

# **TOWARDS A HEALTHY MOZAMBIQUE, ONE MOBILE PHONE AT A TIME**

The use of mobile technology for the development of national health in Mozambique



Heske van Boekel

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By

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## Executive Summary

Health care continues to be one of the critical sectors in Mozambique, where despite combined efforts of the International Development cooperation, and the central government the situation for large parts of the population still continues to be very vulnerable. In many parts of the country access to decent health care and basic information is underdeveloped, while diseases such as malaria, tuberculosis and HIV/AIDS thrive.

For decades alternative solutions and mechanisms have been tested and applied to improve the quality of the health services as well as the awareness regarding healthy behavior, however the effects have been limited. Mobile technology and tailored communication could possibly offer a solution here. Since the exponential growth of mobile network operators and mobile penetration in developing countries the notion that tailored and targeted communication through mobile technology might hold tremendous opportunities for international development and national governments has increased.

In this thesis after a short introduction including an analysis of the context and the overall problem, several relevant theories are explained. Subsequently the findings of this research and some concrete, real life cases will be presented, bringing evidence that mobile technology has almost indefinite possibilities for the development of a better health care system in Mozambique.

This research has been conducted at the request of the Innovation Health Initiative. An advice on how to, most effectively, use mobile technology to promote healthy behavior and the development of public national health in Mozambique has been created in final chapter of this thesis.

## Acknowledgements

Throughout these past four years I have sometimes worried about how I was going to apply ICM in my future career and if a career in the field of communication was really what I wanted. During my internship in Mozambique, conducting this research and writing this thesis all my worries were laid to rest, my eyes were opened to ways I could combine what I had learnt at ICM with what interested me the most, international development.

The entire process leading up to this thesis would not have been the same, nor gone as smoothly without the guidance and help of some people. First of all I would like to express my gratitude towards Yvonne Louw Dekkers and others coordinating the graduation assignment process for allowing me to write my thesis about my chosen subject, even though the subject matter is quite different to that usually researched.

Furthermore, I would like to thank my two main contacts in Mozambique, Marco Gerritsen and Iulian Circo, who have openheartedly answered my questions and sent me information that could be helpful for my research. I would especially like to thank Iulian Circo, for if it were not for him I would not have had the opportunity to intern at PSI Mozambique where I found my inspiration for writing this thesis. For his support during my internship and the process of writing my thesis I am very grateful.

I would also like to thank my parents. They both guided me through this process by regularly reading through my thesis, allowing me to vent, and allowing me to use some of their contacts in Mozambique in order to collect data. My mother has also been extremely supportive throughout this period.

Furthermore there are a few organizations and people who have taken the time to help me with my thesis. I am grateful for all organizations that responded to my emails, a full list of these organizations can be found in appendix 3. Finally I would like to express my gratitude to my supervisor Ewa, for all the guidance she offered. I also want to compliment her on the way she took on Theo Bors' position as my supervisor. I appreciated all feedback, advice and help she offered throughout the process, and hope to make her proud.

I hope you enjoy reading this thesis, as much as I did writing it.

Heske van Boekel, 10 June 2014

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## List of abbreviations and definitions

AIDS	Acquired Immunodeficiency Syndrome.  This is the term used to describe the most advanced stages of the HIV infection. (World Health Organization, 2013)
ART	Antiretroviral Therapy
BCC	Behavioral/Behavior Change Communication
BOP	Bottom of the Pyramid
DIFD	UK Department for International Development
HIV	Human Immunodeficiency Virus.  This term is used to describe a virus that infects cells of the immune system, obliterating or damaging their function. The immune system is considered deficient when it is not able to fulfill its primary role of fighting disease and infection (World Health Organization, 2013).
eHealth	Electronic Health  eHealth (or sometimes referred to as e-health) refers to the use of information and communication technology (ICT), for instance computers, mobile phones and satellite communication, for health services and information (United Nations Foundation; Vodafone Foundation, 2009).
ELM	Elaboration Likelihood Model
ICT	Information and Communication Technology
ICT4D	Information and Communication Technology for Development

IICD	International Institute for Communication and Development
IDRC	International Development Research Centre
INCM	Instituto Nacional de Comunicações de Moçambique
IRS	Indoor Residual Spraying
ITNs	Insecticide Treated Nets
LLINs	Long Lasting Insecticide Treated Nets
MASC	Mecanismo de apoio a sociedade civil (CSSM - Civil Society Support Mechanism)
MCT	Ministerio de Ciência e Tecnologia
MDG(s)	Millennium Development Goals. "The eight Millennium Development Goals (MDGs)- which range from halving extreme poverty rates to halting the spread of HIV/AIDS and providing universal primary education, all by the target date of 2015- form a blueprint agreed to by all the world's countries and all the world's leading development institutions." (United Nations, 2014)
mHealth	Mobile Health The use of mobile communications, for instance mobile phones, for health services and information (United Nations Foundation; Vodafone Foundation, 2009).
MISAU	Ministério da Saúde (Ministry of Health in Mozambique)
Mobile technology	Technologies used for cellular communication



MOH	Ministry of Health
NCDs	Non-Communicable Diseases
NGO	Non-governmental organization "Self-governing, private, not-for-profit organizations that are geared to improving the quality of life for disadvantaged people" (Vakil, 1997)
NPO	Non-profit organization (not-for-profit organization)
ONG	Portuguese NGO
PGB	Programa Geração Biz
PSI	Population Services International
RNE	Royal Netherlands Embassy
SIDA	Portuguese AIDS
SMS	Short Message Service
SSA	Sub-Saharan Africa "Geographical term that refers to the area of the African continent that lies south of the Sahara desert" (United Nations Statistics Division).
SRH	Sexual Reproductive Health
TAM	Technology Acceptance Model
TB	Tuberculosis

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UN	United Nations
UNAIDS	The Joint United Nations Program on HIV/AIDS (UNAIDS)
UNFPA	United Nations Population Fund
WHO	World Health Organization

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## Motivation

Many different events in my life have influenced and inspired me to write this thesis. First of all, my upbringing has been a big influence. I grew up in a household where my father worked for the UN for most of my life, because of his job we moved to a new country every few years. By the time I turned 14, I had lived in Brazil (where I was born), El Salvador, Bulgaria, Mozambique, Croatia, Hungary and had just moved to the Netherlands.

Throughout the years I heard stories about my father's work, or about the history, politics and development of the countries where we lived or that we visited. Looking back my father's job and my upbringing in different countries, most of which were developing countries at the time, has had a significant influence in my life. My interest in the developing world, the work of development organizations and other countries, cultures and customs stems from these experiences.

After having lived in Mozambique between my 6th and 9th year, I have always had a serious interest in Africa, specifically Mozambique and its development challenges. In my future career I would want to do something that would contribute to the development of underdeveloped countries and work to strive for more equality.

When, in my third year at ICM, I got the opportunity to do an internship at PSI Mozambique, in Mozambique, I was very excited. I saw countless opportunities for myself with this chance. First of all, I would be able to obtain direct, firsthand experience working in a development organization. Secondly, I would have the chance to go back to Mozambique, which I had wanted to for years. Furthermore, I wanted to experience living in a country such as Mozambique by myself, without my parents. The final thing that excited me about this opportunity was the fact that with PSI Mozambique I seemed to be able to combine my personal interests and academic development (my bachelors degree in communication) as PSI was rolling out an innovative awareness campaign based on mobile technology and social media.

Though the internship itself had its share of up's and down's, I do see it as a great learning experience. I was able to see and experience directly how clever use of mobile technology, and in some cases social media could create awareness about diseases in Mozambique and influence the public to change their behavior in order to become healthier. Seeing how projects using mobile technology and in essence communication could affect the development of a country, inspired me to write my thesis about ***how mobile technology can be used effectively to promote development in the health sector in Mozambique.***

## Chapter 1. Introduction

In the Western world a life without mobile phones is becoming practically unthinkable. Over the past decade, the number of people with access to mobile technology and the services that come with it has increased exponentially, however, this growth is not only visible in the Western world, but also in the developing world. This can be seen in the amount of mobile phone subscriptions (both pre-paid and post-paid) which has grown from less than 1 billion in 2000 to over 6 billion in 2012. Of these 6 billion subscriptions 5 billion were in developing countries (The World Bank, 2012).

This research will focus on Mozambique, where the usage of mobile phones has increased significantly over the past years and has become very common amongst large parts of the population. Though mobile technology might have developed quickly, and the country is one of the fastest growing 'non-oil economies' in Sub-Saharan Africa (SSA) (African Development Bank, 2011), the country still remains one of the poorest in the world, where large parts of the population are deprived of basic social services, such as health and education. This means, for instance, that in the health sector diseases such as cholera, malaria, tuberculosis, HIV/AIDS and water related diseases continue to be a huge threat to the majority of the population, killing hundreds of people every day. In 2012 AIDS alone killed an estimated amount of 211 people per day in Mozambique (UNAIDS, 2013). These numbers are rough estimations, for in a country like Mozambique with bad infrastructure where it is difficult to collect reliable data from remote rural areas, these numbers might not include people dying of AIDS who had not yet been diagnosed with the virus.

## 1.1 Context



Mozambique is situated in South East Africa, bordering South Africa, Swaziland, Malawi, Zimbabwe and Zambia to the West, Tanzania to the North and the Indian Ocean to the East. (Figure 1.) According to the Central Intelligence Agency Mozambique's population will reach about 24,7 million by July 2014, with a little over 30% of the population living in urban areas, such as the capital Maputo (population in 2009 was about 1,6 million). The average life expectancy at birth is 52,6 years, ranking the country 213th out of 223. (Central Intelligence Agency, 2014)

**Figure 1. Map of Mozambique** (Mozambique, 2012)

### Political background

After centuries of Portuguese domination, Mozambique became independent in 1975. Since then, large-scale emigration, economic dependence on South Africa, a severe drought, and a civil war that lasted almost 20 years has hindered the country's development. A peace agreement between the Mozambique Liberation Front (FRELIMO) and rebel Mozambique National Resistance (RENAMO) forces ended the fighting in 1992. Since then the country has undergone a number of delicate transitions. President, Armando Emilio Guebuza, in (power since 2004), has managed to lead sound economic policies that have encouraged foreign investment (Central Intelligence Agency, 2014). In October 2013 the peace agreement between RENAMO and FRELIMO was ended, due to the occurrence of rising tension and a failed attempt to assassinate Afonso Dhlakama, with a statement from RENAMO spokesperson, Mazanga, that "Peace is over in the country" (BBC News Africa, 2013). Since then tensions have been rising in the country, also because of the upcoming presidential and governmental elections in October 2014.

## Economic overview

As explained before, the economy in Mozambique is one of the fastest growing economies on the African continent. The country has achieved an estimated annual GDP growth rate of 7,4% during the past decade (African Development Bank Group, 2014), however, Mozambique has one of the lowest human development indexes in the world. According to the United Nations Development Program Human Development Index of 2013, Mozambique is ranked as 185th country out of 187 (United Nations Development Program, 2013). After finding coal and large natural gas reserves in 2012, Mozambique has entered a group of emerging resource-rich countries, with large potential for Foreign Direct Investment. The geographical location of Mozambique is a gateway to the Indian Ocean and to some of the world's largest energy-intensive economies (PLMJ; GLM, 2013).

## Development assistance

Mozambique is one of the largest aid receivers in SSA. Over the period of 1997-2003 the official development assistance (ODA) averaged at a net amount of US\$ 1.1 billion (Central Intelligence Agency, 2014). Since the early 2000's focus of ODA has been laid on so called priority sectors, mainly education and health, and the contribution these sectors could have to poverty reduction. Around this time Poverty Reduction Strategies were drafted in cooperation with several different development-, local- and international organizations and the government. Together with the Millennium Development Goals (further referred to as the MDGs), Poverty Reduction Strategies were placed at the centre of the development aid policy in Mozambique (African Development Bank, 2011).

## Environment

Not only does Mozambique face developmental issues, as mentioned before, such as economic development, problems in the health sector and education sector, each year the country is in threat of natural disasters as well. The country's tropical climate leads to two very different seasons, the dry season and the rainy season. Droughts are not uncommon during the dry season (March - October), and each year during the rainy season rivers in the central and southern provinces flood, often leading to thousands of people needing to be evacuated and rescued.

## 1.2 Problem definition

The usage of mobile technology and information and communications technologies (ICT) for development (sometimes referred to as ICT4D) by development organizations (UN/NGOs) in SSA, in trying to achieve large scale behavioral change amongst their target groups, is yet to take off. However, as the world changes and (access to) technology become easier and more wide spread, so should the way these organizations work. When looking at institutions that do use mobile technology in their daily work, such as PSI Mozambique with its initiative Movercado, one can see that this is becoming increasingly successful in reaching out to large parts of the population, even those living in isolated communities.

When looking at the development of national health in Mozambique over the past decades, some things have changed for the better, for instance in 2012 the coverage of antiretroviral prevention services for pregnant women living with HIV (antiretroviral prevention services lower the chance of mother to child transmission of HIV) was a staggering 80% or higher (UNAIDS, 2013). However, the fact remains that very basic needs such as health and education are not yet sufficiently being fulfilled, even with all past and current forms of development aid.

## 1.3 Policy and research questions

For this research the following policy question has been drafted:

*How can a development organization (NGO) use mobile technology to promote the development of national health in Mozambique?*

In order to answer this question and structure this thesis, a few research questions were made:

- 1) *What is the current health situation in Mozambique?*
- 2) *Which are active organizations working in the health sector of Mozambique?*
- 3) *How has the use of mobile technology developed in Mozambique?*
- 4) *What projects or organizations are using mobile technology in their work, both in Mozambique as in other countries/parts of the world? How? And with what objective?*



## 1.4 Target audience for advice

In order for this report and its purpose to be clear and properly understood, the section below presents the target audience for this report and the reasoning behind the choice of this research. First of all, the purpose of this report is to write an advice on how to use mobile technology in the health sector in Mozambique in order to promote development and healthy behavior.

This advice will be written for a fictitious Non-Governmental Organization (NGO) that wants to start operating in the health sector in Mozambique. The NGO for whom the advice will be written, will henceforth be referred to as; The Innovative Health Initiative (IHI). The organization does not yet have any other projects running in Mozambique nor any projects using mobile technology and for this reason has outsourced this research with the final aim to create a foundation upon which it can start up its pilot project in the Mozambican health sector, in an effective and efficient way.

A non-governmental organization (NGO) is often confused with a non-profit organization, however, there are a few distinctive differences.

NGO's are often connected to undertaking one or both of two main actions:

1. the delivery of basic services for which there is a need, and which are not sufficiently offered by the government or private sector, in terms of quality and costs
2. organizing policy advocacy, and public campaigns for change.

However, their work can also include, democracy building, conflict resolution, human rights work, cultural preservation, environmental activism or research and information provision (Lewis & Kanji, 2009). Usually NGO's are described as independent organizations that are not run by governments nor driven by the motive to make a profit, however, there are many NGO's that might not work to make a profit however do get (high levels of) funding from governments, or make a return on their investment and therefore even might possess characteristics of private enterprises, however the big difference lies in the fact that NGO's are not allowed to distribute their profit. So in case an NGO makes a return on its investment, this needs to be reinvested in the organization and may not be distributed amongst their founders.

## 1.5 Restrictions to the research

Before starting the actual process of conducting research a few factors could turn into restrictions. First of all, the vast distance, 8408,66 kilometers to be exact (Distancefromto.net, 2014), between the location where the research will be conducted and where the research topic, and most sources are located is a barrier. The research will mainly be about Mozambique, while the research will be conducted and analyzed in the Netherlands.

Secondly, there is a language barrier, as the official language of Mozambique is Portuguese whilst the thesis will be written in English, however for the duration of research and writing of the thesis possibilities for translation are available.

Furthermore, one of the most difficult parts of the research will probably be interviewing certain resource persons. This has to do with the distance, and the language. However this also depends on the willingness and ability of these resources persons to cooperate.

Finally, what I believe could become a restriction is the fact that there is a lot of information about this subject because it is quite new, popular and very current. This fact can be seen when looking at the enormous amounts of articles and reports written on the subject, most of which have been published in the past three years. Therefore this will make it harder to make good judgments between relevant information and irrelevant information.

## **Chapter 2. Theoretical Framework**

This chapter will explain a number of theories and models that are related to the subject matter of this research and can be used to guide the process of research and writing the advice. Since this research and the policy question can be divided into a few concepts the same thing has been done for the theoretical framework. First a few theories and models that are purely related to the communication aspect of this research are explained. After these, two theories and models about change management are described and their relevance to this research is explained. In the next section, theories and models about international development (in general) are explained. Finally theories and models concerning the main concept of this research, mobile technology for health development, are presented.

### **2.1 Communication**

#### **2.1.1 7 C's of communication**

The 7 C's of communication were first coined by Francis J. Bergin in his book, Practical Communication in 1981. Bergin described 7 principles for communication that must be followed in order to transmit effective messages, both through verbal communication and print communication. The 7 principles can be seen as a guideline to follow when choosing, content and style of a message, keeping the receiver in mind (Bergin, 1981).

The 7 C's of communication are the following:

1. Completeness

In order to communicate effectively and minimize the chance of miscommunication or confusion, one needs to make sure that all messages and communication are complete and sufficient. The receiver of a message should be provided with all facts and information needed to completely understand the meaning and purpose of the message (Bergin, 1981).

2. Conciseness

According to Bergin (1981), effective communication is brief and clear, therefore it is important that the transmitted message uses as little words as possible. There are a few benefits for using concise messages in communication; for instance, shorter messages save time for both the sender and the receiver, they also save money for the sender of the message. Furthermore, by sending short but clear

messages one removes all words that could lead to confusion, leaving only the most important concepts (Online Mini MBA, 2013).

### 3. Clarity

Clarity means "*the quality of being coherent and intelligible*" (Oxford University Press, 2014). In other words the receiver of a message needs to understand what the sender is attempting to transmit, ideally the receiver understands the meaning and purpose of the message the same way as the sender does. However many factors influence how people interpret messages, for instance individual experiences and emotions. The following techniques can be used to make a message as clear as possible:

- choosing short, common words, that will be understood by the receiver
- construct clear sentences and, if necessary, clear paragraphs
- achieve appropriate readability
- include examples, figures or illustrations

(Online Mini MBA, 2013)

### 4. Correctness

The use of the correct level of language and the validity of facts, figures and words is important in order to transmit effective messages. If messages are not correctly created and transmitted the sender might lose credibility, which could have long term effects for any other messages the sender intends to send in the future. (Online Mini MBA, 2013)

### 5. Consideration

According to the Management Study Guide (2013), consideration implies "stepping into the shoes of others". In effective communication the receiver must be taken into consideration (Management Study Guide, 2013). Factors that might influence a receiver, such as background, view points, educational level, even gender and age, need to be taken into consideration before creating and sending a message. It is very important to make sure the message does not offend the receiver or give them any other negative feelings.

## 6. Courtesy

*"The showing of politeness in one's attitude and behavior towards others"* (Oxford University Press, 2014). Consideration and courtesy of the message sent, are quite similar. Both are in essence about the respect that needs to be shown toward the receiver of a message. When looking at different descriptions of courtesy, both as a term in itself as well as part of the 7 C's for effective communication, a very important element of courtesy seems to be sincerity. It is not only important to be polite, however the message needs to be sincerely polite, tactful, thoughtful and appreciative (Online Mini MBA, 2013).

## 7. Concreteness

Communicating concretely means being specific, definite and vivid rather than vague and general. (Online Mini MBA, 2013)

The Seven C's of Communication theory is very relevant to the end result of this thesis, namely the advice. In order to reach target audiences and transmit a message in an effective way one needs to think carefully about communication and the message. By looking at the Seven C's of Communication and taking each one into consideration an effective message can be sent. The theory is relevant for all types of communication, whether it will be writing an article or raising awareness via SMS. In the case of communication via SMS or even via other media, such as Twitter, where a limited amount of figures are allowed, considering the Seven C's of Communication before pressing send is of crucial importance.

### 2.1.2 Shannon-Weaver's Model of Communication

One of the simplest models of communication is Shannon-Weaver's Model of Communication (Figure 2).

