initiated by CMHIL were followed and observed. Of the total six weeks in Kenya, three were spent in Nairobi following the running mHealth project called mKadi ya maternity, two were spent in Mombasa and one week in Malindi (Kenya’s north coast) following the running mHealth project called Linda Jamii. The rationale of this study demands the collection and analysis of various types of data. The data collection process therefore combined a review of relevant policy documents and
reports, qualitative interviews, direct and participant observations and the use of existing and available statistics.

1.3.4 Secondary Sources of Data

The secondary data were collected through published government and mHealth documents and statistics. I obtained data through local and regional government reports, reports from hospitals, unpublished reports from CMHIL, Britam, Linda Jamii and mKadi ya maternity programmes and, articles in professional literature and local newspapers etc. Studying such documents and figures provided a better understanding of the overall health and social situation within the country as well as to understanding the possible power of ICTs in Kenya. Most documents were found on the Internet pages of the Kenyan Government, mHealth Alliance, CMHIL, but some were also collected during the fieldwork from the initiators or distributors of both mHealth programmes. Most of the obtained data was useful for better understanding the context and accessing essential figures for the study.

1.3.5 Primary Sources of Data

The primary data was collected through different techniques and methods such as structured interviews, discussions, and direct and participant observations in local private health facilities and public hospitals, as well as in the office of CMHIL and the local office of Britam in Malindi. Observations and random small discussions with the local people helped to build a general overview of the current health situation in Kenya. The main technique for collecting qualitative data during my fieldwork was interviewing. Four interview guide templates were developed for four groups of informants in order to obtain the information from diverse angles.\(^1\) The four groups of informants covered initiators, providers, users and mobilizers of mHealth programmes. The interviews naturally varied according to the situation, place and interviewee. Most of the interviews were semi-structured discussions and some of them were open conversations. The plan

\(^1\) The interview guides are presented in the Appendix

\(^2\) Poverty line: is defined by minimum level of income necessary to meet basic needs (WB 2011)
was to mainly conduct interviews with open-ended questions. Interviews with open-ended questions can usually expose the most information and give the interviewee the opportunity to reveal as much information as he/she is willing to provide. Participant observations were one of very useful tools to better understand the health-care environment in Kenya.

The structured interviews were mostly based on open-ended questions to get further information and explanation of the studied phenomena. The base of the questions was same for every interviewee in order to have standard frame for comparison and analysis. The study required face-to-face interviews with the midwives, doctors, community health workers, project leaders, owners of health facilities, mHealth programme providers and distributors, etc. Participant observations were conducted in various health facilities with mKadi ya maternity and Linda Jamii users. The participant observations helped to better understand the process of using mHealth programme in the health facility and to recognize the limitations and boundaries of using ICT. The main emphasis was on interviewing Linda Jamii and mKadi ya maternity users, providers, mobilizers, initiators and developers. Doctors and nurses in the local and private hospitals and community health workers helped me to better understand the current situation in health care in Kenya and light upon the main difficulties and barriers of the running mHealth programmes in Kenya. Top representatives of CMHIL were interviewed and also assisted in accessing reference material both published and unpublished. The elite interviews helped to answer research questions as well as deepen the knowledge of the phenomena of mHealth programmes and information from inside.

However I had all the necessary documentation, I faced many difficulties in getting closer to potential interviewees and the process was time consuming with no positive results. Hence I reckoned to set up interviews in advance by email or phone call.
My intention was to use snowball sampling. The main reason for using the snowball-sampling method was to locate people of a specific population – for example mHealth users of mKadi ya maternity and Linda Jamii. Using snowball-sampling worked very well and gave me the opportunity to get contacts for users from diverse locations, health, social and financial situation.

The interviews were recorded and transcribed, the notes were written down shortly after each interview. These documents can be provided upon request.

### 1.3.6 Challenges in the Field and Limitations of the Study

Some of the biggest challenges in the field were lack of time and financial resources, distances between various places where the interviews were held, African cultural differences such as awareness of time or heavy traffic jams in Nairobi and Mombasa. During my fieldwork I have experienced that Kenyans usually do not reveal any negative findings or facts. In order to get this kind of information about the programmes I have followed, I needed to build up a personal relationship, and gain certain trust from my informants. Even though I did not have enough time for building these connections with all my informants, I believe I successfully obtained a lot of useful information by building this trust with most of the interviewees. Due lack of time, I couldn’t interview more Linda Jamii and mKadi ya maternity users, who have been very hard to reach in their busy every day lives. One informant was biased due to the presence of the provider of the mKadi ya maternity programme. I did not consider this interview as relevant for the study.

Even though I wasn’t able to interview more users and the programmes were still in its initial stage, I attempted to get some of the material, which was very valuable for this study.
1.4 Overview

The Chapter One outlines the objectives of the study, together with the research questions to be answered. The background information about health situation within developing countries help readers to better understand the necessity of finding a successful approach to tackle current health situation within sub-Saharan region.

The Chapter Two provides the readers with a general understanding of development and poverty. The principal attention of this chapter will be on theoretical perspectives of authors Mansell and Heeks and on general discussion of theoretical perspectives of ICTs usage in health. Introducing ICT within developing countries shows the Africa’s Information Revolution and explains why a lot of attention is being given to ICTs today.

The main part of the Chapter Three is the presentation of the data obtained, which are presented in logical flow based on theoretical approaches discussed in Chapter Two and followed by relevant citations from the transcript of various informants.

The last Chapter Four sums up concrete findings of the study, includes the conclusions and present the recommendations for further research. This chapter will also include the limitations of the study and points to some of the most fundamental issues that must be given a high priority in both the research and policy communities if ICTs are to contribute significantly in facilitating access to good quality health care in developing countries.
2. CHAPTER 2

*Don’t ask me what poverty is because you have met it outside my house.*

*Look at the house and count the number of holes. Look at my utensils and the clothes that I am wearing. Look at everything and write what you see.*

*What you see is poverty.* —A poor man, Kenya 1997 (WB 2001)

2.1 Introduction

In developing countries many more people now have access to a mobile phone than clean water, electricity or a health facility. Mobile phones have become an essential and practical tool for everyday life for millions of new users in emerging economies and have drastically changed their lives. Africa is not an exception. Mobile phones within the African context are being used from big cities to poor remote villages and the mobile device is not used anymore only as the conventional communication tool. Mobile phones can nowadays transfer and save money, monitor data, or give people a way to "voice" their opinions. I will discuss how ICTs can play an important role in combating poverty in developing countries with the support of various theoretical perspectives.

ICTs are increasingly playing an important part in development, political, economical and sociocultural processes all over the world. The core of this chapter is to present the theoretical perspectives and key findings of the role of ICT in development and poverty alleviation. The first section of this chapter will provide the readers with background information and general understanding of development and poverty. The following section introduces ICTs within the African context and presents a brief literature review concerning ICT and development and poverty reduction in developing countries from which some key research issues are drawn. Two major theoretical perspectives offered by Robin Mansell and Richard Heeks will be presented and discussed more precisely and the key points will be highlighted and debated. These theoretical perspectives will be analysed and later on tested in the field on my case studies.
The main focus of this chapter is on ICTs usage in health. Since there is a general lack of formal evidence of mHealth programmes in developing countries (Krishna et al. 2009), I will undertake a broad discussion of possible barriers and advantages of mHealth programmes by examining the available literature on the topic. Previous studies can help provide a better understanding of the reasons and conditions under which various programmes worked better than the others and what criteria are necessary to fulfil for the successful implementation of such ICT applications in developing countries. A discussion on how the theoretical perspectives are operationalized in this study will be the focus of the final section of this chapter followed by a review of the theoretical perspectives and some key questions in the area will be underlined.

2.2 Understanding Development and Poverty Reduction

The definition of ‘development’ has been presented in various modifications by numerous authors and the definition has been over the years controversial and unstable. According to Sumner and Tribe (2008:11) “the dimensions of development are extremely diverse, including economic, social, political, legal and institutional structures, technology in various forms, the environment, religion, the arts and culture”.

First of all I decided to present three diverse definitions of development debated by Sumner and Tribe (2008). One is historical and relatively value free and present “development as a process of change” (Ibid.). This definition is very wide and open and according to this definition development can be change of any kind. This definition focuses on transformation over a long period of time and development can involve, for example, diverse socio-economic changes. I consider this definition of development too extensive for this study.

The second definition of development presented by Sumner and Tribe is more evaluative and policy related and has a short to medium time horizon. The definition of development is focusing on the outcomes of change and can be
presented as “short to medium term outcome of desirable targets” (Sumner & Tribe 2008:11). One example of such definition of development can be Millennium Development Goals (MDGs), which emphasize the end point to which a society arrives. This definition is suited for the study better, mainly because it is more specific and readers can better imagine the movement towards an end point.

The third and last definition of development by Sumner and Tribe is post-modernist and present development as a “dominant discourse of western modernity” (Ibid.) and is “based on the view that development has consisted of ‘bad’ change and ‘bad’ outcomes through the imposition of Western ethnocentric notions of development upon the Third World” (Sumner & Tribe 2008:12).

Some definitions of development are closely tied to poverty eradication; some definitions are complex and ambiguous and some are connected to the term ‘modernity’. Authors, who define development as ‘modernity’, usually see development in economic terms. Banik (2010:21) for example defines development as “a deliberate movement of societies towards a situation of more liveable life conditions”. Banik (2010) adds that development is a process where these goals are to be maximized even though there may trade-offs. I discuss that Banik’s definition of development can be suitable for this study mainly because it generally defines the complex change towards better life, not only focusing on poverty eradication or the modernity term. Most of these definitional debates have general agreement on the view that “‘development’ encompasses continuous change in a variety of aspects of human society” (Sumner & Tribe 2008:11).

The definition of development is necessary to understand how can be the development achieved. According to Amartya Sen (2001:183), evidence suggests that successful development can be best achieved by involving “a wide dissemination of basic economic entitlements (through education and training, through land reform through availability of credit) [and thereby broaden] access
to opportunities offered by the market economy”. Alampay et al. (2003) argue that only the access to ICTs does not necessarily lead to development. Mann (2003) agrees with Alampay et al. when saying that an integrated approach is needed for development to occur when using ICTs and the capabilities of people and creating value in ICT applications is more important than the ICT infrastructure.

Understanding poverty reduction requires a definition of the term poverty. Until 1990, the definition of poverty was understood largely in terms of income and economists have given a great deal of attention to the functional form of a poverty measure.\(^2\) Being poor meant not having enough sources to provide a proper diet at home and people who do not attain that level of welfare are deemed poor (Ravallion 1998). But the definition of poverty has been in the recent years slightly changing from the simple definition of shortfall in income or calorie intake towards a multidimensional social phenomenon as Sen argues (1995). According to the Narayan et al. (2000:27), “Poverty never results from the lack of one thing but from many interlocking factors that cluster in poor people’s experiences and definitions of poverty.” The European Commission, for example, suggests that “poverty should not be defined merely as a lack of income and financial resources” (EC 2001:2). However, the European Commission (2001:2) adds that poverty also includes “the deprivation of basic capabilities and lack of access to education, health, natural resources, employment, land and credit, political participation, services and infrastructure”. Another definition presented by the United Nations states that poverty “is about the denial of opportunities and choices that are widely regarded as essential to lead a long, healthy, creative life and to enjoy a decent standard of living freedom, dignity, self-esteem and the respect of others” (UN 2014, The Poverty Trap, par. 1). Even broader definitions view poverty as “being deprived of the information needed to participate in the wider society, at the local, national and global level” (ZEF 2002:20).

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\(^2\) Poverty line: is defined by minimum level of income necessary to meet basic needs (WB 2011)
To expand the definition of poverty and understand what poverty is, it is essential to uncover dimensions of poverty that are important to poor people, who can characterize poverty from their own experience. The definitions of poverty generally differ by gender, age, culture, and other social and economic circumstances. World Bank’s *Voices of the Poor* study is based on the views of poverty of more than 60,000 men and women living in poverty in 60 different countries. According to the study, which was conducted as background for *World Development Report 2000/2001*, the poor define poverty through many interacting dimensions such as: i) Material Well-Being; ii) Food Security; iii) Employment; iv) Psychological Well-being; v) Power and Voice; vi) Cultural and Social Norms; vii) State-Provided Infrastructure, viii) Assets of the Poor; ix) Physical, Human and Social Capital; x) Environmental Assets: Shocks and Decline; xi) Assets and Vulnerability; and xii) Vulnerability within the Household and on the Job (Narayan et al. 2000). The World Bank report, based on people’s voices, goes beyond the definition of poverty as a measure of low income and consumption, but rather suggests that poverty includes powerlessness, voicelessness, vulnerability, and fear (WB 2001:v).

Most of the above definitions have in common that poverty is a complex and multidimensional phenomenon, which involves a lack of multiple resources necessary for material well-being such as food, housing, land, etc. According to poor people, poverty also remains as a lack of multiple resources, which leads to physical deprivation and lack of voice, power and independence. There are many significant causes of poverty such as lack of sufficient employment opportunities, lack of access to basic social services in relation to education, health and reproductive health or social exclusion just to name few. Poverty is very closely connected to vulnerability. Poor people often lack crucial health care and are therefore much more vulnerable to illness and disease. The evidence suggests that women with children represent the majority of the poor in many countries. Poverty is transmitted inter-generationally and if women can move out of poverty, their children will have a higher chance to face a brighter future. Poverty has numerous dimensions, which are interrelated and responsible for creating a
vicious circle. Poor health can, for example, prevent people from working full time, thus limiting their income and their ability to move out of poverty. This loop can be also called ‘The Poverty Trap’.

2.3 Introduction of Information and Communication Technologies (ICT) within the African context

In order to understand the actual usage of mobile services, products and applications in the following passages, the recent history of mobile phone penetration in Kenya, will be presented together with data and figures about mobile phone usage in the country as well as the main purposes of the mobile devices within the country.

2.3.1 Mobile Phone Penetration

The first mobile phone was introduced in Kenya in 1992 and by the end of the year mobile phone subscribers numbered 1,100 (Tyler et al. 1999, Mobile Communications and Radio-Based Services, par. 4). Since that time the number of mobile phones subscribers in Kenya has been mounting extremely fast. Kenyans have been interacting actively with the mobile phone technology. The number of cell phone subscribers in Kenya increased from 24,000 in 1999 to 5 million in 2005 (ESFIM 2009:8). By the end of the year 2012, the total number of mobile subscribers increased to over 30 million (CCK 2013). According to the latest sector statistics from the Communication Commission of Kenya (CCK), the penetration of mobile telephony services was 78% in 2012 (Ibid.). Nevertheless, these figures could be slightly misleading due to the fact that the sector statistics of the CCK based its calculations on the number of active SIM cards in the Kenyan mobile networks (Okutoyi 2013), and not the actual number of unique individual mobile subscribers. The latest phenomenon in Kenya is to own more than one SIM card to benefit from different tariffs on different networks (Ibid.). The majority of Kenyans own dual SIM-card phones, which has become extremely popular within the Kenyan population and there has been a
remarkable increase on the market of dual/trial SIM-card phones as the producers try to meet the market needs (Ibid.). The possible reason is to have an opportunity to choose the most convenient service charge.

Over the past years the cost of mobile devices has been decreasing steadily and mobile phones, which used to be considered as a luxury, became essential for every day living. The penetration of the usage of mobile devices is high even for Kenyans at the lower end of the economic spectrum primarily because of the rough competition between mobile operators, which has resulted in rigid price competition. The four mobile phone operators offering mobile GSM/CDMA services in Kenya are Safaricom, Airtel, Essar (Yu) and Telkom Kenya (Orange) (Waema & Ndung´u 2012). Safaricom remains the dominant mobile operator holding a 65,3% share of mobile voice subscription in March 2012, whereas Airtel holds 15,3%, Telkom 10,6% and Essar 8,7% (Ibid.). Various operators are trying to penetrate the market by lowering service charges; therefore the services are affordable for most of the Kenyan population. According to Mittulah & Kamau (2013:2) has 93% of Kenyans access to mobile phones.

2.3.2 Mobile Money

Mobile devices in Kenya are used daily for various services. The most popular unconventional usage of mobile phone is money transfer. As Waema and Ndung´u (2012:19) observe “Use of mobile money in Kenya is convenient, easily accessible, and widely accepted”. The use of mobile money has spread over the unbanked population within the whole country and is offered by all four mobile service providers. Arguably the world’s most successful mobile money transfer platform M-Pesa is offered by Safaricom and according to Safaricom’s 2013 annual report has 17,1 million customers, 65,547 agent outlets and 1,482 paybill partners in Kenya (Safaricom 2013a). “The general consensus is that M-Pesa was largely successful in Kenya because of Safaricom’s significant market dominance, strong branding, and the openness of the Kenyans regulator to encouraging innovation, thus allowed M-Pesa to emerge and flourish” (InfoDev
Followed mHealth programmes closely cooperate with mobile banking service M-Pesa, which enable all the money transactions and saving possibilities.

