A possible establishment of a Swedish mobile health service in a Kenyan context

- Challenges and Possibilities

ABSTRACT

The aim of this thesis is to increase the understanding of the prerequisites for mobile health services in East Africa, through the specific study of the Kenyan market. This is achieved through the investigation of the potential for a mobile health service, which has been developed in Sweden and addresses visual concerns. The area is of interest due to the high level of mobile penetration in Kenya, along with the limited resources in terms of knowledge, talent and infrastructure. With this study we aim foremost to contribute to insights that are applicable on developing markets, contributing to the empirical knowledge about a possible establishment, in terms of challenges and possibilities of mHealth services in such a context. The empirical material consists of interviews with experts on the Kenyan telecom and health market as well as with organizations relevant for the service. Further, this has been complemented by documentation on similar projects in Kenya. The challenges identified as most important for an establishment of the Swedish service in Kenya are price, scale, market prerequisites and deskilling of work, while the possibilities are scale, market prerequisites, process innovation and functionality. In addition to this, the results of the study highlight the relevance of taking the social context into consideration. This is linked to the value of partnerships, as well as creating buy-in and sustainability.

Keywords: *Kenya, Telecom sector, mHealth, dermatology, iDoc24*

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1.0 Introduction

> "*Large areas of sub-Saharan Africa suffer a substantial lack of skin care. Hence teledermatology, meaning the online visual exchange of clinical and histologic data, could develop into a powerful medical resource."(Schmid-Grendelmeier et al, 2000, p.1)*

> *"Dermatology is perhaps the most visual specialty in medicine, making it ideally suited for modern telemedicine techniques, as has been shown in a number of recent studies investigating feasibility and reliability of teledermatology. It has generally demonstrated high levels of concordance in diagnosis and management plans compared with face-to-face consultations. "(Massone et al, 2008, p. 1)*

> *"Innovations in mobile communications have unparalleled and perhaps limitless potential in overcoming persistent global health challenges. But, these innovations will only succeed if we create the networks and partnerships that allow us to bring them to scale and unlock their full potential." (Rodin, 2010, p. 1)*

1.1 Background

During recent years, the markets in the developing economies of the world have experienced growth and stabilization. This development has made companies from outside of those countries, often with a base in developed countries, interested in the often unexploited potential and possibilities of expansion. In many cases, this expansion also includes new innovations in order to address the challenges prevalent in developing markets. Tools that have been thought to have a large potential impact in enabling such innovations are information and communication technology (ICT). The use of ICT and its applications in developing markets is and has been frequently discussed and often praised. It has been argued that ICT increases the ability for any population to interact and exchange knowledge and information within as well as across the borders of the country, and that this would have large benefits especially for the populations in developing countries. Further, ICT creates possibilities for companies in the developed world to expand regardless of their current location.

As an example it is worth mentioning the Swedish company Ericsson expanding all over the world, and at the same time providing the building blocks of ICT and taking part in the exploration and development of new markets. *"We provide communications networks, telecom services and multimedia solutions, making it easier for people all over the globe to communicate."* (Ericsson, 2011) Further, Ericsson states that *"communication is changing the way we live and work. Ericsson plays a key role in this evolution, using innovation to empower people, business and society."* (Ericsson, 2011)

ICT, if used in the right way, bears the potential to create possibilities for developing countries to catch up and deliver products and services in a new way. Such development can be seen within the health sector in the form of an emerging telemedicine area. ICT within health care includes technology that is the base of telemedicine, which will be investigated further in this study.

1.1.1 Telemedicine in the Spotlight

> *"Telemedicine is conceived of as an integrated system of healthcare delivery that employs telecommunications and computer technology as a substitute for face-to-face contact between provider and client." (Rashid, 1995, p. 1)*

With the definition above in mind, it is clear that telemedicine creates the ability to deliver health care services in a new way and help people wherever they are, especially in the developing countries where people often live far away from hospitals or medical clinics. As time often is of essence when it comes to medical concerns, telemedicine has the potential of improving health care delivery through putting the patient in contact with a doctor in a less time consuming way.

Teledermatology is the segment within telemedicine that addresses skin conditions and it has different purposes; triage, diagnostic and management services as well as achieving a second-opinion within primary health care (Massone et al, 2008). Various set-ups of teledermatology have been used all over the world since emergence of the area. Firstly, the technology has made it possible to send images and clinical history from general practitioners to dermatology specialists. Secondly, ICT has been used in order to facilitate the set-up of community-based clinics led by nurses or general practitioners. Yet another, rather new, area of use that has increased during recent years is web consultation. The quality of diagnoses made with the use of teledermatological tools has been proven to be high enough to be comparable to face-to-face consultations. (Massone et al, 2008)

As the mobile phone is a tool that creates possibilities to communicate with people regardless of geographical location, it increases information and knowledge exchange as well as the application of best practice in markets. The development of mobile phones with high quality optics and the possibility to send pictures through Multimedia Messaging Service (MMS) represents a possibility to transfer information with more detail. The technical development has brought with it large potential for improvements in both efficiency and quality within health care, not the least through making it possible to send images digitally.

The use of mobile phones in health care service delivery is a growing subfield within telemedicine that goes under the name of mobile health, mHealth. Organizations such as the mHealth Alliance constitute examples of the growing importance of, and interest in, the mHealth field. The mHealth Alliance was formed in 2008 with the goal to act as a catalyst of innovation and research within mobile health along with harmonizing current efforts, especially within developing countries. (mHealth Alliance, 2010)

Some of the main benefits of mHealth mentioned in the current debate are along the lines of availability, flexibility and mobility. Those aspects are in turn thought to improve access to health care. This has been shown to be true especially in marginalized communities, both in developed and developing countries. (Social Media Healthcare, 2011) Suggested applications for the technique are for example data collection, patient monitoring and remote diagnosing and treatment.

Currently, many benefits have been proven through studies and pilots, but the mHealth area is still at a point where larger investments need to be made in order for solutions to be implemented on a larger scale. This is an ongoing process, where organizations that use mHealth to improve the

efficiency of their health care delivery will have to learn from each other, both in terms of service and process design. With adaptation to the context of use and through working together in partnerships between the different actors in the implementation of projects, the benefits from mHealth applications could be many and large. This is also true on a global level. With the efficiency of existing applications and techniques proven, issues such as how to successfully organize, structure and develop mHealth projects have received increased attention. (Vital Wave Consulting, 2009) As few mHealth solutions exist on a large scale today, this is key to leveraging the true potential within the area (mHealth Alliance, 2011) Forming part of this work, the examination of such strategic and organizational aspects of mHealth projects is also the area of interest of this study.

1.1.2 mHealth in developing countries

> *"The feasibility of mobile teledermatology and mobile teledermoscopy recently has been proven, and these new facilities have the potential to become an easy applicable tool for everyone and may open the door for a new flexible triage system." (Massone et al, 2008, p. 1)*

Weak health is probably one of the main causes of economic and social misery in developing countries. Therefore, an improvement in the access to and quality of medical treatment would improve the lives of those reached by such efforts. The ability to reach the market by using mobile devices in the delivery of health care services represents a possibility to improve the quality of life of the poorest.

As mentioned above, technical development changes the prerequisites and informational structure of a market and provides new possibilities for the health sector to improve the efficiency and quality of treatment while lowering costs. These kinds of implications are likely to be even more useful in developing markets, where needs are great and resources scarce, as has been seen in cases presented in the Base of the Pyramid, (BOP)[1] literature.

A Swedish entrepreneur started a company named iDoc24 in 2008. The entrepreneur created a new segment on the Swedish market by giving medical advice regarding visual concerns through mobile phones. The service has been available on the Swedish market for two years. The entrepreneur saw a social and economic value in entering a developing country, due to the large potential for transaction cost savings and the ability to increase the access to health care, thereby improving the lives of the population. This is the reason behind why it has been considered interesting to study the iDoc24 service in a new context – the developing market.

1.2 Problem area

The Kenyan market was chosen for this study partly because of a suggestion from the entrepreneur behind iDoc24 to choose an East African country and partly because of other factors that make Kenya suitable. Mobile solutions are for example common in Kenya, the institutional framework within the country is well developed when compared to neighboring countries, the political situation is fairly stable at the moment and people have an entrepreneurial mind-set (Hellström, 2010). One example

[1]Base of the Pyramid (even called the Bottom of the Pyramid) – A theory based on poverty alleviation developed from the management literature by Prahalad (2006)

of an innovative mobile solution that has been successful on the Kenyan market and useful for the Kenyan population is Mpesa. Mpesa is a money transaction service that was developed by the Kenyan mobile operator Safaricom and launched in 2007. The goal was to help people access and transfer money in an easy and trustful way. Mpesa got a big uptake in the country, possibly due to the lack of bank accounts among the population as well as lack of trust for the existing financial system. The service addressed existing needs and did not interrupt the lives of the Kenyan people but rather helped them to solve an existing problem. (Hughes & Lonie, 2007) Mpesa is a success example, but there are other solutions that have not succeeded that well in addressing existing needs but rather have been pushed into the market.

In September 2010 the mobile penetration in Kenya reached 55.9 percent (Communications Commission of Kenya, 2011). This makes it even more interesting to examine the potential of using mobile devices within the health care system and how they may increase the quality of life for the Kenyan population. There are few studies of the prerequisites for mobile devices within health care on the Kenyan market, and even fewer of solutions focusing on medical advice. iDoc24 is a unique service and innovation, and the study of it contains a combination of areas; the telecom and health sector as well as the organizational aspects affecting the service, also at an industry level.

The diffusion of innovations has been an important research topic in the context of technological change for long, because of the fact that the actual benefits from innovations are realized only as they diffuse throughout the economy (Trajtenberg & Yitzhaki, 1989). One of the most important researchers within the field, Everett Rogers, has defined an innovation as *"an idea, practice, or object that is perceived as new by an individual or other unit of adoption"* (Rogers, 2003, p.12). This definition includes the iDoc24 service as an innovation in the sense that it would be a new service on the Kenyan market in terms of both practice and object. Results from research on innovation are fragmented but quite extensive. This creates a need for cross-fertilization of research ideas across different subject areas in order to increase the understanding of sources, processes and determinants of innovation. (Gopalakrishnan & Damanpour, 1996)

Everett M. Rogers introduced a theory, Diffusion of Innovations, that examines and highlights the factors that affect the rate of adoption of innovations (Rogers, 2003). The BOP literature on the other hand has emphasized the importance of new innovations in order to find solutions targeted for the poor market segments of the world, combining low-cost and high-quality characteristics of products and services. The process of innovation is, according to this theory, to be driven by the specific possibilities and challenges stemming from the demands and needs of the customer base of BOP markets. (Prahalad, 2006a) However, there is a risk to see the potential from the perspective of a developed market and thereby miss the true needs of the BOP market. In this study, the BOP theory will be challenged and applied in a somewhat different way. Since the iDoc24 innovation is already developed and available on the Swedish market, and therefore not created specifically for the Kenyan market, it will rather have to be suited to the new market context. A combination of the BOP and Diffusion of Innovations literature will increase the ability to examine and understand more about the diffusion of innovations on BOP markets.

Since the efficiency and quality of teledermatology has been proven, the value of the iDoc24 service is established from a technological and medical perspective. The next issue of interest is therefore to

study the establishment of the service, in order to reach a deeper understanding about what happens in the process of going from a good idea with potential to a sustainable presence and impact on the market. Even though the iDoc24 service is already established on the Swedish market, the process of entering a new, developing, market with unique challenges and possibilities is still unexplored. This creates a possibility to add further knowledge about Kenyan context specific prerequisites and their implications for the establishment of mHealth services.

1.3 Purpose

Through this research we aim to increase the understanding of the prerequisites for mobile health services in East Africa, through the specific study of the Kenyan market. This implies an investigation of the organizational, medical and technical structure of the country, along with infrastructure, trends, developments and cultural aspects. By looking at several cases, along with retrieving general information about the prerequisites for mHealth solutions in Kenya, we aim to make a broad analysis of the organizational, technical and sector specific conditions that are likely to influence the establishment and diffusion of the iDoc24 service within and on the Kenyan market. They will be examined through the existing theoretical framework on BOP business solutions and strategy, as well as theories on the diffusion of innovations. Through this broad perspective, we want to relate those areas to each other, and evaluate their relative importance in order to paint the wide picture. The purpose is to perform an explorative study that may give directions for future, more specific, research of interest within the field.

1.4 Research questions

With its base in the purpose of this study, our main research question is as follows:

What are the prerequisites, in terms of challenges and possibilities, for an establishment of the Swedish mobile health service iDoc24 on the Kenyan market?

In order to answer this, the main question has been divided into three sub-questions that will be analyzed in detail:

1. *Which are the important factors?*
2. *Why are they considered crucial for an establishment?*
3. *What are the theoretical and empirical implications for the iDoc24 service in Kenya?*

1.5 Definitions

The following definitions have been used in the study:

- **Non-Governmental Organizations, (NGOs):** non-governmental, often donor-driven organizations, with the exception of faith-based organizations.
- **Faith-based organizations:** non-governmental organizations that are run by religious communities, often churches.
- **High-end phones:** also called smartphones, have higher computational ability than other phones, and are able to run a complete operating system. They can be viewed as handheld computers and have the capacity to handle multi-task applications. Some of the common functions are high-resolution camera and touch screen.

- **Low-end phones:** have less computational power and only basic features – some of them do not even have a camera. Traditionally, the main distinction has been that they do not run on a smartphone operative system, but this is starting to change as they become increasingly advanced. (Know your mobile, 2010)
- **Telemedicine:** is defined as medical information transferred through audiovisual media in an interactive way. The applications reach from consulting to remote medical procedures or examinations.
- **eHealth:** a broad name for healthcare practices supported by electronic processes as well as information and communication technology.
- **mHealth:** the field of mobile health has emerged as a sub-segment of eHealth. The term mHealth was given an early definition – *"wireless telemedicine [that] involves the exploitation of the mobile telecommunication and multimedia technologies and their integration into new mobile health care delivery systems"* (Dalberg, 2011). mHealth commonly refers to the use of mobile communication devices for health services and information.
- **Diffusion of Innovations:** in order to clarify, when relating to the theory developed by Rogers, a capital letter is used in the beginning of Diffusion and Innovations respectively, while the diffusion of innovations relates to how innovations diffuse on a market.

1.6 Delimitations

Many of the delimitations of this study are a consequence of the characteristics of the mobile health service that is investigated. Further, both theoretical and empirical areas to put emphasis on in the study have been chosen. In addressing our research question we will focus the analysis on the industry, organizational and innovation levels, since these affect an expansion of the iDoc24 service into Kenya the most. Thus, we evaluate an adoption of the service by the individuals and organizations on the market through focusing on challenges and possibilities of an establishment on the Kenyan market. The subunit level is excluded, since studying an individual organization has not been considered relevant in this stage of the establishment process and also with regard to the characteristics of the iDoc24 service and its set-up. In order to make that kind of study relevant, it would be necessary to identify an appropriate partner, organization or company on the local market, something that has not yet been achieved.

The impact of the service will not be evaluated due to the fact that it is not yet established, making impact measurement a hypothetical issue. Further, the limits of the study are partly determined with consideration to the perspective of the entrepreneur. Due to the fact that the service is not yet established on the Kenyan market, the focus of this study will be to enable a future decision regarding the iDoc24 service on this market. The delimitations also reflect the amount of time and resources available for the production of this thesis. Two months were spent gathering empirical material in Kenya and the restricted amount of time in the country affected the ability to collect information about local market prerequisites.

1.7 Contribution of the study

This study will contribute to insights that are applicable on developing markets, adding empirical knowledge about the establishment process of mHealth services in such a context. This is a quite unexplored area especially when it comes to medical advice through mobile phones.

Actors interested in the empirical results would be small businesses within health care that are interested in expanding their operations to developing countries. The Kenyan society could also take advantage of the results, in order to evaluate the possible use of mobile phones within the health care system. More specifically, Kenyan health care facilities will through this study get information that can help them evaluate a possible establishment of the iDoc24 service.

Another contribution of the study is to complement the existing theory within the research area. This is even more beneficial since there is currently a lack of empirical studies, especially about mobile phones as a part of general ICT solutions and their use within health care. This study also aims to contribute to existing theoretical frameworks in terms of relevant factors that represent possibilities and challenges on BOP markets. Further, the relative importance of those factors will be analyzed, something that is not focused upon in the BOP literature today. By combining two separate theoretical frameworks new perspectives and insights can be added to current knowledge.

1.8 Disposition

The paper is organized as follows. The next chapter describes the **research approach,** where comments are made upon the design, method, collection, reliability and validity of the study. It is followed by a presentation of the **theoretical framework** that has been found suitable in order to examine the research questions. Focus is put on the BOP and Diffusion of Innovations theories. Thereafter, the **empirical material** is presented. It is divided into a description of the core of the iDoc24 service and a description of the set-up in Sweden, followed by a presentation of Kenyan market characteristics and prerequisites that constitute the base for an establishment of an ICT service in this specific setting. Chapter five contains the **analysis**, combining the empirical material with the theoretical framework in order to answer research question number one and two. The analysis is followed by a **conclusion**, where the broader implications of the findings are discussed in order to answer research question number three. Lastly, the concluding **discussion** contains the implications of the results along with comments on the limitations of the study as well as suggestions for further research within the field.

2.0 Research Approach

This chapter contains a description of our chosen research method. It starts with the description of the characteristics and structure of the study. It then continues to discuss the choices made in the design of the study, as well as their implications for the quality of research.