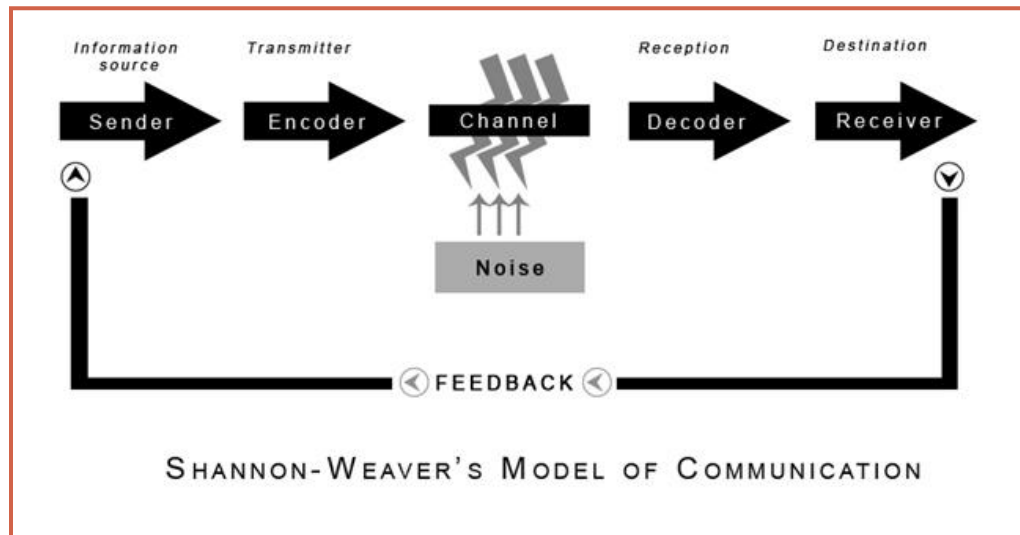


Figure 2. Shannon-Weaver's Model of Communication (Communication Theory, 2010)

The theory, conceptualized in 1949, shows that the transmission of a message involves sending information through electronic signals (University of Twente, 2014). According to Shannon and Weaver (1949) the 'information source' is "a measure of one's freedom of choice when one selects a message". Noise is defined in this theory as anything in the process that works against the predictability of the outcome (University of Twente, 2014). The theory has to do with uncertainty avoidance, and predictability of the outcome, meaning that when a 'sender' chooses what information to send, they want to be assured of the fact that the message will be understood properly by the receiver, or that the receiver acts accordingly.

Shannon-Weaver's Model of Communication is quite similar to the Seven C's of Communication for they were both designed in order to assure that a message is transmitted and perceived correctly. The main difference is, however, that the Seven C's of Communication focuses on the creation of the message to be sent, while Shannon-Weaver's Model of Communication also explains the transmission process.

### 2.1.3 Elaboration Likelihood Model

The Elaboration Likelihood Model (ELM) visualizes the theory that is based on the belief that attitudes are most important, because attitudes guide a person's decisions and other behavior (University of Twente, 2014). Petty and Cacioppo created the model and theory in 1981, and their belief was that it provided a general framework for categorizing and understanding basic processes that underlie the effectiveness of persuasive communication (Petty & Cacioppo, 1986). In their book, Petty and Cacioppo (1986) made a distinction between two different types of persuasion (or ways communication can be persuasive), these two types can be seen as two routes; the central route and the peripheral route.

First of all, the central route is where persuasion results from a person's careful and thoughtful consideration of the true qualities of the information presented. The central route appeals to logic, and involves a great deal of consideration. This route often leads to permanent attitude change, although the effectiveness depends on abilities and motivations of the receiver (of the communicated message) and on how believable the transmitted facts and arguments are. What route is taken also depends on the involvement of the receiver, from the perspective of this theory involvement is defined as: "how much time, energy and other resources the receiver is willing to put into the process." If there is high involvement there is also a higher perceived risk, therefore the central route is taken. However when there is low involvement the peripheral route is more likely. (Benoy & Lander, 2009)

The second route, is the peripheral route. Here persuasion that results from a simple cue in the content (for instance an attractive source, emotional story, colors or music). The actual content transmitted becomes relatively unimportant and is often ignored (Benoy & Lander, 2009), therefore the route induces change without it being necessary to carefully consider the true merits of the information presented (Petty & Cacioppo, 1986). The peripheral route often leads to more temporary results and is subject to change. If an advertisement for example plays into the emotions or feelings of the receiver, then it is aimed at taking the peripheral route (Benoy & Lander, 2009).

The original Elaboration Likelihood Model (Petty & Cacioppo, 1986) can be found in the appendix. Below a simplified version can be seen, as can be seen in the model below, the peripheral route is usually taken under conditions of low involvement, whereas under conditions of high involvement one takes the central route (Morrison, 2012).

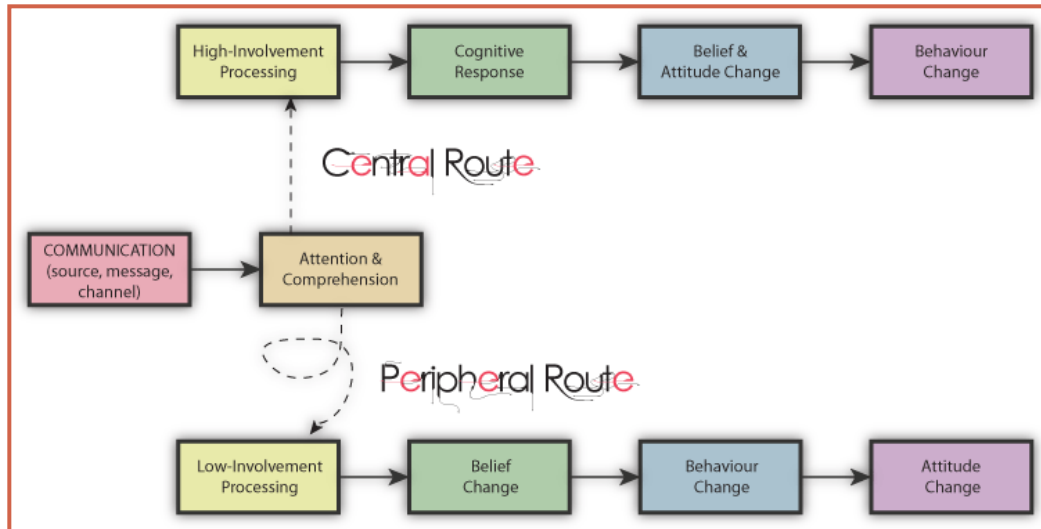


Figure 3. Elaboration Likelihood Model (Morrison, 2012)

The Elaboration Likelihood Model is one that is very relevant to keep in mind while doing this research and investigating other cases using mobile technology for development, but more so when writing the advice as the final phase of this research. As can be seen in the description of the model, a choice needs to be made before communicating with a target audience, whether to use the central or the peripheral route. Both routes have different effects and ask for different communication approaches. Even with communication via SMS this can be very relevant, does an organization for instance chose to play to the emotions of the target audience in order to get quick results (change in behavior) or will it chose a more factual logistic approach, with more long term results.



## 2.2 Change management

As the use of mobile technology for development is a new way of working in the international development sector, this can be seen as a change. Whenever there is a change, whether this be in the sector, as in his case, or in a specific organization, the parties involved need to look at how this effects the way people work, and how this change can most effectively be implemented without losing too much productivity or in the cases of development organizations loosing the ability to effectively provide their service.

### 2.2.1 Technology Acceptance Model

The technology acceptance model was initially presented in 1985 by Fred Davis in his Doctoral dissertation (Figure 4).

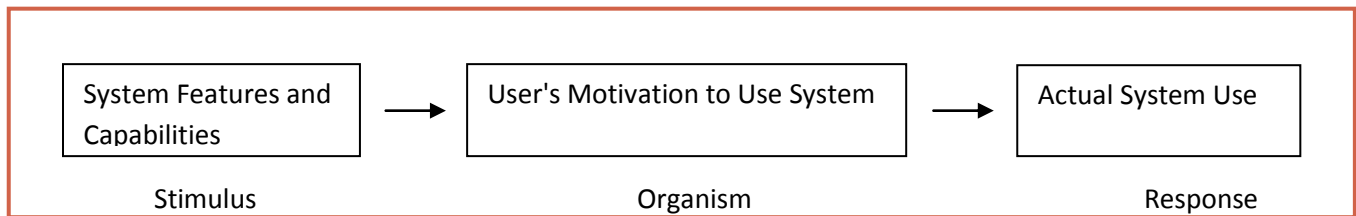


Figure 4. Technology Acceptance Model (Davis F. E., 1985)

In 1989, Davis presented a revised, more commonly known, version. The Technology Acceptance Model (TAM) explains the determinants of users acceptance of technology (Figure 5).

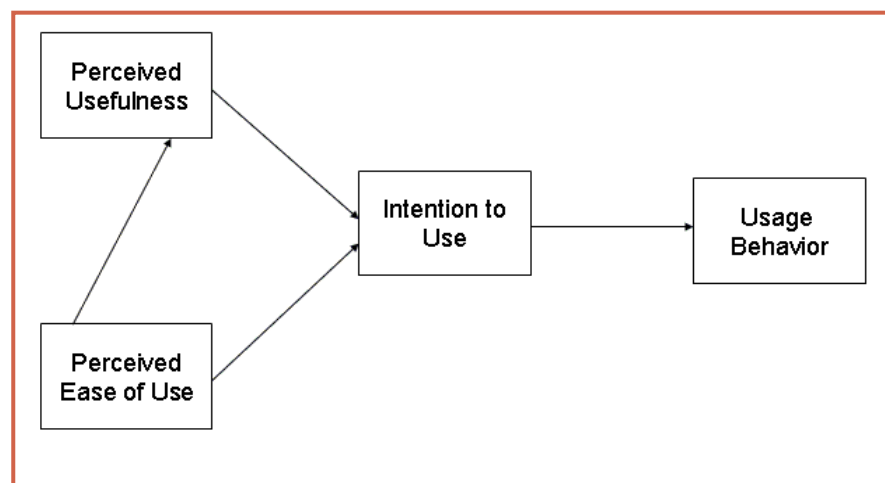


Figure 5. Revised Technology Acceptance Model (Davis F. E., 1989)

Davis (1989) defines perceived usefulness and perceived ease of use as follows:

1. Perceived usefulness- "the degree to which a person believes that using a particular system would enhance his or her job performance"
2. Perceived ease of use- "the degree to which a person believes that using a particular system would be free from effort" (Davis F. E., 1989)

The model has been tested numerous times over the years, in 2004 (Davis & Venkatesh) proved that the model could not only be used to study the acceptance of existing products, but also of upcoming products or concepts. This means that the TAM could also be used in projects connected to technology development and to assess the usefulness of proposed solutions. These applications of the TAM make it more human-centered. The VTT, Technical Research Centre of Finland, has adopted the TAM in their research, especially when it comes to field trials carried out in connection to research and development of new forms of technology. (VTT, 2014) The field studies enable users to try prototype services of new technology in their daily lives, this gives the VTT feedback on these new forms of technology. The research framework of the VTT can then include identifying the actual tasks that users perform and the tasks they would want to perform, the TAM has provided a framework for this type of research (VTT, 2014). In a report for VTT, Eija Kaasinen (2014) presented a special Technology Acceptance Model, specially designed for mobile services. This model can be seen in the image below (Figure 6).

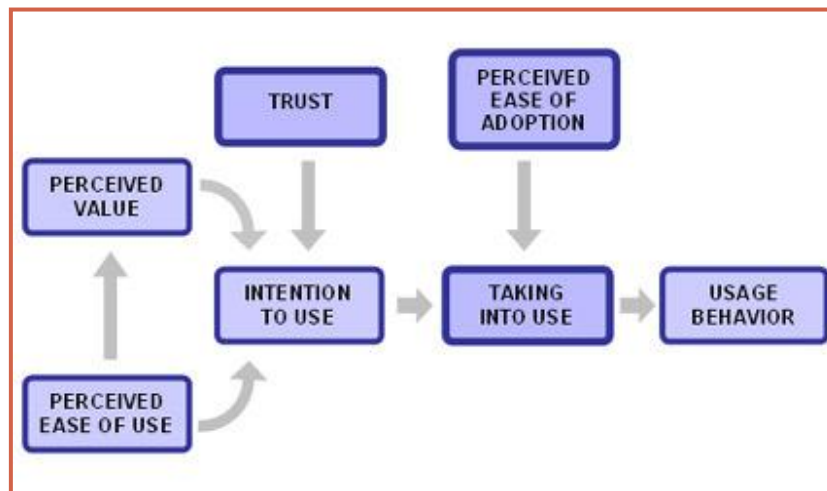


Figure 6. Technology Acceptance Model for Mobile Technology (Kaasinen, 2005)

The TAM is relevant to this research for it explains how individuals, who have not yet been introduced to (modern) technology, because for instance they live in remote rural areas in developing countries, will take to new technology and how the process of acceptance of these new technologies will go.

## 2.3 International development

International development has been a field of study for several decades, starting after World War II. Different theories and models were presented all with different hypotheses on how to end poverty or support developing countries. Several of these theories were criticized by new generations of theorists, who then would present their own theories and models to promote development. Even though many of the previous theories are not believed to be viable anymore and are not very relevant to this research, some of the most crucial to the development of international development aid are presented below, for they show the changes that have occurred during the past decades in the field of international development aid.

### 2.3.1 Theory of modernization

The theory of modernization was a very popular theory after World War II (1940's and 1950's). In short the theory of modernization states that Western countries are modern while developing countries are traditional. In order for developing countries to become developed, Western countries they need to adopt Western values (Hopper, 2012). According to the modernization theory traditional acts and customs are believed to restrain development, therefore if underdeveloped countries rid themselves of these traditions holding them back, they will be able to grow and develop prosperously.

According to the modernization theory for development, all countries go through the same progress of development. Therefore, the wisdom of the Western society can be used and adopted by the developing world. Since the Western world is already developed, developing countries should merely adopt the traditions and customs of the Western world in order to develop as well (Hopper, 2012).

"Development in developing worlds can be attained through following the processes of development that are used by currently developed nations." (Rostow, 1960)

Walt Rostow, an economic historian, presented one of the most well know economic theories of modernization. In Rostow's (1960) view the modernization theory as a five-stage process:

Stages of Economic Growth (Rostow, 1960)

1. Traditional society
2. Preconditions stage
3. Take-off
4. The drive to maturity
5. The age of 'high mass consumption'

According to Rostow (1960), all countries passed through the exact same process when it comes to economic growth. While developed countries might be at a further stage, developing countries or Third World Countries (as they were still called when Rostow's book was published) are at an earlier stage.

There has been a lot critique on the theory of modernization, mostly aimed at the linear conception of history (Hopper, 2012). According to critics the theory does not consider the differing paths towards development that can be taken, nor the fact that some countries or societies might be reluctant to adopt Western values and diminish their own traditional ones in the process. Modernization theorists simply believe that the Western model of development is applicable anywhere and can be easily and willingly applied in and by developing countries (Martinussen, 1997).

The theory of modernization could be somewhat relevant to this field of study due to globalization (a theory that will be explained further on). Many elements of everyday life in the Western world, such as modern technology, machines, even fashion and music, are becoming more common in the developing world. In a way one could say that by adopting these Western values, the developing world is following in the footsteps of the developed world and should also become developed by doing so. However by just undergoing "modernization" or "globalization" a country is not necessarily developed. Though if looking at the use of mobile technology in Mozambique objectively, the development and use of mobile technology could be described as "modernization" and part of the Modernization Theory.

### **2.3.2 Theory of dependency**

The theory of dependency was created after dissatisfaction was heard about the modernization theory. By the 60's, it became clear that despite promising theories, global inequality persisted, therefore attention shifted towards finding an explanation for the lack of economic growth and equality. In essence the position held by dependency theorists is that there is a big difference in development because of international capitalism. This is because international capitalism is based upon imperialistic and exploitative relationships between developed and developing countries, that can lead to developing countries being able to extract wealth from underdeveloped countries (Hopper, 2012).

In *Capitalism and Underdevelopment in Latin America*, André Gunder Frank (1967), explains the theory that capitalism in a sense promotes inequality and underdevelopment. According to Frank (1967) since the 16th century capitalism has been based on a chain relationship between metropolitan or developed countries and underdeveloped countries, that benefits the developed Western world. The theory of dependency sees two actors, first of all the dominant or in other words the developed countries with an

advanced industry. Opposite of that there are the dependent countries, which are the underdeveloped countries with low developed economies (Mount Holyoke College, 2008). The dependency theory examines the relationship and interactions between dominant and dependent countries.

Developing countries provide the Western world with natural resources, cheap labor and (economic) markets. Without receiving these things developed countries would not be as prosperous as they are, making the developed countries dependent on the underdeveloped countries. However the harsh reality is that without the Western world importing these resources, whether these be cheap labor or raw materials, underdeveloped countries would lose an important source of income, which then in turn makes them dependent on the developed countries.

André Gunder Frank believed that developing countries would need a revolution to develop rather than capitalist growth. As long as developing countries found themselves in a situation where there were a set of highly hostile terms of trade, suited to the economic requirements of Western capitalist countries, development would not be possible (Lewis & Kanji, 2009).

The dependency theory is mainly based on economic development of dominant and dependent countries, which to some extent makes it relevant to this research. However it is purely based on capitalism and economic growth, not taking any other sectors or elements within international development into account. This is not an unusual perspective to take when looking at development, until recently development was primarily seen in economic terms. The emphasis was more put on economic growth and statistics than on (equal) distribution and people. Though economic growth will always remain important for development, new perspectives can be seen placing more emphasis on "people-centered" approaches, for instance empowerment, participation, gender equality and rights-based development approaches (Lewis & Kanji, 2009).

Following these two theories many practitioners in the development sector, especially those working 'on the ground', had become frustrated with the abstractions of academic development theorists. Development theorists were accused that they had lost sight of the actual problems, which can be seen for instance, by Edwards' (1994) article on 'the irrelevance of development studies' (Lewis & Kanji, 2009).

### 2.3.3 Theory of globalization

The term globalization can be interpreted in many different ways, depending on the individual's demographic factors, such as political ideology, location and social status. Some might see globalization as an opportunity for progress, development, integration and cooperation, while others might see it as regression, colonialism and destabilization (Al-Rodhan, 2006). The most commonly used definition is the one given by the Swedish journalist Thomas Larsson:

"globalization is the process of world shrinkage, of distance getting shorter, things moving closer. It pertains to the increasing ease with which somebody on one side of the world can interact, to mutual benefit, with somebody on the other side of the world" (Larsson, 2001).

The fact that the term globalization can be translated in many different ways can be seen when looking at Table 1 in the report written by Al-Rodhan (2006) for the Geneva Centre for Security Policy, which can be found in the appendices of this thesis. The Table shows over 80 definitions for the term globalization, all from different sources and from different time periods.

In 2004 BBC News defined globalization as follows:

"The world is shrinking thanks to advancing technology. Depending on what you read, this increasingly interconnected global marketplace is either the best of the worst thing to happen. Meetings of bodies such as G8, the International Monetary Fund and the World Bank often generate large demonstrations" (BBC News, 2004)

Globalization has severe effects on development. Though it is, as explained above, again very often focused on the economic effects. When it comes to globalization many scholars also, however, focus on culture and communication. The main aspects of globalization as a theory for development are:

1. Global communication systems are becoming increasingly important, and through this process interactions between different countries have become easier and more frequent. This is not only visible at governmental levels, but also within the public.
2. Main communication systems still often mainly operate in developed countries, however these systems are also spreading their use to less developed countries. Due to this populations in less developed countries will have the chance to communicate and interact in a global context using new technology, this will allow them to integrate with the "global village".

3. The new forms of communication, and new technologies are not only an improvement for individuals in developing countries however also for small and local businesses. New technologies can lead to advancements in economic activities such as transactions or the utilization of productive resources. 'Virtual money mechanisms' will be able to be applied thanks to new technologies.
4. Social and economic elements of societies in undeveloped countries that are influenced by globalization are all elements that affect the standard of living for people in these societies (Reyes, 2001).

In some ways the globalization theory for development can be compared to the modernization theory. For example, both theories state that the direction of development, needs to be the same direction that developed countries took whilst developing. However the main difference when looking at this point is that the modernization theory believes that countries should just adopt the same exact steps to development as developed countries took, while in the globalization theory the position is that due to for instance the increase of communication between countries and the development of modern technology both in developed and undeveloped countries, information and other resources can be easily transferred from one country to another. Leading to some countries adopting principles they learnt from other countries if these are thought to be effective and therefore not necessarily following the 'blue-prints' as laid out by developed countries.

### 2.3.5 Vicious Circle of Poverty Model

It is difficult to pinpoint the cause of poverty, and the issues with highest priority. Health care experts will most likely argue that if an individual is not in good health, one is not as productive, will therefore receive a low income (if any at all) and this causes poverty, which then effects the health of this individual. Hence, for a health expert the health sector probably has high priority in order to diminish poverty.