### 2.3.3 Mobile Health Applications (mHealth)

As Patricia Mechael, executive director of the mHealth Alliance, argues, “There is a growing body of evidence that demonstrates the potential of mobile communications to radically improve healthcare services, even in some of the most remote and resource-poor environment” (Vital Wave Consulting 2009:4). The rapid uptake of mobile communication technologies in Kenya seems to be in combination with limited number of doctors the optimal environment to launch mHealth innovative services to provide better health care and reduce one of the world highest maternal mortality ratios. Most of the Kenyans are owners of mobile phones and became more ‘reachable’. Kenyans have an access to m-services and according to the InfoDev (2012) research about Mobile Usage at the Base of the Pyramid in Kenya in December 2012 health and education information are the most desired ones. According to the same study, very few mobile phone users are using other applications than M-Pesa. The reasons are due to “the lacking awareness/marketing campaigns, confusion about the difference between applications, phone functionalities, and internet, and challenges in the use of USSD/SMS applications” (InfoDev 2012:9).

Robert Istepanian et al. invented the term mHealth as use of “emerging mobile communications and network technologies for healthcare” (Istepanian et al. 2006:3). In 2010 mHealth Summit used the definition of mHealth as “the delivery of healthcare services via mobile communication devices” (Torgan 2009). Due to the ease of access to the mobile devices and mobile signal, mHealth can be more promising than eHealth. eHealth or e-health stands for healthcare practice supported by electronic processes and communication (Advantech 2012). The main difference between eHealth and mHealth is that eHealth indicates healthcare practice using the Internet, whereas mHealth is supported by mobile devices, such as mobile phones, tablets, computers, etc.
“The mHealth field has emerged as a sub-segment of eHealth and the use of Information and Communication Technology (ICT)” (Access 2014) as shown in Figure 1. Both services can deliver health care information to patients, practitioners or researchers. There is a possibility to monitor a patient through eHealth or mHealth in real-time and make a direct provision of care.

*Figure 1: eHealth versus mHealth*

mHealth applications or services can be used variously. For instance, clients of mHealth services can contact through phone calls or text messages, health workers or mHealth applications can promises inexpensive and fast treatment observance. Users of mHealth services can also get access to health education and health workers can be continuously trained by various alerts or tasks. Through mHealth applications they can organize transport, which can be very convenient in case of emergency. mHealth services users can also save up money for health treatment through the popular money transfer M-Pesa.
2.4 ICTs in Promoting Development and Poverty Reduction

Despite large ICTs usage in developing countries in the recent years, there is a worrying lack of empirical evidence on effects of ICTs upon poor people’s lives. ICT represents a very broad range of various devices with different price, ease of usage and size. Discussions about poverty reduction through ICTs in mobile telephones often receive the highest amount of attention. The mobile telephone is the most affordable communication technology due to the rapid fall in prices in some developing countries, especially in sub-Saharan Africa and has big advantages in its small size and basic and easy way of use. According to O’Farrell & Norrish (1999, Findings, par. 6) the telephone is the backbone of ICTs, which can effect substantial positive change on rural livelihoods by delivering market and trading information or strengthening kinship relations, to mention some examples. The main focus in discussions of ICTs in promoting development and poverty reduction will be therefore put on mobile phones for following reasons: i) mobile phones are not anymore seen as a luxury in some developing countries, due to its size, price and ease of usage, ii) mobile phones are used in developing countries more often than other ICT devices for the previous reasons, iii) the mobile phone is the main device used in programmes followed in this study in Kenya.

Just as there are disagreements about defining ‘development’ and ‘poverty’, there are also disagreements in discussions whether ICTs are crucial to development and poverty reduction, or not (Alampay 2006, ICTs and Development, par. 1). The question whether poverty can be fought with the help of ICTs has been broadly debated in the recent years. The major reduction in the cost of ICT usage over the years, and more recent technological innovation, has contributed to the growing popularity of ICT usage in developing countries. Many donors and major aid agencies have become enthusiastic about the scenarios for improving the effectiveness of their development activities by making ICTs accessible to poor people and multitudes of programmes and initiatives in this field have been
introduced in developing countries. As Heeks (1999:1) argues, “Hundreds of billions of dollars per year are spent on ICTs, reflecting a powerful global belief in the transformatory potential of these new technologies.” Most of the discussions about how ICTs can impact development are positive and share agreement that information technologies play a part in development, even though there are no specific empirical results. According to Adeya: “there are no studies that openly acknowledge failures of ICTs and development” (Adeya 2002:7), the author also alerts, that “some of the sources can romanticize the potentials of ICTs in areas such as poverty alleviation” (Ibid.). With technological innovations also come a lot of barriers, challenges and complications, which can be in developing countries sometimes extremely hard to overcome. To answer research questions of the study, the barriers and challenges need to be further examined on two case studies in Kenya.

First, I will present the general discussion about ICTs in promoting development and poverty reduction. Later I will go further and focus on the two main theoretical perspectives by authors Mansell and Heeks.

Some believe that ICTs in Africa will enable to ‘leapfrog’ some stages of development and Africa will catch up with the global Information Society (Nulens 2000). Some authors (e.g. World Bank 1998, Chowdury 2000, Ellis 2000, Duncombe 2006, Pigato 2001) discuss that ICTs assist in poverty alleviation and share the belief that access to information can help in alleviating poverty, Adeya (2002) for instance argue that access to information and knowledge are key enablers in poverty reduction, other authors agree but discuss certain shortcomings. For instance, Duncombe (2006:81) suggests: “ICT applications may only bring marginal direct benefits for poverty reduction”, but he adds that “greater benefits for the poor may be derived from ICTs if they are applied to strengthen a broader range of social and political assets and if they are able to assist in building more effective structures and processes that favour the poor”. The discussions about whether ICTs are useful for development or not, vary from optimistic to pessimistic to the ones with middle ground arguments
Some of the authors mention that access to information can provide people with the opportunity “to undertake production, engage in labour markets and participate in reciprocal exchanges” (Ellis 2000:31). The others focus more on the challenges such as Duncombe (2006:83) who express that “in most developing countries ICT applications based on digital technologies still face considerable constraints”. The barriers in accessing the information and what the challenges can be in developing countries will be examined in the later discussion.

According to the World Bank (1998:9), ICT can help in expanding opportunities for economic development: “This new technology greatly facilitates the acquisition and absorption of knowledge offering developing countries unprecedented opportunities to enhance educational systems, improve policy formation and execution, and widen the range of opportunities business and the poor.” Chowdury (2000) believes in ICTs to create marketable skills and others such as Kenny et al. (2000:23) have found in their econometric studies growing evidence of a casual link between telecommunications and economic development. Kenny et al. (2000:20) noted: “ICTs provide access to information that can create earnings opportunities, improve access to basic services, or increase the impact of education and health interventions.” Kenny et al. (2000:23) also argue that ICTs can allow the poor to have an access to education and learn new skills as well as to have an access to markets. The evidence also shows that most of the high incomes are from investments in the telecommunications sector. Pigato (2001:8) agrees with Kenny et al. (2000) that the evidence shows that access to ICTs can have a direct effect on better living standard and condition of the life of the poor, which has been recently improving. Pigato (2001:8) adds, “Their effective use may be constrained by lack of skills, financial resources and the existence of urban/ rural, gender and other inequalities.” McNamara (2000) argues that access to and use of ICTs is not anymore seen as a luxury, but instead as determinants of the sustainable development of individuals, communities and nations. Some observers propose
that all worlds’ citizens will one day have the benefit of a global information society (Tapscott 1995). Alampay (2006, Individual Differences That Undermine Freedoms and Capabilities, par. 2) mentions in her article the factors that are often presented as having influence on ICT use: gender; income; level of education and skills; age and the available infrastructure in the area. These factors correspond with the Heeks’s perspective and will be further discussed in the following section.

Other authors (e.g. Kubicek et al. 1997, Sussman 1997) argue that the transformative nature of ICTs has been too positive. Mansell (1999) argues that ICTs are beneficial only for some people and warns that the world could exclude the poor from the information revolution. Nulens (2000:64) warns that ICTs “will only increase existing inequalities and power relations”. Such “situations in which there is a marked gap in access to or use of ICT devices” (Campbell 2001:1) are often termed as the digital divide. The international community is, however, divided over their understanding of the term. Camacho (2001) declares that the digital divide is resulting from other social gaps and will continue to grow if the technology is not used properly. According to Mahan and Misnikov (2004), there are, for many countries, more pressing basic needs that the investments into ICTs and information society. According to the International Labour Organization (ILO), ICTs alone are insufficient for significant benefits to emerge (ILO 2001). The process of development is multidimensional and complex, to understand how ICTs can help to alleviate poverty, we need to study theoretical frameworks further and discuss potential barriers and challenges.

According to Harris (2004:35), “Efforts to increase access to ICTs should be rooted in a broader strategy to combat poverty”. Harris (2004) adds that promoting public access to ICT is one of the principles for the poverty alleviation framework. Others have been arguing that ICTs are not seen as a luxury, but instead as determinants of the sustainable development of individuals, communities and nation, and hence a necessity (McNamara 2000).
There have been many discussions about the possibilities of ICTs assisting in poverty alleviation. I tend to lean to the positive side of ICTs in alleviating poverty, but under certain consequences, which will be examined during my fieldwork. I will present two theoretical perspectives that will help me to analyse that structure in my cases.

2.4.1 The Mansell Perspective

According to Mansell (1999), ICTs are contributing to revolutionary changes in business and everyday life, but only for some people. The author points out that people in developing countries, who are unable to acquire capabilities for using the new ICT applications, will be disadvantaged and excluded from participating in the global information society. Mansell (1999:35) argues that “the social and economic potentials of these new technologies for development is enormous, but so are the risks of exclusion”. Mansell (1999:36) further points out to the danger of widening the gap between rich and poor and to the possibility that the new ICT applications may destroy more jobs than they create. This phenomenon is by some authors called the ‘digital divide’ and the ‘digital divide’ will be one of the phenomena I will focus in the data analysis. Even though big progress has been made in the mechanisms of access, ICT access is still expensive for the ones who would benefit the most from it. According to Mansell (1999), general access to ICT devices remains low especially in rural areas with limited access to electricity and high illiteracy.

Mansell’s study implies three main findings: i) the dangers of excluding the poor from the information revolution, as a consequence of the widening gap between rich and poor, ii) in order to bring positive results in development by ICT, there is need for customised ICT applications for local requirements, iii) the need of mobilising resources by regional and national strategies carry the risk that the resources could have been used in other ways and could have had greater development impact.
Mansell argues that new innovations in combination with high-speed networks are creating new opportunities for information delivery, which can contribute to development goals. She claims that “the applications must be customised for local needs” (Ibid.:41) and that the successful use of ICT applications requires: i) improved awareness in the public and business sectors, ii) better education and improved literacy rates, and iii) user involvement in designing and implementing new services and applications (Ibid.). Mansell also points out the importance of national and regional strategies, which aim to increase the benefits and reduce the risks associated with the use of ICTs.

Mansell argues that “although ICTs clearly can play a major role in alleviating poverty, enabling new learning experiences, and reducing harmful effects of social exclusion, this is only likely to occur if national or regional strategies are effective in mobilising resources” (Ibid.:42). The huge capital investments required to strengthen national capabilities for using ICTs could moreover divert resources from other activities that could have greater development impact (Ibid.:36).

2.4.2 The Heeks Perspective

Heeks (1999) discusses the broad issues surrounding information and information technology. Heeks (1999:2) focused particularly on studying the role of ICTs in assisting development of small and micro-enterprises in Botswana because “these enterprises have such a direct and growing relationship to poverty alleviation”. His research also raises an issue about serious inequalities that constrain the ICTs by poor entrepreneurs as discussed earlier by Mansell and others. Heeks asks: “Can information and communication technologies (ICTs) help to alleviate poverty in low-income countries?” and attempts to provide a theoretical framework for empirical studies in the area of ICTs and development (Adeya 2002:7). Heeks’ work is particularly helpful for my study as the use of technology in everyday life in Botswana is comparable to that in Kenya. Heeks’ focus is on the information process and how information can be used when
delivered by ICTs. For the process of making use of the data delivered by ICT can be compared to the process of understanding the importance of saving through mobile for health care services. The users need more than money, skills and infrastructure to make the most out of it as well. Heeks highlights five key findings and development priorities for information and for ICT use in poverty alleviation: i) knowledge to access, ii) access to relevant information, iii) ‘voice’, iv) ‘intelligent intermediaries’, v) ‘community intermediaries’ and vi) know-how. Heeks’ s theoretical approach will be used as an inspiration and will be adapted into the process of using mHealth programmes in Kenya. I will only apply the points, which are relevant for this study and for the data analysis.

Heeks illustrates the process of turning raw data into usable information on his model of ‘The Information Chain’. I believe that Heeks’ ‘Information Chain’ can help to explain the phenomena of using and understanding mHealth technology in Kenya in this study. Turning raw data into usable information is a similar process such as understanding the importance of financing health services, which are accessible for the poor through mHealth programmes.

The first point Heeks (1999:17) defines such as “the poor need knowledge to access, assess and apply existing information and need resources for action more than they need access to new information”. Heeks explains that for successful developing an enterprise, it is more important for the poor to understand received information and have resources for taking an action, than to have access to new information. This point is very specific when focusing particularly on the role of ICTs in assisting the development of small and micro-enterprises. For this study is more important to present the Heeks’ Information Chain, which can assist in explaining what are the necessary steps for the information to be understood. Figure 2 represents the information chain illustrated by ‘4As’ as Heeks describes it.
Heeks explains that for the information chain to function, people need different environmental components for each step. He separates the chain into three categories: ‘access’ – the need of overt resources (money, skills, technical infrastructure), ‘assess’ – the need for social resources (trust, motivation, knowledge, power) and ‘apply’ – the need of relevant data (Ibid.:7). I argue that the ‘Information Chain’ can be adjusted for the process of using mHealth services and help to better understand the necessary steps in the process of implementing mHealth services in developing countries.

Heeks argues that to access the services of ICTs, people need overt resources such as money, skills and technical infrastructure. Without financial resources, people cannot afford to buy or access ICTs. Technical and literacy skills are necessary to understand the content (Ibid.:7). One of the barriers in alleviating poverty through communication technology can be, according to Heeks and others, the language barrier and illiteracy. Users need to have the literacy skills to understand the content. According to Harris (2004:17), the “lack of local language and locally relevant content is a major barrier to increased use”. Moreover, the technical infrastructure (e.g. electricity and necessary equipment) is needed to keep all the technology working (Heeks 1999:7). Heeks names social resources for understanding the information such as trust, motivation and knowledge. The last point in the information chain is the need for relevant data.

Heeks, similarly to Mansell, points out that the social resource inequalities affecting assessment and application of ICTs can exclude the poor out of the
advantages of ICTs. He notes: “Governments and donor agencies are working to provide the overt resources, but realistically the poor will not own the ICTs, and the poor will be very unlikely to control the ICTs” (Heeks 1999:8). The author points out that trust, knowledge, confidence and security can be problematic while the poor access ICTs. He points out that the users have to first trust its source to fully benefit from the information delivered by ICTs. Heeks believes that trust can be created through for example personal contact. I discuss that trust is one of the most important assets in accessing innovative financial mHealth services and trust will be discussed deeply in the data analysis.

The second point Heeks (1999:17) describes such as: “the poor need access to new-locally-contextualised information more than access to existing information from an alien context”. The poor need to get understandable and relevant information through ICTs. This point is very specific to the study of micro-enterprises, but in our context it could help to understand this point such as the poor need mHealth programmes suitable for their local context and needs. The third point is about the necessity of the poor for having a ‘voice’ more than ‘hands’, ‘brains’ or ‘ears’. As Heeks says: “ICTs can play a limited enabling role in the alleviation of poverty, but will be of greatest value as a technology to provide information from and about the poor” (Ibid.). Points four and five alerts on the necessity of intelligent and community intermediaries (Ibid.). Heeks says: “These intermediaries are needed to bridge both the overt and the social resource endowment gaps between what the poor have and what they would have in order to use ICTs” (Heeks 1999:18).