2.1 Background to the study

This study originated from the interest of the entrepreneur behind iDoc24 to expand the mHealth services of the company to a developing market, preferably an East African one. Kenya is a country of interest since it is one of the poorest performing economies in the world, but with a market based structure and liberalized external trade system, which often makes it regarded as investment friendly. (Library of Congress, Federal Research Division, 2007) Further, the mobile sector of the whole East African region has been growing rapidly in the past decade and the expansion has been above the African average. Within the region, Kenya has the highest level of mobile penetration[2]. (Hellström, 2010; Communications Commission of Kenya, 2011) All together, this makes Kenya and the Kenyan market especially interesting and suitable for the study. An investigation of the Kenyan market was possible through a Minor Filed Study-scholarship from the Swedish International Development Cooperation Agency, SIDA.

Our research subject, the iDoc24 service on the Kenyan market, is an artificial service in the sense that it does not exist in that specific context yet, which makes the study more abstract compared to if the service was already established on the market. The fact that we wanted to find out more about a potential future service made it impossible to study the prerequisites of the service itself. In order to address this somewhat uncommon characteristic of our area of interest, we approached the subject from different angles. This strategy made it possible to reach a deeper understanding of which factors that are important, how important they are, and why that is the case. The angles are represented by prerequisites, characteristics and structure of the health, telecom and organizational spheres respectively in Kenya. Adding to that is experience from other Kenyan cases that are similar to ours. In this, we perform parts of a collective case study, where insights from implementations of ICT, eHealth and mHealth solutions on the Kenyan market and within Kenyan organizations are examined. Further, we have chosen to study parts of the Swedish case that is the current set-up of the service in Sweden, where we compare and contrast with the Kenyan situation in order to highlight phenomena that may or may not be specific to that kind of market. This case therefore also becomes part of the collective case study, even though it has a slightly different role within the analysis. Those perspectives all serve to increase the understanding of our issue of interest – the iDoc24 service on the Kenyan market – as is shown in figure 1.

[2] 55.9 percent in September 2010

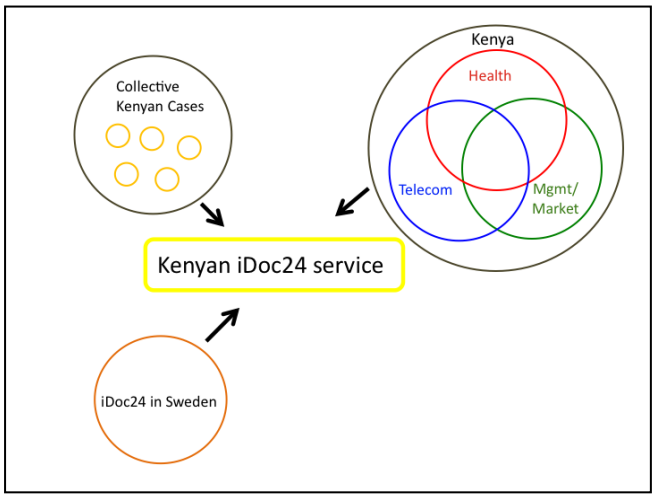

***Figure 1**. Sources of data. Upper left circle representing the comparable cases that are the collective Kenyan case study. The upper right circle represents the prerequisites and structure in Kenya, in terms of the external environment that the artificial case would be in. The lower left circle represents the case of the iDoc24 service set-up in Sweden.*

2.2 Inductive, deductive or abductive approach

The aim of this study, as stated in the purpose, is to reach a deeper understanding of the factors and processes behind challenges and possibilities for the iDoc24 service on a BOP market. Since limited amount of both empirical and theoretical research was available within this specific problem area, no specific predictions could be made as to which factors to look for, a fact that made an explorative approach the most suitable. Further, we wanted to keep an open mind in our search for information, which was also facilitated through this stance that allows for feedback loops in the research process. For example, the principles of data collection are revised continuously (Alvesson & Sköldberg, 1994).

The relationship between knowledge and theory in research is commonly divided into deductive and inductive approaches. In deductive research, the starting point is theory, from which hypotheses are generated and tested empirically in order to confirm or reject and be able to revise the theory. An inductive approach on the other hand has its starting point in observations and findings, which are then examined and used to generate and develop theory. This approach makes theory the outcome of the study. However, those two main strategies are not always clear-cut, and it can be helpful to rather look at them as tendencies. (Bryman & Bell, 2007)

This fact also opens up for a third strategy, positioned in between the two – an abductive approach. This strategy allows for alternation between empirical findings and theory and puts higher emphasis on understanding of underlying patterns through the inspiration of existing theory. It is based on empirical facts just like the inductive approach but lies closer to the deductive approach in that it does not reject theoretical ideas. (Alvesson & Sköldberg, 1994)

When conducting a research project, the choice of method is linked to its purpose. Considering the existing theory and the explorative characteristic of the research question that is the center of this study, an abductive approach has been deemed suitable. It facilitates increased understanding of the prerequisites of the service in Kenya, and theories on the diffusion of innovation in developing countries can be developed with the help of the empirical material of the study. The fact that there is

currently a limited amount of theory available that is applicable on the studied case, along with even less empirical research on the subject, make deductive predictions hard.

An abductive study approach is also recommended for case studies. In those cases, empirical material is the base of the study, but the analysis can be made through an existing theoretical model. The case at hand is analyzed through a hypothetical pattern of how it would be explained according to theory, and then compared to this. The result is either confirmation of the theory or identification of gaps or faults, giving the possibility to develop the theoretical base. (Alvesson & Sköldberg, 1994)

2.3 Design of the Study

A case study is suitable for why-questions and when wanting to examine practice with an abductive starting point (Yin, 2003; Alvesson & Sköldberg, 1994). In this study, those factors combined with the character of the problem itself motivate the chosen research approach. A case study is specified as a study of a limited, bounded system, person, organization or program. Our study concerns a service, which represents an intrinsic case study of a unique case that is studied because of the interest in the case itself and what it might add to theory through its uniqueness. Further, the collective case study of similar services and implementations is used to gain collective understanding of the Kenyan iDoc24 service (Simons, 2009).

There are several other characteristics and strengths linked to a case study research approach that make it a useful strategy in order to fulfill the purpose of this study. The in-depth description and focus on one issue makes it possible to document multiple perspectives. It facilitates analysis of the influence of key actors while describing and identifying contesting viewpoints and interpreting the subject within its context. In short, a case study makes it possible to discover why and how things have happened and it is flexible in the sense that it is neither time dependent nor constrained by method. (Simons, 2009)

The case is described through the concept of “the story of the case”, which means ordering and understanding of different parts that together form a coherent story. Parts can be events, metaphors, statistics etcetera and are therefore not restricted to method. In this sense, the case itself is linked to the area of interest and focus of the research, rather than choice of method since both qualitative and quantitative methods can be used to get further understanding about the case. However, many case studies focus on the type of research questions that are suitable for qualitative methods in that they aim for context specific, in depth understanding of things like processes. (Simons, 2009)

Our study of multiple cases within several categories is mostly comparative and exploratory. The chosen strategy is similar to studying several units within one case study. The units are analyzed somewhat differently, in order to increase understanding of the study object through the analysis and perspective of separate entities related to it. (Yin, 2003)

Because of the abductive approach, our case study can be considered as both theory-led and theory-generated. The theory-led part is the exploration of the case that is guided by one or several theoretical perspectives. In doing so it is important to stay open to differences from established theory, and the method is merely letting theory guide data collection rather than testing a specific

theory. Where gap in existing theory have been identified, the study is also theory-generated in that it uses data in order to create a theory of the case. (Simons, 2009)

2.4 Qualitative versus quantitative methods

Within social science, quantitative methods are focusing on measuring and explaining, mainly through statistics and mathematics. This means that they are more programmatic than qualitative methods, in that quantitative research follows a clear structure in testing theoretical hypotheses through a defined instrument. Qualitative methods are on the other hand more process oriented, and feedback loops are allowed between the different stages of the research process. (Warren & Karner, 2010)

Out of those alternatives, when conducting explorative research in order to understand processes and actions in depth, a qualitative approach is suggested. In our case, the lack of information and knowledge within the area combined with the character of our research question together calls for a qualitative approach. This becomes clear in the purpose of the study; an explorative research question where we want to find out more about possibilities and challenges linked to an establishment. Further, it is significant for a qualitative approach to put emphasis on the perspective of the participant, a characteristic that was valuable in this context.

As discussed, an explorative and iterative research process best fit our purposes as determined by the research question. In this process we go from open-ended to more specific questions, and also narrow the specificity down in terms of interviewees. When wanting to narrow focus down, and follow the indications that we got during the data collection, a qualitative approach was the only alternative as this adaptation is not possible within a strictly quantitative design. Thus focusing not only on which but also on why made the qualitative approach natural.

Since experts are the ones that are most likely to be able to evaluate and answer our questions, we wanted to collect their opinions and comments on the issue at hand. Through this their perspective is the focus of our study, and could best be examined through a qualitative method; in-depth and semi-structured interviews.

Other characteristics of qualitative research that suited our purposes were the possibility of allowing for the investigation of multiple perspectives, which was necessary for a proper investigation of the research question. Qualitative methods are often used for contextual understanding at a micro level, when using emergent theory. They serve to characterize the qualities of a phenomenon, to describe and discover. All of those are aspects that fit our case.

2.5 Choice of interviewees

Expert interviewing is a method where interviewees are chosen because of their position or area of expertise, which makes them more likely to understand your research object and provide insight on the subject. Because of the explorative character of this study, such interviews are suitable since experts are likely to give information on what you need to know about the area, providing an overview through their own structuring of knowledge as well as telling you which persons you need to talk to. (Gillham, 2000)

When conducting case studies, it is often necessary to get access to information through a gatekeeper in order to get confidence of participants that are crucial to understand the case (Simons, 2009). This, combined with the unofficial structure of the investigated Kenyan sectors motivates the snowball sampling method that was used in order to identify organizations and persons with knowledge about the areas of interest for the study.

When using the snowball technique, interviewees make referrals to other people that may be suitable to conduct interviews with. Initially, general experts were targeted and as the sample grew these kinds of experts were increasingly combined with people who had experience from specific cases, and thus closer to using the service themselves. In our continuous evaluation and selection of the interviewees, we balanced experts evaluated on the ground of their position and expertise and getting new ones through recommendations and general research. Talking to people was the way to find out about projects, pilots and examples of similar services, solutions and applications of technology within the health sector.

The sampling method made it possible to reach deeper into the area and get in contact with more experts. In this way the first interviewees gave access to a network of experts on health informatics and with experience from mHealth solutions in Kenya. However, since the information came from previous interviewees, this technique may have given a somewhat biased picture of the study object (Bryman & Bell, 2007).

As mapped in figure 2, attention was put into the distribution of the interviewees, in order to mitigate the possible bias. Further, the snowball sampling technique was combined with research on the internet on mHealth projects and organizations active in Kenya, representing the collective cases and comparative perspective of our study. Research on other actors within our areas of interest, such as hospitals, organizations, forums, and government ministries etcetera was conducted and experts within each area identified and contacted, in order to create a balance in the distribution within the areas of expertise. Through interviewing experts from different organizations, the bias from organizational culture and preferences linked to this was diminished.

Since the sampling was a continuous process, the size of the sample was not determined beforehand. Instead, the empirical findings started to converge after approximately 24 interviews and we reached the end of examining our research question within the delimitations that were set-up for the study. At this point further data gathering would start to cover other issues, such as customer preferences, market analysis and specific fields of interest such as the role of operators as a driver of development on the Kenyan market and the characteristics of the health insurance system, which were all outside of the scope of this study. A complete list and full titles of the interviewees is found in the appendix[3].

[3] See Appendix 1: Overview of interviewees

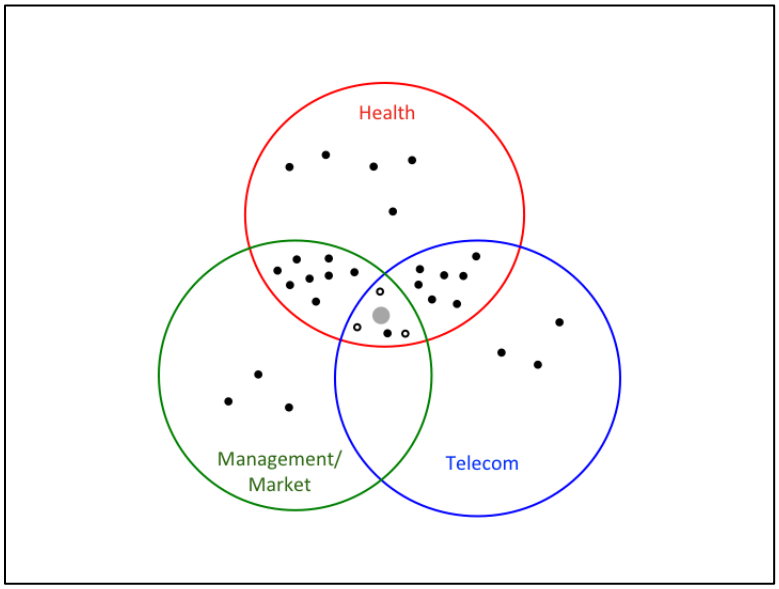

***Figure 2**. Distribution of interviewees according to area. Each black dot represent an interviewee, the small white dots in the middle are interviewees with specific case experience and the larger grey dot represents the entrepreneur in Sweden, Alexander Börve.*

2.6 Data collection

2.6.1 Description

In order to increase the objectivity of the study, both documentation and interview material was used as empirical material. Along with the differences within those categories of information, multiple points of reference were created and the same information was retrieved from several sources of data, what is commonly referred to as triangulation. (Bryman & Bell, 2007)

2.6.2 Document review

We have studied secondary material and analysis of comparable cases, the Kenyan telecom market and research on the efficiency of health ICT applications. The use of multiple sources is suitable for triangulation purposes, increasing the quality of the case study (Yin, 2003), and the fact that documentation is not created with the specific purpose of answering the research question makes such sources even more valuable in that they represent yet another perspective (Bryman & Bell, 2007)

2.6.3 Interviews

The form of interview has been semi-structured and in-depth, conducted with stakeholders and experts linked to the establishment of the service within the identified areas of interest. The strength of semi-structured interviews is their flexibility, leading to a possibility to collect large amounts of data. Combined with the type of interviewees within our study, who are less likely to submit to answering specific questions but rather give you information on topics that you raise, this characteristic made this interview approach the most suitable for our research purposes (Gillham, 2000) In order to remain critical about the type of source, purpose, meaning and credibility, we

asked each interviewee about their personal background, current work, education etcetera. The material was then analyzed with those aspects in mind.

26 Interviews were conducted in Nairobi during January and February 2011, and each session lasted between 45 and 90 minutes. Location and time was to the extent that it was possible, chosen by the respondent, which is likely to create a favorable atmosphere for the meeting. (Krag Jacobsen, 1993) Four interviews were held in Sweden, two before we went to Nairobi and two after returning. Those were with persons with experience from eHealth in Sweden, health care in Africa as well as with the entrepreneur behind iDoc24.

The interview guide contained both broad and more specific questions concerning the three focus areas in order to get the spontaneous reaction and comments from the interviewees but also be able to get deeper into areas of interest. However, since the main research question implies a broad overview over the area, without specific direction or focus, discussion was kept rather general. Counter questions were asked as a necessary part of this research process in order to get deeper into the identified areas of interest and develop specific issues further. Therefore, the interview structure was a guideline used as a base and developed further along the interest of each specific interview. Both we and the interviewees could change between the questions while we ensured that all questions were answered before the end.

The questions where themed along three areas; health, telecom and organizational aspects, that are naturally linked to the service investigated but that also formed part of our choice of limitation of the study. They were also partly based on problem areas for the service identified in our first exploring interviews, such as potential for the service in Kenya, structural challenges, disease environment and culture. We used a standard questionnaire with open-ended questions prepared beforehand. This method facilitated the snowball sampling, since it allowed for brainstorming about other experts that may make valuable contribution to the study. The use of standardized questions facilitated triangulation since they allowed for the interviewees to corroborate the same facts and phenomena (Yin, 2003). The iDoc24 service was not presented to the respondents until the end of the interview, in order not to influence the answers. The application was then shown and the current set-up of the service explained, after which comments and suggestions regarding the use and potential for this kind of service in Kenya were collected.

In cases where it was obvious that the respondent did not have sufficient knowledge to answer questions on a specific area, we simply left that part out, since the interviewees were selected on the basis of their formal expertise and answers outside of that area would be of little interest and probably contain a higher degree of bias. After 24 interviews the identified factors and other input on the Kenyan iDoc24 service were increasingly reoccurring, which represented a saturation of our factor identification. We then proceeded to perform a couple of niche interviews with experts within areas such as health insurance, provision of mobile phone services, and tropical dermatology that had been established as important in previous interviews. However those interviews served mostly as a complement to the other ones who more directly addressed our research question. Five, Experts were selected on the basis of their expertise within one explicit field, or even a sub-field. However, one of those expert interviews could not be further used within the study, because of secrecy reasons. For the interviews with sub-field experts, we constructed a new, more suitable interview

guide – an adaptation of the original one – that would suit the purpose of that specific interview and fill the gaps of information. The main interview guide can be found in the appendix[4].

The interviews were recorded and the content was afterwards summarized in text. This method made it possible to compare different answers to same question in both a quantitative and qualitative manner. The need for literal transcription of the interviews was perceived as limited considering our research question, and summaries both fulfilled our purpose and were suitable due to time restrictions.

2.7 Research quality

All social science research has to handle to fact that the studied object is continuously changing, which adds to the complexity of the research task. Further, studied objects and systems are often closely intertwined, and it can be hard to entangle causes and explanations in a net of processes and events. This means that case studies can be very valuable, as discussed, since they allow for context specific analysis. At the same time, the role of the researcher becomes increasingly important and is a possible cause of bias within the study. Through self-reflection, the use of multiple sources and documentation of the collection of data this bias has been decreased.