An economist, or a human rights activist might think differently. Either way, in many developing countries the so called Vicious Circle of Poverty Model is a fact.

The Vicious Circle of Poverty model can be applied on national and individual levels, for the purpose of this research the model designed for individual levels is used (Eriksson, 1995).

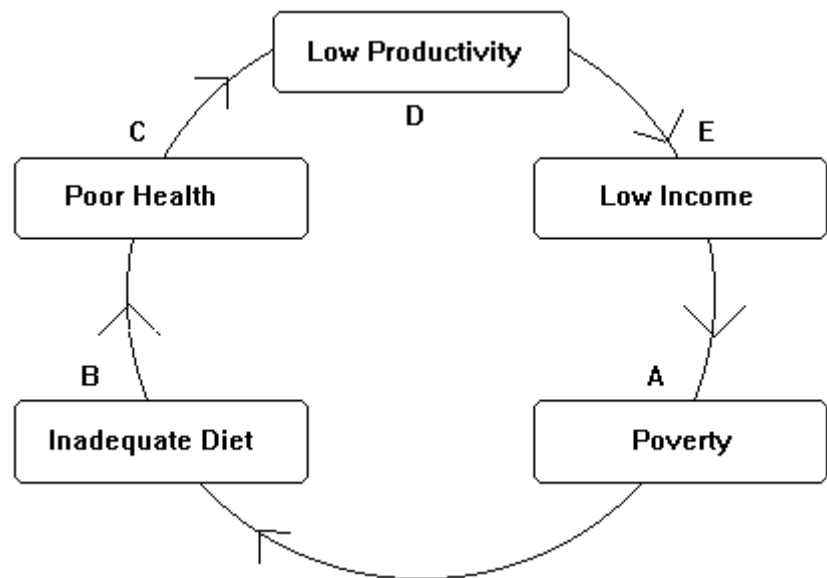


Figure 7. Vicious Circle of Poverty Model (Barke & O'Hare, 1991)



## 2.4 Mobile technology for (health) development aid

The concept of using mobile technology for health development, or often called mHealth, is a relatively new one. If one were to look at traditional care interventions, these are usually based on theories which helps guide and develop interventions (Armstrong, 2014). However what can be seen in literature about mHealth and projects using mHealth is that interventions using mobile technology are often based on Health Behavior models and theories, many of which can be very relevant as a framework for using mobile technology for promoting healthy behavior and the development of national health (Riley, Rivera, Atienza, Nilsen, Allison, & Mermelstein, 2011). A few of the relevant Health Behavior models and theories are described below.

### 2.4.1 Health Belief Model

The Health Belief Model (HBM) is a model developed in the 1950's, by social psychologists Hochbaum, Rosenstock and Kegels. The model attempts to explain and predict health behavior, by focusing on the attitudes and beliefs of individuals (University of Twente, 2014). To this day the HBM is one of the most commonly used theories in health education and promotion. The underlying concept of the model is that health behavior is determined by personal beliefs or perceptions about a disease and the possibilities to decrease its prevalence (Hayden, 2009).

The model is based on the idea that a person will take health related action if the person:

1. feels that they can avoid a negative health condition
2. expects positive results by taking the recommended action, expects to avoid the negative conditions by taking these actions, and
3. thinks that they will be able to successfully perform the recommended health action (University of Twente, 2014).

Four concepts spell out the HBM. According to the theory, the concepts account for peoples readiness to act; perceived susceptibility, perceived severity, perceived benefits, perceived barrier. In recent changes two concepts were added, namely cues to action and self-efficiency, due to the rise of habitual unhealthy behavior, such as smoking and overeating (Hayden, 2009).

In the appendix an example, made by the Resource Centre for the Adolescent Pregnancy Prevention, can be found that shows how the model can be applied. The outline of the model can be seen in the figure below.

Concept	Definition	Application
<b>Perceived Susceptibility</b>	One's opinion of chances of getting a condition	Define population(s) at risk, risk levels; personalize risk based on a person's features or behavior; heighten perceived susceptibility if too low.
<b>Perceived Severity</b>	One's opinion of how serious a condition and its consequences are	Specify consequences of the risk and the condition
<b>Perceived Benefits</b>	One's belief in the efficacy of the advised action to reduce risk or seriousness of impact	Define action to take; how, where, when; clarify the positive effects to be expected.
<b>Perceived Barriers</b>	One's opinion of the tangible and psychological costs of the advised action	Identify and reduce barriers through reassurance, incentives, assistance.
<b>Cues to Action</b>	Strategies to activate "readiness"	Provide how-to information, promote awareness, reminders.
<b>Self-Efficacy</b>	Confidence in one's ability to take action	Provide training, guidance in performing action.

**Figure 8. Health Belief Model (Glanz, Rimer, & Lewis, 1997)**

### 2.4.2 ICT4D Cube

Since there are not many actual models or theories for the use of mobile technology for health development, nor for the use of technology for health development, one of the only developed models is the ICT4D Cube. The ICT4D Cube was created in 2003 by the United Nations Regional Commission for Latin America and the Caribbean. The framework shows the transition towards a so-called Information Society, as an interplay between technology, policy and social change (Hilbert, 2012).

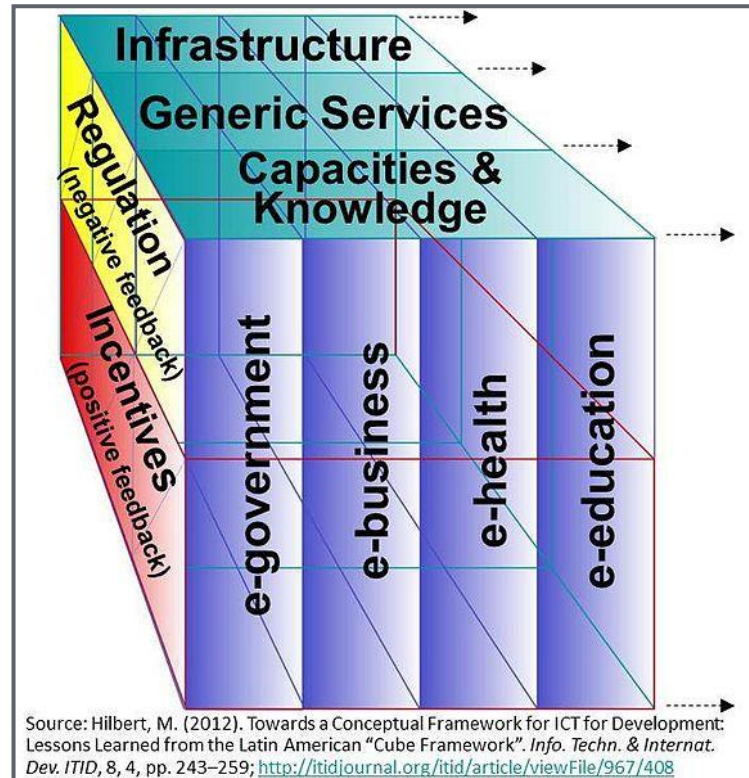


Figure 9. ICT4D Cube

The ICT4D cube shows that the first enabling factor for the transition towards a information society, is infrastructure, the second factor are generic services. The physical infrastructure are for instance telecommunications networks, computers, mobile phones, and other tangible access equipment. While generic services are intangible, for instance software or online social networks. A third horizontal layer was added in order not to undermine the significance of human capital. The third and final horizontal layer focuses on the effective usage of technology. The infrastructure, generic service and capacity and knowledge layer, or the horizontal layers, form the foundation upon which the process of digitalization takes place (Hilbert, 2012).

These technological foundations are the basis for the digitalization of information flows and communication mechanisms applicable in different sectors in society.

These sectors can be seen in the vertical layers of the cube. In comparison to the horizontal layers the vertical layers focus on 'digital processes' rather than 'digital products'. The 'e' before the sectors in the vertical layers, stand for electronic, for these digital processes go through electronic networks (Hilbert, 2012). In the future it is expected that the 'e' in e-governance will be left out, for generations to come will not know that there was once another way of public administration, information and communication other than via technology. The 'e-sectors' shown in this version of the model are not the only possibilities, the ICT can be applied in practically any sector in this way (2012).

The digitization process is supported by institutional developments that are aimed at minimizing negative effects and promoting desired advances. Policies for ICT for Development are found here. The diagonal areas, that infuse both the horizontal and vertical sectors represent regulation, negative feedback; constraints etc. and incentives, positive feedback; funding etc (Hilbert, 2012).

## Chapter 3. Methodology

### 3.1 Research design

In the following chapter the research design will be presented, also the reasons behind decisions the selection process of methods, techniques and resources will be explained.

First of all, for this research it is best to use qualitative research methods. In order to create a good advice, it is not so relevant to know how many organizations are using mobile technology in order to promote development, but it is more relevant to assess how these organizations use mobile technology.

The research design I have chosen is the form of a case study. A case study is when a specific instance or a couple of carefully chosen cases are studied in detail (Gilbert, 2009). Gilbert (2009) explains that the biggest advantage of using case studies for your research is that the research can be much more detailed than would be possible if one were studying a large sample, however a disadvantage is that it is often difficult to generalize findings. Case studies are qualitative research, where a range of different data collection methods can be used, for instance open interviews, observation, document studies and focus groups (Verhoeven, 2011).

Case studies are often confused with comparative research. However one main difference between the comparative approach and case studies is that the latter are detailed and specific while the comparative approach is broad and general (Enli, 2010).

There has been some division in the ideas about comparative research and case studies. Some experts believe that case studies are in a way a form of comparative research, while others think they are a research method on their own. For this research I see case studies as a form of comparative research, for also when researching different cases the final intent is to compare them to some extent. This also shows another concept that is often discussed about: can a case study (as research design) consist of researching only one case or also researching more than one case? According to Bartolini (1993) there are 5 options for case studies:

Five options for case studies (Bartolini, 1993)

1. the single case study - where a researcher investigates one case in detail, for instance either a specific country, an event or a system

2. the single case study over time- for instance a historical study or where one case is studied over a specified time frame
3. two or more cases at a few time intervals
4. all cases that are relevant regarding the research questions under view
5. all relevant cases across time and space (pooled time series analysis)

As can be seen, Bartolini (1993) is one of the experts who believes one can use case studies as a research method, and investigate more than one case at the same time.

After looking into different literature about the two research methods (case studies and comparative research), I will be conducting my research for this report along the lines of a case study, because my research topic is quite narrow and specific and one of the features of comparative research is that it is usually more general and broad.

I will investigate and analyze different methods of using mobile technology for health development, by looking at different types of organizations and their projects using mobile technology, mostly located in Sub Saharan Africa (SSA). Hopefully this research will lead to a number of methods, lessons learnt and ideas as to how to most effectively use mobile technology. This information I will then combine to create a set of methods or steps that an organization in the health sector in Mozambique could implement.

### **3.2 Data collection**

Overall all methods I will use in my research to collect data are qualitative, for this is more relevant to the research topic. There are several different types of qualitative research methods that I could apply to my research, some of which are mentioned in the section above, however the ones that I have chosen are:

- desk research
  - literature research
- qualitative (expert) interviews

### 3.2.1 Desk research

The subject matter studied for this report is very current and popular to research, especially the concept of using mobile technology for development. Within development aid; what works and what does not, theories and models, successes and failures have been researched in detail over the past decades. Since penetration rates and the use of mobile technology have started to develop fast in developing countries over the past few years, much research has been done as to how this can be used to promote development. A lot of desk research was conducted for the purpose of this thesis, leading to numerous resources. For example, several official reports on the development of national health in Mozambique by for instance UNAIDS or the African Development Bank. Furthermore in order to learn from other projects using mobile technology for development, plentiful cases of such projects have been investigated, for instance projects by BBC Media Action or the collaboration between the UN and Vodafone, and of course PSI Mozambique's initiative Movercado.

### 3.2.2 Qualitative (expert) interviews

In order to add some extra expert opinions and knowledge to the results and information that I have been able to gather through the other methods, I conducted a few interviews. The interviews were conducted can be divided into two types, first of all general interviews, where I sent a list of questions to several organizations or individuals whose projects in the development sector work with mobile technology. These interviews focused on mobile technology for (health) development. The second type of interview I conducted were in-depth interviews with experts in the development sector in Mozambique, most of whom work or have extensive knowledge about the health sector in Mozambique, as well. This last group was be asked different questions, both about mobile technology for health development, however also questions to gather information about other important concepts for this research, such as the use of mobile technology by the public in Mozambique, the current (and development) of the health situation in Mozambique and the health sector in Mozambique.

Because of the immense distance between where the research is being conducted and most interviewees are located, most interviews were done via email or Skype. Here there is again a difference between the general interviews and the in-depth interviews.

Most potential interviewees for my in-depth interviews are people who I know (personally or via others in the sector) or with whom I have worked during my internship, these people interviewed via Skype.

The advantages of interviewing via Skype are that it offers the chance to prompt or probe. Prompting involves encouraging the interviewee to answer your question (Gilbert, 2009). This can be done by repeating or rephrasing a question. This is not possible if you send your questions via email, for once the questions are sent they can't be adjusted, also once the answers are sent back there is no room to adjust a question or ask it again to get a better answer. Probing is when the interviews asks follow up questions in order to get a fuller response (Gilbert, 2009). Again this is difficult, though not as unheard of as prompting, while conducting interviews via email. If the interviewer is not satisfied with the answers or thinks of questions because of the responses given to the first set of questions, they could send an email with follow up questions, however not all interviewees will want take the time to answer a new set of questions.

The interviews conducted for this research can be categorized into three groups.

1. First of all a list of questions was sent to a few organizations (or the representatives of these organizations) that work with or research the use of mobile technology for development. The goal of these 'questionnaires' can be describes as, to add 'flavor' to data retrieved from literature research about the lessons learnt of using mobile technology for development and the advantages and disadvantages of using mobile technology for development. A complete list of the organizations and people who have been approached can be found in the appendix, along with how or if they responded.
2. A few more specified questions about the health sector, health situation in Mozambique, and projects in Mozambique using mobile technology were sent to individuals working in Mozambique. For example, representatives at the Swedish and Danish embassy in Maputo, Mozambique, were approached as they have experience working with Movercado, the initiative using mobile technology in Mozambique, developed by PSI Mozambique. Another example of this target group is another institution working in the health sector in Mozambique, for instance UNAIDS. A complete list of these organizations or people approached can be found in the appendix.
3. The last type of interviews that were conducted were two in-depth interviews with two subjectmatter experts on health in Mozambique and the use of mobile technology for development. First of all Iulian Circo, as country representative for PSI Mozambique, Circo has been an essential part of the development of Movercado. The project has grown out to be a well known success in the years since its initial implementation, together with a few other



projects it is one of the leaders in the new trend of using mobile technology for development. Later this year (2014) the project will become an autonomous, stand alone organization, until then it had always been part of PSI Mozambique. Subsequently Circo will leave PSI Mozambique with it, to lead Movercado to further success as an independent organization in Mozambique. Furthermore Marco Gerritsen, tropical disease doctor and health sector specialist at the Dutch embassy in Maputo, Mozambique was interviewed. Gerritsen has worked in the health sector in SSA countries for years, including Mozambique. As the Dutch government, via the Dutch embassy, is a main sponsor of PSI Mozambique and more specifically Movercado, Marco Gerritsen is well aware of its progress, obstacles and successes. While Gerritsen knows much about Movercado, he is also up to date about the political and policy element of the health sector in Mozambique as well as the developments in national health in Mozambique in the past years. The goal of these in-depth interviews is to obtain some expert opinions and detailed information from people who observe and experience the subjects of this report on a daily basis.

In appendix 3, all interview questions that have been sent to several different people and organizations can be found. Also, listed are the organizations and people who were approached, and whether or not they responded.

## Chapter 4. Findings

In the following chapter all findings relevant or interesting for this report are presented. The structure is as follows:

4.1 Development of public national health in Mozambique and the current situation

4.2 The health sector in Mozambique

4.3 Development and use of mobile technology in Mozambique

4.4 Mobile technology for development

These paragraphs contain findings retrieved from desk research, case studies, and the qualitative interviews. All data collected is of the most recent year available, usually 2012, unless this is stated otherwise. Furthermore when researching the development of the health situation and the development of (the use of) mobile technology in Mozambique the time frame set is between 2000-2014 (if the resources allow it). There are two reasons for selecting this time frame. First of all, in 2000 the Millennium Development Goals (MDGs) were instated, two of which focus specifically on the communicable diseases and maternal health. Secondly, most development in mobile technology, modern technology and mobile communications in Mozambique has taken place since the year 2000.

### 4.1 Development of public national health in Mozambique and the current situation

In previous chapters a few facts and figures were presented that show the severity of the current public health situation in Mozambique. While researching the development of national public health in Mozambique it became quite clear that something needs to change, somehow with all the funding and development aid offered, basic needs, such as health care services, are not provided effectively, nor is education about for instance health or health care. With an HDI ranking of 185, in 2012, Mozambique only ranked higher than Niger and Congo, who shared the lowest ranking (186) (United Nations Development Program, 2013), even though Mozambique has seen an annual estimated economic growth of 7,4%, which is currently one of the highest in Africa (African Development Bank Group, 2014). With this economic growth rate, one must keep in mind that Mozambique's economy is starting to grow from a very low point. "Mozambique is a very poor country and so needs to grown from a very low point, 7% of little is still not a lot, but it is encouraging" (Gerritsen, 2014).

The country faces major challenges that hinder its development. As mentioned above the country has one of the lowest HDI's in the world and every day hundreds of people die of diseases such as AIDS and malaria. Even more troubling is the fact that hundreds of people are newly infected with these diseases every day, as will be clear in the remainder of this paragraph.

The largest health threats to the Mozambican public are communicable diseases. Communicable diseases are contagious diseases that spread from one person to another or from an animal to a person. The transmission of such diseases can be via bodily fluids, airborne or via blood. The terms infectious and contagious are often used to describe these diseases, however for this report the term communicable disease(s) is used. In Mozambique some of the most detrimental communicable diseases are HIV/AIDS, Malaria and Tuberculosis (henceforth referred to as TB).

Figure 11 shows the diffusion of deaths related to communicable diseases, NCDs and injuries, in Mozambique in 2011. As mentioned earlier in this chapter, and is eminently clear, from both this pie graph, as well as numerous reports, communicable diseases pose a major threat for public health in Mozambique. Leading to high morbidity and mortality rates among the population, especially those most vulnerable, namely children younger than five years old (World Health Organization, 2012).

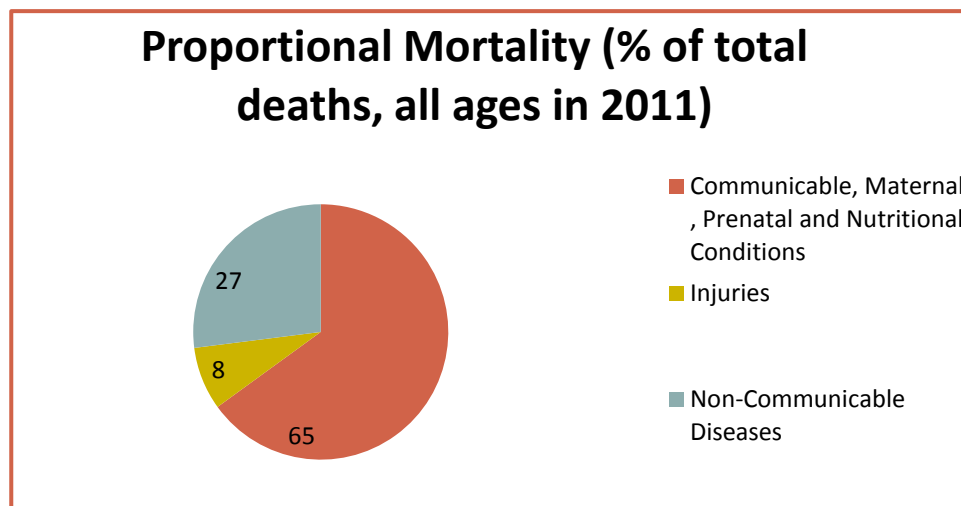


Figure 10. Proportional Mortality in Mozambique in 2011 (World Health Organization, 2011)

In this paragraph the current public health situation in Mozambique will be analyzed by looking at some of the most detrimental diseases, leading to a majority of deaths every day. Where relevant the development of issues presented in this chapter will be *viewed* as well.