The last point and the most relevant for the study is that: “The poor will only reap the fullest benefits of ICTs when they own and control both the technology and its related know-how” (Ibid.). Pigato (2001) agrees with Heeks (1999) and shares his belief that people living in poverty can obtain the fullest benefits of ICTs only in the case the poor understand the existing information and master the technology and related know-how. Pigato (2001:8) discusses that “while information and the new communications technologies have a potentially large
impact on growth and poverty alleviation, their effective use maybe constrained by lack of skills, financial resources and the existence of urban/rural, gender and other inequalities”.

2.5 ICTs in Health

Some authors (Duncombe 2006, Samiullah & Rao 2000) openly believe in positive effects of ICTs in the process of combating poverty and fostering sustainable development. Health is one of the most promising areas in poverty reduction through ICTs and in the following paragraphs it will be shown how ICTs can be used in health sector. Harris (2004) and O’Farrell (1999) agree that under the right circumstances ICTs are capable of inducing development in terms of health care, improved education, employment, agriculture and trade. Harris (2004) believes that to make this possible, the learning on the part of the promoters of the technology as on the part of its users is crucial. He writes: “It is all too easy to introduce technology with great expectations, it is far more challenging to create the necessary conditions under which the technology can attain the full potential, requiring as it does the combined and coordinated efforts of a range of stakeholders with disparate interests” (Ibid.:4).

The priority of enhancing healthcare in Africa is reducing the cost, while improving delivery. Cost reduction of health care can be facilitated by remote consultations; diagnoses and treatment advices delivered by ICTs (Harris 2004), while delivery can be improved by connecting community health volunteers to skilled health practitioners (CHMI 2014).

According to GSMA (2012) and its global overview of mHealth services, there are 852 mHealth services worldwide, 247 of which are in Africa. The Center for Health Market Innovations (CHMI) (2014) profiles 286 mHealth programmes in 63 countries focusing on Maternal, Newborn and Child Health (MNCH). These mHealth programmes are operating with innovative approaches to deliver and finance healthcare and the main intention of these programmes are to improve
access to affordable basic health services (such as prenatal care, deliveries, and newborn care) for low-income mothers (CHMI 2014). Based on the evidence, most mHealth programmes in developing countries are focusing on patient behaviour change such as consumer education and provider training (CHMI 2012). Micro-insurance mHealth programmes are supposed to eliminate cases when the family cannot afford to pay extra expenses in case of urgent complications during the home delivery and enhance financing mechanisms to improve access to affordable quality services. The private sector plays the main role in developing new approaches for delivering maternal and child healthcare. 58% of MNCH programmes are private, not-for-profit models (CHMI 2012:1). The numbers of NGOs, hospitals, community health workers, traditional birth attendants, etc. have been already providing affordable services for low-income families. Based on the statistics, over 70% of CHMI’s MNCH programmes is concentrated in South Asia and East Africa (Ibid.), where the maternal mortality ratio is extremely high and there is an urgent lack of qualified healthcare workers.

It is a challenging task to generalise if the mHealth programmes have positive results on poverty reduction and development due to the small number of controlled studies and evidence. ICTs carry huge economical potential in undeveloped parts of Africa, but despite the proliferation of phones in Africa, a digital divide still persists. In developing countries there are still people who cannot afford to buy a mobile phone and do not understand its benefits. According to Harris (2004:50), it is crucial to develop appropriate approaches for listening to the poor. In order to alleviate poverty through ICTs, a complex transformation needs to take place and requires strengthening the deployment of information infrastructure to reach the poorest and people in remote areas.

2.6 Understanding Maternal Health

To be able to understand how mobile phones can help the maternal health outcome, we need to first distinguish the main challenges in maternal health.
According to WHO (2013a) maternal health refers to the health of women during pregnancy, childbirth and the postpartum period. Three main types of care are essential during pregnancy: i) antenatal care, ii) perinatal care, and iii) postpartum care (Chalmers et al. 2001). Antenatal care (also prenatal care) is a type of preventive care and refers to regular check-ups and medical care during pregnancy. According to the WHO model, a standard antenatal care contains of four antenatal visits (WHO 2012a). Perinatal care refers to care of the woman and newborn before, during and after delivery from the 28th week through the 7th day after delivery (Vlok 1996:368). And postpartum, post-pregnancy or post-natal care indicates the period beginning immediately to after delivery, which is essential to provide all kind of necessary information for the mother to be capable of taking care of her newborn.

Maternal mortality ratio\(^3\) and proportion of births attended by skilled personnel are some of the indicators, which show the maternal health situation within the country. Most of the maternal deaths can be avoided by necessary medical interventions and the main cause of the majority of maternal deaths in the region of sub-Saharan Africa is caused by the lack of trained supervision at delivery. The major killers during childbirth in sub-Saharan Africa are: severe bleeding (haemorrhage); high blood pressure (hypertension) during pregnancy; indirect causes such as malaria, diabetes, hepatitis, and anaemia; and causes directly related to pregnancy and childbirth such as infection or obstructed labour (WHO 2012a) (Figure 3). Severe bleeding mostly bleeding postpartum, can kill a healthy woman within two hours if there are no birth attendants or doctor assisting (Ibid.,). Injecting oxytocin directly after delivery can effectively reduce the risk of severe bleeding. Infection is another high risk usually soon after delivery. The risk of high blood pressure (eclampsia) can be lower by providing magnesium sulfate, which can lower the risk of developing eclampsia from pre-

\(^3\) The maternal mortality rate (MMR) is the annual number of female deaths per 100,000 live births from any cause related to or aggravated by pregnancy or its management (excluding accidental of incidental causes). The MMR includes deaths during pregnancy, childbirth, or within 42 days of termination of pregnancy, irrespective of the duration and site of the pregnancy, for a specified year. (CIA 2013)
eclampsia (Ibid.). Infections can be easily eliminated by good hygiene and if infections are recognized and treated at the right time.

*Figure 3: Causes of Maternal Deaths in sub-Saharan Africa*

<table>
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<tbody>
<tr>
<td>Haemorrhage 34%</td>
</tr>
<tr>
<td>Hypertension 19%</td>
</tr>
<tr>
<td>Indirect 17%</td>
</tr>
<tr>
<td>Other direct 11%</td>
</tr>
<tr>
<td>Abortion 9%</td>
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<tr>
<td>Sepsis 9%</td>
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<tr>
<td>Embolism 1%</td>
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Skilled personnel can reduce the risk of all the major threats during labour. Maternal deaths are in most cases preventable and the main barriers in Africa are: i) access and availability, ii) cost, and iii) information and attitudes (Ibid.). An estimated 74% of women who die during the childbirth would be alive if they had access to the interventions for preventing or treating pregnancy and birth complications, in particular obstetric care (Hunt & Bueno de Mesquita 2007:4). Women in developing countries experiencing some kind of complications during their pregnancies and birth deliveries develop various disabilities, which can adversely affect family income and well-being due to the changes in household responsibilities, earnings, and expenses (Ashford 2002). According to Ashford (2002), reducing women’s disabilities is important for alleviating poverty as it is for reducing needless suffering.
2.7 Operationalization of Research Questions

Kenya, with more than half of the population living under the poverty line, is facing a high maternal mortality ratio. Many of the mHealth programmes are focusing on information delivery about maternal health care, but in most cases, information alone cannot save the life of the mother and the child during a complicated delivery. In case of emergency there is the necessity of a skilled and trained health professional. Most of the population in Kenya cannot afford such assistance. Therefore this thesis focuses on mHealth programmes allowing expecting mother to save up for delivery services in the hospital with qualified medical assistance through micro-insurance and saving programmes. This study addresses two sets of interrelated research questions: 1. What is the impact of technology on poverty reduction at the local level and what are the main sets of challenges in implementing mHealth programmes in developing countries?, 2. To what extent have mHealth systems been successful in reducing maternal mortality in Kenya?

2.7.1 Understanding Development and Poverty Reduction

Understanding development and definition of poverty can vary according to the region and stage of life. Inspired by the *Voices of the Poor* study, I will ask during my fieldwork in Kenya the question: “What does poverty mean to you?” The answers should help us to better understand how local people in Kenya from various places (Nairobi, Mombasa, Malindi); age and life opportunities understand poverty. I will compare the answers with the definitions presented in the first part of this chapter. I will try to analyse the results and compare their answers with the life conditions they live at and attempt to identify their income, if they are willing to tell me. By this, I want to find out if the users of mHealth programmes identify themselves as poor or not, and if it corresponds with the results of measurements by the poverty line. The main barrier can be the fact that people in Kenya usually do not talk about their household finances very openly. I
will probably have to build some further connection with the respondents to
discuss poverty issues.

2.7.2 ICTs in Promoting Development and Poverty Reduction

There is general agreement among scholars that poverty can be alleviated with
the help of technology. Technology provides a big opportunity to help people
combat poverty under certain circumstances. Various authors have presented
these circumstances; I will firstly apply Mansell’s theoretical framework. One of
the main points of Mansell’s findings was that there is a high risk of excluding
certain group of people from ICTs innovations. I will attempt to find out if there
are people in Kenya, who are unable to use new ICT applications and are
therefore excluded from participating in the new innovative applications and
what are the strategies of mHealth initiators to include such people in their target.
One of the ways in which I will answer research question one is by asking these
sub-questions based on Mansell’s theoretical perspective focusing on excluding
the poor from the information revolution: How many people in urban areas of
Kenya cannot afford to buy and access ICT’s services? What is the typical
income of the users of mHealth programmes and what are mHealth programme’s
requirements? What are the users life conditions and where do they live? Are the
poorest ones the target of the initiators?

To answer the second part of research question one, I will work with Heeks’
thoretical perspective and base the questions on his findings. I will focus on
addressing the main challenges and barriers and ask following questions: Do the
poor have the knowledge to use ICT? Do people understand these services? How
developed is the technical infrastructure?, etc.

Mansell also argues that ICTs can play a major role in alleviating poverty, but
only in case when national and regional strategies are effective in mobilising
resources. To find out, I will ask the leaders of mHealth programmes how the
applications are initiated into regional or national strategies and what is the plan
for the future.
mHealth programmes are in early stages and there have not been so far many useful theoretical perspectives suitable for my study. Therefore I have decided to work with Heeks’ theoretical perspective, which deepens the problematic area of access of the poor and he illustrates on his ‘Information Chain’ how the poor turn raw data into usable information. I have decided to use Heeks’ ‘Information Chain’ and adapt it for accessing and using mHealth programmes in Kenya. I argue that there are certain similarities and his theoretical perspective will help the reader to better understand the process of accessing mHealth programmes and its challenges along the way. Heeks describes the main challenges for the poor to access, assess and apply the data in every step. In the first step of accessing the main challenges are: resources skills and technical infrastructure. These overt resources will be examined through the interviews and participant observations and should help us to better understand what the necessary steps are for extending the implementation of mHealth programmes in developing countries. During my fieldwork I will attempt to ask these questions in order to examine the challenges of accessing mHealth services: What is the typical income of the users mHealth programmes aim for? What are the aims of mHealth programmes in terms of typical income? Who are the initiators of mHealth programme targeting? Do the initiators aim at the poorest ones?

Heeks’ findings are supported by various authors, who discuss that the users need to fight challenges when they use ICTs such as their need to understand the language, master the technology, and understand the information just to name few. During my observations and interviews, I will try to observe how people in Kenya master the technology of mobile phones. I will attempt to ask questions about the know-how of the technology and try to figure out what are the biggest barriers and obstacles. I am interested whether there are any complications or obstacles for the poor to understand and whether the initiators attempt to overcome such problems. Some of the questions in the interviews will be focusing on the barriers in understanding mKadi ya maternity or Linda Jamii programmes. Concretely: “What is the main obstacle for you when using Linda Jamii/mKadi ya maternity programme?” I will ask the users if there are some
complications, which cannot be overcome because of ICT. I am interested in the technical infrastructure, hence I will try to examine if electricity blackouts, which are quite common in Kenya, influence or complicate the mHealth projects I follow. All the information about patients is actually saved in a computer in a local hospital, so I will try to observe how unstable electric power can influence such a programme.

The most important resources in the second step of Heeks’ ‘Information Chain’ are social resources such as: trust, motivation and knowledge. During my fieldwork I will attempt to ask questions both to the initiators of mHealth services and to the users about these points. To answer research question one I will attempt to ask these sub-questions: Do the poor have the knowledge to use ICT? Do people understand these services? Is there any problem with the trust of the new users? How poor people handle the money transactions through their mobile phone? Has the problem disappeared with the mobile banking services in Kenya? How do the initiators overcome such problems of trust and lack of skills of the potential users? I am interested if mHealth programme initiators have incorporated the size of the group in the intention of the project. I will ask how much can users usually save through mKadi ya maternity and to what extent these savings influence their household economy.

2.7.3 ICTs in Health

According to Mansell’s theoretical perspective that applications must be customised for local needs, I will attempt to examine if the mHealth applications respond to the local needs of people in Kenya.

In order to answer research question two, I will ask the specific sub-questions about the impact of mHealth programmes on reducing maternal health mortality. How do people get to know about these mHealth programmes? How does the process of saving for maternal health services take place? What are the various possibilities for pregnant women to save up? What are the main reasons pregnant women might prefer saving up by mobile platforms? Does the marketing of the
programme raise the awareness of the importance of giving birth in the health facility? How many users does mKadi ya maternity programme have? How many users are the initiators planning to have? What are the results of mKadi ya maternity programme in urban areas in Kenya? I am also interested if mHealth programme initiators have incorporated in the intention of the project the group size.

Some of the additional information from my informants and the evaluation of the programmes is expected to be delivered after finishing fieldwork in Kenya through email and SMS. I plan to stay in touch with some of the people I will interview, if it is possible, to follow them for a longer period of time.
3. **CHAPTER 3**

3.1 **Fieldwork Details**

My fieldwork began in Nairobi, the capital city of Kenya as it is home to main Kenya’s businesses, international companies, government offices and the main office of CMHIL. Before I went to field, I have contacted numerous mHealth providers, distributors, hospitals and medical clinics, medical and Information technology students working on mHealth platforms and programmes and some of the developers of mHealth programmes from the United States that I was planning to interview. My intention was to build as many connections as possible before I went to the field, mainly due to the expectation of worse conditions of Internet connection in Kenya. In the very beginning of my fieldwork was the main focus on spontaneous and informal conversation with the general public in order to get basic information about the overall knowledge of mHealth programmes. During the first week I did not meet anyone who actually knew what the term mHealth/mobile health means.

Local newspapers, radio and daily observations revealed how important are mobile phones in everyday lives of Kenyan people. Kenyans use their mobile phones mainly for basic communication services and managing their money through M-Pesa application. M-Pesa stands are frequently founded in Nairobi, Mombasa and Malindi and one can frequently find M-Pesa stands even in slum areas. I observed that money transactions through M-Pesa are commonly used in most of the supermarkets, transport services (taxi, bus), post offices, and payment services, just to mention a few examples. M-Pesa is well known among Kenyans and highly used in daily life of majority of Kenyans.

During the six weeks, I was following two programmes: mKadi ya maternity and Linda Jamii initiated by CMHIL. I visited twelve different
hospitals/medical clinics/health care centers in Kenya: three of them were based in Nairobi (Nairobi Women’s Hospital, St. Patricks Health Centre, Karen Hospital), seven of them were based in Mombasa (Savani Medical Center, Tudor Health Center, Bakarani Hospital, Barsheba Family Medical Centre, Meridian Medical Center, Swiss Cottage Hospital, Tudor District Hospital) and two of them were based in Malindi (Star Hospital, Tawfiq Hospital). Three users of mKadi ya maternity programme, two providers, one community health worker and four mobilizers/recruiters, five users of Linda Jamii programme, three mobilizers/recruiters, seven providers and three distributors were interviewed. Previous email conversation with Zacharia Oloo Rombo gave me the opportunity to visit the main office of CMHIL in Nairobi and meet the both CMHIL co-founders Samuel Odera Agutu and Zacharia Oloo Rombo. I interviewed the latter, as well as Daniel Miano, the head of Corporate Business in CMHIL. Seven doctors, two nurses and one birth attendant were interviewed about various complications during the birth delivery and the main health difficulties in Kenya. I had also a Skype interview with medical student Nickson Nyakambi, who is working on a new mHealth programme focusing on breast cancer and with Eric Green, the founder of Baby Monitor mHealth application that is being piloted in Kenya. One interview was also with Fabian Owuor, an IT specialist from Praekelt foundation, working on a new mHealth platform.