2.7.1 Reliability

In order to ensure reliability, videlicet the possibility for another party to replicate the investigation, results and the research process should be documented (Yin, 2003). Through describing interview and data gathering procedures and documenting the results found, the reliability of this study has been strengthened.

The choice of study objects and sampling method represent another possible reliability weakness. We have evaluated the position of each expert before interviewing them, asked for details on position and professional background during the interview and analyzed the answers with this information in mind. In this way we have diminished the bias that stems from having a sample that largely depend on the social networks of the interviewees. Another measure was to make sure that the distribution was as good as possible between the three areas of investigation, as seen in figure 2. To handle the bias from answers being an expression of personal beliefs, all material was related to the background of the interviewee as well as answers to the same question from other interviewees with the same background. This is an example of horizontal control. The closer to the area of expertise of a person an answer was the more significance was given to that answer. Further, the analysis of documents was made with the origin and purpose of the texts in mind, as a way of trying to determine their accuracy and credibility.

The internal organization of the questions in each interview helped secure reliability in that they started off very open-ended in order to direct and influence the answers as little as possible. Very little information was given about the iDoc24 service until the end of the interview. When analyzing the secondary material, purpose and target audience has been taken into consideration, as a way to minimize reliability issues with the use of this kind of data. We were always two people conducting the interviews and to a large extent interviewees with similar positions were selected, sometimes

[4] See Appendix 2: Interview Guide

active within the same organization. Along with the convergence of data, which made its interpretation less subjective, this helped increasing the internal reliability of the study. This concept is similar to inter-observer consistency and concerns to which extent the members of the research team agree upon and interpret observations and information in the same way (Bryman & Bell, 2007).

2.7.2 Validity

Methodological literature is not clear about the relevance of validity measures when it comes to qualitative studies in general and case studies in particular. This stems from the fact that those measures have a background in quantitative research methods. (Bryman & Bell, 2007) When it comes to case studies, there is a more tacit and situated understanding for the link to other cases and settings. Also, it is questioned whether the aim really is generalization or rather particularization. The goal is then to establish the value of the case and increase the knowledge of the specific topic. (Simons, 2009)

The construction validity of case studies has been one of the main points of criticism because of the fact that they are abstract by nature and often lack operational data. Construct validity concerns the extent to which a study measures the theoretical constructs it aims to measure (Kvale, 1996). In order to increase the construct validity in qualitative case studies one should specify what to study as clearly as possible and make sure that the collected evidence reflects that intent (Yin, 2003). In this study, constructing the interview guides with the theoretical background as a base, along with being familiar with it in order to be able to direct the interviews into issues that are especially interesting for our research question and theoretical perspective is a result of the abductive stance of the study and it has also increased its construct validity.

The research instrument, in our case the interviews, has been refined and strengthened in its ability to answer the research question at hand through the use of triangulation; the fact that observations became recurrent and converging towards the end of the data collection period and horizontal control through interviews with colleagues as well as self-reflection during the process.

Concerning the external validity, analytical and theoretical generalization is aimed for in qualitative case studies as opposed to statistical generalization that is the goal in quantitative methods (Yin, 2003). Through the use of multiple sources the identification of parts that are case specific and parts that can be used to construct theoretical reasoning is facilitated. Using documentation to complement interview data and crosschecking the obtained information gives the possibility to confirm and understand which parts that can be used generally and which that cannot.

2.7.3 Alternative Evaluation Criteria

Alternative criteria for evaluating qualitative research have been divided into two main groups: trustworthiness and authenticity. Four factors measuring trustworthiness, each with their respective equivalent in quantitative research, have been suggested: credibility; transferability; dependability and confirmability. Credibility addresses the problem of multiple possible perspectives and perceptions of social reality, and is thought to parallel the concept of internal validity within quantitative research. One of the suggested techniques to overcome this challenge is to use triangulation and the three methods that constitute the triangulation of this study are described

above. Further, conducting research according to good practice has a large influence on the credibility of the results. (Bryman & Bell, 2007)

In terms of transferability, a concept that is linked to external validity, this is fulfilled through a rich and detailed description of the studied object or context. In this way, others may assess which aspects and findings that can be valid in other contexts. (Bryman & Bell, 2007) Within this study, the description of specific characteristics of the iDoc24 service and the geographical and social context in Kenya, along with the discussion on the link between those factors and the results, facilitates an evaluation of the level of transferability of the results.

The dependability criterion is thought to respond to the reliability of quantitative research. The argument here is that the reliability aspect is problematic in qualitative research due to the difficulty of reproducing a social context or chain of events at a later time. (Bryman & Bell, 2007) However, the methods used to increase reliability described above apply also to dependability.

Further, the confirmability of the study concerns establishing that the personal values of the researcher have been allowed to influence the study as little as possible. Acknowledging the fact that complete objectivity cannot be reached in business research, it is still important to make sure that the research process and findings have not been influenced in this way. (Bryman & Bell, 2007) Through ensuring transparency and describing the way that the study has been conducted, the intention of the authors of this study has been made clearer and the confirmability strengthened. The concept of authenticity relates to the usefulness, impact and political landscape related to research, but it has been fairly controversial and not very influential (Bryman & Bell, 2007). However, some of those aspects are discussed in the introduction and discussion sections of this paper.

3.0 Theoretical framework

This chapter contains a presentation of the theoretical framework used in the study. The two main theories presented here are the Diffusion of Innovations and the BOP frameworks. The BOP is suitable as the country of study is Kenya, containing a large share of BOP consumers. Within the BOP theory, this study will focus on the twelve principles of innovation. Further, the Diffusion of Innovations gives a perspective on the diffusion of the iDoc24 service among the Kenyan population and organizations as well as within the mobile health sector. Focus is within this theory put on the factors encouraging diffusion as well as adoption of innovations.

3.1 The Base of the Pyramid

3.1.1 Introduction

*"If we stop thinking of the poor as victims or as a burden and start recognizing them as resilient and creative entrepreneurs and value-conscious consumers, a whole new world of opportunity will open up."(*Prahalad, 2006a p.1)

The BOP theory is developed from the management literature in order to build a framework for poverty alleviation. Prahalad (2006a) came up with a different way to support the BOP market, defined as the four to five billion people in the world living under two dollars a day. The BOP theory will therefore be used in order to investigate the segment on the Kenyan market adhering to this market definition.

Instead of helping the poor through donor-driven funding, Prahalad (2006a) argues for creating partnerships and engaging the poor. This would force the companies to be innovative and achieve sustainable set-ups, creating win-win situations. In that way the companies that are providing services and products are able to make profits. While the poor gets involved in the global economy at the same time as they are able to improve their quality of life. The core of cooperation to reduce poverty would in that case be large-scale and widespread entrepreneurship among the poor. (Prahalad 2006a) Through looking at the variables above this study aims to discuss whether Prahalad's argumentation holds in the case of iDoc24 in Kenya. In this way the theoretical and empirical implications of the study, in relation to the BOP theory, are highlighted. Further, the theory states factors that are important to consider when developing innovations for BOP markets. It suggests specific challenges and possibilities that are adherent in those markets. Therefore, the BOP theory provides guidance in the search for factors that are relevant for an establishment of the iDoc24 service in Kenya.

Further Prahalad (2006a) has based on his research, identified twelve principles of innovation for the BOP markets. Those principles might not apply to all organizations, but managers rather need to select and prioritize those of importance in each specific case. (Prahalad, 2006a) Nevertheless, it has within this study been considered important to include all of the principles in order to fulfill the purpose and provide a complete answer to the research question.

3.1.1.1 Twelve principles of innovation for BOP markets

The principles aim to address the potential for and development of innovations for BOP markets. They represent a summary of the most important aspects to bear in mind when developing innovations, such as iDoc24, for those markets.

Price-performance

Prahalad (2006a) argues that price-performance is not just about lowering the prices. It is also about transforming the price-performance set-up, videlicet the relationship between price and quality, representing an important part when it comes to growth on BOP markets. For individuals at BOP markets, the evaluation of the price-performance options is provided by analysis by journalist, companies, and consumer reports, as well as friends through word of mouth. All together this makes it easier for those that can read to stay up to date regarding options that are available for them. There is a need to provide services and products at the same quality as in the developed world, but for a lower price. In order to be able to do this, the price-performance relationship has to be accommodated and rethought. These efforts can only be justified if the markets are large and global and the returns are in line with the risks. Investors interested in BOP markets expect the margin per product or service to be low but compensated by large volume, low risk and high return on capital employed. (Prahalad, 2006a)

Hybrid Solutions

BOP markets have to be addressed by a combination of existing infrastructure and advanced technology. Old versions of technologies from developed market are not likely to be able to solve the problems that are prevalent on BOP markets. There is a need of fit between the innovation and the specific market. All markets differ somehow and each innovation needs to be evaluated for every market in order to be sustainable as well as suit the environment. (Prahalad, 2006a)

Commercially scalable

In order to reach the BOP, considering the large number of people included in its definition, Prahalad (2006a) suggests solutions that are scalable and transportable across countries, cultures and languages. NGOs are by far the actors that develop new solutions the most. Scale is a prerequisite in order to create a business case for BOP markets. As stated earlier, the low margins increase the pressure on scale in order to create satisfied returns. *"Most of the markets, such as African nations, are poor and small. The prerequisite for scalability of innovation form these markets is that they are supported by organization that have significant geographical ambitions and reach" (Prahalad, 2006a, p.32).* The organizations that are ideal for this situation are multinational corporations (MNCs), due to their size and ability to make the necessary financial commitments for innovations to succeed. Further, MNCs can cooperate with NGOs and vice versa in order to exchange financial support and know-how of the market. (Prahalad, 2006a)

Sustainable Development

Considering the great size of the global BOP market, estimated to contain about 5 billion people, the resources used for solutions targeted for this market cannot be the same as in the developed world. Instead, there is a need for sustainability and solutions that are ecologically friendly. (Prahalad, 2006a) presents the example of how each person in the US generate about 4.62 pounds of waste per day. The equivalent number for China would be around 5.5 billion pounds per day. The main

challenge linked to such numbers would be where to dump the garbage, and in this case packaging would be crucial. The packaging of products and services is a challenge on the BOP markets and plays a crucial role when it comes to sustainability. Yet no practical solution has come up. The BOP markets will force the developed markets with solutions using resources in a way that has not been done before. (Prahalad, 2006a). Prahalad further argues that by serving the BOP markets, more innovative and sustainable solutions will come up compared to when focus is put only on developed markets, partly due to the limitation of resources.

Functionality

Product development has to begin with a deep understanding of functionality, not just form. The functionality of products and services that are accessible in the developed world might not be suitable for BOP markets. Instead the developers need to focus on how BOP markets deviate from more developed markets in terms of expectations and experiences. There is a need to understand the costumers on BOP markets and what kind of functionality and design that is suitable for their life situation. If target customers at the BOP market cannot be reached, value is not created for either part. Therefore, the business requirements need to be considered, not just concerning appropriate prices but also how the customers will use the product or the service. (Prahalad, 2006a)

Process innovation

The process innovation is just as critical as product innovation, focusing on the ability to suit the process to the local infrastructure. It is a critical factor for the accessibility and affordability of products on the BOP markets as well as for maintenance. There is a need to not interrupt the lives of the poor and at the same time improve the quality of life, while not compromising world-class quality. This means that the way that the product or service is delivered is as important as what to deliver. (Prahalad, 2006a)

Deskilling of work

The design of the product or service needs to take the level of literacy into consideration, as well as the poor infrastructure and difficulties to access the rural areas. Mostly, the BOP markets are scarce when it comes to talent. An example of this is a break out of Cholera in Peru in 1998. 11 000 people suffered the attack and in order for health workers in the remote areas to be able to access knowledge about the disease they got a card with pictures of its progress. By comparing the pictures with the lesions on the patients, the health workers could make judgments and contact health officials in Lima by wireless devices. Those devices where out of reach for the patients, which made it difficult for them to contact hospitals in Lima by themselves. The card that was distributed to health workers therefore represented another way to be able to treat the population in remote areas. This is an example of how innovations need to be suited to the given situation on the market, adding small solutions like this that facilitates work and is able to overcome challenges like illiteracy. The work is through this deskilled without a decrease in quality. (Prahalad, 2006a)

Education of customers

Two prerequisites for market development on BOP markets are required in order to approach the customers. First, there is a need of explanation of the benefits of the usage and second, there is a need of education in how to use the innovation. When it comes to reaching and educating the customers, collaboration between the private sector, NGOs and public authorities is often used. Due

to poor infrastructure and media dark zones, the methods used to access and educate customers need to be innovative. Examples of different methods are billboards painted on walls and truck-mounted demonstration crews, and channels can be NGOs as well as schools. (Prahalad, 2006a)

Hostile infrastructure

Innovations must work in a hostile environment with no electricity and no water as well as have the ability to handle the dust, unsanitary conditions and abuse. An innovation cannot fail due to the everyday environment in a developing country. To operate in the hostile environments often add to the cost in order to reduce the affect of the market. These affects are factors that increase the costs for either the customer or the provider. (Prahalad, 2006a)

Interfaces

Research on interfaces is critical given the nature of the consumer population. This means that the learning curve cannot be long, as most users are first-time users of the innovations. Research on consumer behavior is critical in order to determine the future design of products and services successfully. (Prahalad, 2006a)

Distribution

The distribution system on BOP markets is important and represents a challenge. Innovations must reach the consumer, urban consumers as well as rural consumers. Therefore, innovations in distribution are as critical as process or product innovation. As an example it is worth mentioning a subsidiary of Unilever, called HLL, which found it very difficult to reach the remote areas by the traditional distribution system and started a program to solve the problem. It involved village women distributing their products that were not successfully delivered by the traditional system of dealers and suppliers. The program itself also empowered the women and helped them to become entrepreneurs. (Prahalad, 2006a)

Challenge the Conventional Wisdom

The feature and function evolution in BOP markets can be very rapid. This increases the importance of putting emphasis on the broad architecture in order to improve and incorporate new ideas. *"Enabling people to buy by accessing markets creatively and designing affordable products for them breaks the long-held assumption that BOP markets are not viable".* These markets make us think outside the box and leaving the traditional ways of doing things behind. (Prahalad, 2006a)

3.1.1.2 Factors affecting establishment

Market characteristics

The BOP markets are characterized by being low on resources, diverse and localized. In order to succeed in such markets, companies need new capabilities, responsibilities and values. Some of the areas that are suggested as important to focus on are: social capital acquisition, public-private partnerships, downscaling and infrastructure as well as information gaps and new mind-sets in order to educate and empower the poor. (Chatterjee, 2009) Dysfunctional market systems, with low literacy levels, poor logistic infrastructure and lack of contract enforcement mechanisms, make it difficult doing business with the poor. The lack of enabling market systems creates high transaction costs that might result in businesses giving up the BOP markets. (Gradl et al, 2008)

Consumers on the BOP markets

Market developments are necessary in order to convert the poor into consumers on the BOP markets. First of all there has to be a capacity to consume, stemming from the fact that low purchasing power may result in a non-viable market (Prahalad, 2006a). The capacity is based on affordability, access and availability as well as awareness. Furthermore those companies who have an insight in the reality of the population at the BOP market will understand their priorities. (Prahalad, 2006b) The lack of financial ability implies a need for other possibilities in order to access services and products, creating ability for development of new products and services by involving the private sector. The access to products and services is scarce, due to distribution challenges within the BOP markets. Further there is a need to create trust between the consumer and the market itself. The poor are not brand-conscious but BOP consumers are getting increasingly connected in networks, which mean that the acceptance and exchange of information in networks is high and advanced technology is appreciated. (Prahalad, 2006a)

The vast majority of the poor people in developing countries operate in the informal or extra-legal economy. Most people have no bank access, do not own a phone and lack access to formal water, electricity and basic health care. These conditions lead to poverty traps where people in BOP markets pay higher prices for basic goods and services than their wealthier counterparts, videlicet people who live in the same area but have larger financial resources. Households in rural areas spend less on ICT and the probability that they own a phone is lower than it is for urban households. This is in line with the lack of access to ICT services in rural areas. (Hammond et al, 2007)

Partnerships

Serving the consumers at BOP markets requires innovations within technology, products, services and business models as well as collaboration between large organizations, the civil society organizations and local governments. Those collaborations could possibly create the largest and fastest growing markets. (Prahalad, 2006a) An effective entry strategy on BOP markets would be to integrate with local partners or businesses already established on the market, due to their knowledge about the market and its dynamics. In order for each actor to limit the risk, every partnership maximizes both physical and social infrastructure. (Prahalad & Hammond, 2002)

3.2 Innovation theory

The Diffusion of innovations is a widespread but still quite fragmented research area. It has been a research topic among different groups; economists, technologists and sociologists, approaching it from different angles. (Gopalakrishnan & Damanpour, 1996)

3.2.1 Level of study

The diffusion of innovations can be examined on different levels, and Gopalakrishnan and Damanpour (1996) divide them into four; industry, organizational, subunit and innovation level. The industry and the organizational as well as the innovation level are described further in this chapter due to their relevance for this study. The subunit level is not included since the chosen focus of research is on investigating multiple organizations rather than one particular organization.