#### 4.1.1 HIV/AIDS

HIV is the acronym for Human Immunodeficiency Virus. This term is used to describe a virus that infects cells of the immune system, obliterating or damaging their function. The immune system is considered deficient when it is not able to fulfill its primary role of fighting disease and infection (World Health Organization, 2013). AIDS is the acronym for Acquired Immunodeficiency Syndrome. This is the term used to describe the most advanced stages of the HIV infection (World Health Organization, 2013). This means that people get infected with HIV, which at later more advanced stage becomes AIDS, therefore people die of AIDS not HIV, though not all AIDS patients' deaths are caused by AIDS.

HIV/AIDS has developed at a very rapid rate and has cost many people, especially in the developing world their lives.

In Mozambique HIV/AIDS is one of the most detrimental diseases, seemingly impossible to contain or stop. In fact every day new infections of HIV are confirmed. In 2012 on average an estimated 328 people were infected with HIV every day in Mozambique (UNAIDS, 2013). This number includes adults (ages >15), children (ages < 15), as well as mother-to-child transmission. The prevalence for HIV (amongst adults, ages 15-49) has only increased in the past decade, in 2001 was this was 9,0 in 2012 HIV prevalence amongst Mozambican adults had increased to 11.1. The average HIV prevalence amongst adults in SSA has decreased between 2001 and 2012 from 5,8 to 4,7 in contrary to that of Mozambique.

The number of people (of all ages) living in Mozambique with HIV has also increased, in 2001 this was an estimated 850,000 while in 2012 this number had grown out to about 1,600,000. However these statistics also have a positive note, for people live longer with HIV in 2012 due to possible medication and therapy. 2,8% of all males between the ages of 15 and 24, and 6,6% of all females between those ages were living with HIV in Mozambique in 2012 (UNAIDS, 2013).

Mozambique scores very high when it comes to the percentage of pregnant women living with HIV who received antiretroviral therapy (ART). Antiretroviral Therapy, or ART, is a treatment that consists of the intake of at least three antiretroviral drugs, that stop the progression of HIV, it is also used to prevent mother-to-child transmission. In 2012, 86% of all HIV-positive pregnant women needing ART, received it (UNAIDS, 2013).

Still with people living longer with HIV and 86% of HIV-positive pregnant women receiving ART in 2012, 77,000 people died of AIDS that same year. This number equals to about 210 AIDS deaths per day in

2012 (UNAIDS, 2013). These statistics only include people who have been diagnosed with HIV/AIDS. The fact that still so many people die of AIDS, and hundreds of people are newly infected every day can be linked partially to lack of comprehensive correct knowledge about AIDS among people between the ages of 15 and 24. In 2011 USAID conducted research, where young adults, in Mozambique, were asked to identify two ways to prevent AIDS and reject three misconceptions about AIDS. The results show that only 51,8% of all males were able to do so, and only 30,2% of all females could (UNAIDS, 2013).

#### 4.1.2 Malaria

Tropical climates, like the one in Mozambique, can lead to very challenging health threats. Not only the climate itself, leads to these threats, but also natural disasters such as the annual floods in the southern provinces or severe droughts. These practically inevitable environmental factors, make the public vulnerable to tropical, water borne and drought related diseases (World Health Organization, 2012). One of these diseases that is a great threat to public national health in Mozambique is malaria.

"Malaria is a disease that is caused by a parasite transmitted from person to person by certain types of mosquitoes" (African Leaders Malaria Alliance, 2014). The flu like disease can, if improperly medicated, cause coma, life-threatening anemia and death. In 2002 there were an estimated 300-500 million cases of malaria, 90% of which were confirmed in Africa (African Development Bank; African Development Fund, 2002). According to the UN and the MDGs currently 80% of all malaria deaths occur in only 14 countries, most of which in SSA, Mozambique is one of those 14 countries (United Nations, 2014). In fact Mozambique is one of the 10 high burden countries for malaria (World Health Organization, 2013).

In 2011, one fourth of all deaths in Mozambique was due to malaria (African Development Bank, 2011). Most cases of malaria are identified in the Northern provinces of the country (The Global Fund, 2009). The most vulnerable populations for malaria are young children, below the age of five, pregnant women or people with a lower immune system, due to illness. Every year, more children die of malaria than of any other disease; malaria accounts for over 57% of all children admitted to health care services and for 23% of all deaths registered in hospitals (Malaria Consortium, 2014).

In 2011 the prevalence of malaria (amongst children younger than five years old) was 46.3% in rural areas, while in urban areas the prevalence was 16.8%. This high prevalence of malaria does not only put the Mozambican public at risk, however due to increasing mobility and migration, that of neighboring countries, in fact the same can be said for HIV/AIDS (World Health Organization, 2012).

Like HIV, malaria is preventable however due to, mostly lack of knowledge, the disease is not always prevented effectively. The two most effective ways of preventing malaria are Indoor Residual Spraying (IRS), where every once in awhile, houses are sprayed with a mosquito repellent, and the well praised Long Lasting Insecticide Treated Nets (LLINs) (Malaria Consortium, 2014). The Malaria Consortium has been able to deliver over 3 million LLINs in the first 10 years of its existence (2003-2013) and has been able to achieve a 96% maintenance and use rate (Malaria Consortium, 2014).

Malaria infections peak during and after the rainy season, in particular between November and January.

#### 4.1.3 Tuberculosis

One of the most dangerous aspects of Tuberculosis (TB) is that it very hard to trace and diagnose, and that there is a lack of knowledge and data about the disease. This leads to millions of people living with active TB without even knowing it, and unwillingly and unknowingly infecting, on average, 15 to 20 people. Worldwide, nearly 4000 people die of TB every day, close to all of these deaths are accounted for in the developing world (Chambers R. , 2014). Tuberculosis is the leading killer of people with HIV. There is no reliable vaccine or decent therapeutics (Farmer, 2014). In 2011 there were 47,452 notified cases of TB, of these 62,3% were also diagnosed as HIV-positive (The Global Fund, 2012). Mozambique is one of the 22 'High Burden Countries' in the world. In 2014 the National TB Program will conduct a population based TB prevalence survey, throughout Mozambique. No clear starting date has been released, however this survey will be conducted in order to start collecting timely TB data, which is necessary to create strategy plans, to combat TB in Mozambique (World Health Organization, 2012).

## 4.2 The health sector in Mozambique

The prominent existence of communicable diseases is not the only health related challenge Mozambique faces. There are also deficiencies in the delivery, availability and access of health care services. The following sub-chapter shows how the health sector in Mozambique is structured, what major players are involved.

The health system/sector in Mozambique is publicly funded, providing health care to the majority of the population. However equity and universal access to health services is not a reality, even with strong commitments from the Ministry of Health in Mozambique, *Ministério da Saúde*, (further referred to as MISAU). The prime obstacle to delivering essential health care is the shortage of skilled health workers. In 2011 there were 64.5 health workers per 100.000 people in Mozambique, the minimum acceptable health worker density ratio is set at 230/100.000, meaning that Mozambique is far below the minimum (World Health Organization, 2012). In 2011, 23% of all doctors in Mozambique was not of Mozambican nationality.

Leading to further inequality in the delivery of health services is the fact that health care is not equally distributed across the provinces and between rural and urban areas. A slight increase in the health sector workforce can be seen over the past decade, however, the amount of health workers remains far below the accepted minimum set by the WHO (World Health Organization, 2012).

The health information systems (meaning the collection and analysis of health data coming from different sources) in Mozambique includes population-based and health facility-based data sources. Household surveys and registration systems are the most commonly found population-based data sources in Mozambique, while public health surveillance, health services data and health system monitoring data are the most common forms of facility-based data sources (World Health Organization, 2012). Nowadays data is distributed through ministerial periodic reports and through the African Health Observatory (AHO) an open and joint regional platform, which serves as a gateway to WHO data and statistics (2012).

There are many logistical challenges that face the procurement, distribution and storage of medicine and medical products in Mozambique, poor infrastructure, for example, leads to delays in delivery, these delays then often harm the quality of the medicinal products due to lengthy exposure to heat. Also the lack of, reliable, electricity is often a obstacle for storing medicine in the right manner (World Health Organization, 2012).

In 2009, MISAU estimated that as many as 3 out of 4 Mozambicans preferred to go to a 'traditional' doctor or seek traditional medicine over institutionalized health care. MISAU expected most of this to be out of lack of correct knowledge about institutionalized medicine and health care. Traditional medical practitioners, or traditional doctors, attend to health care needs within strong spiritual and cultural contexts. These practitioners are not seen as part of the national health sector. In the same year MISAU founded the Institute for Traditional Medicine, one of the initiatives was to train 'traditional' doctors to recognize symptoms of major public health diseases and refer their patients to institutionalized health care (World Health Organization, 2012).

The Mozambican national health sector/system is financed through two main sources:

- Local funds from the state budget
- External funds received from international donors through different mechanisms including budget support, the Common Fund, which is a basket fund where partners pool their resources, and various bilateral project support initiatives.

MISAU is supported considerably by a number of international development partners. In 2008, 73% of the health sectors budget was given by foreign aid contributors (World Health Organization, 2012).

The public national health service is the main provider for health care services. The private sector is formed by two components:

- private-non-for-profit health care providers. Mainly national and international NGO's.
- private-for-profit providers. These are mainly exclusive to the larger cities, this sector is growing fast and causes competition with the public national health service sector for the limited amount of human resources for health (World Health Organization, 2012).

In 2011 there were 1392 health facilities, that were categorized in three structural levels:

1. Urban and rural health centers, providing vital remedial services including vaccination and prevention of local prevalent diseases. These centers are the entry point and first contact a patient has with the health system.
2. Rural and general district hospitals, where routine surgical interventions can be conducted, where there is a larger capacity for diagnosis, including for instance X-ray facilities.
3. Provincial, central and specialized hospitals that offer more specialized, remedial, surgical and rehabilitative services (World Health Organization, 2012).



In some areas with low population density and limited to no access to institutionalized health care services, outreach activities and *Agentes Polivalentes Elementares* (Community Health Workers) provide community-based care (World Health Organization, 2012).

#### 4.2.1 Local organizations or institutions

The following are a few Mozambican institutions, groups or organizations that work in the Mozambican health sector.

##### **MISAU**

As mentioned before MISAU is the Ministry of Health in Mozambique. Though the governmental headquarters is located in the capital, Maputo, MISAU also has representation in all 10 provinces of the country. In appendix 1, a map of Mozambique can be found, clearly showing the different provinces.

The ministry consists of the following departments (Ministério da Saúde, 2014):

- Gabinete do Ministro (GM) - Cabinet of the Minister
- Direcção Nacional de Saúde Pública (DNSP) - National Directory of Public Health
- Direcção Nacional de Assistência Médica (DNAM) - National Directory of Medical Assistance
- Direcção de Planificação e Cooperação (DPC) - Planning and Cooperation
- Direcção de Administração e Finanças (DAF) - Department of Administration and Finance
- Direcção de Recursos Humanos (DRH) - Department of Human Resources
- Inspeção-Geral de Saúde (IGS) - General Health Inspection
- Departamento Jurídico (DEJU) - Legal Department
- Departamento de Tecnologias de Informação e Comunicação (DETIC) - Department for ICT

*Visão(vision)*

"Be a driving governmental entity of health care quality to citizens through policy design and management of programs that promote actions to prevent and fight diseases."

*Missão(mission)*

"Ensure the implementation and operationalization of policies and primary, secondary, tertiary health programs to provide integrated health care accessible to all Mozambicans."

(Ministério da Saúde, 2014)

**Conselho Nacional de Combate HIV/SIDA**

The *Conselho Nacional ao Combate HIV/SIDA* (henceforth referred to as CNCS) is the national state owned HIV/AIDS council. CNCS was founded on the 23rd of May 2000. The creation of the CNCS was seen as one of the first important local steps, towards in the fight against the HIV/AIDS epidemic in Mozambique. The mandate of the CNCS is to coordinate the multi-sectoral response to combat HIV/AIDS in Mozambique in order to stop the spread of the disease and alleviate its impact in Mozambique. The council is funded by the state and in contrary to many other organizations and councils that combat the HIV/AIDS epidemic in Mozambique, the CNCS does not implement any projects in the field. The only role the CNCS plays is coordinating the planning, implementation, monitoring and evaluation of other organizations (Conselho Nacional de Combate ao HIV/SIDA, 2014).

#### 4.2.2 International organizations or institutions

Below a few of the most relevant international organizations or institutions for this research can be found that work in the Mozambican health sector.

##### **World Health Organization**

Within the UN the World Health Organization (henceforth referred to as WHO) is the directing and coordinating authority responsible for health. The organization is responsible for: health research, providing leadership on global health matters, setting norms and standards to which countries much oblige, providing technical support and monitoring and assessing health trends (World Health Organization, 2014).

##### *Mission*

"To support the development of an efficient and equitable health system in order to achieve the health-related MDGs in strong partnership with all UN Agencies, international and national health partners"

(World Health Organization, 2012)

In Mozambique WHO in collaboration with MISAU is responsible for generating and using health information to support decision making, the delivery of health care, and management of health care services(2012).

##### **PSI Mozambique**

Population Services International (PSI), founded in 1970, is a global health organization that dedicates itself to improving the health of people all over the world in developing countries, by using commercial marketing strategies. PSI originally focused only on family planning. Since 1988, the organization focuses on health challenges that face the public health of developing countries such as, HIV/AIDS, barriers to maternal health and the greatest threats to children younger than five years old, including malaria (Population Services International, 2010).

PSI is believes that health services and products are most effective when they are accompanied by robust communication and distribution efforts that help ensure wide acceptance and proper use (Population Services International, 2010).

*Mission*

PSI makes it easier for people in the developing world to lead healthier lives and plan the families they desire by marketing affordable products and services.

(Population Services International, 2010)

PSI Mozambique, was founded in 1994 to help MISAU scale up HIV prevention. PSI Mozambique assists MISAU by offering technical and managerial support in voluntary counseling testing for HIV and preventive mother-to-child transmission services, such as ART. In 2000 malaria prevention became a second priority for the organization, followed by a safe water program in 2004 (Population Services International, 2010). Two of the major donors for PSI Mozambique, are USAID and the Dutch Government.

PSI Mozambique's, together with many partners, such as the local government and many other NGOs, helps to expand the reach of communication campaigns and product distribution to those populations most vulnerable, especially in remote rural areas, with inadequate commercial infrastructure (Population Services International, 2010).

**Royal Netherlands Embassy**

Royal Netherlands Embassy (henceforth referred to as the RNE) in Mozambique is located in Maputo. The priority sectors that the RNE supports in Mozambique are safe water, food-security and sexual & reproductive health and rights. In the health sector specifically the RNE supports, MISAU, PSI Mozambique with their initiative Movercado, which will be explained further on in this chapter and Programa Geração Biz. (Gerritsen, 2014). Projects such as Movercado are selected supported financially, also the RNE supervises the progress where necessary. Each organization or project receiving the support of the RNE needs to report their progress in the form of three reports each year; a progress report, a financial report and a financial audit.

Together with MISAU the, the RNE; on behalf of the Dutch government, decide what projects or organization the RNE is going to support and how. This is done by understanding the priorities of MISAU and how it plans to tackle these, then putting those priorities next to objectives set for Mozambique and the RNE by the Dutch government. Then the best form of support is designed to fit both MISAU's approach and the objectives of the RNE and the Dutch government. Furthermore some issues in Mozambique might not be on the agenda of MISAU or weigh as heavy in Mozambique as it does in the

Netherlands, therefore these issues are also analyzed and taken into account when deciding what to support and how. Such issues include supporting the rights of the Mozambican LGBT community; lesbian, gay, bisexual and transgender. Also for instance, encouraging abortions to be done legally and safely, is a priority for the RNE, while it is not as high of a priority for MISAU (Gerritsen, 2014).

### **Malaria Consortium**

Malaria Consortium Mozambique mainly commits itself to reducing malaria and the burden it has on the daily life of Mozambican citizens, however the organization is also committed to the reduction of other non communicable diseases, especially those that target young children.

The organization works with MOH and other health authorities, providing technical guidance for the development of health strategies. Also support for the creation of strategies for LLIN distribution, provide LLINs at antenatal care services for prevention during pregnancy and creating awareness and understanding with mothers that can later be communicated to their children. Provide trainings for community health workers, creation of tools and training manuals.

Malaria Consortium in Mozambique, works closely with communities, training community health workers, participatory activities with teachers and school children to raise awareness and understanding of the disease and prevention mechanisms.

## 4.3 Development and use of mobile technology in Mozambique

### *Mobile network system*

Over the past years the use of mobile phones in Mozambique has increased exponentially. In a Media Diary Survey conducted in Mozambique in 2009, results showed that the number of mobile phone subscribers had become twice as high as that of citizens with access to the electrical grid (InterMedia, 2010). Furthermore, the survey showed that mobile phone users were becoming increasingly receptive to mobile phone-based development communication campaigns, a few examples of such campaigns are presented later in this thesis.

Nowadays there are more mobile phones subscriptions in Mozambique than fixed lines, surveys suggest that people in Mozambique currently prefer to have mobile phones due to the accessibility, mobility and price (InterMedia, 2010).

The mobile market has been crafted to be ready for exponential growth, the first mobile network, mCel, was established in 1997. The network was state-owned and operated by Telecomunicações de Moçambique (henceforth written as TDM). In 2002 South Africa's Vodacom joined the market. To date mCel dominates the mobile market, however within six years of its introduction in the Mozambican mobile market Vodacom had claimed 40% of the mobile phone users (International Telecommunications Union, 2008). In June 2010 the Mozambican government announced that a third mobile service provider would be joining the market, to boost competition, increase the range of services for customers as well as lower costs for customers. November 2010, Movitel joined the market after being awarded a license. The network is to this day owned by a consortium made up of Viettel Telecom (Vietnam) and SPI (Mozambique) (GSMA, 2013). Due to high competition between the three mobile providers, the costs for mobile services are comparable, in many cases lower, than those of neighboring African countries (InterMedia, 2010).

#### 4.3.1 Mozambican mobile phone users

Mobile networks and the use of mobile phones are still far behind those in a developed country, however they will get there one day, "that is the day we need to plan for" (Circo, Movercado and Mobile Technology for Development, 2014). Movercado an 'eco-system' built around mobile phones in Mozambique, is one of the cases studied in the next chapter. Many questioned whether using mobile technology for development, the way Movercado does in Mozambique, is effective in countries such as Mozambique where penetration rates might not be very high, and network coverage is not equally accessible in all regions. However, in Mozambique, penetration rates, network coverage and the use of mobile technology are all dynamic variables that are growing exponentially, future potential needs to be considered not the current indicators. "We need to plan years ahead so we evolve with the phones and their use" (Circo, 2014)

As any consumer market, the mobile network/phone market in Mozambique can divide the total population of mobile phones users into different segments, to see who uses mobile phones, why and how. Variables often used in market segmentation are: geographic, demographic, psychographic and behavioural (Kotler & Armstrong, 2010).

In order to create an image of the Mozambican mobile phone user, the research and findings have been structured according to Kotler and Armstrong's market segmentation theory (2010). However, since there is not a lot of documentation about the use and users of mobile technology in Mozambique it is difficult to create a clear picture. Given the fact that documentation, about this subject, is not very timely, for instance, the number of mobile network subscriptions in 2010 is most definitely not the same as it is today. However as a reader, one must also keep in mind that this field has been developing and expanding at a fast rate, even in Mozambique.

##### **Geographic**

In general, in most developing countries, coverage of mobile networks is concentrated around the most densely populated cities (GSMA, 2011), the same is true for Mozambique. However in Mozambique mobile network coverage has been expanding to other parts of the country. Not only all main cities, but also key roads such as those going to and from South Africa or Swaziland, and the national highway through the Gaza and Inhambane provinces have network coverage (GSMA, 2013). A map of Mozambique, clearly showing the different provinces can be found in appendix 1.

The spread of mobile network coverage is beneficial to populations living in rural areas, for they often have no other way of communicating due to lack of electricity or other tools (InterMedia, 2010).

### **Demographic**

In a Media Diary Survey conducted amongst 1207 Mozambican adult mobile phone users (ages 15 or older) results showed that 74,4% belonged to groups C1 and C2 of the ESOMAR Social Grade, meaning that they were either skilled manual labor workers, semi-skilled manual labor workers or unskilled manual labor workers. Even though most of Mozambique's work force was doing manual labor at the time, the results shown in the survey proved that the ability to afford and regularly use a mobile phone was not restricted to the upper class society (InterMedia, 2010).

It is not uncommon for those who cannot afford an actual mobile phone to own a SIM card which they can then use in the phones of friends or relatives.