Presenting the Kenyan health system, its history and its difficulties is crucial for understanding the following data analysis and the possibilities of how mHealth services can help to improve the health situation within the country. The background information about mHealth programmes will be supported by the information from my interviews, since the literature and sources about mHealth are very limited.
3.2 The Main Challenges of the Health System in Kenya

According to the Library of Congress (LOC 2007) “Kenya’s health infrastructure suffers from urban-rural and regional imbalances, lack of investment, and a personnel shortage”. All three challenges mentioned by LOC lead to worsening health care services, consequently worsening the health outcomes of the population in Kenya.

3.2.1 Under-financing

According to available data from the World Bank (2013a), Kenya's gross domestic product (GDP) in 2012 was estimated at USD 40.7 billion. Compared to many other developing countries, the Kenyan economy can be considered to be quite healthy. In terms of the overall resource envelope, Kenya spent 4.7% of its GDP on healthcare in 2012 (WB 2014a). Kenyan health expenditures are lower compared to the average 6.5% of the African region and much lower than health expenditures of OECD countries, which is 12.4% (WHO 2012b). The under-financing of the health sector has serious consequences in tackling urgent health care problems and has reduced the availability of good quality healthcare in the country. The health system in Kenya is profoundly inequitable, and according to Chuma and Okungu (2011) the needs of the poor and vulnerable have not been successfully addressed, even though Kenya has initiated various movements to strengthen its health system. The Kenyan health system has also struggled with stagnant or declining budgets for health. Health care funds in Kenya come from the public (government), private (private companies and households) and donors (Chuma & Okungu 2011). According to available evidence, the reliance on foreign donors to fund health care in Kenya has been recently increasing. For example, in 1994, donor funds only accounted for 8% of total health expenditure (THE), whereas in 2001/2002 this proportion increased to 16% and in 2005/2006 to 31% (Ibid., Results, par.1). Kenya is fairly dependent on donor funds supplementing the national health budget. The largest
bilateral donors are the United States and United Kingdom, followed by Denmark, Germany, Japan, Netherlands and European Union (Bliss 2013). Kenya also obtains support from the World Bank and agencies within the United Nations system, including World Health Organization (WHO), United Nations Programme on HIV/AIDS (UNAIDS), the United Nations Children’s Emergency Fund (UNICEF) and the United Nations Population Fund (UNFPA) (Ibid.).

### 3.2.2 The Lack of Personnel

Like most other African countries, staff shortages in the Kenyan public health system are critical. Even though Kenya has worked on improving the health system since achieving independence from Great Britain in 1963 and by the late 1980s had the number of health facilities quadrupled (Ibid.), the problem of the lack of medical doctors and health workers (nurses and midwives) remains acute. According to (Mwaniki & Dulo 2008), Kenyan doctors and nurses are emigrating to developed countries to seek better employment conditions and higher payment. The same situation remains within the country, where Kenyan doctors and nurses leave rural areas to work in urban areas for the same reasons. Doctor-patient ratio in Kenya, according to the last available figures in 2012, was 19 doctors per 100,000 people (Kenya National Bureau of Statistics 2012). Doctor-patient ratio gives the number of medical doctors (physicians), including generalist and specialist medical practitioners per 100,000 of the population. The density of nursing and midwifery personnel according to the last figures from 2011 is 80 per 100,000 people and compare to the earlier years has declined from 118 in 2002 (World Bank 2013c). The problem of staff shortages remains acute especially in rural areas in Kenya.

### 3.2.3 Access to Health Care

More than half of the population living in Kenya live in hard-to-reach areas with hard access to any qualified personnel or health clinic. At the same time Kenya lacks qualified health workers within the whole country. Combination of these two factors makes the situation of regional and urban-rural imbalances urgent.
The urban-rural imbalances are very problematic in Kenya, because most of the hospitals remain in urban areas. Most of the people live in rural areas and only 24% of total population is urban population (CIA 2013).

With almost half of the population living below the poverty line, the access to affordable, quality health services is very limited. The very poor cannot in most cases afford to pay service fees and generally do not have access to alternative financing options. In addition, Kenyan culture places a low priority on saving. Kenya, just like in most African countries, has a very low insurance penetration. According to the statistics in Kenya, only 11% of population is part of healthcare insurance (CMHIL brochure 2013).

### 3.3 Current Health Situation in Kenya

Even though Kenya made significant improvement in advertising awareness of health, an economic downturn in the 1980s, together with the intensification of the HIV/AIDS pandemic, increased a number of health challenges in Kenya. The country has a high burden of tropical parasitic and bacterial infections, and the number of people infected with preventable and communicable diseases such as tuberculosis, malaria, and HIV/AIDS, has increased in recent years. The Kenyan government declared HIV/AIDS a national disaster and in 2004 had HIV/AIDS exceeded malaria and tuberculosis (LOC 2007). According to Federal Research Division of Library of Congress, “AIDS has contributed significantly to Kenya’s dismal ranking in the latest UNDP Human Development Report, whose Human Development Index (HDI) score is an amalgam of gross domestic product per head, figures for life expectancy, adult literacy, and school enrolment” (Ibid.). According to WHO (2013c): “The African Region suffers more than 24% of the global burden of disease but has access to only 3% of health workers and less than 1% of the world’s financial resources.” The personnel shortages in Kenya remain an acute problem, and according to IRIN (2010), there have been shortages of medical staff identified as one of the major impediments to achieving the health MDGs (IRIN 2010). According to the World Bank report
(2013b), sub-Saharan Africa has made the least progress in achieving the MDGs related with reducing infant and maternal mortality, and access to sanitation. The report further indicates that Kenya is not presently on the track to meet the health-related MDGs by the 2015 target. Even though the number of doctors and health facilities in Kenya increased, Kenya’s figures are still far away from being ideal. According to the WHO's criterion, it is estimated that at least 230 health workers per 100,000 people are necessary for achieving health-related MDG (Ibid.).

### 3.3.1 The Situation in Kenya

The high ratio of maternal mortality\(^4\) is one of the biggest problems in Kenya, which with 360 deaths out of 100,000 births is the 29\(^{th}\) highest in the world (CIA 2013). Even though the maternal mortality ratio declined from 530 deaths out of 100,000 births in 2008, it is still a significant problem in the health system in Kenya (Ibid.). One of the reasons for a high maternal mortality ratio can be the fact that most of the women in Kenya deliver at home without assistance from an experienced and trained provider (Duncan 2012). The national average of hospital deliveries is 40% (Mwangome et al. 2012) and the situation when women deliver outside of health facility remains acute especially in rural areas, where women do not have an access to skilled birth attendants or health facility. According to Ziraba et al. (2009), most of maternal deaths occur to women delivering outside of a health care facility and with the help of unskilled personnel. They find very high mortality ratios in the slum population in low-income countries and identify the importance of providing skilled assistance to all deliveries because there is “current evidence that maternal mortality in developing countries could be reduced if all pregnant women have access to health professionals as well as quality emergency obstetric care services” (Ziraba

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\(^4\) Maternal deaths are subdivided into two groups: 1) Direct obstetric deaths: deaths resulting from obstetric complications of the pregnant state (pregnancy, labour, and puerperium), from interventions, omissions incorrect treatment, or from a chain of events resulting from any of above. 2) Indirect obstetric deaths: Deaths resulting from previous existing disease that developed during pregnancy and which was not due to direct causes, but which was aggravated by the physiologic effects of pregnancy (Birn et al. 2009:219)
et al. 2009, Discussion, par. 2). According to the MDGs 2015, the target on proportion of births attended by skilled staff is 90% by 2015 (WHO 2008:1), whereas the percentage of deliveries without skilled birth attendant is currently much lower in Kenya. The proportion of births attended by a skilled health worker (doctors, nurses, midwives, etc.) was in Kenya in 2009 according to the latest data 44% (WB 2014b).

Odinga (2013) agrees with the article by Ziraba et al. that the solutions for improving maternal health can be skilled attendance at birth and emergency obstetric care and add that it should also include family planning as well. Most of the women in Kenya are often unable to obtain appropriate medical services due to lack of funding, transportation, and even awareness of their rights. Some of the important first steps, according to Odinga (2013), include raising awareness among the public of the impacts of maternal death in Kenya and educate the public on their responsibilities in addressing women’s health. I argue that mHealth programmes provided by CMHIL can be part of the solution on how to raise the consciousness among the Kenyans and to inform expectant women how to get good maternal care during and after pregnancy.

Maternal mortality is globally the most asymmetrically distributed health indicator. Nearly 50% of maternal deaths in the world happen in Africa, which has only 15% of the world’s population; hence maternal-care interventions need to be supported in Africa. As Odinga (2013, par. 1) writes: “Maternal mortality is the single greatest indicator of health systems that fail to meet the basic needs of the society’s poorest and most vulnerable women”. Many maternal-care interventions are proven to be both effective in reducing maternal death and cost-effective, especially for high-risk groups. Some of these interventions are cost-saving, yielding returns of investment of over 100% (WHO 2010:23). Improving maternal health care can have positive results in the future. According to WHO (2010) the number of women seeking care during childbirth in health facilities has been increasing and therefore it is crucial to ensure the good quality of delivered care.
One of the reasons for a high maternal mortality ratio can be the fact that most of the women in Kenya deliver at home without the assistance from an experienced and trained provider (Duncan 2012). Qualified and skilled personnel can be the only approach how to save woman or child during the delivery. My informant echoed these findings:

The big challenge now is that after doing a lot of research, we realized, especially in maternal cases, if this lady, woman decide to give birth using traditional mechanism and traditional birth attendants, you find that if there is any complications, it always leads to the death of either the mother or the child.5

As a WHO (2012a) report points out, most of the maternal deaths can be avoided by necessary medical interventions and the main cause of the majority of maternal deaths in the region of sub-Saharan Africa is caused by the lack of trained supervision at delivery. Mobile phones and mHealth programmes can assist in monitoring during the antenatal care or postpartum care, one of my informants - the birth assistant, agreed with my informant with these findings when she said:

Mobile phones can only help to send push messages or alerts, but nobody can explain you through mobile phone how to assist during the delivery. There has to be someone who knows what is crucial to do in any case of emergency.6

Hence I have not followed programmes focusing on monitoring and delivering information, but I rather followed mHealth programmes Linda Jamii and mKadi ya maternity, which can enable expecting low and middle-income mothers plan, save and pay affordable quality maternal care expenses and low-income families access good quality health services.

5 Interview with the head of Corporate Business in CMHL, Nairobi (14.10.2013)
6 Interview with the birth assistant, Nairobi (10.10.2013)
3.3.2 Maternal Health Care in Kenya

Based on the evidence, only 44% of births in Kenya are delivered with the assistance of a skilled birth attendant, this percentage is well below the target of 90% of deliveries by 2015 (Bourbonnais 2013). What are the reasons why Kenyans people do not deliver in hospital? Most Kenyan women are not informed about complications and they have an insufficient understanding of the benefits of delivery in hospitals. Another difficulty for delivering inside health facilities is the fact that health facilities or skilled attendants are for most Kenyans difficult to access. Within the following passages will be discussed how the announcement of free delivery services in all public hospitals changed the overall maternal health situation in Kenya and whether it lead to decreasing high maternal mortality ratio within the country.

3.3.3 The Cost of Maternal Health Services in Kenya

Even though the new government announced in June 2013 that delivery services in public hospitals are free of charge, the situation remains acute, mainly because of the low number of medical personnel and limited capacity of the public hospitals as one of my informants confirmed when he said:

    Earlier they could pay around KSh 3,000 for delivery, but now the government was coming and saying: “Now, if you go to the government hospital, then you will deliver for free.” But what happens, again we go back to the numbers, so the hospitals are overwhelmed because the people rushed there. What happens that the quality of the service is deprived. Sometimes are women even giving birth on the floor. If you visit these places you will have any idea how crazy it became. So most women are given the opportunity, even we find them in governmental hospitals, they say they are there because they say that they don’t have a choice.\(^7\)

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\(^7\) Interview with the head of Corporate Business in CMHIL, Nairobi (14.10.2013)
One of the providers of Linda Jamii program noted that the government policy on free delivery services is not sustainable and can collapse any time, therefore Kenya needs a sustainable solution. He added that mHealth programmes could be that solution. Another informant commented on free maternal services: “Some women even cannot afford it, even mother cannot afford to get bicycle and bike to the hospital. The problem is poverty.”

The high maternal mortality ratio in Kenya is the result of lack of facilities in public hospitals, lack of qualified personnel and difficulty in accessing health facilities at affordable price. Until very recently women had to pay for deliveries in the hospitals. The price range was from KSh 3,000-5,000 (USD 40 – 60) for normal delivery in a local health care center up to KSh 135,000 (USD 1,600) for Caesarean Section (C-Section) in an average hospital (Standard 2008). In the country, where half of the population lives below poverty line, delivery in the hospital was simply not reachable. Free maternal healthcare in Kenya was declared June 1, 2013, as a result of the presidential Uhuru Kenyatta’s campaign. The hope and purpose of the free maternity services at public hospitals is to reduce maternal mortality.

The majority of my informants (doctors) confirmed, that they lost most of the birth deliveries in their facilities after the announcement of free birth deliveries in public hospitals, as one of my informants echoed when he said:

It is helping a lot and the mothers are very happy about it. Ok, we are supporting it as well, because people who have money, they always go to the best hospitals. It depends on how much money are you being charged, but if you are not having money, somebody will come here and say: “I want to give birth, but I don’t have money.” I will tell them: “Just go to public hospital, because they are providing these services for free.” It has

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8 Interview with the provider of Linda Jamii in Star Hospital, Malindi (31.10.2013)
9 Interview with the provider of Linda Jamii (doctor) in Bakarani hospital, Mombasa (29.10.2013)
10 Interview with the provider of Linda Jamii (doctor) in Barsheba Family Medical Centre, Mombasa (29.10.2013)
just affected our business. We made some money from delivery services, but now they are going there. Some of the ones, who has the money, they still go there, because they want to save the money.11

The majority of my informants expressed concerns about the announcement of free delivery services in public hospital, as one of my informants confirmed when he said:

Its working now, but we need to wait. You know, anything free can’t be sustained. At least maybe they put some small cost share to sustain it. I have seen the masses, who are waiting there. Sometimes they deliver on their own, because there is no one who can help them. They lack staff.12

My informants frequently noted the lack of equipment and qualified personnel in public hospitals were some of the main barriers when accessing public hospitals for free deliveries, as one of my informant echoed by saying:

In the government facility you find the chemists, the pharmacists, they are not equipped. They don’t have the drugs, they don’t have the basic medication, and if you go there, you can spend there the whole day, because of the big numbers of people.13

Nevertheless the problem with overcrowded and understaffed public facilities has been worsening with announcement of free maternal healthcare. The density of physicians in Kenya in 2011 was 19 physicians per 100,000 population and hospital bed density was in 2011 1.4 beds per 1,000 population in 2010 (CIA 2013). With making the delivery services free, there is a need to increase not only the number of personnel, but also the number of operation theatres and required equipment such as incubators for instance. Another difficulty within the new announcement is that even though the fee charged for delivery in public

11 Interview with the provider of Linda Jamii (doctor) in Barsheba Family Medical Centre, Mombasa (29.10.2013)
12 Interview with the provider of Linda Jamii (doctor) in Bakarani hospital, Mombasa (29.10.2013)
13 Interview with the head of Corporate Business in CMHIL, Nairobi (14.10.2013)
hospitals was cancelled, fees for the other recommended maternal services such as postnatal care and antenatal care fees still remain (Owino 2013). Prenatal visits were free before Kenyatta's announcement (Wairimu 2013). Even though many women have started to take advantages of newly free delivery service, some mothers still opt for traditional birth attendants, because of the long distance to get to public facilities that are also often in a poor condition (Owino 2013:4).

3.3.4 The Evolution of mHealth Programmes in Kenya

Kenya’s ICT policy, issued through a special issue of the Kenya Government Gazette in 2006 by the Ministry of Information and Communication (MoIC) presented a vision for Kenya to be “a prosperous ICT-driven Kenyan society” with a mission “to improve the livelihoods of Kenyans by ensuring the availability of accessible, efficient, reliable and affordable ICT services” (Waema & Ndung’u 2012:4). As they conclude in their report: “ICT responsibilities are distributed across different institutions of the government with little, if any, coordination” (Ibid.:44). Waema and Ndung’u add that the lack of coordination led to the confusion of the stakeholders in terms of which government institution is responsible for what (Ibid.).