Research on industry level can either be intra-industry or extra-industry. While the extra-industry perspective focuses on factors influencing the diffusion of innovations between industries as well as

its magnitude, the intra-industry perspective focuses on the outcomes of innovations and their influences on the performance of an organization. Another line of intra-industry research is the adoption and timing of an innovation across organizations within an industry. (Gopalakrishnan & Damanpour, 1996)

Within organizational research two approaches can be distinguished; the outcome and the process approach. The outcome approach tries to identify the contextual, structural and behavioral characteristics that make innovative organizations deviate from non-innovative organizations. The process approach on the other hand focuses on identifying a broad class of earlier cases and sequences, which is the core of the innovation process. Studies that focuses on the innovation itself, focuses on its diffusion within an industry as well as its use within an organization, influenced by the innovation's characteristics. This study falls into this last category. (Gopalakrishnan & Damanpour, 1996)

3.2.2 An Organization as Generator or Adopter of an Innovation

The innovation generation process is divided into three phases; idea generation, problem solving and implementation, of which the last is the one that influences the diffusion of innovations the most. The process is influenced by its environment, where two elements are of higher importance; technical knowledge (training, devices, publications and current techniques) and the degree of economic and social use of existing products and processes. Those factors result in recognition of needs and wants for new products and processes. Both of those elements are changing over time, shifting the organization away from its current state. (Utterback, 1971)

The adoption of an innovation is expected to result in an organizational change that might affect the performance of that organization. The process consists of three stages; initiation, development, and implementation. Once the decision is made to adopt an innovation the adoption has been made, regardless of the stages within the process. Thereby the decision to adopt a new idea does not necessarily guarantee its implementation. Other requirements, such as the acceptance of the new idea by organizational members or necessary modifications in the procedures, must be satisfied. When the members of an organization have begun to use an innovation as represented by a new device, system, policy or program, the adoption has taken place. (Damanpour & Evan, 1984)

> *"A fundamental element in adoption theory is recognition that innovations are not independent of their environmental context but that they rather evolve in a specific ecological and cultural context and that their successful transfer depends on their suitability to the new environments they enter during diffusion." (Ormrod, 1990, p. 310)*

Innovators are mostly affected by characteristics such as societal entity, familiarity with the innovation, status characteristics, socioeconomic characteristics, position in social networks and personal characteristics. Direct and indirect costs as well as risks are related to the adoption of an innovation, which is associated with the economic situation of actors. When costs exceed the resources of an actor, it often results in rejection of an innovation. (Wejnert, 2002)

In order for organizations in emerging economies to undertake innovative activities, regardless of whether they are adopters or generators, there is need of innovation infrastructure, defined as a set of resources; capital, scientific labor markets, knowledge sourcing and vertical intermediation. Firstly, innovation requires access to capital and organizations can either use internal or external cash flow. Secondly, innovation requires good research facilities and a pool of talented scientists. In economies with a lack of scientific talent, groups can act as incubators for such talent to be created. Thirdly, groups can use relationships with foreign organizations in order to gain the knowledge needed to develop and commercialize new ideas. It could be research joint ventures, co-production, and co-marketing agreements. It is important for organizations in emerging markets to create technological linkages with organizations in advanced economies. However, weak property rights in many emerging markets mean that organizations have only limited ability to negotiate enforceable arms-length contracts. Fearful that they will lose intellectual property, organizations from developed economies may hesitate to license technology in emerging economies. Fourthly, developed economies tend to have robust pools of intermediaries such as suppliers and distributors, which often play key roles in the degree of innovativeness by providing access to skills, equipment, and customers. On the other hand, suppliers and distributors in emerging economies tend to be much weaker. (Mahmood & Mitchell, 2004)

3.3 Diffusion of Innovations

3.3.1 Introduction

This study investigates an establishment of a Swedish mobile health service on the Kenyan market, a new idea in a new context. The theoretical framework on the Diffusion of Innovations, initiated by Everett Rogers, is therefore of importance since it is one of the dominating theories examining innovation and the way it diffuses. The area of focus of this framework makes it relevant for the research question and a useful tool in order to examine the prerequisites for the iDoc24 service in Kenya, in terms of challenges and possibilities. An adopter of an innovation can either be an individual on the market or within an organization, affecting the rate of adoption. Within the extensive literature on the Diffusion of Innovations, we have identified factors that are relevant and applicable for our study and research question. Those factors create an ability to investigate the prerequisites that determine the diffusion of a technological innovation on a market.

In the diffusion process, an innovation is communicated through certain channels within a social system over time. Rogers (2003) refers to diffusion as a social change, where new ideas are established, diffused and thereafter adopted or rejected. They affect the context and social changes occur. This diffusion through communication is a two-way rather than one-way process, where messages are characterized by newness. This newness brings some degree of uncertainty into the diffusion process, where the uncertainty is indicating a lack of predictability, structure and information. (Rogers, 2003)

Four concepts are mentioned within the Diffusion of Innovations; the innovation, communication, time and the social system. Those concepts represent an understanding of how innovations are able to diffuse effectively in a system, either on a market or within and among organizations. The four concepts are applicable for this study in providing a base for the investigation of the prerequisites for

a diffusion of the iDoc24 mobile health service on the Kenyan market. Further, the concepts provide direction in terms of how to characterize and analyze the iDoc24 service.

3.3.2 Concepts

3.3.2.1 The innovation

As previously mentioned in the background, Rogers (2003) defines an innovation as *"… an idea, practice, or object that is perceived as new by an individual or other unit of adoption"*. Newness has different definitions but in this case it could be knowledge, persuasion or a decision to adopt. (Rogers, 2003)

Most of the innovations explored in Diffusion of Innovations by Rogers (2003) are technological innovations. Such innovations usually have two components, a hardware aspect and a software aspect. Hardware is the tool that embodies the technology as a material or physical object, while the software aspect is the information base of the tool. Further, technological clusters are described as a group of one or more technical products closely interrelated to each other, which makes the boundaries of each product a challenge. (Rogers, 2003)

The rate of adoption is affected by differences in acceptance levels. Factors such as the characteristics of an innovation are related to the rate of adoption and some innovations require just a few years while others require decades in order to be accepted within a community. (Rogers, 2003)

Characteristics of an innovation defined by Rogers (2003)

1. Relative Advantage - the innovation is perceived as better than the existing idea, measured in economic terms, social prestige, convenience and the degree of satisfying needs.
2. Compatibility - the degree of alignment between existing values and needs as well as past experiences of the potential adopters. Innovations that go against the norms and values within a social system will have a longer process until it is accepted and adopted, compared to innovations that are in alignment with the current system.
3. Complexity - difficulty to understand and use innovations lead to a situation where solutions that do not need the adopters to develop new skills and understandings will be adopted more rapidly than an innovation that is more complex.
4. Trialability - ideas that can be tried out during the plan of process, videlicet tested parallel to the release of the product will in general have a faster rate of adoption. A higher degree of trialability represents less uncertainty for the individual as a potential adopter in combination with the advantage of learning by doing.
5. Observability - the degree to which the results and consequences of an innovation are visible to others.

The characteristics can be divided into primary and secondary characteristics. Primary characteristics are constant, meaning that they are the same regardless of organization or industry, while secondary characteristics may vary. The primary characteristics are inherent and essential to the object or substance, describing the innovation type. Secondary characteristics are affected by the senses and can therefore be perceived differently. (Downs & Mohr, 1976)

Categories of innovations

The categories are describing the type of innovation. Researchers mostly divide innovations into three types of contrasting categories. These are product versus process, radical versus incremental and technical versus administrative. (Gopalakrishnan & Damanpour, 1996)

In the product versus process category, process innovations are changes between input and output, for example within the technological systems within a subunit, organization or industry (Ettlie & Reza, 1992). Product innovation on the other hand, represents outputs or services introduced in order to create benefits for those interested, for example clients or stakeholders. (Gopalakrishnan & Damanpour, 1996)

Within the radical versus incremental category, the difference between the types of technological process innovation is the degree of novelty. Radical innovations are revolutionizing changes while incremental changes represent continuous and small improvement and changes within the framework of current technology. (Dewar & Dutton, 1986)

In terms of technical versus administrative types, innovations could be a response to external or internal changes. Organizations can fit into environmental changes and uncertainties not only by introducing new technology, but also by integrating technical or administrative changes that improve the level of achievement of their goals, into their organizational structure. (Rosner, 1968) Technical innovations are defined as innovation related to the basic work activity, which occurs within the technical system of an organization. Administrative innovations on the other hand, are defined as innovation that occurs in the social system of an organization, including the relationships within the organization as well as rules, roles, procedures and structures related to exchange of information and knowledge. The outcomes of the changes are perceived to improve and affect the performance of the organization in a positive way within the system where the innovation occurs. Technical and administrative innovations are equally important in order for organizations to grow and run effective operations. (Damanpour & Evan, 1984)

3.3.2.2 Communication

The second concept, which is the communication process, involves messages concerning new ideas. The communication channel is the tool and media that is used in order to exchange information between actors. In general the process involves an innovation, an individual or other unit who is aware of the innovation, an individual or other unit who is not aware of the innovation and a communication channel making the two individuals or units exchange information with each other. Mass media channels are often the most rapid and efficient ones, while channels with more interpersonal characteristics, such as face-to-face, are more persuading for individuals. (Rogers, 2003) Media is a channel to use for influencing the adoption of an innovation primarily at the time when the innovations are popular and well-defined within the society (Wejnert, 2002).

Homophilous versus heterophilous

Other research concerns the way individuals evaluate an innovation. Results show that the first people to adopt an innovation rely upon scientific studies while other groups mostly rely upon the subjective evaluation from people already using the product or service. The latter way is more convenient if the persons exchanging information have the same socio-economic status and

education and therefore are more alike, which signifies being more homophilous. However, a distinct challenge for the diffusion of an innovation is that individuals are mostly heterophilous, which means that they have different socio-economic status, background, education etcetera. A general conclusion is that diffusion is a social process involving communication in interpersonal relationships. (Rogers, 2003)

3.3.2.3 Time

Time is the third concept in the Diffusion of Innovations theory. Rogers (2003) argue that the time aspect strengthens the theory because of the fact that this concept is simply ignored within other strands of behavioral research. A common problem for organizations and individuals is to increase the rate of diffusion. This means that an innovation requires lots of time, often many years, before it is widely adopted, even though there are obvious benefits of adoption. (Rogers, 2003)

The innovation-decision process

The innovation-decision process is an information seeking and an information processing activity, where the end-customer or individuals within an organization want to create an understanding of the innovation resulting in decreased uncertainty. The process begins with an individual having knowledge about the innovation and ends when the individual has formed an opinion about the solution and whether to adopt it or not. It is a five-step process containing the stages of knowledge, persuasion, decision, implementation and confirmation. The first two steps will be explained further, due to their relevance for this study. (Rogers, 2003)

Within the knowledge step the main purpose is to seek information about the innovation. An increased knowledge reduces the uncertainty about the innovation and its cause-effect relationship, which signifies its capacity to solve a problem. There are three types of knowledge. The first one represents and answers the question *"What is the innovation?"* creating awareness of the innovation, which might induce an individual to search for the second and third type of knowledge. The second type of knowledge is necessary in order to use the innovation correctly, that is how-to knowledge. The third and last type of knowledge is the principles-knowledge. It deals with the functioning of the innovation and it is possible to adopt an innovation without this kind of knowledge. However, there is a risk of misuse of the innovation that would result in discontinuance, which means that the innovation is rejected after the adoption. Within the knowledge phase, mass media is an effective communication channel due to its ability to reach a large population rapidly, create knowledge and provide information as well as turnaround weak attitudes against an innovation. (Rogers, 2003)

Persuasion is the next step and represents the individual looking for information regarding the evaluation of the innovation. This is done in order to decrease the uncertainty about the possible consequences and understand the advantages and disadvantages linked to the use of the innovation. In this step the most effective communication channel would be the interpersonal network, due to its two-way communication characteristics, partly through meeting face-to-face, and the ability for an individual to persuade another individual and change his or her attitude. (Rogers, 2003)

Categories of adopters

Adopters of new innovations can be divided into categories, where innovativeness is the degree of which an adopter is early in accepting new ideas compared to other members of the system. The different categories are: innovators, early adopters, early majority, late majority and laggards. Innovators actively seek new information regarding new innovations. (Rogers, 2003)

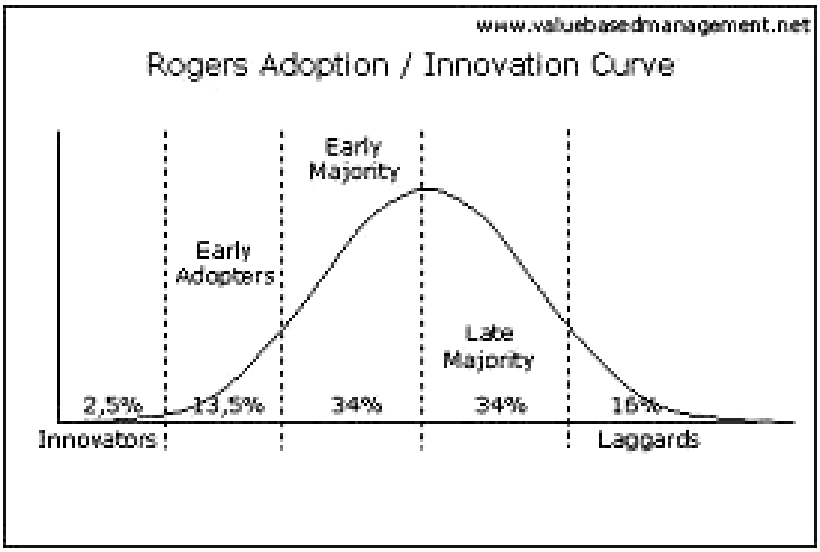

Figure 3: *Adopter categories for innovations. Source: Rogers (2003).*

Goffin and Mitchell (2010) define the categories of adopters as follows:

- **Innovators** – Innovators have a widespread interpersonal network and they take part of mass media, which results in uptake of information and insights from outside of their own local system (Rogers, 2003). They are often technicians and interested in the novelty itself.
- **Early Adopters** – Their primary interest is the new opportunities that the innovation provides. In cases where the adopter is a company, it is mostly competent within technology and wants to acquire a competitive advantage by adopting innovations at an early stage. When the adopter is an individual, he or she is typically socially and financially secured, which increases the willingness to take risks and make failures.
- **Early Majority** – The adoption of an innovation within this group represents the phase where an innovation is beginning to diffuse widely on the mainstream markets. Members of this group are conscious about their decisions and will only adopt an innovation when they believe that they will achieve benefits from it. In contrast to the early adopters, the early majority rely on observability and trialability, instead of their own judgment.
- **Late Majority** – They are careful with the adoption of novelty. Often they buy from a large brand or large companies in order to receive security.
- **Laggards** – Members of this group are hesitant to novelty and will only adopt when they are forced to.

The focus of this study will be on the innovators and early adopters, because of the fact that those groups are the ones most eager to pick up new ideas and solutions. The iDoc24 service does not yet

exist on the Kenyan market, which makes those categories of adopters the most relevant in order to investigate the research question of this study.

The categorization of adopters depends on the willingness of each individual to take risks through adopting a new idea or behavior before anyone else does. Most common is that people are reluctant in the beginning and prefer to wait until someone else has tried the new solution or idea. Recent studies claim that the social network has an impact on the categories of adopters. The social system creates relationships among the members of the system, that communicate, advice and support each other, and those relationships influence the time-of-adoption and thereby the ability for an innovation to diffuse efficiently. (Valente, 1996)

The diffusion of innovations within a social network is influenced by characteristics such as centrality, density and reciprocity (Valente, 1996) as well as structural equivalence (Burt, 1987). Further, weak ties among the individuals in the network make it easier or even necessary for diffusion to cross subgroups within systems (Granovetter, 1973). Granovetter (1978) also argues for the threshold model of collective behavior as a way to approach the diffusion of innovations, which means that already existing behavior within a system and its norms influences each individual to act and behave according to the engagement of other people within the social system.