A study conducted by Research ICT Africa in 2008, showed that ownership of mobile phones varied a lot within a selected 17 countries in SSA, in the case of most countries the percentage of mobile penetration was higher among men than it was among women. In South Africa, Cameroon and Mozambique however, there tended to be more female mobile customers than male mobile customers. In fact in Mozambique in 2008, the mobile penetration for men was 22% while for women it was 33% (GSMA, 2011).

### **Behavioral**

Phone use and behavior at BOP segments, such as in Mozambique, differs a lot to the phone use and behavior in developed countries. "The way I put the problem though, is not how phones are used now, but how they could be used" (Circo, 2014). Maslow's hierarchy of needs also explains the BOP, where the first and most important needs are what is strived for; the physiological needs the basic necessities of human survival, without these needs a person will not be able to function. A more elaborate explanation of Maslow's theory on the hierarchy of needs can be found in appendix 1.

The hierarchy of needs could be applied in the use of mobile phones, at the BOP a mobile phone will primarily be used to help fulfill the physiological needs. However, Mozambique is collectivistic country therefore mobile phones will be used a lot to stay in touch with family and friends -if this is not the case already. The latter would mean that mobile phones at the BOP will most probably be used mostly for fulfilling physiological needs and social needs.



#### 4.3.2 Social impact of the mobile industry

The development of the mobile industry in Mozambique can have many positive effects for the country. First of all, due to the expansion of network coverage one day soon there will be decent reliable mobile coverage in most parts of the country, furthermore the growth of this market also means a new flow of cash, and opportunities for jobs. The ability to communicate with the other side of the country was nearly impossible for many segments of the population, however as mentioned before often even those who cannot afford a mobile phone themselves have access to one nowadays.

The development of mobile technology in the developing world has caught the attention of organizations and the importance of communication for development has been recognized. This recognition and awareness has lead to the creation many developmental initiatives based around the use of mobile technology (BBC Media Action, 2013). As will be explained in the following chapter, mobile phones can have a great impact on health behavior and in the long run public national health. However mobile phones can be, and are also used in different development sectors such as education; mLearning, politics or disaster relief, the possibilities are endless.

#### 4.4 Mobile technology for development

"Unfortunately the development sector is one of the least innovative. That is a factor of conservative donors and partners as well as indicators and incentives that discourage taking risks - a crucial part of innovation. I believe we need to change that or else we will fail at solving some of the most pressing problems of our time" (Circo, Movercado and Mobile Technology for Development, 2014).

Communication is increasingly often seen as an important, impactful tool for development initiatives (BBC Media Action, 2013). Also due to the exponential growth in the past years, and the growth expected in the future of mobiles technology and mobile networks in developing countries, as in Mozambique, mobile technology is becoming an increasingly popular tool for behavior change communication projects, such as a few presented in this chapter.

It is now widely recognized that the availability of timely, accessible, accurate and relevant information is vital for shaping knowledge, which then can influence behavior change and promote development (BBC Media Action, 2013).

The potential of the BOP and rural markets is more often being noticed by both mobile networks as well as by consumer goods companies. The belief that a segment of people even with limited purchasing power might chose to invest money, although over a long time period, in mobile services that offer real value is growing (United Nations Foundation; Vodafone Foundation, 2009). Information, when reliable also has the power to influence social norms and culture by raising awareness about what other people, all over the world are doing, and by informing people about what is going on in the world (BBC Media Action, 2013).

The way communication approaches used for development initiatives, differs per project and per target audience. These can be by using mass media, such as radio, television, social media, or community outreach, for instance educational street theater. Interpersonal communication, between for instance a community health worker and a patient, can also be used to influence behavior change. However most studies show that a combination of the two methods above, communication via mass media and interpersonal communication lead to greater long term impact. (BBC Media Action, 2013).

However the way organizations use mobile technology in their development projects is different in every situation. There is no, nor is it possible to have a one-size-fits all approach, that an organization can implement in any given place and time. It is not possible to have a 'modernization theory approach'

when it comes to mobile technology for health development. Modernization theorists would propose developing countries to adopt and copy successful development initiatives using mobile technology. According to the modernization theory if a developing country were to follow the exact same steps that a (further) developed country had taken using mobile technology, then the developing country would follow in the other's footsteps to a more developed state.

This however does not work, use of mobile technology and mobile network coverage are just two of various elements that need to be researched before a mobile technology for development initiative can be introduced. While it is possible to learn from the 'lessons learnt', failures and successes of other projects, elements such as mobile network coverage differ per country and therefore it is impossible to simply 'copy-and-paste'.

## mHealth

The emergence and growing interest in the field of mHealth can be traced back to a few interrelated trends. First of all the fact that in many parts of the world epidemics and a severe shortage of (adequately trained) health care workers present serious challenges for countries, their governments, and health providers. However at the same time, an exponential growth of the use of mobile communication services can be seen over the past decade, even in countries that face challenges such as the ones mentioned above.

The so called 'digital divide' has become less distinct, though still existent as can be concluded when reading the previous chapter, especially when looking at the dispersion of mobile technology between rural and urban areas.

According to a press release on the website of The World Bank in 2012, citizens in developing countries are using mobile phones more often, mostly to 'create new livelihoods' and improve their everyday life, while governments and organizations are using mobile phones to improve the delivery of services and ways of receiving feedback from citizens (The World Bank, 2012). An example of an organization working with the use of mobile phones is the Technology Partnership between the United Nations and Vodafone. The Technology Partnership between the United Nations and Vodafone was launched in 2005. Since then the partnership has funded the use of wireless communications for the development of global health and for disaster relief work. As well as to further public dialogue about how wireless

technology can address some of the world's toughest challenges (United Nations Foundation; Vodafone Foundation, 2009).

According to the United Nations and Vodafone Technology Partnership there is a growing amount of proof that shows that mobile communications can potentially radically improve healthcare services, even in the most remote and resource-poor environments (United Nations Foundation; Vodafone Foundation, 2009).

The correct use of media and communication can help promote healthy behavior, by improving knowledge, shifting social norms and attitudes (taboos, etc.) and increasing people's confidence and motivation to act, in order to live a health(ier) life (BBC Media Action, 2013).

Research has also shown that by facilitating and stimulating public and interpersonal communication and discussion about public health, can lead to the adoption of healthier behavior. Furthermore, by giving people the opportunity to engage in dialogue about health, enables them to hold leaders and health care service's to account (BBC Media Action, 2013). The extent to which people feel comfortable and confident enough to discuss behavior change with others, is quite often correlated with the willingness to adopt that change (2013).

Globally with low-cost handsets and the penetration of mobile networks, tens of millions of people that never before had regular access to fixed-line telephone or computer now use mobile devices as daily tools for communication and data transfer (United Nations Foundation; Vodafone Foundation, 2009).

Definitions for eHealth and mHealth according to the public health community:

*eHealth: "using information and communication technology (ICT) - such as computers, mobile phones, and satellite communication- for health services and information."*

*mHealth: "using mobile communications - such as PDAs and mobile phones- for health services and information."*

(United Nations Foundation; Vodafone Foundation, 2009)

## mHealth applications

### Education and awareness

mHealth Education, or more often referred to as mHealthEd, is where mobile technology is used to raise public health awareness, by increasing access to information, in order to influence individuals and families to take control of their own health (BBC Media Action, 2013).

SMS, short message service, a short text message sending service on mobile phones, was launched on the 3rd of December 1992. Since then it has grown out to be an immensely popular form of communication, it's; simplicity, ease, and compatibility made the act of texting popular across age groups and cultures all over the world (CNN, 2012). SMS now offers cost-effective, efficient and scalable methods for providing outreach services for health issues. The most common, simple way of using SMS in educating or raising awareness in mHealth is by sending an SMS directly at a mobile phone user to give that person information about testing and treatment methods, accessibility of health services and disease prevention.

SMS alerts have a measurable impact on and a superior capability to influence behavior than radio and television campaigns (United Nations Foundation; Vodafone Foundation, 2009).

SMS alerts, allow recipients to remain relatively confidential. In many environments diseases, especially HIV/AIDS are taboo, therefore this could become an obstacle for patients to visit a doctor. Through SMS however people can be informed and even discuss their condition or the dangers of diseases such as HIV/AIDS privately without any shame (United Nations Foundation; Vodafone Foundation, 2009). SMS services used for raising awareness can be set up as both one-way or interactive, as mentioned above.

There have been instances where people are sent short quizzes via SMS to test the recipients knowledge of HIV/AIDS and encourage them to get tested or get counseling(United Nations Foundation; Vodafone Foundation, 2009), again here the factor of HIV/AIDS being a taboo is sidestept.

SMS services for mHealth are much more cost-effective, scalable and have a more widespread reach and popularity amongst the public in the developing world, than for instance television or the internet.

Since the use of SMS for mHealth started to gain popularity, its potential to encourage healthy behavior by communicating with people in an engaging manner that respects their privacy and gives them tools to make informed decisions has been noticed(United Nations Foundation; Vodafone Foundation, 2009).

The Health Belief Model described in chapter 2 can well applied in order to create awareness and educate people about healthy behavior. Often it is seen in developing countries that lack of knowledge is one of the main reasons why people do not get tested for HIV/AIDS for instance, or do not choose to use water purifying tables in order to drink healthy, safe drinking water. The underlying concept of the Health Belief Model is that health behavior is determined by personal beliefs or perceptions about a disease and the possibilities to decrease its prevalence (Hayden, 2009).

The model is based on the idea that a person will take health related action if the person:

1. feels that they can avoid a negative health condition
2. expects positive results by taking the recommended action, expects to avoid the negative conditions by taking these actions, and
3. thinks that they will be able to successfully perform the recommended health action (University of Twente, 2014).

Knowing this, it is very important to use communication methods, tailored specifically for a target group with a goals:

- To build upon a person's knowledge of a disease, and the fact that they could be infected unless they change their health behavior. The person also needs to learn what they can do themselves in order not to be infected.
- To build people's self-confidence, that they can take the necessary steps in order to be healthy

To reach these goals the KISS principle, drafted in 1960 by the US Navy could be used. KISS is an acronym for Keep It Simple, Stupid. Meaning that messages needed to be kept as simple as possible, in order for everybody to be able to understand, no matter their educational background (Technopedia, 2014).

### **Remote data collection**

For public health programs, and the improvement of national public health in a country such as Mozambique efficient data collection is of crucial importance. This is important for any person working in the health sector at any level, whether they be a policy maker at MISAU, or a healthcare provider at national, district, community or local level. No matter the level these people need accurate, up-to-date information. Data collection is more efficient and reliable when done using Personal Digital Assistants

(PDAs) or mobile phones. Paper-based surveys need to be submitted in person and often, due to lack of digital technology entered into the central health database, if this is even available, by hand (United Nations Foundation; Vodafone Foundation, 2009). In Uganda the use of PDAs to collect health data in the field was experimented. Hundreds of health workers received PDAs from the Ugandan Health Information Network, after merely six months the use of PDAs had turned out to be saving 25% of costs. Health workers also reported an increase in job satisfaction, because they were able to perform their jobs more efficiently and quicker due to the introduction of mobile technology (United Nations Foundation; Vodafone Foundation, 2009).

### **Remote monitoring**

mHealth can be applied effectively in so called remote monitoring. This principle offers opportunities to treat patients in an outpatient setting, meaning that the patient does not need to go to an actual facility. Remote monitoring can be one-way communication or interactive communication. An example of mHealth used for remote monitoring is when messages are sent to patients as reminders to take their medication, or reminders about their doctors appointments (United Nations Foundation; Vodafone Foundation, 2009).

For many health conditions, also those most threatening to the public health in Mozambique. Monitoring patients with chronic conditions at home, and sending them reminders to take their medication or advice on health behavior, dramatically improves survival rates. The use of mobile technology, and specifically SMS is an efficient and cost effective way to do so.

Monitoring patients in such a way has been tried in many different countries, a Thai study (2007) showed that TB patients who received a daily SMS medication reminder, the level of adherence increased to 90%. Often patients do not intentionally 'forget' to take their medicine, however often the lack of knowledge about proper healthy behavior leads people to inadequate medicine use.

SIMpill, a pilot project in South Africa in 2007, also showed that the use of mobile technology for monitoring and direct medication adherence is very useful. With SIMpill 90% of the monitored patients complied with their medication regime, while without the reminders only 22-60% would. With the vast worldwide spread of the HIV/AIDS epidemic, this system is now also used in countries such as the United States of America (United Nations Foundation; Vodafone Foundation, 2009).

### **Communication and training health workers**

As was already explained in a previous chapter in Mozambique, as in many other developing countries there is an acute shortage of health care workers. This does not only mean that there are very few health care workers for a large amount of citizens. It also means that existing health care workers are often 'overstretched' due to a huge work load (Circo, 2014), leading to less efficiency, productivity and job satisfaction.

Connecting health workers to timely, up-to-date information is important for them to be able to execute their jobs effectively. Mobile technology is a perfect tool for this, as it can offer timely information, which provides the support needed for them to execute their jobs effectively and independently.

Mobile phones can also be used to train health workers. As will be explained in the case about BBC Media Action's use of mobile technology, (community) health workers can be offered to take part in training via their mobile phones. This is a very cost-effective and efficient way to educate these health workers. They will not have to travel, often vast distances over bad roads, to go to class-room-based training sessions (BBC Media Action, 2013).

Communication among different health units, between for instance community health workers and institutionalized health facilities, is crucial for efficient health care services. However in Mozambique there is a pressing need to improve this communication. As there is not an abundance of landlines nor is there a lot of (stable) access to internet, the growth of mobile penetration could offer a solution and bridge the communication gaps (United Nations Foundation; Vodafone Foundation, 2009).

### **Disease and epidemic outbreak tracking**

Mobile phones can be deployed to quickly capture and transmit data on possible outbreaks of diseases. This information is necessary in order to prevent and contain these outbreaks, before they have an impact on national public health. In a way mobile technology is used as a national warning system (United Nations Foundation; Vodafone Foundation, 2009).



### **Diagnostic and treatment support**

The inability to properly diagnose a condition or misdiagnosis' can have serious even fatal ramifications. Using mHealth applications can provide diagnosis and treatment advice to remote community health care workers. These applications can offer access to medical information, such as symptoms to identify certain diseases etc or what the best treatment for a specific condition is. With such applications people living in remote areas, are able to be diagnosed in their homes, without needing to visit a health facility. The University of Melbourne, has created software for on mobile phones in Mozambique that can guide health workers through a step-by-step diagnostic process (United Nations Foundation; Vodafone Foundation, 2009).

## Case studies

### BBC Media Action

BBC Media Action is BBC's development charity, supported by the UK Department for International Development (DFID). In February 2013 BBC Media Action published a policy briefing introducing their project in Bihar, India, using mobile technology to empower people with life-saving information. Bihar is one of the poorest, most rural, densely populated states in India, with one of the worst maternal and child mortality rates in the world.

Ability to reach the population living in Bihar is limited. This is mainly due to bad infrastructure, and scarce availability of mass media. The only source of health information people tend to have is delivered by often poorly trained community health workers.

BBC Media Action has created platforms and projects using mobile technology to reach this remote population and educate the community health workers. In Bihar, about 63% of all adult men, own a mobile phone, only 32% of the women own one, however 83% have access to one. Research has shown that women in Bihar tend to stay at home, to take care of the house and children, or work from home, while the men leave the house. In many cases, each household has two mobile phones, one for the man of the house, and one for general use in the house, this is the phone that the women usually have access too, though it is often only used to communicate with the other household owned mobile phone.

All of the community health workers in Bihar either own a mobile phone or have access to one.

The majority of health workers in Bihar are women, as are the people taking care of the household. Women in these settings often take on the role of sole care taker of the children. Therefore women are an extremely important target for mHealth projects such as BBC Media Case's project in Bihar. If these women are well informed about health issues, diseases and how to prevent them, they are more likely to not only take control of their own health but also that of their children, and teach their children what they have learnt.

BBC Media Action has created a few communication interventions, that have been piloted in Bihar in 2013. The targets of these communications interventions are either, pregnant women (and their families), mothers with young children and community health workers.

### **Mobile Kunji**

Mobile Kunji is a job aid for community health workers. In Bihar literacy rates are extremely low, also most mobile phones available do not offer the local languages therefore SMS messages are not often understood. With this in mind BBC Media Action developed, Interactive Voice Response (IVR). Community health workers were equipped with a deck of 40 illustrated cards on a ring, each card illustrates and informs about a certain health issue and has a unique seven digit number. When in consultation the community health worker uses the cards as sources of information, to reinforce the meaning of the card the community health worker can call the seven digit number (for free) using her own phone, and put it on speaker. The character of an authoritative yet sympathetic female doctor has been designed purposely for those calls. Together with the community health worker, the (pregnant) beneficiary can listen to the information. Mobile Kunji is a free service, that can be accessed by any community health worker in Bihar, with any mobile phone. The service is offered on 5 of the biggest mobile networks in India, which account for approximately 80% of all mobile subscriptions in Bihar.

### **Mobile Academy**

The Mobile Academy is a voluntary training application, that community health workers can buy. Due to their low wages, the entire training session costs approximately 1,50\$. This price was decided on by BBC Media Action and the community health workers. The Mobile Academy was designed in order to refresh the knowledge of the community health workers in Bihar, in order to enhance their interpersonal communication skills. Community health workers can access the 190 minute long course by calling a code on their mobile phone, they can take up a year to finish the course, each time starting where they left off. Once a community health worker has completed the course, with a pass grade, he or she will receive an official printed certificate from the government of Bihar.

### **Kilkari**

Kilkari is a mHealthEd service that is currently still being developed by DFID and BBC Media Action. The service will target pregnant women and mothers with children of younger than a year old. Families can subscribe to the service after, for instance, a consultation with a community health worker or a doctor's appointment. The service then consists of weekly phone calls about maternal and child health, linked to the stage of that specific woman's pregnancy or the age of her children. If a family were to subscribe for 16 months, they would receive 64 calls, costing a total of 1,18\$.

## Movercado

Movercado is an application created by PSI Mozambique's country representative Iulian Circo. In his words Movercado is a mobile technology powered 'ecosystem' at the BOP. An ecosystem in which beneficiaries, health workers and facilities, shopkeepers, the distribution chain, mobile operators and e-money interact, and these interactions are recorded. A level of synergy is created due to all these interactions among the different actors, together they create more impact than when each actor works alone (Rodolfomelia, 2013). Movercado creates retailing, communication and payment structures at BOP markets, leading to more efficient aid distribution and creating real economic value in these markets (Movercado, 2012).

The underlying technological platform for Movercado is based on the application of unique codes that are validated via SMS when an activity has been executed. For example, if a pregnant women attends a consultation with a community health worker, she will receive a voucher with a code at the end of the session. When texting the code via a free SMS using her mobile phone, she is told she can pick up a free LLIN (long lasting insecticide treated net) if she goes to a her local clinic for a prenatal consultation. Meanwhile the community health worker who gave her the voucher after a consultation session or focus group, is also validated for her work, receiving a commission based income.

By sending the free SMS the pregnant woman begins an interactive conversation, where she receives relevant, personalized health messages (based on for instance the term of her pregnancy, or the fact that rainy season is coming up), referrals for (health) services or vouchers for discounts or free products, services or transport.

When the pregnant woman takes a bus to the clinic for her appointment, and to pick up her free mosquito net, the bus driver then receives his fare through mobile money. It is also possible for the pregnant women to receive a voucher for a free product or discount, instead of a physical net.

The vouchers are in the form of a code that an individual can store in an SMS on their phone, or for example written on a piece of paper. These vouchers can be exchanged for the discounted or free product at any shop with a 'Troca Aki' sign. At these stores the code is shown to the shopkeeper, who validates it by sending a free SMS with that specific code, the shopkeeper then receives an SMS telling him or her what product to give. The shopkeeper will then be paid in mobile money.

The application is created in such a way that all interactions are recorded so that future interactions are easily made, for instance a few weeks after the pregnant women picks up her mosquito net, she will receive a follow up SMS asking how her net is holding up, or how the pregnancy is going etc. This allows Movercado to collect detailed information, which is analyzed and can be used in the future. As a consequence of this system future interventions can be much more tailored and targeted, and are therefore more efficient and effective.

The principles of Movercado can be applied in practically all segments of life ranging from agriculture, emergency response, education, research, media to telecoms, etc.

"A genuine ecosystem supported by complex interaction and interdependencies allowing beneficiaries, aid organizations, shops of all sizes, supplier, producers, competitors, transport operators, cell phone companies, banks and other stakeholders to co-evolve" (Circo, 2013).