The mHealth programmes are not mentioned in Kenya’s ICT policy, even though the number of new mHealth programs in Kenya has been continuously rising in the recent years. mHealth programmes are currently independent and in most cases being funded by external donor agencies. The funding of mHealth programmes varies according to the location, size and specific programmes. mHealth initiatives in Kenya are in most cases pilot studies or local projects with limited scale and scope, and the literature about their structure is very limited, therefore it is impossible to create a complete overview of the structure of the projects and resulting experiences. The two mHealth projects will be therefore
discussed further and backed up with citations from the interviews with the co-founders and initiators.

The cooperation with governments is being discussed and planned, but the reality is that there are many difficulties in implementing such initiatives into the government strategies. According to a co-founder of CMHIL, there are a lot of useful initiatives going on in Kenya, but the problem is according to his words the missing cooperation with the government of Kenya:

I think that there are a lot of useful initiatives going on, but the difficulty has been that the government integrated ICT strategy for health has not been implemented and therefore it means that everything else is going on independently and you cannot integrate the entire effort, until the government is ready.  

Another complications when diverse programmes have diverse donors is according to his words hard cooperation:

For example we have met some people, whatever they are doing, we have met one particular group in Kitui, who only do text messaging for maternal care. And we saw that this could very easily pair with our programme, our programme has a text-messaging component. So that could very easily fit in it, but because they have been funded separately, they were not prepared to give up there whatever they were doing.

The sources with information about cooperation of mHealth programmes with the Kenya Government are hard to access. The NGO, World Vision Kenya (WVK), initiated the only initiative where the Kenyan Government of Health (The Ministry of Medical Services and The Ministry of Health and Sanitation) cooperated with mHealth programmes in 2011 (World Vision International 2013). The mHealth platform was named Kenya Integrated Mobile Maternal,

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14 Interview with the co-founder of CMHIL, Nairobi, (11.10.2013)
15 Ibid.
Newborn and Child Health Information Platform (KimMNCHIp) and key stakeholders of this initiative were Kenya Ministry of Health, Safaricom, Amref Care and Aga Khan University (Ibid.). KimMNCHIp initiative have not showed any particular results so far and the co-founder of CMHIL shows his disappointment about the KimMNCHIp initiative when he says:

There are all these big organizations, all sitting together talking every few months, but nothing moves. Great idea, but nothing moves. It’s a great idea, only if they could implement it.  

mHealth stands for enabling access to health care through mobile communication device and the main application areas of mHealth are: i) Education & Awareness, ii) Point-of-Care Support & Diagnostics, iii) Patient Monitoring, iv) Disease & Epidemic Outbreak Surveillance, v) Emergency Medical Response System, vi) Health Information System, vii) mLearning, and viii) Health Financing (mHealth Info 2013). Each application area has diverse usage. Education and awareness support to prevent diseases and promote health mobilize community or support educational programmes. Point-of-care support and diagnostics, as the title indicates, provides support in diagnostics, screening and clinical care, whereas the third area Patient Monitoring maintenance treatment and appointment adherence. Disease and epidemic outbreak surveillance area can be tracking cases of infectious diseases in real-time. An emergency medical response system can cope with emergency obstetric care and accidents as well as help in disaster management. Health information system supplies chain management and procurement information. mLearning can provide distance training and continuous professional development for health workers. Health financing area provides smart cards or vouchers making use of mobile payments.

According to The Millennium Villages Project (2013), power mobile technologies, such as mHealth programmes, should: (i) “improve access to emergency and general health services, (ii) Improve efficiency of health service

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16 Interview with the co-founder of CMHIL, Nairobi, (11.10.2013)
delivery, (iii) Enhance collection of vital statistics on birth and deaths to refine public health interventions, (iv) Improve clinical practice for enhanced health outcomes, (v) Reduce child and maternal mortality and morbidity, (vi) Improve disease surveillance and control, (vii) Improve monitoring and evaluating of health system activities for enhanced planning and decision-making” (The Millennium Villages 2013). Many of mHealth programmes still cooperate with eHealth and vice versa. Most of the running mHealth projects focus on acute and life-threatening situations, but mHealth programmes also control the spread of preventable disease like HIV/AIDS, malaria, tuberculosis and others. mHealth programmes are suggested as a promising development for the provision of improved health care services to poor people and those, who are hard-to-reach. The evidence of the potential to improve health systems through mHealth programmes in remote areas is increasing with every year. The growing coverage in Kenya can contribute to the health system with new possibilities to address problems in accessibility, quality, effectiveness and costs of health care.

3.4 Changamka MicroHealth Insurance Limited (CMHIL)

Based on the information about the health challenges in Africa, there is an urgent need for finding the solution for better and more accessible health care services in Kenya for middle and low-income population. CMHIL is Kenya’s first mHealth company incorporated in 2008 in Nairobi. The service offers three basic financial services: i) “maternal health financing vouchers for antenatal care, delivery and postnatal care services, along with transport subsidy vouchers to access these services; ii) a maternal health savings plan to save for discounted health services in a ‘wallet’ on the mobile phone using M-Pesa, Kenya’s mobile money-transfer system; and iii) micro health insurance, also using M-Pesa, in which individuals’ savings are converted to an insurance cover underwritten by a commercial insurance company, which pays Changamka a commission” (WHO
All the financial services use an electronic platform, which can be accessed by mobile phones, to facilitate the financing of healthcare services. CMHIL went through a developing process of its services and introduced middle and low-income Kenyans various innovative financial services from Changamka Smart Card, through Internet based saving platform for maternal services, to the Kenya’s cheapest version of micro-health insurance. For better understanding of the challenges and barriers is necessary to introduce the concept from the very beginning.

CMHIL operates on the premise that “low-income Kenyans will access quality healthcare if provided with an easy way to save or pay for services incrementally, over time” (CMHIL brochure 2013:3). The motivation of CMHIL is combination between poor maternal and child mortality statistics; high mobile penetration; product innovation – Mobile Money; unaffordability of health services for the lower income groups; and a low uptake of insurance due to high cost and lack of appreciation of the concept (CMHIL 2013). The service is mainly aiming for self-employed low-income earners in Kenya, who cannot afford and fulfil the terms and conditions of insurance companies. The frustration by the lack of insurance options for low-income Kenyans lead the founders of CMHIL to build a system for allowing the poor ones access good quality services as one of the co-founders of CMHIL expressed when he said:

We realized that only 3% of Kenyans had informal private healthcare insurance. And those 3% were the top of the economic pyramid and therefore anybody else bellow didn’t have any kind of insurance or health plan. At that particular moment, M-Pesa just come to interplay and we figured that there must be way using technology who could take health care
financing down to the 95% of people who didn’t have any kind of health financing or insurance.17

Innovative financial services (M-Pesa) were introduced in Kenya in mid-2007 and throughout the years became highly popular and used on daily basis by majority of people in Kenya. CMHIL introduced in 2010 a micro-health cover to Kenyan market in cooperation with M-Pesa financial services. M-Pesa represented a suitable telephony system enabling Changamka’s clients to save through their mobile phones and make payments at designated providers in an easy, fast and safe way. Pre-paid smart card technology allowed the members to access treatment at selected medical outlets. Changamka Smart Card could be used by any member of a family and bought for third-party beneficiaries such as parents or other family members (Kenya Insurance Report Q1 2012). Principally, the user of Changamka Smart Card could start saving up after formal registration any amount of money with the lowest limit of KSh 5. The amount of money saved on the smart card was designated only for health services and remained protected from unexpected financial expenses. One of the directors of CHMIL explains how the service works:

So we put together an electronic platform, that uses a smartcard, therefore you went alone and bought a smart card, saved on it and you saved by using M-Pesa. And whatever money you had saved, if you felt ill, you could go to accredited providers, where we had provided points of sales terminals and you could get a treatment.18

This innovative service should provide the low-income population with the possibility to save up for health care in an accredited good quality health center and should prevent the poor from experiencing unexpected health

17 Interview with the head of Corporate Business in CMHIL, Nairobi (14.10.2013)
18 Interview with the co-founder of CMHIL, Nairobi, (11.10.2013)
expenses, which can have according to my informants, catastrophic consequences for the whole household.

One of the advantages of participating in Changamka’s service was an offer for lower price for the health services at accredited providers. CMHIL entered into partnerships with diverse medical health centers and hospitals to lower overall costs and increase subscription rates (Kenya Insurance Report Q1 2012). Director of CMHIL explains this advantage of Changamka Smart Card:

  We went a bit further, and negotiated packages with these providers, discounted packages. So if you went to see one of these providers with cash, like normal walk-in client, they would charge you for malaria KSh 1,000, but if you showed up with the Changamka Smart Card, they would charge you KSh 600.¹⁹

Even though the Changamka smart card was according to the head of corporative business in CMHIL had Changamka Smart Card considered as successful with up to 12,000 users, the initiators of CMHIL introduced two new mHealth programmes: micro-insurance programme Linda Jamii and maternity saving programme mKadi ya maternity, which became the case studies of this study. The new programmes were supposed to replace electronic chip cards mainly because the production of electronic chip cards was expensive and the terminals were insufficient as one of two founders of CMHIL confirmed by saying:

  But in all this, in 2010 we realized, that there were some problems with our business model. We had a smartcard, which cost a lot – USD 2 and in every point of service they needed to be the point of sales done – USD 300-400. Therefore scale up was going to be very expensive, because if

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¹⁹ Interview with co-founder of CMHIL, Nairobi, (11.10.2013)
we needed to have 100 hospitals, we needed to spend between USD 400 times 100, which we didn’t have.  

Another reason for implementing the services through Internet was the need to recognize who are the customers and possibility to access the information on the Internet as one of the directors of CMHIL confirmed by saying:

We needed to identify whom we are dealing with, so we have then transitioned our technology, we have refined our technology, redeveloped it. And we moved to the situation where we were done with the smart card, so now we have virtual card, a simple number, unique ID. And now if you go to our providers, they get onto an Internet, using a browser and they get into our system. Now if you want to join one of our schemes, you have to be registered. What you do, you go to a registration point and they register you into the computer, they write down your full details. We also integrated our system into our mobile, so there are people going around who have Changamka mobile application, and they can register you in a phone.

One of my informants explained why these mHealth programmes are necessary, even though the Government of Kenya announced free delivery services in public hospitals. My informant said:

What we are trying to do is to improve the quality of healthcare because they would go and look for the free services, but now they can even go to the private facility: qualified hospitals, with qualified personnel, and now access medical services at a fee, because now they can afford to pay.

The mission of CMHIL is to innovatively use mobile technology to create mechanisms for delivery of easily accessible, affordable and quality

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20 Interview with co-founder of CMHIL, Nairobi, (11.10.2013)

21 Ibid.

22 Interview with the head of Corporate Business in CMHIL, Nairobi (14.10.2013)
healthcare. (CMHIL Brochure 2013). The aim is “to improve access to affordable healthcare to millions of the working class, currently excluded from conventional government arrangements and private insurance schemes” (Ibid.). CMHIL expanded its services throughout the years and is currently offering diverse products. In this study I focus on maternity subsidy programme (mKadi ya maternity) and micro-insurance coverage offering inpatient and outpatient care (Linda Jamii) (CMHIL Brochure 2013).

TWO CASE STUDIES

3.4.1 mKadi ya maternity

mKadi ya maternity is one Changamka’s services focusing on low-income Kenyans. mKadi ya maternity is a mobile phone based savings card that enables expecting mothers (pregnant women) plan, save and pay affordable quality antenatal, delivery and postnatal care expenses. Money on the mKadi ya maternity is dedicated only for maternal healthcare and the savings can never expire. mKadi ya maternity is supported by UNDP, Ken Invest and M-Pesa by Safaricom and was initiated in Kenya by Changamka in 2012.

mKadi ya maternity programme is suitable mainly for people who can save little amount of money towards the date of birth. Customers can see the saved money, manage them and also receive benefits in getting cheaper prices for delivery based on the deals of the distributors with providing health facilities.

Potential customers can register for free with a Changamka agent in diverse places such as supermarkets, insurance agencies, hospitals or medical clinics. The list of providers can be found on official Changamka web page and currently (October 2014) accounts for around 600 private medical health care clinics and according to one of the co-founders of CMHIL: “There will be 4,000 (health care clinics enrolled in the programme) by the end of the
Changamka cooperates only with private clinics as the head of Corporate Business in CMHIL confirms by saying:

One: we don’t go with public hospitals because of quality; we do a quality assurance before they become medical provider. So for example, they are already public hospital they cannot be able to handle the numbers, because it is overcrowded already, so bringing new clients to them, it doesn’t make sense because already the numbers they have, they cannot handle. Number two: is in terms of providing the services, in terms of medicine, pharmacists, they don’t have drugs, so what they do, as much as I am a doctor, after seeing you, I can send you to another pharmacy. And then within hygiene norms, governmental hospitals actually are really not to standard at all.

The Changamka agents capture the details of the potential member and take a necessary photograph. The mKadi ya maternity is activated 24 hours after the registration and the customer receives a confirmation SMS with the mKadi number from Changamka. After the confirmed registration can mKadi ya maternity user start saving for maternal services via M-Pesa. The amount for antenatal, delivery and postnatal services differs by each provider. mKadi ya maternity members can therefore choose the health facility they prefer and start saving for the exact amount they need. KSh 5 is the lowest limit users can save and there is no upper limit for savings. Members can save daily, weekly, monthly or irregularly. The saving system can be very flexible and suitable even for low-income population. While paying for the maternal healthcare services, the mKadi ya maternity user can simply present her mKadi ya maternity number at any of the participating providers, which are registered as mKadi accredited medical service providers. Care will be offered if funds are sufficient and the cost of care will

23 Interview with co-founder of CMHIL, Nairobi, (11.10.2013)

24 Interview with the head of Corporate Business in CMHIL, Nairobi (14.10.2013)
be deducted from the mKadi ya maternity and a receipt issued. According to the user of mKadi ya maternity service from St. Patricks Health Centre is the payment solution for mKadi ya maternity programme easy, fast and convenient as she say:

You don’t have to close your business to go to town and take that money (for insurance) there. That is time consuming. Here you can save to mKadi within your phone. You just sit in your house; send the money, save them.25

mKadi ya maternity programme is based on the research of CMHIL, which was supposed to reveal the main reasons why low-income women do not give birth in the hospital. According to the head of Corporate Business in CMHIL the majority of low-income women can save up the amount necessary for delivery in health facility. The main problem is according to my informant the fact, that women have access to the money. My informant recounted various stories obtained from the Changamka’s research revealing the complications during saving money for maternal health services in the household. My informant said:

We asked the mothers, why couldn’t you go to hospital and give birth there? They all said they didn’t have money. And then you ask them: “You knew for nine months you were pregnant, and then for example maybe the cheapest government facility that is available, charges around KSh 3,000, so in nine months you couldn’t have saved KSh 3,000? They say: “No, actually I can have even more, but the problem is at some point, as much as I have the access to that cash, I take it.”26

Both Linda Jamii and mKadi ya maternity allow low and middle-income people to keep their money for health care services protected and only used

25 Interview with the user 1 of mKadi program, St.Patricks Health Centre, Nairobi (15.10.2013)
26 Interview with the head of Corporate Business in CMHIL, Nairobi (14.10. 2013)
for health services. The informants have different kind of stories as one of the co-founders of CMHIL confirmed by saying:

Some women tell you that her husband comes drunk and takes the money, or somebody in their family died and they had to pay the burial so they used that money. So that’s when you realized that maybe give it somewhere, where you cannot access this money, apart from medical and then it now help them control their funds.²⁷

mKadi ya maternity system have the potential to provide poor women with innovative saving services, where the saved money can be used only for medical expenses. Figure 4 illustrates the process of Maternal Innovative Services provided by CMHIL.

²⁷ Interview with the head of Corporate Business in CMHIL, Nairobi (14.10. 2013)
The targeted group of mKadi ya maternity are middle and low-income earners, especially the ones who are economically active. Self-employed earners with small businesses usually earn small amount of money every day, so the mKadi ya maternity saving platform enable to save little amount of cash everyday.

The mKadi ya maternity have also benefits and qualifies pregnant women for a 50% discount on antenatal and postnatal care and at least 10% discount on delivery at listed participating providers. Discounted treatment services can
be obtained from any of the participating providers. The motivation of mKadi ya maternity are to let women deliver in a good healthcare facility as well as to monitor them during the whole pregnancy and help them to get good antenatal and postnatal care.