3.3.2.4 The social system

A social system is a set of interrelated units that are engaged in achieving the same goals, through joint problem solving. The sharing of the same objective makes the interrelated units stay together, but every unit can be distinguished from the others. The nature of the social system and the characteristics of the individuals affect the innovativeness within the system. The social structure within the system gives stability and regularity to individual behavior, while the communication structure represents the way that the communication flows within the system. Individuals talking to everyone in the system with equal probability would characterize a lack of communication structure. Both the communication and the social structures facilitate the diffusion of innovation within the system. However, research on how the structures actually affect the diffusion and the adoption of innovations within the system is still scarce. (Rogers, 2003)

Business groups can facilitate innovation by providing institutional infrastructure, such as internal capital markets in weak external capital markets, business reputations and government ties that attract foreign technology providers and concentrated ownership that provides long-term perspectives on research and development investments. However, business groups can also hinder innovation by creating barriers to new entrants and thereby limiting opportunities to experiment with new technology. Given their ubiquity, it is important to understand how groups of businesses affect innovation, which is crucial for economic and social development in developing countries. (Mahmood & Mitchell, 2004)

The social system sets the boundaries of how an innovation can diffuse due to norms, the role of opinion leaders, types of innovation-decision and change agents as well as in terms of the expected consequences of the innovation. (Rogers, 2003)

Norms, Opinion leaders and Change agents

Norms represent the expected behavior among the members within a social system, which can create barriers and resistance toward certain changes. The norms are implicit guidelines for the actions of the members. Opinion leaders provide information and advice within the social system. An opinion leader is an informal leader who is able to affect the attitudes or change the behavior of other members of the group in a certain direction. If an opinion leader deviates too much from the norms of the group the trust and respect for the leader can be affected in a negative way. (Rogers, 2003)

A change agent is a person, often with a university degree within the technical field, who sees the inherent possibilities of new solutions and wants to adopt them. At the same time the agent rejects solutions that do not align with the needs of the unit. Undesirable innovations are thus prevented. The change agents often introduce innovations that are desirable, direct and anticipated in terms of consequences. (Rogers, 2003)

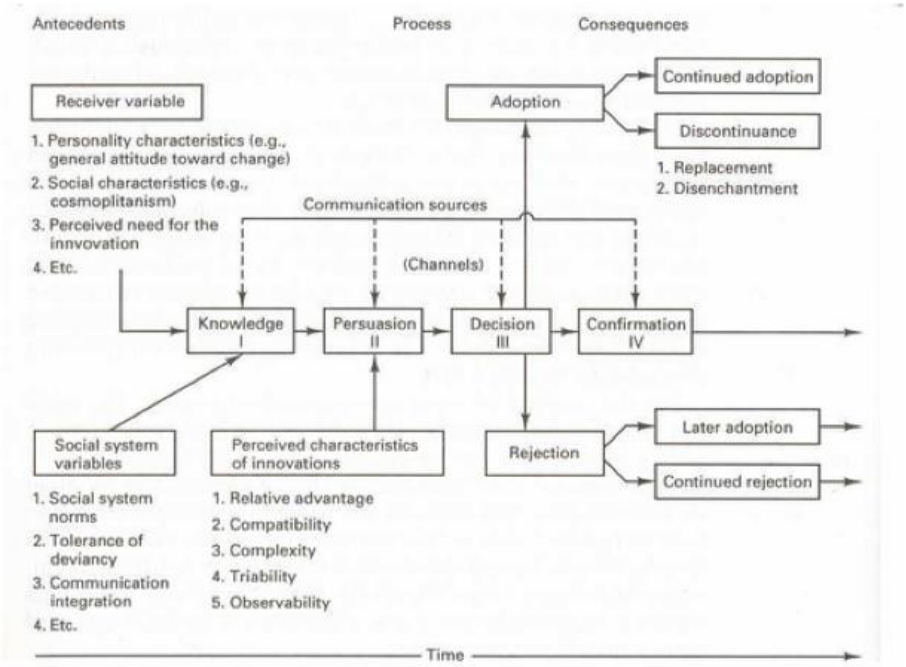

Figure 4: *Diffusion of Innovations. Source: Rogers (1995).*

3.4 Problems and limitations with the theories

The Diffusion of Innovations framework is one common innovation theory raising the importance of time. The theory lifts the characteristics of the innovation and its environment, affected by the time factor. When analyzing an establishment as a process and not a static phenomenon, this is an important element complementing the BOP theory, which has a different and more static focus. Further, the BOP framework is a general theory that provides principles and insights applicable to all developing countries and their markets. The Diffusion of Innovations is developed from a consumer perspective, on markets where consumers are able to pay for the innovations provided. By merging the BOP theory with the Diffusion of Innovations, the latter becomes applicable to developing markets where its use previously has been limited.

3.5 Integrating the Theories

By combining the two theories, research question one and two can be answered. The twelve principles of innovation for BOP markets are used in order to answer question one. Those are matched with theoretical concepts from the theory on Diffusion of Innovations, and the theories are coupled in order to create a base for addressing research question two.

Social systems and networks don't have a lot of focus within BOP (or at least their inherent mechanisms are not analyzed or developed much, it is merely pointed out that relationships are important). However, those are estimated to be crucial for the diffusion and development of innovations, including interactive development, which is emphasized within BOP theory. More specifically, the character of the institutional and social context, including relations and actors is important in order to reach increased understanding of the processes of establishment of new innovations and the local context factor is explored in depth through the Diffusion of Innovations theory.

As mentioned earlier, the theories are complementing each other and therefore they create a suitable match in order to analyze the prerequisites of an establishment of the iDoc24 service on a BOP market, in this case Kenya. As shown in the figure below, some of the principles from the BOP theory are aligned with the characteristics of innovations mentioned in the Diffusion of Innovations. The principles that are not applicable to the Diffusion of Innovations create a complement to the theory that makes it suitable for BOP markets as defined by Prahalad (2006a).

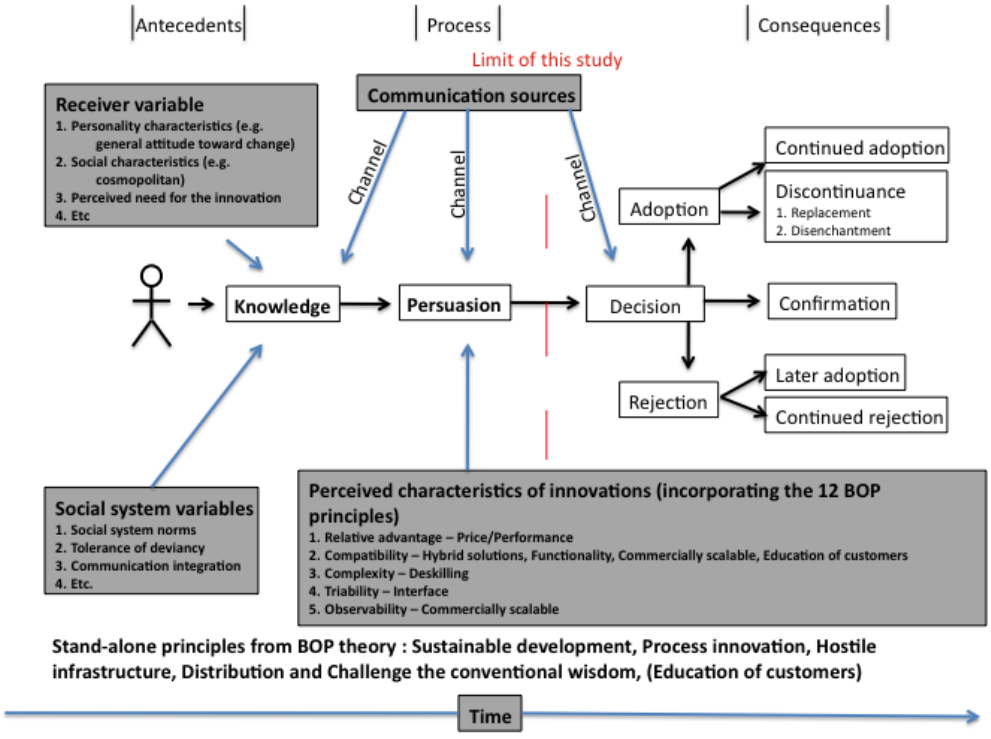

***Figure 5**: A figure combining the Diffusion of Innovations and the BOP theory. Source: A modified figure based on Rogers (2003) and Prahalad (2006a).*

4.0 Empirical Findings

This chapter starts by presenting the iDoc24 service and describing the way it is set-up in Sweden, including specific market characteristics. Thereafter, the chapter continues to describe similar services and solutions that are already at a pilot stage in Kenya. Lastly, characteristics of the Kenyan market related to the iDoc24 service are presented with a focus on the health and telecom sector, as well as general structural aspects.

4.1 The iDoc24 service

The idea of iDoc24 is to increase the availability of skin specialists (dermatologists) regardless of time, place and quality of network connection at the particular moment. iDoc24 offers anonymous medical advice for any visual medical concern, through mobile phones and Internet. (Interview, Börve, 2011)

The user can send a case trough the mobile phone either by using MMS or a smartphone (iPhone/Android) application consisting of a picture and questions regarding the skin concern. A third possibility is to use the web form on the iDoc24 homepage. Within 24 hours the patient is guaranteed a response from a dermatologist. The patient will know the name of the dermatologist giving advice, but every patient is anonymous. If the patient would like further contact with the dermatologist, he or she can either send another case or contact the dermatologist in order to meet face-to-face. The process from the time that the case is sent to iDoc24 until the patient receives an answer is illustrated in the figure below. (Interview, Börve, 2011)

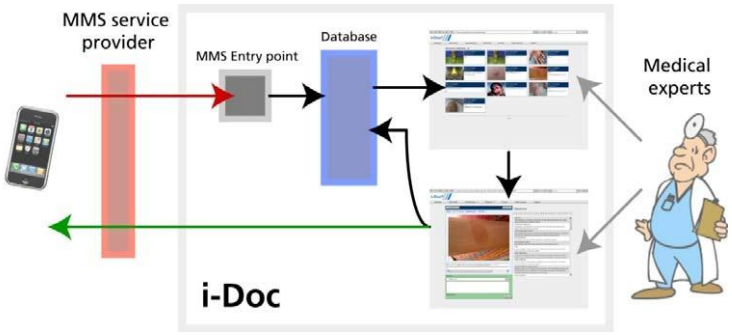

Figure 6: *The operation flow of the iDoc24 service. Source: iDoc24 Business Plan (2009).*

4.1.1 The value of iDoc24

Any person with a visual concern is a potential customer. By using the iDoc24 service, the patient does not need to spend the time, money and effort needed to go to a hospital. Through the service a dermatologist can be reached at an early stage and the consultation takes less time than a visit to a general practitioner in order to receive a referral to a dermatologist. (iDoc24 Business Plan, 2009)

The service is not supposed to substitute the patient-doctor relationship, but rather it is a complement to the existing health care system (iDoc24 Business Plan, 2009). The value of visiting a dermatologist face-to-face cannot be replaced. This service is a complement and provides another possibility for the patient to get medical advice, and to decide whether to go and see a dermatologist in person or self-treat. The service enhances more advanced search on Google, as now the user knows what to search for. (Interview, Börve, 2011)

Videoconferencing is another way for the patient and doctor to reach each other, even though compared to the iDoc24 service it has a slightly different purpose. Through not being dependent on coordination in time nor space, the iDoc24 service is less dependent on the specific whereabouts of the doctor and patient and the service therefore contains a higher degree of flexibility. (Interview, Börve, 2011)

4.2 iDoc24 in Sweden

4.2.1 Payment Model

In the current Swedish set-up, the patients pay the whole cost of the service, which is 195 SEK[5]. The dermatologists receive approximately 100 SEK per consultation, and the cost of the transfer of the cases depends on which kind of channel that is used. Further, the service is outsourced to a network of dermatologists. The payment model is illustrated in the figure below. (Interview, Börve, 2011)

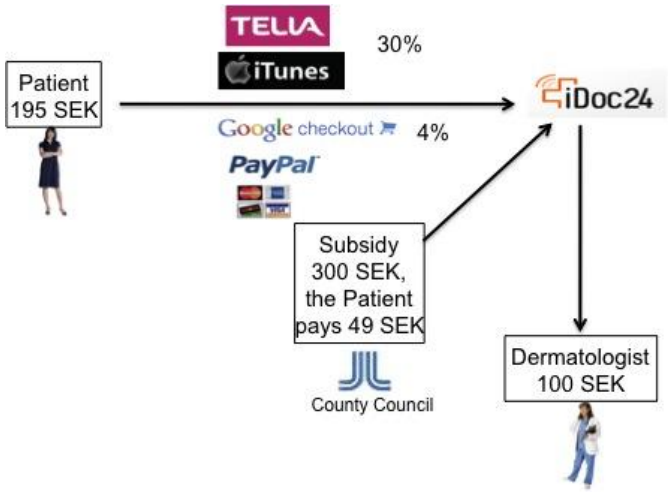

Figure 7: *Business model – flow of money. Source: Börve (Interview, 2011).*

The cost of the service is today too low in order for iDoc24 to reach break-even. To achieve this, the cost of the service would have to be 300 SEK. With no similar service on the market, this optimal price has been derived from the actual costs of the process and by comparison with the costs of existing health care services, for example the actual cost for the county council to send patients to specialists (1700 SEK) as well as the cost of visiting private dermatologists (600-1000 SEK), on the market. There are still challenges, as the service is new on the market and people are not yet comfortable using mobile phones for health care. (Interview, Börve, 2011)

There is a second payment model illustrated in the figure above, where the patient pays a smaller part of the cost, 49 SEK, and the county council pays the rest. By using the service within the Swedish health care system the costs for the county council would decrease. This model is however still under development. Initially, the primary user was supposed to be the county council who is still a key player in order for the company to grow and reach the big mass (iDoc24 Business Plan, 2010). During

[5] Swedish krona – The currency of Sweden.

the past years the entrepreneur has put effort into research, in order to show potential investors and authorities, evidence and facilitate being accepted on the market. (Interview, Börve, 2011)

A third payment model for iDoc24 can be based on advertising income. When the users send a case and receive an answer, they would have the possibility to click on a hyperlink. In that way each patient could get in contact with the dermatologist offering advice in person and book an appointment for treatment. In this set-up, the dermatologists can either give free consultations and get the ability to advertise for free or they can charge for each consultation and pay for advertising. (Börve, 2011)

4.2.2 The Market

The entrepreneur behind iDoc24 has estimated that approximately 20 percent[6] of the Swedish population has either an iPhone or an Android. This means that there are 1.5 to 2 million people with the possibility to use the application provided by iDoc24. (Interview, Börve, 2011) Another estimation is 13 percent (Barreto, 2009). The availability of the phones is not the problem, but rather the advertising in the phones. For example the iDoc24 application is quite hard to find for an iPhone user. (Interview, Börve, 2011)

According to Börve (Interview, 2011) 15 percent of all visits to general practitioners are related to dermatology, which more or less indicates that there are 2-3 million cases relating to skin in Sweden. According to the pilot study, explained further in the section "testing the service", iDoc24 was able to advise 70 percent out of 200 patients within the study to self-treat while 30 percent were advised to go and see a doctor in person, preventing "patients delay". 30 percent of the cases were genital worries, 25 percent were pigmented lesions and the last 45 percent were other skin concerns. During the study three throats cases and one eye case were received, as well as one skin tumor that was successfully treated within 48 hours using the service. (Interview, Börve, 2011)

Other main segments have been identified based on the distribution of the cases that have been handled during the two years that the service has been running. The distribution of the cases is:

- 25 percent skin cancer (Basal carcinoma, Dysplastic nevus, Malignant melanoma, Actinic keratosis, Squamous cell carcinoma). Either it is nothing to worry about, but you should still be observant if it itches, grows, changes color or looks strange, or you should go and see a doctor face-to-face for further analysis.
- 30-40 percent genital problems (Herpes, Condyloma, Balanitis, Folliculitis), mostly of the male gender. The cases are mainly sent in during weekends.
- 35-40 percent worried mothers and travelers but also others that feel concern. Within this group, the problems can be symptoms that are easily recognized at an early stage, like Borrelia (Lyme's disease), and therefore treatment would cost less for the society if the patients were treated in an early stage. There are also people sending cases in order to get a second opinion, they have already been to either a general practitioner or a dermatologist, and wants to have another statement from a dermatologist. (Interview, Börve, 2011)

[6] 2010

4.2.3 Legal issues that concerns iDoc24

iDoc24 is following the legal concept behind Vårdguiden[7] and Mina Vårdkontakter[8]. This is a way for them to play safe and do what an authority is already doing. If iDoc24 knew who the patient was, if the service was not anonymous, they would have a responsibility to follow up each patient, which is costly in terms of time and effort. This concept also limits their ability to give prescriptions that would be an advantage according to the entrepreneur and possibly a way to increase the traffic and value of the service (Interview, Börve, 2011).

4.2.4 Testing the service

The service has been tested within the county council in the Västra Götaland Region[9] via Vård på Webben[10], over an 8-month period (iDoc24 Business Plan, 2009). The county council bought 200 consultations from iDoc24. In average every user received an answer within 3 hours. Thereafter each patient was requested to go to the iDoc24 website in order to evaluate the service and 25 percent of the 200 patients did this evaluation. 98 percent of them were satisfied, 1 percent got more worried and another 1 percent did not trust the service. (Interview, Börve, 2011)

4.2.5 Challenges

One of the biggest challenges today is the scalability of the service. iDoc24 need to handle 10 cases per day, videlicet 300 cases per month in order to reach break-even. For iDoc24 and its type of service, especially in a country with a health system like the Swedish one, the relation to the county council is crucial in order to reach the bigger mass, and in that way the volume necessary to decrease the cost that is put on the patient. The current set-up of the service is transportable and makes the service easier to expand to the rest of the world. iDoc24 has already expanded to the countries within the European Union. (Interview, Börve, 2011)

To overcome the issue of scalability, iDoc24 is planning for rapid international expansion in order to leverage on the technical characteristics of the service making it possible to have users and providers of the service located virtually anywhere on the globe. However, there is a need for adaptation of the business model for each country where the service is going to be provided in terms of business model, adaptations to the local health care system and regulations. (Interview, Börve, 2011)

The different versions of providing the service all have differing challenges linked to their set-ups. Firstly, from the medical quality aspect, the application provides a package to the dermatologist including picture and the information needed in order to give medical advice. The MMS service on the other hand cannot ask the patient about certain information, but rather it is up to the patient to provide the correct information, which constitutes a risk for the quality of the medical advice. Further, the MMS service is difficult to use for certain groups, like elderly, due to the fact that you have to send your case to a specific number, 72 672 and use the prefix “doc”. This should be compared to the application where you just follow the instructions given in the application and send it in, which more easily can be done by anyone.

[7] Vårdguiden is driven by the county council in Stockholm to inform about health care through internet, telephone, journal.
[8] Mina Vårdkontakter is an eHealth service in order to keep in contact with your health care facility.
[9] Region on the west coast of Sweden
[10] An internet project: for the Swedish citizens to retrieve health information.