In order to create work at scale, Movercado needs many mobile numbers in its database to interact with. The primary target audience of PSI Mozambique's social marketing activities are young adults between the ages of 15 and 25. To attract this target audience and capture their mobile numbers for later use, the Movercado platform ran a reality TV dance competition; Dupla de Sucesso. The TV audience would vote for their favorite couple. Those phone numbers were then added to the database of Movercado, and could later be used for sending health messages.

Many organizations are only able to paint a semi-complete picture of their clients interactions. Usually this is because data collection is still done with semi-automated systems, including paper trails, which lead to high prevalence of mistakes and high costs. Also time passes, and timely messages cannot be delivered to the beneficiary (Rodolfomelia, 2013).

In essence PSI and Movercado are social marketing organizations, and are therefore beneficiary driven. It is important to know, who is the beneficiary, what do they think, what do they want, etc? However when PSI Mozambique supports MISAU with logistics in the distribution of mosquito nets, the organization does not know how fast they reach the target audience, where they go etc. However, if the organization puts a unique code on each box or label and asks the public to SMS that code, in return they will receive a voucher that they can swap for a product or service at one of the Troca Aki collection points, and PSI Mozambique will receive data about their beneficiaries.

## Chapter 5. Conclusions

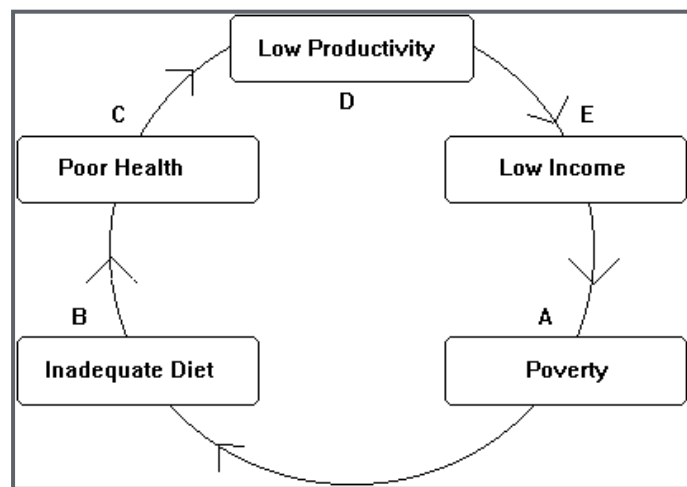
When looking at the development in Mozambique, the general multi-sectoral development things seem to be improving at a very slow pace. Which, though it might take long for Mozambique to have overcome some of the challenges it faces, is encouraging.

The theories of modernization and globalization for development are very similar, in a way globalization can lead to modernization as seen in Mozambique with the mobile phones. However according to the theory of modernization development aid can be seen as a type of one-size-fits all set of steps to undertake in order to reach a developed state, namely those steps developed countries took to get where they are. However, just like with mHealth there is not a one-size-fits all approach for health communication (BBC Media Action, 2013), the same can be said for development, each country faces different challenges, has different resources and development aid programs must be tailored specifically for a country.

The previous chapter presented four interconnected subjects that need to be researched in order to create such a tailored development aid program, in this case for the health sector and using mobile technology.

### Current health situation and the development of national public health

Out of this chapter it is eminently clear that one of the major challenges Mozambique faces and one of the main barriers to development is the poor condition of public national health. Something needs to change in order for Mozambique to break out of the proverbial 'Vicious Circle of Poverty'. Many different version of this model have been created, in the figure below the Vicious Circle of Poverty model for Individuals can be seen. In Mozambique this model can be applied, living below the poverty line can lead to bad health behavior choices which lead to poor health, lower productivity and less income. If the Mozambican health situation does not change all those affected will not be able to be as productive and take care of themselves and their families, nor will they be able to lead healthy lives.



## Health sector in Mozambique

Even with many attempts and investments made by local and international organizations working in the health sector in Mozambique, many things still need to change. All organizations working in the same sector should have the same end goal, sustainability however there are always organization that work in the health sector to reap personal benefits.

Information and communication is becoming increasingly important in the world of development aid, as in health. Not only to create health awareness or encourage health behavior through BCC but also within the health sector.

Good communication and timely correct information transmission between different health facilities and organizations, and within these facilities and organizations is vital for a sector this important, can sometimes even mean the difference between lives lost and lives saved. Mobile technology can be a great help in this field.

## Mobile technology in Mozambique

When you first think of a country such as Mozambique you might not think of the potential mobile phones have for the development, in all sectors. However research has shown that mobile phones, if used correctly can impact behavior and raise awareness due to the reach, design and scale (BBC Media Action, 2013).

Mobile technology might not be developed as well as it is in the western world, nor is it used the same way, however one day it will be. Given the exponential growth of the use of mobile technology in the SSA and in Mozambique that day could be sooner than many believe. "That is the day we should plan for" (Circo, 2014). If not, the opportunity to might be lost.

## Mobile technology for development

Mobile technology is one of the fastest growing technologies in the history, this growth is also blatant in the developing world. The opportunities for development projects are endless. As Iulian Circo said:

"I think investing in technology could create the most interesting opportunities for countries such as Mozambique. The fact that analog infrastructure is so weak constitutes not a barrier but in fact an argument for doing so. Technology can help us solve problems at which we have failed otherwise."

(Circo, 2014)

Movercado and the BBC Media Action's initiatives using mobile technology are just two of many, however they do show the different ways mobile technology can be used for developmental purposes. BBC Media Action uses the technology to create awareness and train community health workers. While Movercado has created an entire 'ecosystem' revolving and based on the use of mobile technology, where different sectors come together.



## Chapter 6. Advice

This research has been commissioned by The Innovative Health (IHI) Initiative, an NGO that wishes to start working in the health sector in Mozambique, by using mobile technology.

### Contextual analysis

In order to start working in the Aid sector in Mozambique, it is important for IHI to understand the context, i.e. to conduct research on what other organizations -also working in the health sector- are doing.

#### Step 1. Identify the goal

The goal of the IHI is to use mobile technology in such a way, that awareness about serious health threats in Mozambique can be raised, and that the public will actively chose healthy behavior. As the research has shown, it is important to remember that mobile technology is merely a tool for IHI to use. The ultimate purpose of any NGO is to better the services it provides to the public (Gerritsen, 2014). It is not IHI's job in Mozambique to find ways of using mobile technology that will benefit the organization, instead to find ways mobile technology can make the services it provides as effective and efficient.

#### Step 2. Identify the target audience

In order for BCC (Behavior Change Communication) to work, an organization will need to clearly establish whom it wants to target and know as much as possible about the target audience. In this case I advise IHI to primarily target women between the age of 15-40. First of all, to differentiate from organizations such as PSI Mozambique, whose main target group are manual workers, most of which are males. Furthermore as explained in the previous chapter women tend to spend most time taking care of the household, taking care of their children, the elderly and sick. In a 2004, report on Child Marriage data showed that girls between the ages of 15 and 24, were more than twice as likely to be infected with HIV (Population Council, 2004). Finally the average age for a woman to give birth to her first child is 18, the frame of 15-45 includes the ages during which women are most likely to become mothers in Mozambique.

If IHI targets women with their BCC, not only will they target a vulnerable group but since women spend more time taking care of the children and the their immediate surroundings, the impact of improving

their knowledge about health and healthy behavior is most likely to be far greater than that of a man. So this way there will also be a significant indirect target audience.

I suggest IHI to start a pilot in both rural and urban areas. Since it is new initiative it should be gradually implemented, hence the suggestion to launch a pilot in three provinces during Year 1, as will be clear in the timeline.

### **Step 3. Plan of action**

IHI will use BCC in order to reach their direct target group, the women between 15 and 40. This will be done combining two types of communication, first, regular SMS messages with:

- health information to raise awareness and increase knowledge
- health reminders to take medicine or go to a doctor's appointment
- tips and advice on healthy behavior, primarily for increasing confidence in own capability to control personal health
- interactive conversations between the beneficiary and IHI.

The second type focuses on interpersonal communication between community health workers and beneficiaries. IHI should make clever use of a group of specially chosen and trained community health workers in each province. The combination of mobile technology and traditional health care, the community health workers, creates a safe mix for large parts of populations not very comfortable with or used to mobile technology. Especially in a country where, specifically populations living in isolated communities in rural areas prefer traditional medicine, the community health workers, can be the first contact with IHI and guide the beneficiaries to adopting mobile technology. Community health workers can use the (TAM) as a guide when supporting beneficiaries in the process of adopting mobile technology into their lives, for example the model explains the importance of the perceived value and the perceived ease of use of mobile technology. Community health workers can show this by demonstrating this ease and value with their own mobile phones.

During the first phases of the pilot, it is important to create a database of mobile phone numbers. This is when the community health workers will need to be most productive, for during this time the SMS message system is not as useful yet. Not only will the community health workers need to have health interventions and consultations with women in the region where they work, but they will also need to send data to IHI, with their mobile phones, in order to create the database (they will continuously send

new patient information to IHI after the SMS health messages have launched). When a database has been created, including personal information of each woman to whom SMSs will be sent, the SMS health messages can be sent.

The information the database needs to include is the beneficiaries' :

- Mobile phone number
- Name
- Age
- City or region of residence
- Medical condition
- Household information; is the woman pregnant, does she have children (how many, what are their ages, and medical conditions)

Having this information will allow IHI to send out tailored and targeted SMS health messages. The information sent to individuals' phone's should be reliable and trustworthy, just as though a doctor gave them the information.

#### **Step 4. How to complete that plan**

This research has shown that most of the tools and necessities to start a campaign are already in place in Mozambique. IHI needs to work with what is available and already there. "I am not advocating for additional investment...I am advocating for repurposing some of the existing investment and leverage technology to increase results" (Circo, 2014). In Mozambique many people have access to a mobile phone, even if it is a very simple one. That is fine for IHI's plans, there is no need to invest in the development of or the introduction of newer, more fancy phones or applications.

If community health workers do not own a phone themselves one will be offered to them, for job purposes. IHI will need to try to create a cooperation agreement with either mCel or Vodacom, preferably mCel for it has a larger market share. All calls or SMS messages sent to IHI by the community health workers will be free of charge.

PSI Mozambique has a very large database of mobile phone numbers due to all marketing activities the organization does with its successful project Movercado. The organization does not however use these numbers to send out regular messages reminding people to take their medicine. I would advise IHI to

figure out if it could cooperate with Movercado/PSI Mozambique by perhaps sharing parts of the databases, allowing IHI to send SMS health messages to numbers from that Movercado/PSI Mozambique.

As became clear during the research, *good communication* is vital to the success of this initiative. Therefore I advise IHI to create their content for the SMS health messages using the 7 C's of Communication model. Each 'C' is important, however clarity, consideration and concreteness are of utmost importance. The SMS health messages need to be short, clear and include concrete information, while keeping the consideration of the beneficiary in mind. Some diseases such as HIV/AIDS are taboo in certain communities, people need to be approached in a friendly manner and with respect. IHI will need to do research, possibly using community health workers, to figure out if the language resonates as soon as possible and what local literacy rates are. If it turns out that the vast majority of the target audience is illiterate, IHI might need to consider IVR (Interactive Voice Response) instead of SMS health messages.

Depending on the message, a choice of whether long term behavior change is aimed at, or short term behavior change, needs to be made. The messages will need to be tailored specifically for the chosen response, the ELM (Elaboration Likelihood Model) is a good model to use in creating this content. The theory makes a distinction between behavior change (sustainable, long term) and attitude change (acute, short term), between which IHI will eventually need to choose. In general long term behavior change leads to more sustainable development and healthy behavior, however in the cases of SMS health messages reminding individuals to go to their doctors appointment later that day short term behavior change, or attitude change in the ELM model, is adequate.

In support of local businesses, I advise IHI to work with local organizations and businesses as much as possible. PSI Mozambique might be a good partner, due to the organizations knowledge about the sector and huge database, however further cooperation should be with local organizations and businesses. First of all this way IHI stimulates the development of these businesses and of Mozambique in general, and secondly, as mentioned before the resources are already there. If IHI would choose to work with several foreign companies or create new organizations, this would undermine the potential of the existing local setting.

In the same context it is also important to advise IHI not to hand out free health care products and services. Not only will the public become increasingly dependent and not capable of taking control of

their own health, but again the IHI will undermine the potential of local companies selling these same health care products. So I would promote 'no free rides' .

It is very important for people to learn to feel responsible for their own health in order to stimulate sustainable development and health behavior change. Beneficiaries need to have *a sense of ownership* and commit consciously to a healthier life.

Instead of offering free goods and services, IHI could subsidize medical or health related products that the women and their families, who are part of IHI's database, need. This way the beneficiary will have to pay only a very small fee for their health related goods and services, but it will promote them taking conscious control of their own health. Simultaneously this system does not undermine local businesses and prevents beneficiaries from becoming dependent on free development aid.

If IHI only partially subsidizes the SMS health messages the beneficiaries send from their personal phones to IHI, the beneficiaries only need to pay a very small fee per SMS, however this might encourage interaction with IHI, which is crucial for data collection and the monitoring and evaluation of the project.

#### **Local and ethical considerations**

One very important ethical issue that IHI needs to keep in consideration when working in Mozambique is the prevalence of corruption. Corruption exists at all levels in the country, however in IHI must steer clear of corrupt deals or any other form of corruption.

Before launching the pilot, IHI needs to receive the appropriate licensing to be able to operate in Mozambique. The INTICT, which is the National Institute for Technology and Communication is the governmental office that IHI will need to register with in order to make sure everything is legal and the organization receives its appropriate licenses.

**Advised timeline**

	Y1	Y2	Y3	Y4	Y5
<b>Maputo</b>					
<b>Sofala</b>					
<b>Cabo Delgado</b>					
<b>Tete</b>					
<b>Zambezia</b>					
<b>Gaza</b>					
<b>Manica</b>					
<b>Nampula</b>					
<b>Inhambane</b>					
<b>Niassa</b>					
	Evaluation session	Evaluation	Evaluation	Evaluation	

**Table 1. Timeline for the rollout of Innovative Health Initiative's mHealth project in Mozambique**

In the first year the pilot will be launched in Maputo, Sofala and Cabo Delgado, this is because this way the process can be evaluated in the north of the country, Cabo Delgado, the centre, Sofala and in the south in Maputo. Furthermore these three provinces form a wide spread audience, with several remote rural areas versus very highly populated and densely populated urban areas.

After year one there needs to be a large evaluation session where everything and all data that has been collected in the first year is analyzed and assessed. If changes need to be made, these are planned. The following year the project will be scaled up to include a new province.

Year round activity includes: -consultation sessions and focus groups with women by community health workers; -constant dialogue with the beneficiary (flow of two-way text messages); and a permanent monitoring and evaluating system, checking all data that come in and ensuring a continuous data analysis, in order to spot issues or trends and react accordingly.

## **Team**

Teams of community health workers need to be formed in each province. In each province also a local community team leader is assigned, who is responsible for the health workers in his or her province. The team leader is a community health worker as well, but is also the contact person for the IHI Mozambican headquarters in Maputo. At the headquarters there are two community health worker coordinators stationed, these two people have final responsibility over all teams of community health workers. These people need to be Mozambican professionals with a sound understanding of local culture, habits and local language. In a country with 23 recognized local languages the latter is very important. Whenever a new team of community health workers is established in a province, the two coordinators assign a team leader and travel to that province in order to provide a training session for that team.

The experts working at IHI head office in Maputo need not necessarily be Mozambican. An international coordinator is preferred since this person generally can be more neutral and less susceptible to possible political pressure. At head office there is also a need for a full time monitoring and evaluation expert as well as a data analyst who can keep the database updated if necessary and can spot changes or trends, in cooperation with the person responsible for monitoring and evaluation apart from the normal support staff (drivers, secretary, guards, etc).

## Resources

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## Appendices

### 1. Introduction

#### 1.1 Policy, research and sub-questions

##### **Policy question**

How can a development organization (NGO) use mobile technology to promote the development of national health in Mozambique?

##### **Research and sub-questions**

##### 1) What is the current health situation in Mozambique?

1. What are the most detrimental diseases causing deaths every day?
  - a) What is the disease?
  - b) Who are most often affected?
  - c) What is the impact of the disease on national health?
2. How has the national health situation developed in the past decade?
  - a) Who have been key actors in this development?
  - b) How have these actors gone about their work in general?

##### 2) Who are active organizations and factors working in the health sector of Mozambique?

1. Which Mozambican organizations are working in the health sector?
2. Which international organizations are working in the health sector?
3. Does and how does the Ministry of Health oversee projects and work being done in the Mozambican health sector?
  - a) How does the Ministry of Health determine who is or is not allowed to work in the health sector in Mozambique, do they have such power?

- b) How does the MOH (Ministry of Health) feel about new innovative ways of development aid?
- c) Does corruption play a part in the equal distribution of health care and financial aid?

3) How is the use of mobile technology developed in Mozambique?

- 1. How is mobile technology used by the public in Mozambique?
  - a) What is the penetration of mobile phones and mobile networks in Mozambique?
  - b) Is the use of mobile phones equally spread out throughout the population in Mozambique?
  - c) Is there a clear difference in penetration in urban and rural areas?
  - d) What are mobile phones primarily used for in Mozambique?
    - i. Does this differ when looking at different factors such as: gender, geographical location, occupation, etc.?
- 2. How can the use and impact of mobile technology in the health sector in Mozambique be measured?

4) What is mHealth and what projects or organizations are using mobile technology in their work, both in Mozambique as in other countries/parts of the world?

- 1. How does PSI Mozambique's project Movercado work?
  - a) How can/does the organization measure the success of the project?
  - b) Has the project been successful in the years it has been up and running?
    - i. How has/can this success contribute to a healthier population?
  - c) What have been the challenges and issues Movercado faced/faces?
  - d) How was/is the response to such a project in Mozambique?
- 2. What factors are important to look at when examining different projects in different countries using mobile technology?
- 3. What other organizations use mobile technology for the development of health in a way similar to that of Movercado?



## Towards a healthy Mozambique, one mobile phone at a time

- a) How do these projects work?
- b) How are the results measured?
- c) What are the successes and downfalls of the projects?
- d) What are the lessons learnt?

### 4. What is mHealth?

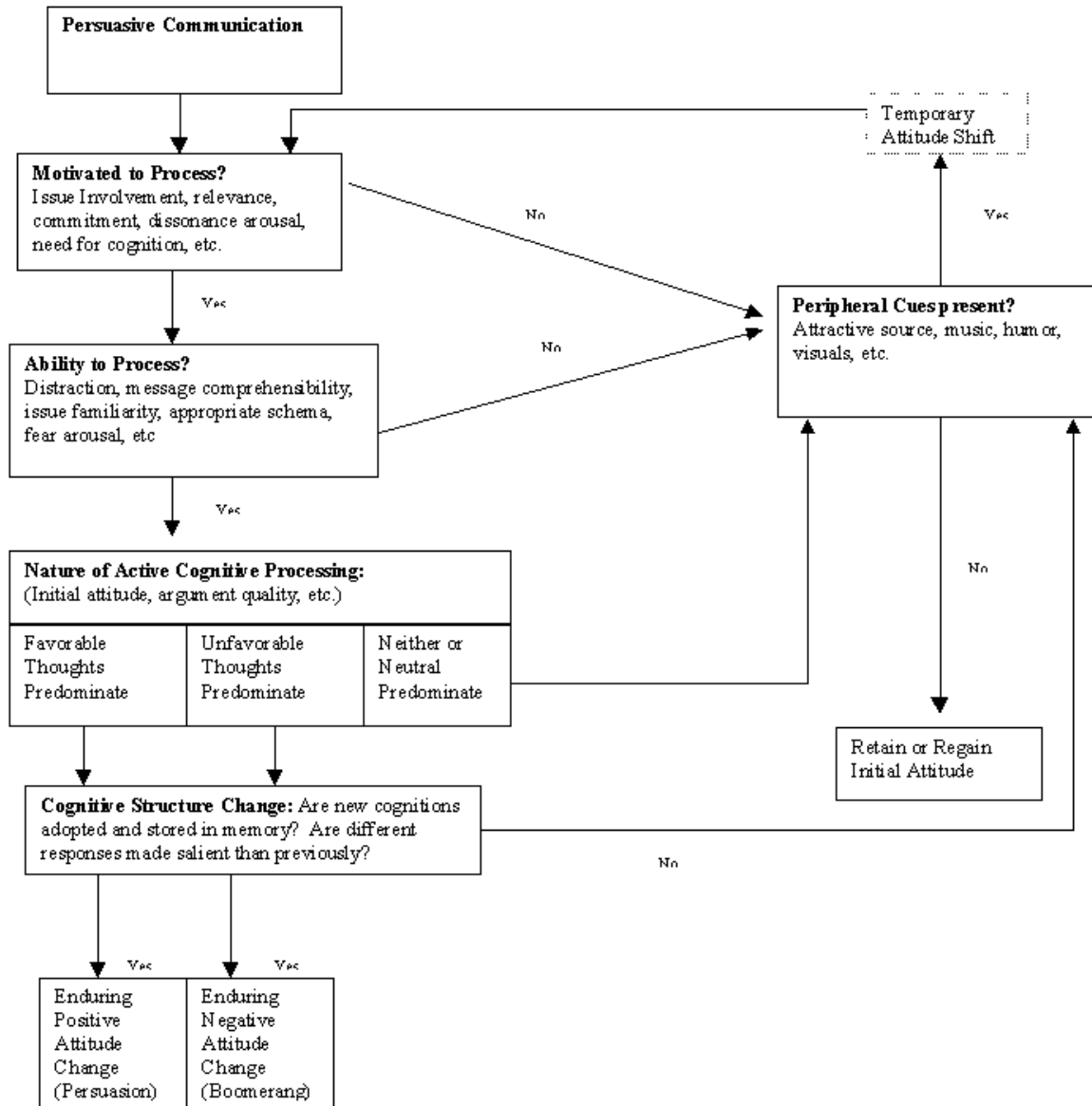
- a) How does it work?
- b) What are the pro's and con's?
- c) What must one take into consideration when applying mHealth?