After seeing the success of implemented mKadi ya maternity programme in its initial stages, Changamka’s initiators went further and decided to provide the Kenyan population with affordable and accessible micro-insurance for middle and low-income families called Linda Jamii.

3.4.2 Linda Jamii

Linda Jamii is a comprehensive healthcare micro-insurance that focuses on low-income and self-employed population. Linda Jamii in Swahili means “protect family”, and it is an initiative introduced in Kenya in 2012 by Safaricom, Britam, CMHIL and PSI and currently remains the cheapest version of micro-insurance covering out and in patient services, dental, optical and maternal services and funeral expenses. The programme is labelled as convenient as having very easy terms and conditions compare to national health insurance programmes, eliminate all the paper work as running through Internet and make deals between providers and distributors, by which raising the level of health facilities in Kenya. One of the directors of CMHIL explains the reasons for implementing Linda Jamii:

One thing that occurred to us all along this process was that we are enabling people to save, people are saving for outpatient (Changamka Smart Card) and for maternity (mKadi ya maternity). But there is this catastrophe for someone who is hospitalize for four weeks, he can never save enough to pay for four weeks of hospitalization. So we put together a micro-insurance, we brought together Safaricom and Britam. And that product is, we believe, affordable to this target market at the lower end of
the pyramid. So that they are able to buy this and then go to hospital and we will pay the cost.\textsuperscript{28}

The potential customer can subscribe to an e-card that allows him/her to save fully towards the purchase of health insurance for the family using M-Pesa. The potential customer can be registered either by phone dialling 525#, entering ID number and receiving a confirmation through SMS, or by visiting one of many Linda Jamii providers in diverse Uchumi supermarkets. The registration of new client is fast and easy without any special paper work.\textsuperscript{29}

The Family premium cover of KSh 12,000 (USD 140) per year provides access to healthcare for the whole family – one principal member, one spouse and all legally owned children. The users can start receiving health benefits from the moment they have paid KSh 6,000 and Linda Jamii will give an opportunity to pay the other half during the following months to keep receiving healthcare throughout the year. Inpatient cover has a KSh 200,000 limit per family, outpatient cover KSh 50,000 with a KSh 100 co-payment charge. The daily hospital cash benefit is KSh 500 which is payable to the insured person from day three to day 60 of hospitalisation. A member can seek inpatient and outpatient treatments in the accredited medical facilities. Using M-Pesa the individuals are given the possibility to save towards the purchase of Linda Jamii. The payment terms are very flexible; users can pay through M-Pesa, check-off, or by cash in any BRITAM or Safaricom branch. The benefits of Linda Jamii programme are dental cover limit of KSh 5,000, optical cover of KSh 5,000, maternity cover of KSh 30,000 and funeral assistance of the principal member or spouse of KSh 40,000.\textsuperscript{30} Another advantage of Linda Jamii programme is that also allow the online process of

\textsuperscript{28} Interview with the co-founder of CMHIL, Nairobi (13.10.2013)

\textsuperscript{29} Interview with Linda Jamii provider, Uchumi Supermarket, Nairobi (07.10.2013)

\textsuperscript{30} Ibid.
verifying the insurance coverage of patients, which means for the doctors the certainty of receiving the payment for the health services.

According to Leach (2008:257-260), micro-insurance programmes are designed to protect low income people against catastrophic health expenditures, in exchange for regular premium payments proportionate to the likelihood and cost of risk involved. The plan for the future of Linda Jamii programme is to have million members within one year as one of the directors of CMHIL confirms by saying that the programme is: “very ambitious, because we want to transform the landscape in Kenya completely.”

3.5 Data Analysis

The analysis of qualitative data is based on the research questions and issues I explored during my fieldwork. I have addressed critical questions with sub-questions based on the theoretical perspectives presented earlier in a series of interviews. Each of the questions and sub-questions is tied to theoretical perspective and will be examined separately in order to develop the analysis with well-arranged logical flow. First I will present my findings in informal discussions about what poverty means for Kenyan people.

3.5.1 Understanding Development and Poverty

Understanding the development and definition of poverty can vary according to the region and stage of life. Inspired by the Voices of the Poor study, I have asked the following question to informants during my fieldwork in Kenya: “What does poverty mean to you?”. The most common answers exposed that one of the main assets in definition of poverty for people in Kenya is good health. Since physical labour is, in most cases in Kenya, the source of income. Medical expenses for treatments of family members can

31 Interview with the co-founder of CMHIL, Nairobi (13.10.2013)
have devastating and lasting consequences on the whole household. Most of the informants who were users of either Linda Jamii or mKadi ya maternity did not classified themselves as poor, mainly because they could afford to take care of their health care insurance or expenses for the future, that poor people simply cannot. Owning a mobile phone also gives them certain social status and many opportunities how to deal with life conditions in which they live. Some of the informants expressed that occasionally they have to decide between obtaining food and airtime. Comparison of money income and the poverty line was extremely difficult as long as most of my informants were self-employed and their income was extremely varied day by day. The informants who had standard payment salary faced no difficulties with financing health micro-insurance for the whole family. These findings were mainly gained out of the informal and general discussions with random people in Kenya. The purpose of presenting these findings is mainly to enrich this study.

According to Mansell (1999), ICT can play a major role in alleviating poverty under the condition that national and regional strategies are effective in mobilising resources. In order to find out if the mHealth programmes are part of the national and regional strategies, I have asked questions: Do mHealth programmes receive any funding from government of Kenya? Or are the programmes financially dependent on their funders? What are the biggest challenges in overcoming problems with various funders and do followed mHealth programmes face such difficulties?

Both the followed mHealth programmes were in their pilot stages and according to the one of the initiators in the stage of negotiation with the Government of Kenya about the possible cooperation. According to co-founder of CMHIL is the cooperation with the government difficult as he says:
The government-integrated strategy for health has not been implemented and therefore it means that everything else is going independently and you cannot integrate the entire effort until the government is ready.\textsuperscript{32}

The main complication is according to his words, the legal framework, which has to be changed because the laws about medical confidentiality are not clear. For most of the mHealth programmes medical records need to be electronically available to make mHealth programmes work.

As I have experienced, various mHealth programmes in Kenya are funded from diverse sources for a fixed period, which can be according to my informant problematic in terms of possible cooperation within mHealth programmes. My informant, one of the co-founders of CMHIL, expressed that CMHIL is open for any collaboration with other mHealth programme, but this cooperation is problematic mainly because of separate funding. He noted one example when the cooperation with other mHealth programme working on text messaging for maternal care was not possible because of separate funding, which they did not want to give up. My informant added that some of the mHealth programmes in Kenya could be more helpful if aligned with other initiatives, because the amount of small separate mHealth programmes is very high and most of them have great ideas but are not sustainable.\textsuperscript{33}

I have not gained much information about cooperation of the programmes with the government of Kenya mainly because the cooperation was in negotiations during my fieldwork and my informants either were not informed or did not want to reveal such information.

\textsuperscript{32} Interview with the co-founder of CMHIL, Nairobi (13.10.2013)

\textsuperscript{33} Ibid.
3.5.2 Challenges and Barriers in ICT Usage

The usage of ICT can be for some more complicated than for others. Any kind of technology brings challenges with the electricity, system errors or complicated way of use. The barriers and challenges in a technology use are various. Therefore in order to gain as much information as possible, I asked all my informants very broad question: “Are there any challenges in using ICT?” I attempted to find quite a wide spectre of answers from user informants, initiator informants, mobilizer and provider informants. I decided to classify the answers into six different groups according to Heeks’ theoretical perspective. Even though Heeks’ Information Chain primarily focuses on the process of how the poor can understand the receive information, I decided to apply his perspective on the overall understanding of mHealth service usage. I believe that the process can be comparable and Heeks’ perspective can help us to better understand and organize these challenges and barriers.

Table 1 provides an overview of the main resources necessary for accessing and assessing mHealth programmes based on Heeks. These resources, which turned in most cases into challenges and barriers, will be studied separately in order to present gained information from fieldwork in logical flow. In order to answer the second part of research question one, I have also asked additional questions such as: Is there any problem with the trust of the new users? How poor people handle the money transactions through their mobile phone? Has the problem disappeared with the mobile banking services (M-Pesa) in Kenya? How do the initiators overcome such problems of trust and lack of skills of the potential users?
### Table 1: Resources for Accessing and Assessing mHealth Programmes

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<td>2. a Technology control</td>
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<td>The need of relevant services</td>
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### 1. Resources

One of the biggest challenges in using the ICT is certainly the financial sources to purchase ICT and to access the ICT services. I attempted to uncover if the ICT access is still expensive for the ones who would benefit from it the most. In order to fully investigate this phenomenon, I will work with Mansell’s theoretical perspective and the term ‘digital divide’. There has been a lot of agreement on the risk, that the information revolution is likely to reach everyone but poor, who would advantage from it the most (Panos 1998, Mansell 1999). The publications of these authors are more than fifteen years old; I discuss that the situation might have changed for
following reasons: i) most of the mHealth programmes are available on basic mobile phones; ii) lower prices of ICTs, especially basic mobile phones; and iii) easier access and usage of the applications. I discuss that there might be less people who cannot participate in the information revolution nowadays, but the risk of widening the gap between the poorest and low and middle income still remains.

According to the theoretical framework that the ICTs can widen the gap between rich and poor, by several answers can be confirmed for the question “Is there anyone in Kenya who cannot reach to pay for Linda Jamii/ mKadi ya maternity?” Most of the informants agreed on that the majority of people living in Kenya could afford these mHealth services. According to the assistant administrative manager of Tawfiq hospital in Malindi, Linda Jamii programme is affordable for the majority of people.\textsuperscript{34} Another informant, a doctor from Tudor Health Care in Mombasa, agrees with this statements and adds: “Linda Jamii is a good programme for middleclass income people - for the people who cannot pay the high rates of the national insurance.”\textsuperscript{35} One of Linda Jamii distributors revealed that this program is not cheap for the majority of Kenyans, but rather affordable. But even though it is the cheapest insurance programme you can get in Kenya, there are still people who cannot afford to pay for it.\textsuperscript{36} A doctor from Barsheba Family Medical Center in Mombasa agrees with majority of my informants when he said:

I think a majority will be able to afford it, because it is actually for working class, if you are not having some business, or you are not working, raising a money can be challenging.\textsuperscript{37}

\textsuperscript{34} Interview with the provider of Linda Jamii (assistant administrative manager) in Tawfiq Hospital, Malindi (06.11.2013)

\textsuperscript{35} Interview with the doctor in Tudor Health Care Center, Mombasa (29.10.2013)

\textsuperscript{36} Interview with the Linda Jamii distributor in Tawfiq Hospital, Malindi (07.11.2013)

\textsuperscript{37} Interview with the provider of Linda Jamii (doctor) in Barsheba Family Medical Centre, Mombasa (29.10.2013)
One of my informants, recruiter of mKadi ya maternity, revealed that the income of people they are targeting is less than USD 1 per day. She added that even though they have very low income, they still could afford to save up for mKadi if they are willing to.\(^{38}\)

Even though the majority of Kenyans can afford to access the technology and the mHealth services, some informants revealed that there are still people who cannot afford these services. Answers from diverse groups of respondents (e.g. doctors, Linda Jamii and mKadi ya maternity providers, recruiters, distributors and users) revealed that the number of people who cannot pay for both the cheapest version of micro-insurance coverage in Kenya Linda Jamii and save up for maternal services by mKadi ya maternity programme is still a relatively large. One of my informants, the head of a Corporate Business in CMHIL, noted that there are people in Kenya who cannot afford to pay these services: “There is around 25% of people living in Nairobi, who cannot afford to pay for this (mHealth programmes initiated by CMHIL)”\(^{39}\). He added that the reason for such a high number could be the fact that large groups in the population are unemployed. He also highlights that these programmes should be affordable for the majority of working people. One of my informants, a user of mKadi, revealed that she is usually saving around KSh 100 or KSh 200, in a week or in a month according to what she gets. She also added that she is usually trying to save more than KSh 100, because: “When you are saving through M-Pesa, there is a transaction fee, so it is very important when you are saving, that you save KSh 100 or KSh 200.”\(^{40}\)

I was interested in examining whether these services are also being implemented in slum areas and where the majority of the poorest live. Based

\(^{38}\) Interview with the mKadi ya maternity recruiter 1, St. Patricks Health Centre, Nairobi (15.10.2013)

\(^{39}\) Interview with the head of Corporate Business in CMHIL, Nairobi (14.10.2013)

\(^{40}\) Interview with the user 1 of mKadi, St.Patricks Health Centre, Nairobi (15.10.2013)
on my observations, people in slum areas were using mobile phones, however many of the phones were commonly shared within the family. According to the amount of M-Pesa stands frequently found in and around slum areas, I consider that innovative financial services are being used there as well, even though I have not fully examined it. Health facilities enrolled in mKadi ya maternity programme were easily reachable from slum areas in Nairobi as well, but according to my informant it was not successful to target the slums as they realized after two weeks, that they were not getting the target group, because for somebody in the slums to save even KSh 20 is a problem. “As much as they all say, the product makes sense to them, they are willing, but they are not capable of doing that” as he said.  

There are people who cannot afford to save up for health services, as one of my informant echoed, when he said: “Because the money is not even there, they cannot save something, they don’t have.” As discussed earlier, mHealth programmes are currently targeting middle and low-income population, mainly focusing on self-earners and people who cannot reach to pay the national health insurance fund (NHIF), but still can save “little by little” at the end of each day. The marketing campaigns of the programmes are also pointing out the fact, that daily savings for health services through Linda Jamii programme cost the same amount as one litre of milk in Kenya. My impression is that the majority of people can afford the programmes.

Based on the gained information form various interviews with the initiators and distributors, followed mHealth programs are not aiming to help the poorest. According to the initiators of both programmes, the programmes are targeting self-employed people, not the unemployed population.

The term ‘digital divide’ is defined by excluding the poorest from benefiting from the innovative services of ICTs. Based on the findings from the

41 Interview with the head of Corporate Business in CMHIL, Nairobi (14.10.2013)
42 Interview with the provider (doctor) of Linda Jamii in Tudor Health Care Center, Mombasa (29.10.2013)
interviews, there is still quite a wide group of people who cannot reach these innovative services in Kenya. But if we compare the number of mobile phone users in 2014 and in 1990, there is obvious difference as shown in Table 2.

Table 2: Mobile Telephony Subscription in Kenya (1999-2013)

<table>
<thead>
<tr>
<th>Year</th>
<th>Number of Subscriptions</th>
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<tbody>
<tr>
<td>1999</td>
<td>5,000,000</td>
</tr>
<tr>
<td>2001</td>
<td>10,000,000</td>
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<td>2003</td>
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<td>2005</td>
<td>20,000,000</td>
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<td>2007</td>
<td>25,000,000</td>
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<tr>
<td>2009</td>
<td>30,000,000</td>
</tr>
<tr>
<td>2011</td>
<td>35,000,000</td>
</tr>
<tr>
<td>2013</td>
<td>40,000,000</td>
</tr>
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</table>

Source: CCK (2013).

Another phenomenon, revealed from the interviews, is the raising popularity of sharing mobile devices by the poorest. The Chief Executive Officer (C.E.O) at St. Patricks Health Centre in Kayole Estate confirmed this finding. According to her words it is very common and efficient to purchase only the SIM card, because even people who cannot afford to have their own mobile device they can still have an access for the innovative services by sharing the mobile phone.43

43 Interview with the C.E.O. in St. Patricks Health Centre, Nairobi (15.10.2013)
2. Skills

2. a Technology control

According to various authors (Heeks 1999, Pigato 2001), people living in poverty can obtain the fullest benefits of ICTs only in the case that they know and control both the technology and its related know-how. Heeks focuses on the role of technology control in his ‘Information Chain’, which he believes is crucial for users to both understand and control the technology. To control the technology is necessary not only for users, but also for the providers. During my interviews I have examined how the users and providers control the technology and if there are any complications in understanding and using the technology.