Secondly, the quality of the picture is a challenge, depending on the mobile camera and its focus as well as the number of megapixels. The more information and the better quality of the picture the easier it is for the dermatologists to give the correct medical advice. There is a risk that the users of the service provide too little information and an unfocused picture, depending on the education of the user. If the service would be used within the health care system, in order to send information between a nurse and a dermatologist, the nurse would have been trained in that particular stage and through that the resulting pictures would probably have been of better quality. Also, the correct information in order to provide the best possible answer related to the concern would have been added to the picture. (Interview, Börve, 2011)

Another challenge is to make people think about iDoc24 when they recognize a visual medical concern. Today iDoc24 has been granted the distribution of their Android application in the Samsung Galaxy Tablet for the UK market. Cooperation with different operators creates channels for free marketing and increases consciousness among the population. (Interview, Börve, 2011)

4.3 Kenyan cases

4.3.1 WelTel

The WelTel project was at the beginning a pilot, with the purpose of reminding HIV-infected adults who were in antiretroviral therapy, ART, to take their medicine. The pilot involved three clinics in Kenya. Patients were reminded weekly through a short message service, SMS, from a clinic after which each patient had a responsibility to answer. Previously, there have been difficulties controlling HIV-infected adults through prevention strategies, partly due to poor infrastructure and increasing health-system costs. (Lester et al., 2010) Increasing penetration of mobile phones and decreasing costs of both handsets as well as services have resulted in a tool that is possible to take advantage of within the health sector (Interview, Lester, 2011). This has created a possibility to improve health service delivery by providing patient-focused support and management within the health system. (Lester et al, 2010)

The pilot was developed through an interaction between investigators, clinic staff and the patients with a goal to achieve both decreased costs and a widespread usability. The study involved two different groups of participants, a control group and a group receiving the SMS´s. The service was a complement and did not replace the regular counseling nor the emergency service. The patients all got a brief explanation and training on the SMS-service. Every Monday morning an SMS was sent from the different clinics to each patient to check their status and remind them about the phone-based support. The patients were then supposed to respond within 48 hours. The response was either that everything was good, “sawa” (which means ok in Kiswahili), or not, “shida” (which means problem). The clinicians then phoned the patients responding “shida” and those that did not respond at all. (Lester et al, 2010)

The results from the pilot were an increased self-reported adherence among the participants (95 percent) and an increased suppression of viral loads among the patients receiving the SMS compared to the control group. The conclusion from those results was that mobile health innovations could possibly improve the outcomes of HIV treatment in Kenya. The higher follow-up rates and lower mortality strengthens the outcome of the pilot study. (Lester et al, 2010)

4.3.2 Study on Mobile Applications for the Health Sector

Dalberg, a consulting firm based in Africa has conducted research within the mHealth ecosystem. This system is described as consisting of three areas; health, finance and technology. New mobile technology, as well as increased mobile penetration, creates an ability to carry and process information within the health systems, even though this technology cannot carry drugs, doctors or equipment from one place to another. The information carried can be in several forms; coded data, images, audio, video and text.

To develop sustainable business models, integration between investors, policymakers and developers is important. At the same time, regulations have to be conductive to business, competition, entrepreneurship and finance access. The development, adoption and establishment of mHealth applications need to be guided by several stakeholders; government agencies, technology companies, mobile network operators and health care providers, as well as groups already involved in ICT and national eHealth strategies, taking advantage of their knowledge. Further, the developed technologies and business models have to be able to handle scalability and replication. The business model should be able to carry costs for monitoring and evaluation as well as further implementation. Evaluation is important in order to achieve successful uptake and use. (Dalberg, 2011) Thereby it is important to reflect the key priorities, needs and opportunities as well as constrains of the Kenyan market in the development of mHealth applications. The strategic approach needs to recognize broader ICT priorities and integrate mHealth. Further, the core requirements and strategy for implementation needs to be outlined. To be able to evaluate the strategy further, the lessons learned and the impact of the efforts needs to be identified. (Interview, Miller, 2011)

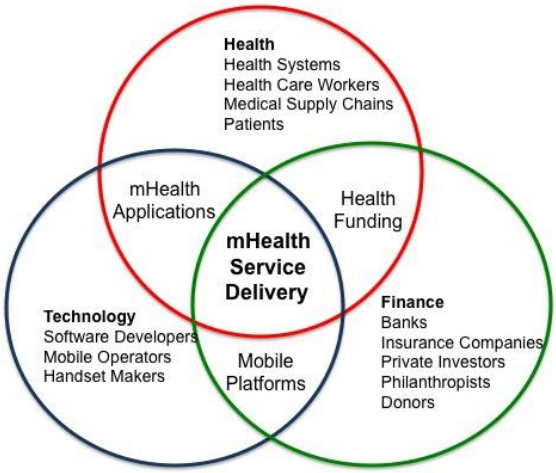

Figure 8: *The main areas of mHealth solutions. Source: Dalberg, 2011 (Modified from the report).*

Most of the 60 mHealth applications studied were in their pilot phase. Due to their limited time of existence, the structure of operations and business models for most mHealth applications are quite underdeveloped in Kenya. The health sector is dynamic and developing, even though it lacks standardization and interoperability. Solutions within mHealth are often homegrown and limited in their capacity as well as in the training of those using and delivering the service or product. In order for the whole population to take advantage of mHealth applications, the level of literacy in ICT and health needs to increase, in order for the users to be able to understand and access the applications. Both new and already existing services within mHealth have to address the needs on the ground. In

the rural areas there is an acute challenge, both when it comes to human resources and finance but also concerning data on health needs.

Most implementers on the Kenyan market are NGOs that are financed by donors, who often are governments, multilateral agencies, and foundations. Further those donors should strive to fund mHealth projects that reflect the needs of the health systems in developing countries. (Dalberg, 2011)

Based on the investigation and development, focus should be put on platforms and enablers, and incorporate mobile health workers and clinics. Today most applications are focusing on data collection and health information systems, HIS. In order to standardize and integrate HIS, the government should cooperate with the private health care providers on the market. That would increase the possibilities to maximize the coordination between private and public health care and thereby the power of mHealth. (Dalberg, 2011)

The mobile applications study consists of several example cases from Haiti, India and Kenya, of which two are Kenyan cases. One of those is WelTel, described above, and the other is Changamka. Changamka was founded in 2008, and offer their customers a digital health service in a smart card. When a smart card is bought for 500 KES[11] it includes credit for a medical consultation, a lab test and a prescription and the cards can be reloaded using Mpesa. This is one way of increasing the usage of the card. The integration of existing mobile services, such as Mpesa and Mobile Money[12], to the platforms is important in order for a solution to be sustainable and suit the existing market. The results of the report suggest that the Government, along with industry associations, should set-up rules to create the most integrative systems as possible, for example by using open-source platforms. (Dalberg, 2011)

Today, Changamka cooperates with 48 clinics in Nairobi. Their business model is a for-profit model, where Changamka receives 20 percent of the sale price of the cards. During their first year they sold around 500 cards per month and in order to reach break-even in the future they need to sell around 8500 cards per month. This would give them a revenue of 23 300 KES, compared to the revenue of 3 200 KES in 2008. One advantage with the product is that the card is not private in the sense that the users are able to share cards with their families, relatives and friends. Further, the user does not need to pay regular premiums and savings are realized at the point of treatment across the network of clinics. Until now the services have mostly been used by pregnant women and new mothers. (Dalberg, 2011)

A challenge with the service is to convince and serve customers in a market where the culture of health savings is a new and unusual area, which requires customer education and marketing that reaches as many people as possible. Finance is another noticed challenge from the perspective of Changamka, along with the cost of acquiring customers. There is a lack of marketing and difficulty of promoting health insurance, which has a negative historical image. To increase the evidence base on mHealth projects and through that increase the possibilities to acquire new capital and influence financing decisions, it is essential for the backers of the industry within both public and private

[11] Kenyan shilling – The currency of Kenya
[12] Money transaction service via the mobile phone (another solution like Mpesa)

sectors to gather information on the potential as well as the performance of mHealth today. (Dalberg, 2011)

4.4 The Kenyan Market

4.4.1 Country Background

The Kenyan population is approximately 40 million, and the estimated unemployment rate was 40 percent in 2008. The urban population was 22 percent of the total population in 2008, and the urbanization rate 4.2 percent annually (CIA, 2011). In 2005, 40 percent of the population were living on less than USD 2 a day, which means that the BOP market in Kenya consist of approximately 16 million people (Gapminder, 2011). GDP per capita is USD 786 according to 2011 forecasts (Economist Intelligence Unit, 2011).

The share of the population over 15 years of age that can read and write is estimated to be 85 percent. The population growth rate is 2.5 percent, with a birth rate of 33.5 births/1000 population and a death rate of 8.9/1000 population. The median age of the population was about 19 years in 2011. (CIA, 2011)

Kenya is a regional hub for trade and finance in East Africa, even though society is highly influenced by a large prevalence of corruption on all levels. The government has done little to deal with this problem. The growth rate for 2010 was 4 percent, representing a recovery from post-election violence in 2008 and the global financial crisis. Services represent the largest sector in the Kenyan economy (62 percent), but 75 percent of the labor force work within agriculture, the second largest sector. (CIA, 2011) In 2009 6.8 percent of the adult population was using a formal insurance product and the aid received from other countries was 4.4 percent of GNI in 2007 (Finscope, 2011; Gapminder, 2011) by mid-2009 there were 3.4 million Internet users (BBC, 2011).

4.4.1.1 Institutional Structure

One of the main challenges within the Kenyan institutional structure is excessive bureaucracy (Interview, Sequeira, 2011). Some processes can be tedious and frustrating, but that has to be weighed against the benefit of an overall control of the different solutions on the market (Interview, Sundsmo, 2011). Further, uneven allocation of the scarce resources within the country is a persistent problem (Interview, Wawira, 2011). For health projects, there is a procurement process including registration with the government and a control that the project adheres to the standards and regulations that are set-up. Following this, continuous reporting is required. (Interview, Ogara, 2011; Imbugwa, 2011) Within the mHealth area, there is so far not that much regulation and the legacy systems are to a large extent created in cooperation with the actors within the sector. In terms of regulation, one of the main issues is the secure transferring and storage of sensitive data on servers. (Interview, Wesonga, 2011)

The structures for starting businesses are somewhat lacking and the estimated time to start a business is 34 days (Interview, Liko, 2011; CIA, 2011). There are not very many suitable bodies and communities to partner with and implement new solutions through and the provision of statistics within the country is not satisfactory (Interview, Wanyee, 2011; Liko, 2011). However, it has been easier for Swedish companies to establish in Kenya recently, and access to the market is facilitated by

its level of global integration (Interview, Källbäck, 2011; Kahindi & Mutengi, 2011). The high focus on reaching the UN millennium goals in Kenya has been noted internationally (Interview, Wiking, 2011).

4.4.2 The Telecom Market

Kenya was an early adopter of telecommunications technology and mobile solutions, which has led to a rapid penetration of mobile phones and expansion of the sector (Interview, Wawira, 2011). The increased use of fiber optics and lowering of prices are two trends within the sector that seems to be improving all the time in terms of efficiency, quality and cost. (Interview, Milewa, 2011)

The fixed line telephone system is small and inefficient (CIA, 2011). Mobile network coverage has grown rapidly during recent years, with four main operators – Safaricom, Airtel Networks, Essar Telecom and Telkom Orange – active on the market, resulting in price wars. Out of those, Safaricom is the market leader, with a 75 percent market share in September 2010. (Communications Commission of Kenya, 2011) In May 2011, regulation changed and it became possible to switch between operators while keeping your phone number (Interview, Miller, 2011). Some of the recent developments that have facilitated the rapid growth of the Kenyan ICT market are deregulations, introduction of a single licensing system for service providers and policies that encourage the sharing of infrastructure by operators (Hellström, 2010). General network coverage is estimated to be close to 100 percent in the urban areas, while both coverage and more basic infrastructure such as electricity often is a problem in rural areas, which means that service providers that are dependent upon such infrastructure have to rely on a back-up system (Interview, Sequeira, 2011). The increase in availability and network reach makes service provision possible to a certain extent even in very remote areas (Interview, Mimano, 2011).

Mobile penetration reached 55.9 percent in September 2010. Levels have risen and continue to rise; the 55.9 percent can be compared to a 46 percent level one year earlier. (Communications Commission of Kenya, 2011) A rough estimate is that 20 percent of the population in the urban areas has access to data through their mobile phones, while low-end phones are the most common device in rural areas (Interview, Milewa, 2011). The price wars have resulted in a decrease in prices not only on data transfer but also on the devices themselves, leading to a situation where mobile devices in general are cheap gadgets and smartphones are affordable for an increasingly large share of the Kenyan population (Interview, Mimano, 2011; Ogara, 2011). As a consequence, the BOP part of the Kenyan market also has access to mobile phones, if nothing else through sharing within large families and/or villages, but any mHealth solution would need to take the technological capacity of the devices that the target group has access to into account (Interview, Lester, 2011; Wiking, 2011; Mukabi, 2011). Today, the Kenyan population is reliant on the mobile phone as single modality and there has been a shift towards mobile solutions as norm (Interview, Lester, 2011).

Mobile phones are mostly used for calling and texting. However, as more advanced technology is spread, a rapidly increased use of MMS and Internet applications is anticipated (Interview, Sundsmo, 2011). Increased sales of data services are estimated to be crucial for operators in order to create higher revenue. Another common use of phones is for handling payments, above all through Mpesa. (Interview, Sequeira, 2011) Mobile phones have been easily accepted as a communications tool among the population, regardless of the level of literacy, which means that even illiterate people use it for payments (Interview, Mimano, 2011). The penetration of mobile phones has also increased the

possibility of using two-way communication within organizations and projects, increasing quality of the feedback that is received. (Interview, Imbugwa, 2011)

4.4.3 The Health Sector

The current trend when it comes to health in Kenya is that living standard and healthiness increases in both urban and rural areas. However, medical treatment is not in line with those environmental changes. Fundamental socio-medical facts are ignored, and hospitals refusing patients who cannot afford to pay for their treatment is still a big problem. Access to doctors outside of the big cities is low – about one percent of the Swedish standard. Further, nurses and clinical officers, who have an abbreviated medical training, manage most of the open clinics. At the same time as the healthiness within the rural areas in Kenya is increasing, the types of diseases are becoming more similar to the European ones. This puts pressure on the hospitals in Kenya to handle the new needs, a challenge that so far seems to be difficult. (Andersson, 2008)

4.4.3.1 Statistics

In 2005 4.5 percent of GDP was spent in health. (Gapminder, 2011) Life expectancy in Kenya is approximately 60 years (CIA, 2011), and the mortality rate among children who are under 5 years old was 84 in 2009[13] (WHO, 2011).

4.4.3.2 Resources

The Kenyan health sector is to a large extent tormented by a lack of financing. There is a low investment rate, partly linked to corruption within the institutions, which leads to hesitation among funders (Interview, Kituyi, 2011). Nevertheless, the Kenyan health sector is largely dependent on funding from outside of the country even though this flow of resources has recently been affected by the global financial crisis (Interview, Imbugwa, 2011). Lack of financing leads to problems with paying salaries and getting access to new technology, as well as maintenance (Interview, Kituyi, 2011; Kahindi & Mutengi, 2011). Further, it has also resulted in some, mainly government, facilities experiencing a lack of drugs and other medical supplies (Interview, Otieno, 2011)

One general trend is that costs continue to increase within the health sector. One effect of this is that an increasing amount of the costs of health services are put on the patients themselves, because of the unsustainable nature of the increase. However, it is unclear what the patients are willing to pay for when they are paying a larger share themselves. (Interview, Kituyi, 2011) As the cost of consultation from doctors remains fairly high in relation to the general purchasing power of the population, the accessibility of health care services is limited, especially among the poor (Interview, Kiama, 2011). Thereby the distribution of income among the population causes problems for society, in terms of health provision (Interview, Magolo, 2011). The amount of adequate facilities within the country is too low to serve the large population and its needs (Interview, Otieno, 2011).

Brain drain is a common problem in many developing countries, and Kenya is no exception. Among the medical personnel, the level of training and competence is fairly low (Interview, Kituyi, 2011). The level of human capacity leads to a limited capability to receive technology, especially in the rural areas, since the highest competence is centered in the cities (Interview, Sundsmo, 2011; Odhiambo, 2011). Further, the amount of dermatologists active on the Kenyan market is limited, estimated to

[13] Defined as the probability of dying by age 5 per 1000 live births.

around 30 with a loose definition and close to none with the Swedish definition of specialists that demands more in-depth education (Interview, Kituyi, 2011). However, compared to many surrounding countries, the educational level and competence of Kenyan medical staff is not the lowest (Interview, Musomi, 2011).

When it comes to mHealth projects specifically, donors are willing to invest, and the huge adaptation of mobile phones has resulted in the development of lots of mobile applications within the health sector. In such solutions, challenges with the payment and business model concern adapting the application to the resources available, for example medicine. (Interview, Miller, 2011; Sequeira, 2011)

The first point of contact for patients turning to public health care are dispensaries, which are run by nurses and treat fairly uncomplicated conditions such as malaria, colds and skin conditions. Patients are referred to a health center, where the next level of personnel - clinical officers - is located. A clinical officer is a nurse with supplementary education. (Interview, Bradley, 2011) Relations between the different health providing units are not always smooth, and the possibilities to refer a patient from one to another may be small (Interview, Holmgren, 2010). It is however easier to transmit information than patients (Interview, Odhiambo, 2011).