Towards a healthy Mozambique, one mobile phone at a time



## 2.Theoretical Framework

### 2.1 Elaboration Likelihood Model



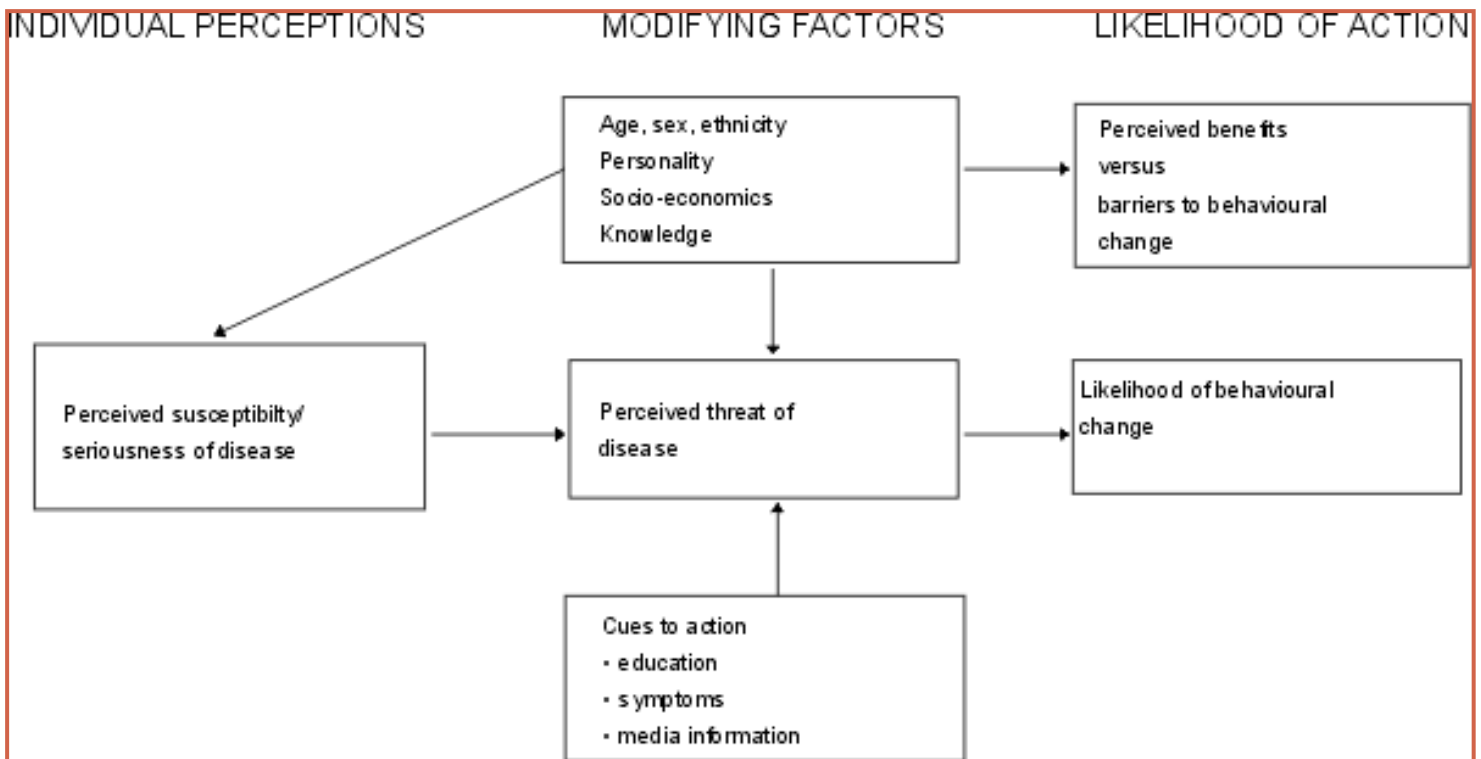
## 2.2 Health Belief Model

(An example of how the model can be used)

Concept	Condom Use Education Example	STI Screening or HIV Testing
<b>1. Perceived Susceptibility</b>	Youth believe they can get STIs or HIV or create a pregnancy.	Youth believe they may have been exposed to STIs or HIV.
<b>2. Perceived Severity</b>	Youth believe that the consequences of getting STIs or HIV or creating a pregnancy are significant enough to try to avoid.	Youth believe the consequences of having STIs or HIV without knowledge or treatment are significant enough to try to avoid.
<b>3. Perceived Benefits</b>	Youth believe that the recommended action of using condoms would protect them from getting STIs or HIV or creating a pregnancy.	Youth believe that the recommended action of getting tested for STIs and HIV would benefit them — possibly by allowing them to get early treatment or preventing them from infecting others.
<b>4. Perceived Barriers</b>	Youth identify their personal barriers to using condoms (i.e., condoms limit the feeling or they are too embarrassed to talk to their partner about it) and explore ways to eliminate or reduce these barriers (i.e., teach them to put lubricant inside the condom to increase sensation for the male and have them practice condom communication skills to decrease their embarrassment level).	Youth identify their personal barriers to getting tested (i.e., getting to the clinic or being seen at the clinic by someone they know) and explore ways to eliminate or reduce these barriers (i.e., brainstorm transportation and disguise options).
<b>5. Cues to Action</b>	Youth receive reminder cues for action in the form of incentives (such as pencils with the printed message "no glove, no love") or	Youth receive reminder cues for action in the form of incentives (such as a key chain that says, "Got sex? Get tested!") or reminder messages (such as posters

	reminder messages (such as messages in the school newsletter).	that say, "25% of sexually active teens contract an STI. Are you one of them? Find out now").
<b>6. Self-Efficacy</b>	Youth confident in using a condom correctly in all circumstances.	Youth receive guidance (such as information on where to get tested) or training (such as practice in making an appointment).

Source: (Resource Centre for Adolescent Pregnancy Prevention, 2009)



### 3. Methodology

#### 3.1 People and organization to whom interviews were sent

Organizations and people approached and whether or not they responded by answering the interview questions.

Organization/Person	Did not respond	Responded but was not willing/did not have time to answer the interview questions	Responded by answering the interview questions, or sending information
IDRC			
BBC Media Action			
Iulian Circo (PSI Mozambique)			
UNAIDS Mozambique			
IICD			
Dance4Life			
World Health Organization			
World Bank			
African Development Bank			
USAID			
UNFPA			
Marco Gerritsen (Royal Netherlands Embassy)			
MASC (Mecanismo de Apoio a Sociedade Civil, DFID)			

### 3.2 Interview questions

#### Interview people/organizations with knowledge about the health sector, health situation in Mozambique.

1. What, in your opinion, is the most optimal form of development aid in the health sector in Mozambique? (Combinations of different methods possible)
2. When looking at the table below, why do you think even with so much money being spent on

<b>Table 3 - Median HIV prevalence rates among 15-24 year old pregnant women attending antenatal clinics, 2001-2009<sup>†</sup></b>					
<b>Ano</b>	<b>2001</b>	<b>2002</b>	<b>2004</b>	<b>2007</b>	<b>2009</b>
<b>National Prevalence</b>	12.5%	13.1%	15.6%	11.3%	12.0%
[Source: MISAU/INS, 2009]. <sup>†</sup> Median of the site level prevalence percentages					

development aid on a yearly basis the prevalence of HIV/AIDS is not decreasing at a faster rate?

3. What is your opinion about the changes in development aid in the past few decades? Were these for the better or worse?
4. Do you believe development organizations such as NGO's should invest in the use of mobile technology in developing countries? Please elaborate on why or why not?
5. Do you think it is a responsible decision to invest in the development of modern technology that will benefit the health sector in medium or long term, while at the same time in short term people are still dying of very basic diseases, such as malaria and cholera?
6. How do you think organizations asking for donations from individuals could develop a better image for themselves, meaning that individuals trust their money is being spent well, etc.?
7. What do you think is the image and the impact of traditional development aid in the health sector in Mozambique, such as the building of hospitals or distribution of free mosquito nets? From a donor point of view.
8. And from the point of view of the beneficiary?
9. Do you think that institutions such as the Ministry of Health and in general the public in Mozambique are reluctant to see a change in development aid from for instance the distribution of free mosquito nets to the use of mobile technology in creating awareness about malaria? Please explain why or why not?

10. According to you should the final decision of the distribution of donor money and the implementation mechanism, be left to the donors or to the beneficiaries (line ministries or central governments/ sector budget support vs. general budget support vs. project support)?
11. Has the development of national health increased, stagnated, or decreased in Mozambique since 2000? Please explain your answer.
12. Who have been key actors in the development of national health in the past few years, how have their efforts contributed to this development?
13. What, in your opinion has the highest priority when it comes to development aid in the health sector in Mozambique

**Interview people with knowledge about the (development of the) use of mobile technology in Mozambique**

1. What are mobile phones used for generally, in Mozambique?
2. What are the advantages and disadvantages of communicating via mobile technology with the vulnerable groups in Mozambique? Please explain your answer.
3. Are the networks and providers of mobile technology in Mozambique ready and willing to participate in projects for development using mobile technology?
4. Is the coverage of mobile networks spread out equally throughout the country? Please explain your answer.
5. What are the pro's and con's of communicating via SMS?
6. How can the use and impact of mobile technology in the health sector in Mozambique be measured?

**Interview about Movercado**

1. Why was Movercado developed?
2. How and when was the initiative of Movercado launched?
3. Could you explain in brief, how Movercado works?
4. How is the Mozambican public involved?
5. How many people currently work on the project (team)?
6. Has Movercado expanded in the past years?



7. What has been overall the feedback, remarks or comments from external institutions, such as the Ministry of Health in Mozambique, the donor community and other development organizations?
8. Can you briefly explain what has been the major impact of Movercado? And what have been the major pitfalls and constraints?
9. How is the success and the impact of Movercado monitored?
10. Why is Movercado currently graduating from a project into an independent organization?
11. Was this originally planned?
12. Do you know of any other projects using mobile technology in a similar way that could be seen as inspirational for my thesis?

**Interview people/organizations with knowledge/experience with mHealth/mobile technology/communication/ICT for Development**

1. How do you believe mobile technology can be used for development in the health sector in countries such as Mozambique?
2. How do you see the dilemma between innovation and tradition in this context?
3. How would you expect national governments to react to the introduction of innovative technologies which enable easy and quick access to large segments of the population, in particular vulnerable groups, that are usually difficult to reach in a cost effective way?

**Interview about the health sector in Mozambique**

1. What does the national health landscape in Mozambique look like, who is doing what?
2. Is it a competitive landscape?
3. Do the donor community and the national government cooperate efficiently?
4. And is the donor community speaking with one voice?
5. Is the MOH consulted and involved in the formulation of new projects? And are these projects aligned with national health policies?

### 3.3 Interview with Iulian Circo

As I explained in my email, and contacted you about before, I am writing my thesis in response to my internship at PSI Mozambique. Being able to see how PSI combines the use of mobile technology and communication in order to promote healthy behavior opened my eyes to possibilities for both the final phase of my studies, my thesis, as well as after I get my Bachelors degree. The work of Movercado and PSI Mozambique has inspired me to conduct further research on mobile technology for (health) development.

The final goal of my thesis (this is one of the requirement set by the Graduation Commission responsible at my study) is to create an advice, therefore I have had to create a policy question and several research questions. My policy question is:

*How can a development organization (NGO) use mobile technology to promote the development of national health in Mozambique?*

In order to answer this question, I have and am still conducting research on four sub sections:

- The past and current health situation in Mozambique
- The health sector in Mozambique
- The use and development of mobile technology in Mozambique
- Other projects and organizations using mobile technology for development

Below are some questions about the development of national health in Mozambique, use of mobile technology and Movercado. Having your expertise opinion and knowledge about these subjects would be of great value for my thesis. I would therefore greatly appreciate it if you could answer the following questions.

1. What, in your opinion has the highest priority when it comes to development aid in the health sector in Mozambique?
2. Do you think it is a responsible decision to invest in the development of modern technology that will benefit the health sector in medium or long term, while at the same time in short term people are still dying of very basic diseases, such as malaria and cholera?
3. How do you see the dilemma between innovation and tradition in this context?
4. Do you think that institutions such as the Ministry of Health and in general the public in Mozambique are reluctant to see a change in development aid from for instance the distribution of free mosquito nets to the use of mobile technology in creating awareness about malaria?  
Please explain why or why not?

**Mobile technology & Mozambique**

5. What are mobile phones used for generally, in Mozambique?
6. What are the advantages and disadvantages of communicating via mobile technology with the vulnerable groups in Mozambique? Please explain your answer.
7. Are the networks and providers of mobile technology in Mozambique ready and willing to participate in projects for development using mobile technology?
8. Is the coverage of mobile networks spread out equally throughout the country? Please explain your answer.
9. What are the pro's and con's of communicating via SMS?

**Movercado**

10. Why was Movercado developed?
11. How and when was the initiative of Movercado launched?
12. Could you explain in brief, how Movercado works?
13. How is the Mozambican public involved?
14. How many people currently work on the project (team)?
15. Has Movercado expanded in the past years?
16. What has been overall the feedback, remarks or comments from external institutions, such as the Ministry of Health in Mozambique, the donor community and other development organizations?
17. Can you briefly explain what has been the major impact of Movercado? And what have been the major pitfalls and constraints?
18. How is the success and the impact of Movercado monitored?
19. Why is Movercado currently graduating from a project into an independent organization?
20. Was this originally planned?

Thank you very much for your help with my thesis. If you are interested in reading it after I finish, I could send it to you. If there is any information that you wish not to be disclosed to third parties (except for my tutor who will be grading my thesis) it will not be published. Furthermore I would once again want to thank you for giving me the opportunity to intern at PSI Mozambique last year, it has been a great learning experience for me, one that I have enjoyed very much and will be a stepping stone for my future studies and career.

Good luck with all work at PSI Mozambique and with Movercado,

Thank you, Heske van Boekel

## Answers interview with Iulian Circo

1. **What has, in your opinion the highest priority when it comes to development aid in the health sector in Mozambique?**

*I think there is a lot of development aid going into the same direction while other directions are completely ignored. There are a lot of resources going towards coordination and capacity building, which offer in practice on the ground means that the same overstretched frontline health workers (nurses specifically) end up being tasked with more and increasingly complex tasks. This is the case for example with distribution of medical and other health commodities. While in theory it makes sense to expect such commodities to be available at all public facility, in practice that means that nurses need to handle a very sophisticated supply chain, in addition to doing their job plus pretty much everything else at that clinic. That will always fail. It would be therefore be more interesting to offer vouchers for such commodities and in effect outsourcing logistics to the private sector, Mobile technology allows us to do that very easily.*

2. **Do you think it is a responsible decision to invest in the development of modern technology that will benefit the health sector in medium or long term, while at the same time in short term people are still dying of very basic diseases, such as malaria and cholera?**

*I think investing in technology could create the most interesting opportunities for countries such as Mozambique. The fact that the analogue infrastructure is so weak constitutes not a barrier but in fact an argument for doing so. Technology can help us solve problems at which we have failed with traditional means. In fact some of the most fascinating innovations in technology are coming from the frontlines in countries with poor infrastructure such as India and Kenya and Nigeria. I am not advocating for **additional** investment, though. I am advocating for repurposing some of the **existing** investment and leverage technology to increase results. That is exactly what we are doing with Movercado and I believe is the reason why so many people in so many countries are excited by it.*

3. **How do you see the dilemma between innovate and traditional approaches in this context?**

*Unfortunately the development sector is one of the least innovative. That is a factor of conservative donors and partners as well as indicators and incentives that discourage taking risks – a crucial part of innovation. I believe we need to change that or else we will fail at solving some of the most pressing problems of our times.*

4. **Do you think that in this respect institutions such as the Ministry of Health, and in general the public in Mozambique, are reluctant to see a change in development aid from for instance the distribution of free mosquito nets to the use of mobile technology in creating awareness about malaria? Please explain why or why not?**

*I think both the public as well as the ministry are experiencing a certain level of cynicism towards our industry. That is a pity but it is easily explainable by a track record of poor results and focus on (often self-serving) processes rather than results. I believe that when we begin to show a change there and when we start seeing results both governments and people on the street will come around. We are seeing this already with Movercado in Mozambique. Of course in the process we are always confronting resistance. Some of this resistance has to do with inherent conservatism , but other times it has to do with perverse incentives – whole organizations benefit from the current inefficiencies. Once those are addressed, many of these organizations will have to face an existential threat. As far as I am concerned, creating that threat is a good thing.*

#### **Mobile technology & Mozambique**

5. **What are mobile phones used for generally in Mozambique?**

*There is a lot of literature on this. Phone use and behaviour on bottom of pyramid segments differs significantly from the way phones are used in places like Holland or the US. The way I like to put the problem, though is not how phones are used now, but how could they be used? Here is a more light-hearted treatment of the same topic:*

*<http://enter.movercado.org/2014/05/08/plan-for-the-future-not-the-past-also-your-bugatti-sucks/>*

6. **What are the advantages and disadvantages of communicating via mobile technology with vulnerable groups in Mozambique? Please explain your answer.**

*Biggest advantage is access. Second one is personalization. We can theoretically have individual, interactive conversations with millions of people, the way in other markets it is happening on social media and sites such as Amazon and Google. Meanwhile on BOP segments we continue to insist on one-way generic messages. Why? Mobile technology allows us to apply what we have learned from interactive media over the last decade to segments that have not yet been exposed to social media. That is a tremendous opportunity.*

7. **Are the networks and providers of mobile technology in Mozambique ready and willing to participate in development projects using mobile technology?**

*Yes they are. But we do not want them to contribute to a “development project”. We want them to be part of partnerships that make business sense to them as well as provide a development benefit. Once we manage that that battle is half won.*

8. **Is the coverage of mobile networks spread out equally throughout the country? Please explain your answer.**

No it is not. But it will be one day – that is the day we need to plan for.