Users

Both Linda Jamii and mKadi ya maternity programme are using the electronic platform for money transactions called M-Pesa. M-Pesa has according to Waema and Ndung’u (2013) become convenient, easily accessible, and widely accepted throughout the years. As the evidence shows, and most of my informants agreed on, M-Pesa is commonly used in the everyday life of Kenyans and M-Pesa platform is easy to use. One of them expressed that the only problem with M-Pesa is when the network is overloaded; which happens usually in Friday evenings, otherwise M-Pesa is easy to use and without any complications.44 Most of the informants articulated that using the payment platform is not problematic for them, because they already use M-Pesa in their everyday lives. In addition to daily use of M-Pesa, the initiators also provide a proper training and assistance in any kind of complications or misunderstandings as one of my informants confirmed by saying:

It is easy for them to understand, because we explain to them the way we are trained and the same thing is written here [showing the flyer of mKadi

44 Interview with the Linda Jamii recruiter, Uchumi Supermarket, Nairobi (09.10.2013)
Providers

Even though the technical knowledge necessary for using the mHealth programmes is very basic, the lack of these skills can be problematic. Both programmes Linda Jamii and mKadi ya maternity are run through computers, and therefore the personnel must be adequately trained. Training personnel can, in some cases, be problematic and challenging as the provider in Tawfiq hospital in Malindi confirms by saying:

The challenge is that we train people to know how to use the programme on the computer and then they leave and we need to train new people.46

As I have observed, the majority of providers were capable of using the technology without any complications. It seemed that the trainings for using the programmes and technology are offered and provided in all health facilities. Even though most of my informants revealed that the use of technology is not problematic for them, I have not fully examined the reality.

I discuss that some of the challenges can appear during the process of accessing the programme on Internet.

Most of my informants confirmed that using the technology for mHealth services is not complicated, but rather time saving compared to the administrative work. The use of the technology is mainly influenced by technical complications, which will be discussed in section Technical infrastructure.

2. b Literacy

Illiteracy rates can be relatively high in some places of Kenya. For mHealth programmes, illiteracy can mean a serious problem for understanding both

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45 Interview with the mKadi ya maternity recruiter 1, St. Patricks Health Centre, Nairobi (15.10.2013)

46 Interview with the Linda Jamii distributor, Tawfiq hospital, Malindi (07.11.2013)
the concept and delivered information and can also discourage potential
users to participate in such programmes. The information from some of my
interviews was unclear, some of the informants said that most of the users
are illiterate,\(^\text{47}\) and some others claim that most of the users even in slum
areas are capable of fully understanding the programme.\(^\text{48,49}\)

Some illiterate users exploit the possibility of help from Linda Jamii
assistants, who help them to proceed to the payment. As one of the users in
Tawfiq hospital in Malindi echoed by saying: “I give someone the money
and he sends the money”.\(^\text{50}\) The user didn’t really know who the person is,
he gives the money to, he only knew it is someone from Linda Jamii
programme who takes care of the payment. As the providers echoed, the
target of these mHealth programmes is mostly middle and low-income
people, who are in some cases illiterate. The possibility of assistance for
illiterate users is crucial for implementing mHealth programmes for low-
income users. I argue that this assistance might not be sustainable for all the
potential users in the future. I also suggest implementing mHealth
programmes for illiterate people; there is need of designing these services for
possible usage even without the ability to read. For example using these
services by voice control or voice messages in both English and Swahili.

2. c Language

There are a few conditions according to Heeks’ theoretical perspectives, on
how users can get the most out of the delivered information. For users to
understand the content of delivered information it is important to have
literacy skills to read and understand the service. One of the barriers in
alleviating poverty through communication technology can be not only

\(^{47}\) Interview with the Linda Jamii distributor, Tawfiq hospital, Malindi (07.11.2013)

\(^{48}\) Interview with the co-founder of CMHIL, Nairobi (13.10.2013)

\(^{49}\) Interview with the mKadi ya maternity recruiter 1, St.Patricks Health Centre, Nairobi (15.10.2013)

\(^{50}\) Interview with the user 1 of Linda Jamii, Tawfiq hospital, Malindi (07.11.2013)
literacy, but also the language barrier. According to Harris (2004:17), “lack of local language and locally relevant content is a major barrier to increased use”. And Adeya (2002) identifies language, illiteracy and lack of technical skills as some of the barriers of information delivery services through ICTs.

As discussed earlier, some of the users are illiterate and some of the users do not understand English, therefore are all the brochures and trainings of both the programmes are both in English and Swahili language. Linda Jamii and mKadi ya maternity does not have a language barrier, because all the information brochures and services are both in English and Swahili, moreover English is an official language in Kenya.

3. Technical infrastructure

3. a Electricity

Electricity blackouts and viruses in the computers were repeatedly mentioned in answers for the questions “What are the challenges in technology use?” Blackouts are quite common in Kenya, especially in the rural areas. Even though most of my informants were located either in big cities or in the suburb of a city, some of them mentioned complications with frequent electricity blackouts. According to my findings the main problem was if there was blackout during the approving process of the treatment of Linda Jamii through Internet system. Patients had to occasionally wait some time before the doctor or assistant could check if all the bills of Linda Jamii are paid and then they are approved for treatment. In case of the blackout this process could last for a long time, because there was not any other way then on the Internet how to check necessary data of the patient. Most of the providers of the mHealth services pointed towards the responsibility of the distributors to provide them with electricity back ups and necessary equipment to handle these technology complications. As one of my informants noted:
The programme could be good, but it involves a good computer, not a virus. You must have a powerful router, sometimes we have black outs here. You know modems, sometimes there is no credit on modems and you don’t access Linda Jamii Internet... so this Linda Jamii, if they can guarantee us those back-ups, computers with back-ups, so even though there is a black out for half an hour, we can continue, keep on. If they can also ensure, that the system we use are not eaten by virus, those are big problems.51

3. b Equipment in the hospitals

The hospitals, which can be rolled into the Linda Jamii and mKadi ya maternity programmes, have to fulfil requirements of cleanliness and certain equipment. One of the requirements is to have a computer and Internet connection. Not all hospitals can afford to buy the equipment and fulfil these requirements. One of the initiators of Linda Jamii expressed an example:

The hospitals need to have computer and Internet connection. The hospitals in south coast are facing challenges, there is a hospital, which wanted to have our [Linda Jamii] services, but they don’t have computers, they don’t have electricity, and it is the only one of the health providers there.52

One of the often-repeated problems of the providers was the lack of necessary equipment in the hospitals. To cooperate with both mHealth programmes, the hospitals need to show evidence that they fulfil the necessary conditions of the programs to participate. Some of the providers were complaining that for them to have the necessary equipment for mHealth programmes is expensive and impossible to fulfil.

One of my informants revealed, that there is a possibility for facilities struggling to fulfil the necessary conditions. His facility, Barsheba Family

51 Interview with the provider of Linda Jamii in Star Hospital, Malindi (31.10.2013)

52 Interview with the Linda Jamii distributor, Tawfiq hospital, Malindi (07.11.2013)
Medical Centre, was offered the necessary equipment from Linda Jamii, he confirmed this finding when he said:

If you don’t have it [the equipment], they can give you the laptop, they give you the modem, they give you the scanner, and then you pay, they are not giving it to you for free.

The users of both programmes can also choose from various hospitals and health care centres enrolled in the program, which can raise the competition between various health clinics as one of my informant confirmed by saying:

They will not go to some who doesn’t have drugs, they can choose, so it’s a bit challenging for us, so you have to have the medicine, because the patient can ask how come you want to treat me when you don’t have the medicine? The patient can choose where to go.53

One of the barriers of ICT was the web-based programme as the same informant echoed by saying:

First of all, the main barrier is IT. This programme is web based, you have to go to the site, not like other insurance, you have to log in to the system.54

The complication with the technology is according to my informants the time consuming process with online approval of the treatment by Linda Jamii. My informants revealed that for approving the payment by Linda Jamii, the diagnoses must be put into online form. This process of rewriting the diagnoses for online approval from Linda Jamii can be challenging in many ways. This process is especially time consuming for doctors as the assistant administrative manager of Tawfiq hospital in Malindi echoed by saying:

53 Interview with the provider of Linda Jamii (doctor) in Barsheba Family Medical Centre, Mombasa (29.10.2013)

54 Ibid.
Although there are some complications, because all the information has to be filled in the computer, so it takes long time. The information needs to be filled by doctor, diagnose, what the person is suffering from. So what we have done, we have printed the form what is online, we gave it to them, they fill it and then someone just type in the information. But it was not easy to come and start to type the information. So they enter the information, then they send it to Linda Jamii.\footnote{Interview with the provider of Linda Jamii (assistant administrative manager) in Tawfiq Hospital, Malindi (06.11.2013)}

One of my informant attempted to demonstrate how the online system of Linda Jamii works. I experienced approximately 10-15 minutes of waiting time for the online system to be loaded. I was not capable to explore if the problem was caused by Internet connection or the errors in the programme.

According to another informant from the BRITAM office in Malindi when asked if the process is convenient and fast he replied:

> Immediately. Its system generated, so if you come to the hospital, the receptionist he or she will ask for you card, he/she will check the card number, he enters your number into computer and can see if the card is active and you can get the treatment. There is no waiting, or no procedure. So you will be treated and the invoice will be sent to Safaricom.\footnote{Interview with the informant from BRITAM office, Malindi (06.11.2013)}

### Social resources

#### 4. Trust

Since 2007, when Safaricom introduced mBanking services called M-Pesa, mobile phones had become crucial tools used in every day life of majority of Kenyans. The distrust of Kenyans towards money transactions through mobile phones was naturally present and the trust within Kenyan people for using ICT had to be gained throughout the years. One of the co-founders of
CMHIL illustrates the same distrust towards money transactions for health services when he said:

In the beginning we had difficulties in terms of people scepticism and the perception of what if my money disappears? It was a big challenge to convince people to save, especially for medical offers, because they think: “How assure I can be that my money will be there tomorrow, what if this company closes down?” But the confidence has been growing with time.⁵⁷

Most of my informants agreed on that they trust both the innovative financial services and the mHealth programmes.

5. Motivation

One of the most problematic areas to get new users is according to my informants the motivation. People in Kenya usually lack the motivation of paying health insurance or saving towards health services. In several cases unexpected financial payments for health services are extremely harmful for the whole household. The focus of both mHealth programmes is to show the middle and low-income people the possibility to save up by small amount of money for health services. According to the head of corporate business this step was one of the hardest. They had to motivate the users as well as the providers to cooperate as he confirms by saying:

So we had valid propositions for the patient that they could save and they could get discounted services, we had valid proposition for the medical provider, that they could get us steady income and that he would not have to do any administrative work.⁵⁸

⁵⁷ Interview with the head of Corporate Business in CMHIL, Nairobi (14.10.2013)

⁵⁸ Interview with the co-founder of CMHIL, Nairobi (13.10.2013)
One of my informants confirms that to motivate Kenyans is extremely hard, mainly because they do not understand the concept of insurance as he said:

One problem with our people is that, when we talk about insurance, they are willing to give the money to insurance, but they don’t see the feedback they are going to get. Someone can ask you question: “If I don’t get sick and no one in my family, will I get my money back?” They want their money back, because they didn’t get sick. So see, that is a big problem.59

Another informant express his thoughts that Kenyans sign up for the insurance, if they can understand the advantages and they are educated as he says:

Everything is education. If they are well educated, they buy insurance. The knowledge is there, people nowadays are getting informed. It is just about how you pass the boat.60

Motivation is needed not only for the potential customers, but for the recruiters of both mHealth programmes as well. As my informants revealed during the interviews, there is very little motivation for them to recruit new users, as they receive payment only if the potential user confirms and pays the first fee for the program. As one of my informants who was one of the recruiters for mKadi ya maternity programme in the St. Patricks Health Centre, confirmed by saying:

If I register somebody today as a member of mKadi user, I am paid KSh 100 per person, when I register him/her. And if he/she doesn’t activate their account, I don’t get paid. And remember I used my airtime to register… you see, there is a challenge there.61

59 Interview with the provider of Linda Jamii (doctor) in Bakarani hospital, Mombasa (29.10.2013)
60 Ibid.
61 Interview with the mKadi ya maternity recruiter 2, St.Patricks Health Centre, Nairobi (15.10.2013)
The recruiter based in St. Patricks Health Centre revealed the challenges to motivate people to become users as she said:

We have a challenge, sometimes we register them, hoping they are going to activate their accounts, but at the time, they don’t activate their account, you keep asking them why haven’t you activated, this is for your own use… But what we have realized that some reasons is poverty, some is ignorance.62

Another recruiter revealed that the number of customers per day varies as she answered the question “How many new users do you usually get per day?”:

Per day, it depends. Like today I talked to four people, one of them told me: “I will call you tomorrow if I want to register”, so I am waiting.63

6. Knowledge

Heeks (1999) and Pigato (2001) argue that people living in poverty can obtain the fullest benefits of ICTs only in the case that they know and control both the technology and its related know-how. The main advantages of Linda Jamii and mKadi ya maternity are, according to my informants, the following: affordability, flexibility and the fact that both programs are easy to understand and use. An informant echoed these findings when he noted that it is manageable and affordable to the poor people.64

Most of my informants confirmed that both mKadi ya maternity and Linda Jamii programmes are not only relevant but also very useful, mainly because most of the people in Kenya cannot fulfil the terms and conditions of NHIF and other insurances available in Kenya. Linda Jamii is so far the cheapest

62 Interview with the mKadi ya maternity recruiter 2, St.Patricks Health Centre, Nairobi (15.10.2013)

63 Interview with the mKadi ya maternity recruiter 1, St.Patricks Health Centre, Nairobi (15.10.2013)

64 Interview with the provider of Linda Jamii (doctor) in Tudor Health Care Center, Mombasa (29.10.2013)
possible micro-insurance program available in Kenya as one of the initiators confirms by saying:

At the moment, there really isn’t anyone who is doing the same, both from the saving perspective and at micro-insurance level, but there are a lot of initiatives, where they want to get there. I think our lead now comes out of the system, nobody else has this electronic platform, that can integrate mobile money and service provision at the medical facilities and is also integrated at the insurance company.65

Most of my informants agreed on that both mHealth programs are convenient and working very well. I observed that the majority of my informants, who already got treatment through the mHealth programs, were satisfied and did not really have negative findings to reveal. This can be naturally influenced by the short time of usage. One of my informants, the user of Linda Jamii programme in Malindi, said:

My son came for treatment. That was after 60 days (after registering), he came here (Tawfiq Hospital), and (it) cost only KSh 100. It was flu, cold. He is three years old.66

My informant added that he is very satisfied with the programme, because such treatment would normally cost KSh 2,000. He also revealed that his monthly salary is KSh 10,000 and it is very easy for him to pay Linda Jamii cover, even though his wife does not work.67

One of my informants, recruiter of mKadi in Nairobi, revealed how users react about mKadi ya maternity, when she said:

65 Interview with the co-founder of CMHIL, Nairobi (13.10.2013)
66 Interview with the user 2 of Linda Jamii, Tawfiq hospital, Malindi (07.11.2013)
67 Ibid.
I am happy with mKadi and I am happy to help people to register them. I tell people about mKadi so that they can understand it. People react positively about it and I am happy because they are registering.68

My informant also added that her clients are satisfied with the program (mKadi) and some of them call her to say: “Thank you, I see it is working good”. She also added that she loves to help people in her community and she walks around trying to persuade pregnant women to save up for maternal services, because she understands how important it is. She also added: “The way it is is so good, but it needs a lot of improvement.”69 Such shortcomings will be discussed in the following part.

**Shortcomings of mHealth programs**

Some of the informants claimed that even though the Linda Jamii program is affordable and understandable; they are missing some services such as specialists, as one of my informants Rachel from Swiss Cottage Hospital in Mtwapa noted:

> I am satisfied, because I can get the treatment, although the hospitals that are in the program, you cannot get all the treatment you need and want. Like today I came here and I had problem with my nose, ears, throat. Unfortunately they gave me some medicine and referred me to another hospital where I can find the specialists.70

Rachel adds that she needs to pay for the specialists by herself and that is not convenient. Rachel also revealed that she is not fully satisfied with the hospitals she can chose from, because not all of them are according to her opinion good and some of them are too far away.

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68 Interview with the mKadi ya maternity recruiter 1, St.Patricks Health Centre, Nairobi (15.10.2013)

69 Ibid.

70 Interview with Rachel, the user of Linda Jamii, Swiss Cottage Hospital in Mtwapa, Mombasa (06.11.2013)
Shortcomings of mKadi ya maternity programme were according to my informants mainly in weak marketing campaign. The recruiters noted the difficulties in enrolling new users, who were in many cases sceptical towards the program. One of the main reasons for the mistrust was the fact that the potential users have not heard about mKadi ya maternity from other sources. One of my informants noted that the last time the public heard about this programme was in July 2013. He adds that the campaign should continue, otherwise it is very hard for the recruiters to enrol new users.