Many Kenyans still visit the traditional healer first when getting sick, because of tradition, access and price. Secondly they try out the pharmacist, of which many can be quite good diagnosticians. Visiting a doctor is only the third option in many cases. (Interview, Kituyi, 2011) This means that health service providers often face competition from less educated actors that have larger possibilities to compete on price. (Interview, Magolo, 2011)

4.4.3.3 The Health System

Today, there is no nationwide free health care and accessibility is restricted by for example distance, resources and costs (Interview, Sequeira, 2011). There is also a lack of efficiency and performance within the sector, which has been described as conservative (Interview, Wanyee, 2011; Miller, 2011). Since the government is not providing enough money, there is a need to develop sustainable business models targeting the rural market segment. With health provision to a large extent being quite donor dependent, there is an increased sense of dependency. This includes a challenge regarding the ownership of and responsibility for health issues, where the government to some extent looks at health provision as an outside issue. This is especially true for HIV. (Interview, Sundsmo, 2011) The current financing structure also creates challenges related to the sustainability and development of health care provision. Further, it also means that the health sector is tied to the "flavor of the month", for example HIV, instead of prioritizing according to need and potential impact of the resources used. (Interview, Wesonga, 2011; Sequeira, 2011)

The Kenyan Ministry of Health was recently divided into two ministries; the Ministry of Health and the Ministry of Medical Services. This change meant that actors on the market now have two government bodies to interact with, which sometimes causes confusion in terms of who to address when it comes to specific issues. Some also experience a lack of vision and a clear framework within the new governmental organization. (Interview, Sundsmo, 2011) The Ministry remains fairly centralized and underperform in the sense that it does not succeed in providing proper health care to

all Kenyan citizens, one of the reasons being a general lack of capacity (Interview, Imbugwa, 2011; Wanyee, 2011). Further there is also a lot of mistreatment of patients within the Kenyan health care system, suggesting a lack of quality both within the system in general and among its facilities (Interview, Musomi, 2011; Kahindi & Mutengi, 2011). However, service delivery by the government has been improved and resources focused through increased attention on sustainability and the use of local resources and knowledge (Interview, Kiarie, 2011) There is still a long way left to go when it comes to sustainable health care provision though, since large parts of the sector, including development programs, is dependent upon donors and NGOs providing solutions that by construction are less sustainable since they depend on [foreign] politics and trends (Interview, Ogara, 2011; Liko, 2011).

The Ministry makes an annual plan in order to coordinate the different stakeholders within the sector, harmonize activities, evaluate and follow up. The exact structure of this work is still under development. The overall strategy within the sector has moved towards a community-based approach, where top-down working methods are replaced with bottom-up strategies. This means that the planning is more decentralized than before having the communities themselves responsible for their health budget and making them able to make decisions regarding needs and staffing etcetera. (Interview, Imbugwa, 2011) Formalization and standardization is used to ensure quality in service delivery, an example of which is the recently developed eHealth policy (Interview, Wesonga, 2011; Miller, 2011). Further, a framework for mHealth efforts has been developed by the Ministry of Health in order to align the Kenyan market with the efforts.

Thereby, there is still more to be done when it comes to harmonization of health care provision, and especially incorporate those projects originating from outside the country. Frameworks are needed for training, adapting solutions to the local context and in order to avoid overlapping work. (Interview, Wanyee, 2011) Not only regulation and control is missing, but also cooperation (Interview, Wawira, 2011). One of the main consequences of the scattered character of the health sector is that many of the systems that are currently adopted are neither synchronized nor integrated (Interview, Sequeira, 2011). This results in many competing solutions trying to solve the same issue (Interview, Mrema, 2011). Some of the consequences are lacking accessibility and affordability, particularly when it comes to outpatient services and reaching the rural areas (Interview, Kinuthia, 2011; Musomi, 2011; Liko, 2011). Remaining needs of immunization within the country is yet another issue (Interview, Wiking, 2011). Further there is a lack of quality projects and fundamentals for technology to work with within the sector, which is likely to affect its rate of development (Interview, Musomi, 2011; Sundsmo, 2011). Kenyan health institutions have been described as both up to date from a global perspective and slow in receiving global changes, however the eHealth area specifically is catching up (Interview, Mrema, 2011; Kiarie, 2011; Wesonga, 2011).

The adaptation of IT within health care is quite slow in Kenya and there is so far a limited use of ICT within health facilities resulting in potential benefits of volume and efficiency, if the need of customization and integrated solutions is taken into account. Further, there is also a lack of success stories when it comes to using ICT for health service provision at a low cost. (Interview, Wanyee, 2011; Magolo, 2011) Technology has been identified as something that might help decrease the fragmentation and gaps within health care service provision (Interview, Mimano, 2011).

Scale

In terms of the process of reaching large spread for new innovations, scalability is one of the most important challenges. There is a need to show evidence for the impact of the new solution, to go along with a sustainable business model. Since money is so scarce within all sectors in Kenya, it is crucial to show both medical and cost efficiency in order to convince the population and government that money should be allocated from elsewhere. Two aspects that are important to take into account are the type of diseases that are treated and the relation to any current lack of treatment of those. To some extent, the potential for large-scale success is hard to show only through pilots, which makes the task more difficult, even though it is thought to be possible. (Interview, Sundsmo, 2011; Lester, 2011)

In order for any service to be viable, it is important that it is not too resource intensive since both investing and continuously paying for large scale may be cumbersome or even impossible. Along those lines, a drop in the price of the service can be one of the most important factors determining the inherent potential for scale. (Interview, Lester, 2011) Further, a service provider would need sufficient capacity for delivering services on a large scale, along with a sustainable business model and a reliable set-up that ensures the accessibility of the service (Interview, Miller, 2011; Mimano, 2011; Lester, 2011). Sustainability includes ensuring skill transfer within the organization and employing responsible staff (Interview, Wesonga, 2011; Lester, 2011).

As for market potential, the largest part of the Kenyan population would rather have access to a pure SMS solution (Interview, Milewa, 2011). Also, in order to scale up a service in cooperation with the government and through government facilities, it would need to be convincingly proven to be cost effective. However, the possibility to differentiate cases that lies within the iDoc24 service has the potential to have a high impact on health, which is a strong argument for the service. (Interview, Lester, 2011) Further, end consumers and facilities that are needed for scale exist within the country (Interview, Kariri, 2011).

Since it is easier to monitor a pilot compared to a larger project issues of maintenance and the ability to sustain the capacity needed for reliable service delivery lies within the development challenges, and becomes even more important when attempting to reach scale for the service (Interview, Kariri, 2011; Mrema, 2011; Wesonga, 2011). Further, it is necessary to have clear organizational goals, aligned with funding, and a way of keeping the scope of the project (Interview, Sundsmo, 2011; Wanyee, 2011).

4.4.3.4 Actors

The major players in Kenyan health provision can be divided into government, representing 54 percent of the sector, and private, NGOs and Faith-based organizations with the other 46 percent (AMREF, 2011). The main differences between providers concern goals and set-up structures, since they have somewhat differing stakeholders affecting their agendas. (Interview, Sundsmo, 2011) Government, NGO and faith-based institutions are the ones that are most dependent on financing from outside of Kenya. (Interview, Imbugwa, 2011) The scattered characteristics of the Kenyan health sector discussed above also apply to the high number of different actors and agendas present on the health market and the Ministry split further adds to this fragmentation (Interview, Mimano, 2011; Wesonga, 2011). For example, there are a vast number of different NGOs, many of them fairly

small and focusing on a specific cause or area. (Interview, Sundsmo, 2011) This leads to a situation where stakeholders related to any specific health issue are many and may be hard to satisfy (Interview, Miller, 2011). Lately, there has been a focus on introducing Electronic Medical Records, (EMR)[14] within Kenyan health facilities as a part of bringing the many stakeholders together. The increased coordination through government effort aims to make all stakeholders coming together to work towards the same goal, and increased cooperation has recently been noted. (Interview, Wesonga, 2011; Imbugwa, 2011; Sundsmo, 2011)

Private

The private sector is the most organized with access to resources that lead to better service delivery. Within this sector you pay directly or by insurance but the services are afforded by less than 20 percent of the Kenyan population. At the same time, it can be hard for private actors to raise funding, since many donors want to work through the public sector in order to get the largest impact or within their own organizational structures in order to avoid corruption. (Interview, Magolo, 2011) By construction, the private health care sector focus their resources on delivering services that they can make profit from. This means that they are neither covering all health care that is needed nor prioritizing according to needs of the Kenyan population as a whole. Linked to this is also the profit maximizing incentive structure that means that private actors are not always interested in reducing the cost for the patient, including consultation fees. (Interview, Lester, 2011)

Private actors mainly serve the small rich fraction of the population. It is a sector that is patronized by policy-makers who pay for high quality services from their own pockets or through insurance. Due to salary levels those institutions also get the most skilled people working for them. To some extent, this system implies that incentives for policy makers to improve public health care are missing, since they are not using it themselves, as they are able to afford private health care. (Interview, Imbugwa, 2011) The private actors face a challenge in how to provide health care to the poor rural areas while being sustainable businesses and even make profit, since purchasing power is low. In some sense, this is linked to whether they regard their mission as providing quality health care to the whole Kenyan population or whether goals are more focused on surviving and growing as a business. However those goals are to some extent intertwined. (Interview, Sundsmo, 2011)

Public

Public institutions on the other hand have the goal of serving a majority of the population. This part of the sector faces many challenges, which results in a lack of quality within the health care provided. The institutions perform their work in an environment with an overload of patients, leading to high pressure with a lack of resources and low quality of governance as well as a short supply of personnel. Health care services are however provided at a low cost. (Interview, Mimano, 2011)

Non-Governmental Organizations

Most NGOs are focusing on preventive health care, which is often more profitable than emergency health care (Interview, Wiking, 2011). This part of the health care sector is even more scattered, with over 2500 registered NGOs in Kenya today (Interview, Kituyi, 2011). In general, NGOs support the government and to some extent the private sector in filling the needs and gaps that are a consequence of those actors not covering all areas of health care provision and limited reach. NGOs

[14] A computerized medical record

are somewhat unsustainable and donor dependent and their agendas, which may not always align with local needs, matter a lot. The fact that donors often do not want to lose control over resources shapes the organization of the work, since this lack of trust has implications for partnerships. (Interview, Mukabi, 2011; Sequeira, 2011)

Further, NGOs do not always address the real needs of the local population, and may face the problem of lacking competence within their own organization, which forces them to cooperate either in their operations or in the delivery of services within a very restricted niche. (Interview, Sequeira, 2011) In order for an NGO to be active on the Kenyan market, it has to be registered and report to the government. In terms of dealing with the government, NGOs have a lot to gain from working together since they can make themselves and their agendas known with a common voice but also learn from each other when it comes to reporting etcetera. One example is a network of NGOs active within health in Kenya. (Interview, Imbugwa, 2011)

The internal organization of the NGOs can also cause complications when it comes to cooperation. Since they are donor-driven, they are somewhat opportunistic and dependent on trends and the political climate in the country or countries where the money comes from. As a consequence of this, combined with the lack of harmonization efforts from the regulatory authorities, several NGOs perform overlapping activities. Further, problems with governance, especially in terms of follow-up of expenditures to check that they reach the communities, are still persistent. At the same time, NGOs are also a good platform for trying new solutions and innovations, since they are often small and flexible organizations. The results of such trials can then be used by the government for implementation on a larger scale, if best practice can be shown. (Interview, Sundsmo, 2011)

Within a profit-based organization, the systems are more streamlined and long-termed compared to an NGO, since larger focus is put on budgeting and the efficient use of money. Since NGOs to a larger extent are driven by causes, their internal organization tends to be project based, a fact that sometimes challenges the sustainability of their operations. (Interview, Sundsmo, 2011)

4.4.3.5 Partnerships

Current networks between different actors in the health sector are fairly good, primarily between mHealth projects. Within pilots and projects, collaboration between different actors such as the government, operators, mobile phone producers, health institutions, consultancies and universities are common. Actors that could be included even more are universities and original equipment manufacturers. Further, getting buy-in from operators is somewhat obstructed since mHealth projects often have a social rather than a business case. Operators tend to have their own agenda, guided by commercial incentives and focusing on revenue. They are low in risk taking because of pressured margins that make them act in a protective way where they don't care as much about health outcome. (Interview, Wesonga, 2011; Sundsmo, 2011; Milewa, 2011) However, due to those pressured margins they are in need of new services to break-even (Interview, Imbugwa, 2011). Further, they have a lot of expertise and any mHealth initiative is more or less dependent on them (Interview, Lester, 2011). For any specific project, cooperating with the government would help in lowering barriers of entry within the health sector, while partnerships in general may help in terms of access to useful knowledge and resources. When forming strategic partnerships in order to facilitate the progress of a project, it is important to identify supporters with a shared vision. Some difficulties

may however occur in partnerships with actors that are not geographically present on the local market. (Interview, Liko, 2011; Wanyee, 2011; Källbäck, 2011)

Some of the main reasons to form partnerships on the local market are sustainability and facilitation of operations through for example free tools and devices, to get outreach, construct payment models and to cooperate with insurance companies in order to get revenue (Interview, Kariri, 2011; Wiking, 2011; Mrema, 2011; Magolo, 2011; Kiama, 2011). Dermatologists are estimated to be accessible for cooperation, if nothing else internationally (Interview, Mrema, 2011). Another possibility is to partner directly with Kenyan hospitals (Interview, Kinuthia, 2011).

4.4.3.6 Health Insurance

The amount of the Kenyan population that is covered by health insurance is low, and the design of the public insurance system is unsatisfactory (Interview, Miller, 2011). One estimate is that currently about 25 percent of the population is covered, a number that has increased from 10 percent a decade ago (Interview, Mukabi, 2011) Further, the current system only covers a bed in a hospital and no tests or treatment (Interview, Kituyi, 2011). Recently, an update of the insurance system, through the National Hospital Insurance Fund (NHIF) has been developed. The aim is to find ways to also cover those that are in informal employment. The system is however not yet fully implemented, and both the Kenyan population and actors within the health sector are a bit hesitant as to what the effects will be. (Interview, Mukabi, 2011; Gichuhi, 2011) The health insurance market has recently experienced increased competition and the market is growing (Interview, Kinuthia, 2011; Kiama, 2011). The development has been towards an increase in private people as target groups, including the development of affordable products for those groups and some solutions targeted towards the BOP market segment (Interview, Gichuhi, 2011; Otieno, 2011).

4.4.4 Governance

The current lack of proper governance in Kenya concerns not only the health sector but also all administration. The Ministry of Health needs to strengthen its capacity in order to provide proper policy guidance, monitoring, regulations and planning. Further, the Ministry needs to decentralize even more while continuing to deliver high quality services. (Interview, Imbugwa, 2011)

The lack of control, responsibility and ownership of issues linked to the distortion of incentives in the structure of the sector, as mentioned above, obstructs proper governance, (Interview, Sundsmo, 2011). This is also linked to gaps in regulations, follow-up and accountability, especially concerning NGOs and private-public partnerships. Those gaps are likely to affect the level of trust in the relationships. The existence of herbalists and fake doctors is one example of the consequences of governance issues within health service delivery on a national level (Interview, Wanyee, 2011; Magolo, 2011). Another is the extent to which the health sector is trend driven, and how the regulatory structures have failed to limit this problem (Interview, Sequeira, 2011).

The lack of proper leadership has resulted in bad process management, especially within Kenyan public health institutions, one example of which is the difficulty of directing users of the system in an efficient way (Interview, Kituyi, 2011; Kariri, 2011). The existence of improper relationships between policy makers and private health providers, along with the necessity of political links are impeding factors to the system. (Interview, Musomi, 2011; Imbugwa, 2011) This means that bureaucracy and a

slow governmental system are factors that represent challenges for any actor on the Kenyan market (Interview, Mimano, 2011). The lack of governance also has implications for the distribution of resources between rural/urban and private/public domains respectively.

Concerning governance within specific organizations, the necessity of a clear vision and organizational goal is highlighted. This can be especially challenging for NGOs that may have to align their goals to their funder in order to be able to continue their work. (Interview, Sundsmo, 2011)

4.4.4.1 Corruption

Linked to the issue of governance is corruption. This problem is prevalent within Kenyan institutions and has been described as an important obstacle for development and poverty reduction (Swedish Ministry for Foreign Affairs, 2009). The highest degree of corruption is found in the public sector, and it creates a corruption fee in the sense that it increases transaction costs of public services for the citizens (Interview, Iveroth, 2011). One of the underlying explanatory factors of the Kenyan corruption problem is the lack of long term thinking from individuals within all kinds of organizations (Interview, Magolo, 2011)

4.4.5 Knowledge

4.4.5.1 Education

Challenges in terms of the educational level in Kenya can be found in several sectors. When it comes to mHealth projects, medical, technological and economic "literacy" levels within the target groups are crucial. One example of economic literacy is the extent to which the population is used to saving and insuring themselves, which directly affects their purchasing power. (Interview, Miller, 2011; Kinuthia, 2011) Concerning technological literacy, the age of potential customers and adopters is likely to be linked to the extent of which they are accustomed to technology and ICT services (Interview, Kiarie, 2011). Further, illiteracy levels affect the development of the country and more specifically the potential of health projects, even though illiteracy rates are lower than those of many of the other countries in the region. MHealth solutions need to find the suitable level of simplicity, depending on target group. The urban population in Kenya is however conversant within all of the areas mentioned above and there is a high level of local competence and human resources within technology. (Interview, Milewa, 2011; Kiama, 2011; Lester, 2011)

4.4.5.2 Research

When it comes to knowledge development, especially within the health sector, there is a lack of local research which links to the creation of solutions that are suitable for local conditions. Kenya has not invested that much in research within health issues, probably mostly due to the existence of more pressing issues that call for the limited resources. (Interview, Magolo, 2011; Wawira, 2011) This means that there is currently a need to balance short-term and long-term goals (Interview, Imbugwa, 2011). Most of the medical research in the world today is not focused on the most important issues for developing countries, such as HIV, Malaria and Tuberculosis. Solutions are instead adapted for developed and resource rich countries. (Interview, Imbugwa, 2011; Mukabi, 2011) Further, there is currently a lack of statistics, which limits the development of successful and suitable solutions. The sector is experiencing more push than pull. (Interview, Magolo, 2011; Wawira, 2011)

4.4.6 Infrastructure

Out of 161 000 km of road in Kenya, around 11 000 km is paved while 150 000 km remains unpaved (CIA, 2011). Railroads are almost non-existing while national air traffic runs between the major cities. This implies that logistics is still a common problem within the Kenyan society. Further, basic infrastructure and systems such as timetables for buses and addresses within cities are still not properly in place (Interview, Lester, 2011; Sequeira, 2011). This lack of basic informational infrastructure and systems is linked to the potential for development of the health sector. Technology in itself cannot fix problems in underlying structures, and the outcome of any project will always be dependent on these kinds of foundations. This is also true for the existence of good development projects: if they are not there, technological innovation will do little to help the situation. There is a gap between what is happening outside of Kenya and what can be applied within Kenya when the local context may lack electricity and network availability etcetera. (Interview, Sequeira, 2011)

Even though availability and reliability of electricity is constantly increasing, blackouts are still fairly common in Kenya and they affect the reliability of service delivery on a broad level (Interview, Sundsmo, 2011). Network coverage, data transmission and connectivity sometimes represent a challenge in rural areas, and such aspects affect the possibility to make sure that information reaches the recipient (Interview, Musomi, 2011; Wiking, 2011). Technological capacity and communication infrastructure is however continuously improving. This development allows feedback and interaction within all activities in the society. Further, solutions using solar power to provide electricity increases reliability. The fact that current facilities often have systems in place from other projects facilitates the development and implementation of new solutions. (Interview, Odhiambo, 2011; Milewa, 2011)

4.4.7 Disease environment

The major infectious diseases in Kenya are food and waterborne diseases such as diarrhea, hepatitis A and typhoid fever, along with diseases such as Malaria and Rift Valley fever. Further, Schistosomiasis, a water contact disease, and rabies are fairly common. As for HIV, the adult prevalence rate was 6.3 percent in 2009, the eleventh highest rate in the world, and 1.5 million people are estimated to live with HIV/AIDS in the country. The trend is pointing downwards, but it is important to remember that all further spread represents a major challenge due to the current high levels, the complexity of the disease and the costly treatment as well as its large effect within all levels of society. (CIA, 2011; Imbugwa, 2011) The disease environment in Kenya has implications for the health sector in terms of costs and necessity of education (Interview, Liko, 2011; Otieno, 2011). Further, unsatisfactory levels of sanitation, access to clean water and nutrition complicates the situation even more, along with the fact that many severe conditions are only present in a climate like the Kenyan one (Interview, Odhiambo, 2011; Wiking, 2011; Otieno, 2011).