<http://enter.movercado.org/2014/05/08/plan-for-the-future-not-the-past-also-your-bugatti-sucks/>

9. **What are the pro's and con's of communicating via SMS?**

*There are many cons: costs, cumbersomeness, intrusiveness. But is the only available way right now. We believe in technology that keeps a low-tech interface on the user side. As new technologies emerge we are implementing them – in particular USSD is currently very interesting. Android as well, in 3-5 years.*

### **Movercado**

10. **Why was Movercado set up ?**

11. **How and when was the initiative of Movercado launched?**

12. **Could you explain in brief, how Movercado works?**

*These first three questions can be answered here: <http://enter.movercado.org/>*

13. **How is the Mozambican public involved?**

*They are our clients. We have between 100k and 200k events in the system each month. We have the scale and width that allows us to tinker continuously with the system to make it more relevant to the public all the time.*

14. **How many people currently work on the project (team)?**

*There is a development team of 5 programmers. And an operational team of 7.*

15. **Has Movercado expanded in the past years?**

*It has expanded exponentially. Movercado one year ago is almost unrecognizable in relation to what we have now. It evolves continuously – it is part of the DNA, the way we designed it as an eco-system continuously evolving rather than a static project.*

16. **What has been the overall feedback, remarks or comments from external institutions, such as the Ministry of Health in Mozambique, the donor community and other development organizations?**

*There is almost a consensus of excitement from people and partners who understand its potential.*

17. **Can you briefly explain what has been the major impact of Movercado? And what have been the major pitfalls and constraints?**

*The biggest impact so far has been increasing efficiencies, or better said removing inefficiencies. I believe the future impact has to do with disrupting a whole industry – that is what will happen if I am right about its potential. Alternatively it will be a worthwhile failure out of which we will all learn a lot. The insights on which Movercado is based are sound – the problems we are trying to solve are real. Even if we won't end up solving those problems with Movercado we will open the way for other people to push further after we have failed.*

18. **How is the success and the impact of Movercado monitored?**

*Movercado is a real-time system. We get insights across the operation in real time. That helps us continuously tinker with what we do to maximize those results we are interested in. This is unprecedented in our industry.*

19. **Why is Movercado currently graduating from a project into an independent organization and was this originally planned?**

*Movercado's potential expands beyond Mozambique, beyond health and beyond the development industry. Additionally, as a real-time eco-system it requires the sort of agility that no large organization can deliver. As any fast, impactful innovation the only way to ensure its potential is spinning it off.*

### 3.4 Interview with Marco Gerritsen

*For the convenience of readers who do not read Dutch, the following interview has been translated. The translated version of the email, interview and answers, can be found in appendix 3.4.1.*

Naar aanleiding van mijn stage bij PSI Mozambique schrijf ik op dit moment mijn bachelors scriptie over het gebruik van 'mobile technology for development'. Het meewerken bij PSI Mozambique en zien hoe Movercado in zijn werk gaat en wat voor een mogelijkheden communicatie en mobile technology hebben voor de ontwikkeling van, bijvoorbeeld gezondheid, in landen zoals Mozambique heeft me geïnspireerd om hier verder onderzoek naar te doen.

Het doel van mijn scriptie is een advies schrijven voor een NGO die mobile technology wil gaan toepassen in zijn werk de 'health sector' in Mozambique. Daarom heb ik de volgende vraag gemaakt:

*How can a development organization (NGO) use mobile technology to promote the development of national health in Mozambique?*

Het zou voor mijn scriptie van enorme toegevoegde waarde zijn als je me zou kunnen helpen door een paar vragen te beantwoorden. Ik zou het enorm appreciëren.

1. Wat is jou functie bij de Nederlandse Ambassade?
2. Welke sectoren ondersteunt de Nederlandse Ambassade in Mozambique?
3. Welke projecten ondersteunt de Nederlandse Ambassade in Mozambique in de gezondheid sector?
4. Hoe worden projecten die gesteund worden door de Nederlandse Ambassade geselecteerd?
5. Waarom heeft de Nederlandse Ambassade besloten het initiatief van PSI Mozambique, Movercado, te ondersteunen? En wat zijn jullie beoogde doelen?
6. Moet PSI Mozambique de Nederlandse Ambassade op de hoogte houden van de ontwikkelingen en resultaten van het project, door bijvoorbeeld periodieke rapporten? Zo ja, hoe en hoe vaak?
7. Wat is de impact van Movercado in de gezondheid sector in Mozambique tot nu toe? En hoe is deze impact te 'discrimineren' (attributie)?
8. Is, naar jou mening, er in Mozambique veel corruptie als het gaat om funding voor ontwikkeling?
9. Waarom, als Mozambique een relatief hoge economische groei doormaakt, blijft het land een van de armste landen in de wereld, met nog steeds zo veel problemen in verschillende sectoren?
10. Hoe is de samenwerking tussen de Nederlandse overheid/ambassade en de Mozambikaanse?



11. Staat het Ministerie voor Gezondheid in Mozambique open voor projecten zoals Movercado die gebruik maken van mobiele technologie?
12. Word het Nederlandse ontwikkelingsbeleid ten aanzien van ontwikkelingszorg in Mozambique bepaald in dialoog met lokale ministerie van gezondheid? Zo ja hoe?
13. Wat is de structuur van ministerie van gezondheid in Mozambique en hebben ze lokale vertegenwoordigingen?
14. Kan/mag Movercado onafhankelijk opereren van de structuur van het ministerie?
15. Is het de bedoeling dat Movercado diensten gaat aanbieden die de MOH gaat kopen?

*Dank je wel voor de hulp. Als je mijn scriptie zou willen lezen na dat ik hem heb ingeleverd kan ik hem sturen. Het eind resultaat wordt alleen gelezen door mijn begeleider en een tweede examinerator van mijn studie, als er informatie in staat die niet gedeeld mag worden kan ik dit aangeven en word het niet gepubliceerd.*

*Bij voorbaad dank,*

*Met vriendelijke groet,*

*Heske van Boekel*

## Antwoorden interview met Marco Gerritsen

### 1. Wat is jou functie bij de Nederlandse Ambassade?

*Eerste secretaris – expert seksuele & reproductieve gezondheid en rechten (SRGR) inclusief HIV/AIDS*

### 2. Welke sectoren ondersteunt de Nederlandse Ambassade in Mozambique?

*Speerpunten;*

- i. Water*
- ii. Voedselzekerheid*
- iii. SRGR*

### 3. Welke projecten ondersteunt de Nederlandse Ambassade in Mozambique in de gezondheid sector?

- a. Ministerie van Gezondheid*
- b. PSI: social marketing*
- c. Programa Geração Biz – Mozbiz via UNFPA – Coalizão, en technische steun van PSI*

### 4. Hoe worden projecten die gesteund worden door de Nederlandse Ambassade geselecteerd?

- a. Financieel*
- b. Ondersteunend toezicht*

### 5. Waarom heeft de Nederlandse Ambassade besloten het initiatief van PSI Mozambique, Movercado, te ondersteunen? En wat zijn jullie beoogde doelen?

- a. Meer en beter gebruik, vooral door jongeren en juist meiden, van middelen:*
  - i. Die het mogelijk maken om zwangerschap te plannen, zodat deze gewenst zijn en niet te dicht op elkaar of te vroeg in het leven.,*
  - ii. Seksueel overdraagbare aandoeningen voorkomen*
- b. Toegang tot veilig drinkwater bevorderen*
- c. Chronische ondervoeding bestrijden*

### 6. Moet PSI Mozambique de Nederlandse Ambassade op de hoogte houden van de ontwikkelingen en resultaten van het project, door bijvoorbeeld periodieke rapporten? Zo ja, hoe en hoe vaak?

*Zeker:*

- i. Voortgang rapportage 1x/jr*
- ii. Financiële rapportage 1x/jr*

iii. *Financiële audit 1x/jr*

**7. Wat is de impact van Movercado in de gezondheid sector in Mozambique tot nu toe? En hoe is deze impact te 'discrimineren' (attributie)?**

*Movercado is een mobiel telefonie platform die het mogelijk maakt om:*

- i. Meer te doen: b.v. meer condooms uit te delen en te verkopen. Dankzij de vouchers kunnen we nu condooms gratis aanbieden waar dat voorheen niet mogelijk was.*
- ii. Beter te doen: niet allen doordat de toegang is verbeterd, maar ook omdat we in de gaten kunnen houden hoe goed de promotors hun werk doen: recallrate bij de klanten (benaderde personen) via call centre controle.*

**8. Is, naar jou mening, er in Mozambique veel corruptie als het gaat om funding voor ontwikkeling?**

- a. Zoals in vele landen is er corruptie in Mozambique. Veel vind ik het niet als je vergelijkt met bv Nederland, waar we toch alles redelijk goed voor mekaar hebben en er toch corruptie voor komt.*
- b. Desalniettemin zijn wij met onze ontwikkelingsgelden zero-tolerant voor corruptie:*
  - i. Wij doen er alles aan om corruptie, diefstal, fraude, mismanagement, etc. te voorkomen: preventie;*
  - ii. Wij doen ons uiterste best om tijdig te herkennen dat het gebeurt als het al gebeurt: detectie;*
  - iii. En als het dan al gebeurt dan stellen we het aan de kaak en moeten fouten hersteld en bestraft worden, waar nodig: prosecutie;*

**9. Waarom, als Mozambique een relatief hoge economische groei doormaakt, blijft het land een van de armste landen in de wereld, met nog steeds zo veel problemen in verschillende sectoren?**

*Mozambique is een zeer arm land en komt dus van ver, 7% van weinig is nog niet veel, maar wel bemoedigend. Wij zijn voortrekkers om ook juist de kansarme mensen grotere en beter toegang tot kansen te geven met behulp van deze groei. Dit soort inclusieve groei is inderdaad is wel een uitdaging.*

**10. Hoe is de samenwerking tussen de Nederlandse overheid/ambassade en de Mozambikaanse?**

*Goed*

**11. Staat het Ministerie voor Gezondheid in Mozambique open voor projecten zoals Movercado die gebruik maken van mobiele technologie?**

*Jazeker*

**12. Word het Nederlandse ontwikkelingsbeleid ten aanzien van ontwikkelingszorg in Mozambique bepaald in dialoog met lokale ministerie van gezondheid? Zo ja hoe?**

*Jazeker:*

- i. Ten eerste proberen wij te bergijpen welke prioriteiten het Ministerie van Gezondheid (GZ) heeft en hoe zij deze wil aanpakken.*
- ii. Ten tweede leggen wij die naast onze (NL) doelstellingen (bv SRGR incl. HIV/AIDS)*
- iii. Ten derde kiezen we voor vormen van steun die het beste aansluiten bij de benadering van de GZ.*
- iv. Ten vierde hebben we aandacht voor onderdelen van onze agenda die niet bovenaan staan bij de Mozambikaanse overheid. Hierbij zou je kunnen denken aan de rechten van seksuele minderheden (i). Wij steunen dus de belangen organisatie die op voor de rechten van bijvoorbeeld lesbiennes, homoseksuelen, biseksuelen, trans- en inter-seksuelen. In dit kader dringen wij ook aan op het legaliseren van abortus, om gewenste zwangerschappen te bevorderen en onveilige abortus te voorkomen (ii).*

**13. Wat is de structuur van ministerie van gezondheid in Mozambique en hebben ze lokale vertegenwoordigingen?**

*Hiervoor verwijs ik naar de website van Misau en hun documentatie.*

**14. Kan/mag Movercado onafhankelijk opereren van de structuur van het ministerie?**

*Ja. Maar vergeet niet Movercado is een toepassing, zoals het internet. Waar het voor gebruikt is een hele andere zaak. Een slecht doordacht programma wordt niet automatisch beter doordat je Movercado er op los laat.*

**15. Is het de bedoeling dat Movercado diensten gaat aanbieden die de MOH gaat kopen?**

*Dat zou zeer goed kunnen.*

### 3.4.1 Interview with Marco Gerritsen - English version

As a result of my internship at PSI Mozambique I am currently writing my bachelor thesis about the use of mobile technology for development. Working at PSI Mozambique, seeing how Movercado works and what opportunities communication and mobile technology can have for the development, of for example health, in countries such as Mozambique has inspired me to conduct some more research into this subject.

The goal of my thesis is to create an advice for an NGO wanting to use mobile technology in their work in the health sector in Mozambique. I have come up with the following policy question:

How can a development organization (NGO) use mobile technology to promote the development of national health in Mozambique?

It would be of great value if you could help me by answering a few questions. I would appreciate it a lot.

1. What is your job at the Royal Netherlands Embassy (henceforth referred to as the RNE)?
2. Which sectors does the RNE support in Mozambique?
3. What projects does the RNE support in the Mozambican health sector?
4. How are projects that are supported by the RNE selected?
5. Why did the RNE decide to support PSI Mozambique's initiative, Movercado? What are the RNE's intended purposes?
6. Does PSI Mozambique need to rapport to the RNE on developments and results of the project, in the form of for instance periodic reports? If yes, how and how often?
7. What is the impact of Movercado in the health sector in Mozambique so far? And how can this impact be discriminated (attribution)?
8. Is there, in your opinion, a lot of corruption in Mozambique when it comes to funding for development?
9. Why, if Mozambique has a relatively high economic growth, is the country still one of the poorest in the world, with still so many challenges in different sectors?

10. How is the cooperation between the Dutch government (the RNE) and the Mozambican government?
11. Is MISAU open to projects such as Movercado that use mobile technology?
12. Is the Dutch development policy in regards to development aid in Mozambique defined in dialogue with MISAU? If yes, how?
13. What is the structure of MISAU? Do it have local (regional) representation?
14. Can/Is Movercado allowed to operate independent from MISAU's structure?
15. Is it intended for Movercado to sell its services to MISAU (or other Ministry's of Health) in the future?

Thank you for your help. If you would like to read my thesis after I've handed it in I can send it to you. The end result will be read only by my tutor and a second reader, if there is any information that is not to be disclosed to others I can mark the thesis as confidential and it will not be published.

Thank you in advance,

Kind regards, Heske

## Answers interview with Marco Gerritsen

### 1. What is your job at the Royal Netherlands Embassy (henceforth referred to as the RNE)?

*First Secretary. Expert sexual and reproductive health and rights including AIDS*

### 2. Which sectors does the RNE support in Mozambique?

*Priority:*

- *Water*
- *Food-security*
- *Sexual & Reproductive Health and Rights*

### 3. What projects does the RNE support in the Mozambican health sector?

- *MISAU, ministry of health in Mozambique*
- *PSI Mozambique, social marketing*
- *Programa Geração Biz. Mozbiz through UNFPA. Coalizão, and technical support of PSI*

### 4. How are projects that are supported by the RNE selected?

- *Financially*
- *Supportive supervision*

### 5. Why did the RNE decide to support PSI Mozambique's initiative, Movercado? What are the RNE's intended purposes?

1) *More and better use, mostly by young adults/adolescents primarily girls, of tools:*

*that make it possible to plan pregnancy, so these are wanted and not to close after each other or too early in life*

*that prevent the transmission of sexually transmitted diseases*

2) *improve access to safe drink water*

3) *Combat chronic malnutrition*

- 6. Does PSI Mozambique need to rapport to the RNE on developments and results of the project, in the form of for instance periodic reports? If yes, how and how often?**

*Definitely*

- *Progress report - Once a year*
- *Financial report - Once a year*
- *Financial audit - Once a year*

- 7. What is the impact of Movercado in the health sector in Mozambique so far? And how can this impact be discriminated (attribution)?**

*Movercado is a mobile phone platform that makes it possible to:*

- 1) *Do more: for instance sell or hand out more condoms. Thanks to the vouchers it is now possible to offer free condoms where this was first not possible*
- 2) *Do better: not only because access has improved, but also because we can monitor how promoters work: by calling all people approached/clients via a call centre control.*

- 8. Is there, in your opinion, a lot of corruption in Mozambique when it comes to funding for development?**

*As in many countries there is corruption in Mozambique. I personally don't think it is a lot if you compare it to for instance the Netherlands where everything is quite well organized but still there is corruption.*

*Nevertheless, with our development funding we have a zero-tolerance policy with regards to corruption:*

- *Prevention: we do everything we can to prevent corruption, fraud, theft, mismanagement etc.*
- *Detection: we do our very best to timely recognize when it happens*
- *Prosecution: If it does happen we openly let it be known that we have a zero-tolerance policy and mistakes will need to be punished or repaired*



**9. Why, if Mozambique has a relatively high economic growth, is the country still one of the poorest in the world, with still so many challenges in different sectors?**

*Mozambique is a very poor country and so needs to grown from a very low point, 7% of little is still not a lot, but it is encouraging. We are frontrunners in also giving the poorest people a bigger and better chances with help of this economic growth. This sort inclusive growth is indeed a challenge.*

**10. How is the cooperation between the Dutch government (the RNE) and the Mozambican government?**

*Good*

**11. Is MISAU open to projects such as Movercado that use mobile technology?**

*Definitely*

**12. Is the Dutch development policy in regards to development aid in Mozambique defined in dialogue with MISAU? If yes, how?**

*Definitely:*

- 1) First of all we try to understand what priorities MISAU has and how they was to tackle these*
- 2) Secondly, we will put those priorities next to our Dutch objectives*
- 3) Furthermore, we chose forms of support that are the best fit according to MISAU's approach*
- 4) Finally, we also pay attention to elements of our agenda that might not be at the top of the Mozambican government's agenda. Here you could think of the rights of sexual minorities. (i) We support organizations that support the interests and stand up for, for instance: lesbians, homosexuals, bisexuals, trans- and intersexual people. In this context we also urge the legalization of abortion, to promote desired pregnancies and prevent unsafe abortion. (ii)*

**13. What is the structure of MISAU? Do it have local (regional) representation?**

*For this I will refer to the website of MISAU and their documentation.*

**14. Can/Is Movercado allowed to operate independent from MISAU's structure?**

*Yes. But don't forget that Movercado is an application, like the internet. What it is used for is something totally different. A badly thought through project does will not automatically be better because of using Movercado.*

**15. Is it intended for Movercado to sell its services to MISAU (or other Ministry's of Health) in the future?**

*That could be a possibility.*

## 4. Findings

### Maslow's Hierarchy of Needs' Theory

In 1943, Abraham Harold Maslow proposed his 'Maslow's hierarchy of needs' theory, with it the psychologist tried to understand human motivation. Since then the model has often been used in studying consumer behavior amongst other things (Communication Theory, 2010).

According to Maslow (1943), human motives can be categorized into 5 separate sections in a hierarchical manner (Figure 3).

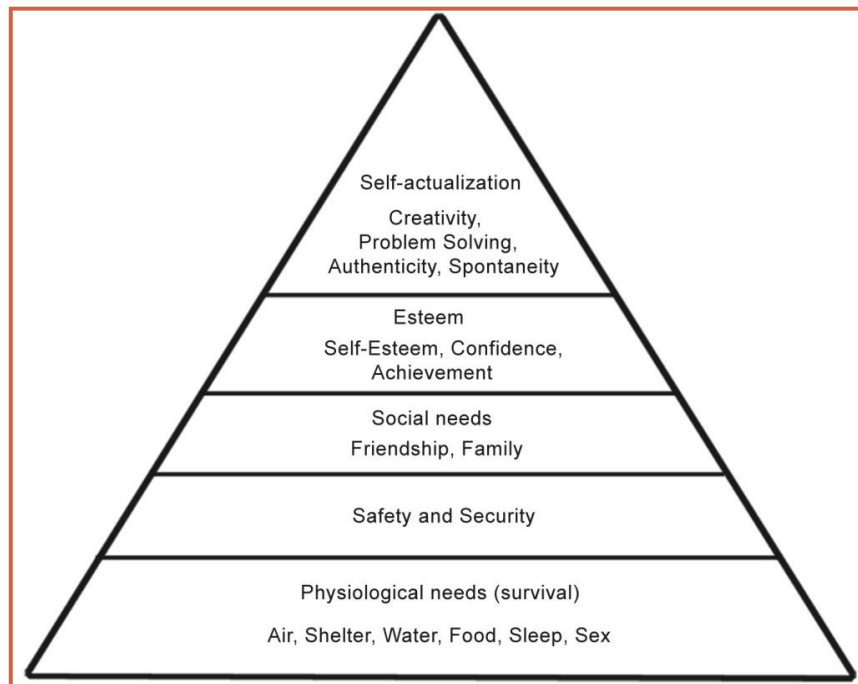


Figure 11. Maslow's Hierarchy of Needs. Source: (Communication Theory, 2010)

Physiological needs: the basic necessities of human survival, without these needs a person will not be able to function

Safety and security: after fulfilling all physiological needs, a person feels the need to live a secure life where safety at all levels in life is ensured.

Social needs: the need to feel that one belongs to a chosen social group or in other relationships. People need to feel accepted, otherwise people are prone to negativity such as loneliness or depression.

Esteem: A person needs to feel good about themselves, content with who they are, however they also need to get recognition from others. Without this a person could get an inferiority complex.

Self-actualization: This is the need for a person to be the best person they can be and the need to maximize one's potential (Communication Theory, 2010).

Maslow's theory states that unless lower order needs, such as physiological needs or safety and security needs are fulfilled, higher ones will remain dormant. Yet if one looks at the past decade the highest increase of consumption has been in the category of communication and technology, which definitely do not belong in the lower hierarchical levels of Maslow's theory (Hollensen, 2011).

Maslow's theory is relevant to this research because it clearly shows the needs of every human being, no matter what socio or economic background they have, their principle needs (in Maslow's hierarchical order) are the same. This theory should not only be considered by marketers in the commerce business, but also by development organizations, for if these organizations need to first help the primary needs with most priority to be fulfilled before any of the next needs.

Towards a healthy Mozambique, one mobile phone at a time