According to my informants, it is important that potential users hear about mHealth programs from other channels, like TV or radio, as one of my informants confirmed by saying:

It [mHealth commercials] should be on TV or radios, that people can understand it even better and to make it easy for us to persuade them. The main barrier is that they haven’t heard about it from any other channels, so we are the ones telling them about it for the first time. They need to hear about it from another channel.

Most of my informants, who were either users or recruiters, echoed these findings and pointed out that the initiators of both programs should invest more into marketing campaigns.

Another shortcoming of mKadi ya maternity programme was the weak motivation of recruiters, who had to use their own money to register new clients as one of my informants echoed by saying:

We are the ones putting credit on the phone recruiting the community, you see, there is a challenge. We normally work as volunteers in different places, but the little money we are getting from there, we are now forced to

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71 Interview with the community health worker in St.Patricks Health Centre, Nairobi (15.10.2013)
72 Interview with the mKadi ya maternity recruiter 1, St. Patricks Health Centre, Nairobi (15.10.2013)
buy airtime to put on the phone to go and register the client, you see, there is a challenge.\textsuperscript{73}

The complication comes when the potential user does not finish the registration by paying KSh 100, therefore the recruiter does not receive his or her reward.

Even though I could not interview more informants, I consider my fieldwork in Kenya as successful, mainly because it revealed a lot of information, which I was not possible to gain from the literature or other sources. Most of my informants shared many personal experiences and were cooperative and reliable. Data analysis revealed the main challenges and barriers when implementing and using Linda Jamii and mKadi ya maternity, shed light on the practises of these programs, and explained many phenomena I was studying.

\textsuperscript{73} Interview with the mKadi ya maternity recruiter 1, St. Patricks Health Centre, Nairobi (15.10.2013)
4. CONCLUSION

The purpose of this study was to explore what role do mobile phones play in healthcare system in Kenya and to explore the impact of mHealth programmes on the lives of middle and low-income population. Poverty is defined as a multidimensional social phenomenon, where health is one of the most important and interlocking factors. The main focus of this study was on providing health care through the mobile phone devices closer to the most vulnerable people, who often lack crucial healthcare, but have the possibility to use mobile phone, which can assist in accessing and financing good quality healthcare through mHealth programmes.

This thesis identified some of the challenges and opportunities related to the use of information and communication technology (ICT) to promote human development and social change and combat poverty. This study has also sought to find out whether mHealth programmes can result in improving general and maternal health outcomes, particularly in urban areas in Kenya. The study sought to answer two sets of interrelated research questions:

1. What is the impact of technology on poverty reduction at the local level and what are the main sets of challenges in implementing mHealth programmes in developing countries?

2. To what extent have mHealth systems been successful in reducing maternal mortality in Kenya?

Use of Heeks and Mansell theoretical perspectives facilitated easier recognition of challenges and barriers as well as provided the necessary frame for identifying challenges and barriers.
This chapter, the last chapter of this study, answers the research questions, highlights the limitations of the study, provides directions and areas for future research and ends with the future direction of the phenomena.

4.1 What is the impact of technology on poverty reduction at the local level and what are the main sets of challenges in implementing mHealth programmes in developing countries?

Based on the poverty definitions and the findings, that health is one of the most important interlocking factors in poverty alleviation and general discussions with my informants, I conclude that a good health condition is one the most important in the lives of the majority of Kenyans. The current health care system does not allow the majority of Kenyans, middle and low-income population, to access these services. My findings demonstrate that the impact of ICT on poverty reduction has enormous potential for reducing poverty in Kenya, but there are numerous social, political, infrastructural and economic challenges, which have not been overcome yet as the mHealth programmes are still in their initial stages. I conclude that the connections to technology are a way to solving difficulties in the access to health care for the majority of Kenyans, although without more resources and time it was not measurable.

I argue that to extend the impact of mHealth services in developing countries, certain challenges and difficulties discovered in the field have to be overcome. Answering second part of the research question ‘What are the main sets of challenges in implementing mHealth programmes in developing countries?’ will help us to identify such difficulties. Suggestions for policy implications with be presented for each challenge.

Based on fieldwork in Kenya, I conclude that the main challenges in implementing mHealth services in developing countries include affordability; trust; understanding both the programs and the importance for
access to health care; technological infrastructure such as technical equipment in the health facilities and sufficient Internet connection; and the cooperation with Government of Kenya, which can provide sufficiency of qualified personnel.

One of the examined challenges was the affordability and the phenomenon of excluding the poorest from benefiting on innovative mHealth services grounded in Mansell’s theoretical perspective. One can argue that these innovative mHealth services can hardly reach the poorest, who would benefit from it the most. I conclude with the following findings: The number of people who cannot participate and benefit from using innovative services is continuously reducing for two reasons: firstly due to the lowering of the prices of ICT and its services, and secondly because the common practice of sharing mobile devices in Kenya with either family members or close friends is highly popular.

My informants confirmed that both examined mHealth programmes Linda Jamii and mKadi ya maternity are affordable for the majority of Kenyans. Both the mHealth programmes target economically active middle and lower social class, but because the number of people living under the poverty line and unemployed population in Kenya is exceptionally high, the percentage of people who cannot reach such innovative services seem to be high. Based on my findings, both programs are affordable even for low-income self-employed people, who earn small amount of money every day.

I conclude that trust is one of the main challenges in the process of implementing mHealth services in Kenya. I found out that this challenge has been already partly overcome with the highly used mobile banking system M-Pesa, which has throughout the years gained the trust within the majority of Kenyans and prepared the base for the mHealth programs. I noticed that gaining trust within Kenyan population can be a long-term project, especially when it comes to saving money through innovative services. I explored that
Kenya have already gained such trust with M-Pesa services, therefore I discuss that Kenya is very specific and unlike other developing countries and ready more than others to implement and use mHealth services for easier access of health care.

Some of the findings point out to the difficulties with understanding the programs, which can be easily overcome with certain assistance from the initiators, who are aware of the necessity of such support. This assistance can be hard to sustain in the future as well as the necessary assistance for illiterate users.

The awareness, education and explanation of the importance of implementing such mHealth programs are necessary for easier expansion of such programmes to other parts of Kenya. I argue that even people with no education can understand the necessity of having access to health care, particularly if properly explained.

The technological infrastructure seems to be problematic, even though the programs are running in urban areas. The major problems can be to sustain electricity and Internet in rural areas in the future, as both of the programs will be implemented throughout the whole Kenya. Some of the health care centres face immense difficulties for being approved and therefore enrolled into the cooperation with mHealth programs as lacking necessary equipment such as computers or Internet connection. This leads to the fact, that for some users of Linda Jamii or mKadi ya maternity can be health facilities hard-to-reach, as the local ones are not enrolled into the cooperation when not fulfilling the necessary conditions for collaboration.

The cooperation of both Linda Jamii and mKadi ya maternity with the Government of Kenya was during the time of my fieldwork in the stage of negotiation. I found this cooperation crucial for the future of the programs as the mHealth programmes need proper support and funding in order to achieve a more enabling environment. I argue that for such mHealth
programmes to work, there is a high demand for educating and qualifying new medical personnel, as long as Kenya is lacking a high number of doctors and medical assistants. The working cooperation with the Government of Kenya should assist in accessing the sufficiency of qualified personnel and in more strategic use of ICTs for realisation of better health outcomes of the poor.

The potential of ICT on poverty reduction is primarily because the usage of ICT is common in everyday life of middle and low-income Kenyans and ICT can supplement various services such as payment transactions and in this case micro-insurance services and platform for saving up money for maternal health services. Micro-insurance and electronic platforms are highly needed in Kenya because the majority of the Kenyans cannot fulfil the strict terms and conditions of the national healthcare insurance companies. However, the majority of Kenyans are not willing to save up for health care services for various reasons, some of them do not fully understand the potential benefits of such savings, and others believe that they will not need health care. I believe that the demand for micro-insurance services and saving up platforms will be extremely high and can actually change the health care system in Kenya.

4.2 To what extent have mHealth systems been successful in reducing maternal mortality in Kenya?

Even though there is a high number of diverse mHealth programs in Kenya focusing on maternal health outcomes, which are appearing and disappearing, I consider that these programs can raise the awareness of local people to actual concern and interest about insurance and maternal health care financing.

One of the biggest difficulties in the Kenyan population is the fact, that people ignore the possibility to save up and think in advance about health coverage. The ignorance is caused according to my findings by combination of following
reasons: lack of finances; very strict terms and conditions of the insurance programs in Kenya; lack of knowledge and information about the importance of health care coverage; and not traditional to save up for health care services in Kenya. All these factors are based on gained information from my informants in Kenya.

I argue that mHealth programs I have studied educate general public about the importance of birth delivery with qualified assistance, give the opportunity for middle and low-income people to save up through innovative services for prenatal, and postnatal services, and slowly change the general opinion of Kenyans about giving the birth at home. During my fieldwork, I observed and concluded from the interviews, that the main problem is not the absence of the financial resources, but rather the combination of ignorance, lack of information about various possibilities and the importance of qualified assistance and the way Kenyan people use their financial resources. The ignorance of Kenyan population is according to my findings caused mainly by lack of information. Most of beneficiaries of mHealth programs live in conditions of extreme poverty, and saving up money for health care at home is not really sustainable. In any case of emergency during birth delivery, most mHealth users simply cannot pay the high amount of money at once. To change the alarming maternal mortality ratio, it is necessary to educate and inform general public about the importance of qualified assistance. I have observed that the majority of people in Kenya are willing to save up for health services, if they understand the reasons and possible consequences of the health complications and are given a sustainable, affordable and efficient possibility. The education of the population in Kenya can improve also the way in which people use their financial resources. The majority of health services in Kenya are paid out-of-pocket, which can lead poor families into a cycle of poverty.

Both programs I followed had been in place for too short time period to measure the possible effects on maternal mortality ratio in local level and expected
evaluation of both Linda Jamii and mKadi ya maternity programmes have been for unknown complications delayed from the original date in March 2014.

4.3 The future of ICT and health interventions

There is powerful global belief in the potential of the information and communication technologies to help to alleviate poverty. This study focused on the potential of ICTs to assist in accessing good quality health care services for middle and low-income Kenyans, who can be very easily trapped in their own cycle of poverty by sudden out-of-pocket expenses for health care. Good health is essential for every person in the world, especially in developing countries where even a short work absence can lead to serious consequences for the whole household.

If properly deployed, ICTs have enormous potential as tools not only for increasing information flows but also for empowering poor people and making it possible to access health services through innovative saving programmes. Various authors have pointed out a wide spectrum of challenges and barriers, when implementing ICT for any m-services and alleviating poverty. I suggest that CMHIL initiating both the micro-insurance programme and mKadi ya maternity, eliminated most of the difficulties in implementing the new mHealth programs, but some of them still remain. For example technical infrastructure and technical equipment in the health care facilities, alarming lack of personnel, the knowledge about such programmes within the general public or full understanding of the importance of access to healthcare.

Based on my fieldwork in Kenya, I tend to think positively about Kenya being on a good path to sustain health care services for the majority of people with the help of ICTs, even though some of the challenges still remain. I argue that for the successful implementing of mHealth programs in developing countries the following conditions of the programmes have to be fulfilled. The programme needs to be affordable for the majority of the population as the poor ones tend to
be the most vulnerable when not having an access to health care. According to my findings it is necessary for the programme to be easily understood and followed by educational programs for better understanding the necessity of accessing health care. The initiators need to work on gaining the trust from the users, which can be gained through personal contact and continuous dialogue. Building technological infrastructure needs to be done as well as close cooperation with the government for financial, technical and resource support such as investing into educating more qualified health personnel and supporting and supplementing health facilities. The most important conditions content educating the users about the importance of access to health care.

Kenya has a suitable environment for implementing such mHealth programmes and many factors influence the process of accepting mHealth services such as Linda Jamii and mKadi ya maternity. I argue that the process of implementing mHealth services cannot be precisely replicated in other developing countries. The innovative financial services M-Pesa, which have become the common tool of the majority of Kenyans, influenced the process of gaining trust within Kenyan population and fostered the process of implementation. I argue that one of the most important factors in implementing ICT is the trust within the population. This trust can be gained through long process within population in other developing countries, which can slow the planned process.

Some of the authors argued that one of the important conditions for implementing m-services is education, but none of them really explained it well. My fieldwork revealed that users do not have to necessarily have education, as long as they fully understand the advantages and usage of mHealth programmes. I suggest that educational programmes about maternal health, family planning or possible complications during the birth delivery should be part of the implementation campaigns of mHealth programmes. These educational programmes could be very helpful part of the strategy to lower the maternal mortality ratio within the country.
The main limitations of the study were lack of time and financial resources. The actual impact could not have been fully measured for the following reasons: both projects were delayed from the original plan and during my fieldwork were therefore still in the pilot phases; the users have not been using the programmes for longer than a few months, therefore the outcome information were limited; and due to the financial and time resources, I was able to conduct fieldwork only in big cities, not in rural areas where the situation can be different. Even though I faced many limitations, I have gained a lot of useful material to draw conclusions of my study.

I recognized that there is a knowledge gap about the impact of ICT in health, and in development generally. I discuss that ICT innovations in developing countries could have an impact on better health outcomes of the population, but the evidence about such impacts is absent. Further research is needed in effects on quality of health care, on affordability and accessibility of mHealth programmes and ICT innovations, which have been primarily piloted as small-scale models. There is an urgent need for researching the accessibility and affordability of mHealth programmes in rural areas and what are the main limitations and barriers in hard-to-reach areas. Further research is needed to understand whether the expected benefits of these approaches can be actualized in rural and hard-to-reach areas in Kenya, where the technical infrastructure and technology control might be some of the biggest limitations.

My motivation for writing this study was to find another success story within developing countries. I believe in the positive effects of mHealth services in Kenya in the future, if most of the presented challenges and barriers can be overcome and the process of implementing mHealth programmes will be applied on a large-scale.

With this study, I would like to encourage other students and researchers to examine the potentials of ICT in alleviating poverty, because many questions have not been answered in this field and based on my findings, I believe that
the potential of ICTs in alleviating poverty in developing countries is excessive.
Appendix

QUESTIONNAIRE 1 (initiator of mHealth programme)

1. Could you please basically explain how (the programme) works?

2. What are the advantages of (this programme)?

3. What are the main challenges in using ICT?

4. What hospitals are you cooperating with?

5. How many users do you have right now?

6. How is the program funded?

7. How do you get people to know about (the programme)?

8. Is there any group of people who cannot afford to participate in (this programme)?

9. What is the typical income of the users your program aim for?

10. What places and life conditions the users usually live?

11. Are the poorest ones the target of this program?

12. What do you think about mHealth programmes going on in Kenya currently?

13. Is here any other company, which does something very similar, or are you the only unique company here?

14. Do you plan to go in other countries or do you want to stay in Kenya?

15. How do you think that mHealth integrated into overall system in Kenya?

16. How do you see (the programme) in the future?

17. Do you plan to spread out into rural and hard-to-reach areas?
QUESTIONNAIRE 2 (user of mHealth programme)

1. Could you please explain how (the programme) works? How you understand it?

2. When did you become a member?

3. Why did you become a member?

4. How did you get to know about (this programme)?

5. Have you faced any difficulties with using the technology?

6. Are you satisfied with the program so far?

7. Have you already gotten any treatment?

8. Is there anything you do not like about this program?

9. Is there anything more you would like to mention about this program?

10. What are the main barriers in (the programme) usage?
QUESTIONNAIRE 3 (provider of mHealth programme)

1. Why did you decide to cooperate with (the programme)?

2. For how long have you been cooperating with (the programme)?

3. Why have you decided to start cooperating?

4. What are the advantages of (this programme)?

5. What are the disadvantages of (this programme)?

6. What are the main challenges in using ICT?

7. Is there any group of people who cannot afford to participate in (this programme)?

8. How much does it cost for delivery services in your health centre?

9. How did the situation change since the new government said that delivery services are for free in public hospitals?

10. What are the reasons for the lack of doctors in Kenya?

11. How do you see (the programme) in the future?

12. What do you think it’s the biggest problem in terms of health?

13. Do you think this programme can spread out into rural and hard-to-reach areas?

14. Is there anything more you would like to mention about (the programme)?
QUESTIONNAIRE 4 (mobilizer of mHealth programme)

1. Could you please explain how (the programme) works? How you understand it?

2. What are the advantages of (this programme)?

3. What are the disadvantages of (this programme)?

4. What are the main challenges in using ICT?

5. Is there any group of people who cannot afford to participate in (this programme)?

6. How do you see (the programme) in the future?

7. Is there anything more you would like to mention about (the programme)?
Bibliography