The disease environment in Kenya is complex, and therefore handling it requires diagnostic precision (Interview, Kituyi, 2011). Dermatological cases are likely to be fairly similar to the Swedish situation, with the main difference being differences in types of infectious diseases that are prevalent in Kenya and the implications that come with this due to the fact that skin conditions and infections often are closely intertwined. Examples of diseases with visual symptoms that are prevalent in the region are measles, leprosy, parasites and HIV-related skin conditions such as herpes zoster. This disease is more or less only seen with HIV positive patients, which means that a correct diagnose has life

changing consequences and implications for the patient. Since HIV is still a stigma, and a diagnose means that there is a need for counseling, giving advice on skin conditions that are this intertwined with HIV prevalence becomes complicated. (Interview, Holmgren, 2010; Iveroth, 2011; Bradley, 2011)

Living with diseases such as HIV as well as many skin conditions in Kenya today has several consequences. Not only is the social stigma of visual symptoms especially strong, but expenses for health care and treatment along with missing work and/or school are other problems that have to be taken care of. However, the social stigma means that people tend to prioritize skin conditions (Interview, Bradley, 2011).

4.4.8 The Potential of Technology

The recent introduction of new technology has opened up for increased efficiency within health provision (Interview, Sundsmo, 2011). Technology enables higher speed, larger access to information and lower transaction costs, among other things. Further, the full potential of technology for health is not leveraged today; there are for example few solutions using smartphones. (Interview, Kituyi, 2011; Wanyee, 2011) However, the large amount of pilots shows how the Kenyan market is open-minded when it comes to new ideas and solutions, and the excitement is large. The largest part of the benefits is likely to be within the provision of health services in rural areas, where transaction costs are high and specialists rarely travel. Solutions such as videoconference are for example under development. (Interview, Sundsmo, 2011; Otieno, 2011; Milewa, 2011) Mobile phone technology is improving lives through the increased information transfer and it can constitute the crucial link between a doctor and the rural population through complementing the normal examination. Another potential is to interlink voice and e-mail. (Interview, Kahindi & Mutengi, 2011) In general, mobile technology also lowers the dependence on specific personnel or lacking governance. One example is the possibility of outsourcing quality control of lab tests – already existing solutions that has increased the cost efficiency and security of test analysis. (Interview, Iveroth, 2011; Kituyi, 2011)

The potential of technology for the Kenyan health sector is also affected by some of the general challenges mentioned above. One of the main differences between Kenya and developed countries is the amount of resources that are available. Further, the necessary skills for adopting and maintaining new technology has to be present, along with a set-up of the project that ensures sustainability, especially in terms of financing and implementation on a larger scale. Further ICT per se forces people to change their mind-sets, a fact that represents both potential and challenge for such solutions. (Interview, Sequeira, 2011; Wanyee, 2011; Sundsmo, 2011; Mimano, 2011)

4.4.9 Culture

In terms of evaluating consumer behavior and patient needs, cultural aspects such as the way that people perceive medicine, how they relate to a doctor and what they expect from health care become relevant. (Interview, Kituyi, 2011) The role that traditional medicine still play in some parts of the society in Kenya affects expectations and beliefs through the level of general medical knowledge along with expectations on what health service provision should contain (Interview, Musomi, 2011). The fact that some people have a fear of going to the hospital has direct implications for the possible use and demand for alternatives in terms of health care services (Interview, Otieno, 2011). A general lack of awareness about mHealth includes not appreciating what technology can do

and people seeing IT as an end to itself. (Interview, Wanyee, 2011) The extension of this is acceptability and social barriers to adopting ICT tools for health, both on the consumer as well as the provider side. This reluctance may include preferences for face-to-face meetings with doctors as well as a preference for calling and not texting. (Interview, Milewa, 2011; Magolo, 2011)

However, the Kenyan people have been proven to be fast adopters of technology and the acceptance is high if the value is shown. Further, since mobile technology has been spreading very fast within the Kenyan society, the population is by now used to this specific device. (Interview, Wesonga, 2011; Milewa, 2011) The transfer of knowledge within the society has been improving, and there is a willingness to learn, including a general acceptance of development and a positive attitude to new solutions and smartphones (Interview, Imbugwa, 2011; Mukabi, 2011). People are embracing solutions to real problems, and the health sector is by some described as open to change. (Interview, Liko, 2011; Wesonga, 2011) Further, Kenyan businesses and organizations have similar mind-sets to Swedish ones, which facilitates working and collaborating across cultures through increased understanding of each other (Interview, Källbäck, 2011).

4.4.10 Behavior

The level of knowledge about medicine, combined with cultural aspects, also affects health consumption in the sense that it has created a tendency of overconsumption in Kenya. In terms of the iDoc24 service, the health seeking behavior is linked to the need for the service among the population and the way that medical problems are prioritized. When resources are scarce, demand is naturally the highest for basic needs such as food. (Interview, Kituyi, 2011) This implies that people may wait to seek health care. However, Kenyan people in general spend a lot on health care which points towards a fairly high willingness to pay. (Interview, Kahindi & Mutengi, 2011; Lester, 2011; Iveroth, 2011) Within this setting, it is therefore important to address the true needs of the target group – solve a problem for them – as well as meeting the needs of doctors in some sense (Interview, Odhiambo, 2011). In order to identify those needs and increase understanding of the patient, market research is of essence. When introducing new services, there is also a risk of altering financial incentives and structures, something that may affect behavior, take-up and demand. (Interview, Kahindi & Mutengi, 2011)

Considering the user interface for the use of a mobile phone as a health service tool, this is one of the parts of a service that is the most affected by consumer behavior. The requirement for the interface is linked to the need of minimizing information loss when the tool is used, in order to compensate for the fact that no face-to-face meeting is taking place. Quality anamnesis and a proper algorithm for setting diagnose, including procedure and protocol, is necessary. (Interview, Milewa, 2011; Musomi, 2011) The quality of pictures and the fact that working in a Kenyan setting implies diagnosing dark skin are also relevant aspects (Interview, Iveroth, 2011). From the patient side of view, the tool has to be easy to use and communication has to be in a language that is understood by the user (Interview, Mimano, 2011; Wanyee, 2011).

Despite taking such aspects into consideration, a general resistance towards change is likely to affect any introduction of new services and tools. Such resistance can be expressed through reluctance to pay over Internet, doctors feeling undermined and the perception of the tool as replacing people, all of which are important to take into account. (Interview, Odhiambo, 2011; Sequeira, 2011) Within

organizations, a lack of basic organizational structures as well as corrupt behavior such as lies and fraud may affect service provision (Interview, Wanyee, 2011).

Timing is another factor to take into consideration. It takes more time to build a new solution from scratch, and it is necessary to find the right strategy in order for people to adopt it (Interview, Liko, 2011; Kariri, 2011; Mrema, 2011). To succeed it is important to involve the informal leader of a community since it is hard to approach poor people with a new solution when they do not have basic needs such as proper education, sanitation and availability to clean water fulfilled. The involvement of social leaders is also crucial in order to approach and change the mind-set of people. Further, using word of mouth is one way to go about in achieving a change, making those using the solution communicate their opinion and informal leaders communicating face-to-face with the population as a way to build trust. (Interview, Otieno, 2011; Mimano, 2011)

General trends in Kenya today are however pointing towards a continuous increase in the interest for solutions including mobile phones (Interview, Sequeira, 2011). This also includes an increased willingness to pay for health services, which has been said to be true also on a global level. The social stigma of skin conditions makes solutions to such problems a possible consumer preference. (Interview, Imbugwa, 2011)

4.4.11 Commercialization

Innovations are very important within the health sector, and many of them are developed globally and enter and spread within Kenya through conferences, workshops, local meetings, projects and pilot studies. Even though there are some technological solutions that are developed locally, those examples are few. The crucial factor is said to be patience in the adoption process and need for strong advocates, rather than a lack of innovations. (Interview, Sundsmo, 2011) When it comes to challenges linked to the diffusion of new solutions and knowledge, there are challenges linked to not properly transferring all the necessary information regarding a subject as well as the correct description of how to apply new technology correctly. (Interview, Imbugwa, 2011)

Uptake of new solutions is described to be quick due to relatively high educational levels, a general willingness to learn, prevalence of English-speaking people also in rural areas and a high penetration of mobile phones. Further, many organizations are active within the country and therefore put resources into the spread of information and innovations. (Interview, Imbugwa, 2011) The way that solutions used to be built for developed countries and then trickled down to the developing ones has changed. Nowadays there is more focus on the BOP segment of the market even though Kenya is still too dependent on global changes. The most common reason behind rejections of new solutions has been said to be a lack of buy-in and scalability. Further, focus on skill transfer is necessary, even though it is rarely done. Using technology that is already existing on the ground, for example through developing solutions that use the bulk of the mobile phones on the market is another aspect to be taken into consideration, since diffusion and adoption is severely limited if facilities cannot afford the device. (Interview, Wesonga, 2011) However, the most innovative solutions are often created in areas with the largest problems (Interview, Magolo, 2011).

The inherent potential of the iDoc24 service on the Kenyan market has been estimated to be fairly good. The design of the application is well done, there are a lot of different possible variations of the service and a potential for integrating solutions. (Interview, Lester, 2011; Iveroth, 2011)

4.4.11.1 Buy-in

One of the main challenges in terms of buy-in lies within finding the early adopters and convincing them that the solution is really going to contribute to health. Reluctance faced in this process may stem from a lack of understanding of why new technology is applied when more fundamental problems still have not been solved. (Interview, Wesonga, 2011)

To create buy-in, evidence and follow-up is of importance in order to prove the efficiency, value and viability of the solution as well as communicating this value clearly, especially when addressing health care workers and doctors. (Interview, Kituyi, 2011; Miller, 2011; Sundsmo, 2011; Sequeira, 2011) One way of doing this is to show previous success stories and tests (Interview, Milewa, 2011). Several challenges linked to the establishment of a new mHealth service are likely to only be identified through the launch of pilot that takes the local context into account (Interview, Lester, 2011).

Some of the key actors to approach for buy-in are opinion leaders and social leaders, and in this task using the local area network has been recommended (Interview, Kiarie, 2011; Mimano 2011; Mrema, 2011). Another important actor is the government, through key departments (Interview, Mukabi, 2011). Another aspect that has to be communicated is the potential for lowering the workload for specialists through segmenting the degree of severity of diseases. (Interview, Lester, 2011; Kahindi & Mutengi, 2011) The goal and challenge is to maintain interest and create pressure and push for the service (Interview, Mrema, 2011). Further, the trialability is likely to influence the success of any attempt to create buy-in among stakeholders, while moving with the market (Interview, Kiarie, 2011; Otieno, 2011).

4.4.11.2 Adaptation

As previously mentioned, adaption of a solution to the context of use through bottom-up development approaches is a key factor in the establishment of ICT solutions. Solutions should also be simple, user friendly and preferably using only one tool. (Interview, Mimano, 2011; Lester, 2011; Wesonga, 2011) In pursuing this, using the base in existing technology and integrating solutions in the systems that are already in place is of essence. Further, adaptation to local institutions is also relevant, along with a patient centered use of phones. (Interview, Mimano, 2011; Sequeira, 2011; Lester, 2011) The need for homegrown solutions on the Kenyan market has implications also for the commercialization of new products and services. Systems have to be created for individuals and customized for understanding and efficient use. A process in which there is a need for local capacity. (Interview, Ogara, 2011; Kahindi & Mutengi, 2011)

4.4.11.3 Development process

Several aspects previously discussed here as crucial for the establishment of ICT solutions in any context include the process perspective and interactive development processes. This can be seen in terms of customization and design in order to suit the work process to the habits and preferences of the user. (Interview, Mimano, 2011) A bottom-up development strategy has the benefit of being able to address complicated conditions and create solutions that are adapted to local health systems (Interview, Liko, 2011; Kahindi & Mutengi, 2011; Lester, 2011). Through cooperating with the user,

the limits of pre-designed solutions can be overcome and the need for word of mouth and feedback during the process fulfilled (Interview, Odhiambo, 2011; Magolo, 2011; Otieno, 2011). The interactivity of the process is especially important when it comes to software development (Interview, Kariri, 2011). Today, there is a gap between what is pushed into the market and what is actually needed. (Interview, Sequeira, 2011)

A successful business model has been identified as one of the crucial factors for success. In the case of the iDoc24 service in Kenya such a model may include payment through the marketing of local doctors and advertisements. Further, the availability of Mpesa as a payment tool facilitates that part of the set-up. Sustainability in the business model includes firstly financial sustainability, but also creating proper systems for developing the service and its maintenance. (Interview, Kahindi & Mutengi, 2011; Sundsmo, 2011; Sequeira, 2011) In order to move beyond the pilot stage, with a health service business case reconciling social and financial goals, it is important to be able to illustrate in what way savings are generated (Interview, Ogara, 2011; Wesonga, 2011; Lester, 2011). Further, depending on the goal of service provision, a set-up that does not only serve the wealthy may be preferable (Interview, Sundsmo, 2011).

The strategy of business development includes identifying customer segments. Concerning this it is worth noting that hospitals are more active than dispensaries within the Kenyan health sector. One conclusion from experiences within previous projects is that the health care worker model rarely launches since this group are usually underpaid with low motivation. Further, they would in many cases not use the service often enough to remember its existence. However, there are many possible set-ups and solutions for ownership and for-profit-models have been proven to be both efficient and sustainable. One alternative is to use a mixed model that incorporate the social and financial goals through differentiating between customers based on valuation of the service and willingness to pay. (Interview, Lester, 2011; Mrema, 2011)

4.4.11.4 Creating trust

The first step in trust creation is ensuring the quality of the service. This process includes the quality of photos, knowledge about the local health system among the specialists and the security of data transmission, videlicet confidentiality of data and patient integrity. All of those aspects may be even more challenging to fulfill in rural areas. (Interview, Sundsmo, 2011; Wesonga 2011; Lester, 2011) A form of guarantee would help increasing the trust in the service (Interview, Sequeira, 2011). Further, reliability in terms of predictability of service delivery, but also in the general performance of the organization and cooperating institutions is crucial. This can be enforced through word of mouth and such parts are key in order to increase trust in the whole system - both money transfers and health care in general - which may constitute a challenge. (Interview, Kinuthia, 2011; Iveroth, 2011) With a patient–doctor relationship without face-to-face meetings, issues like legitimacy become even more important. Through relations to people in the system and identification of gatekeepers, such challenges can be overcome. (Interview, Wanyee, 2011; Liko, 2011; Otieno, 2011; Mrema, 2011)

4.4.11.5 Training

Training is necessary in any launch of a new ICT solution. Both patients and doctors, also at district level, are in need of face-to-face training in order for a solution to increase its potential impact. (Interview, Wanyee, 2011; Miller, 2011; Jarlman, 2011; Ogara, 2011; Wesonga, 2011) The closer the

contact is during the implementation phase, the better. Further, development of supporting documentation is preferable, along with re-training and the identification of persons that know how to operate a phone. The device needs a learning curve that is not too steep. (Interview, Mrema, 2011; Wesonga, 2011)

4.4.11.6 Market

The readiness of the Kenyan health market is at the core of the potential for an establishment and further growth of a new service. The novelty may be a beneficial factor, along with the fact that the market is currently growing, especially as credit systems are developing. The successful example of a unique innovation made by Safaricom, such as Mpesa, points towards the large potential uptake within the market. (Interview, Mrema, 2011; Liko, 2011; Källbäck, 2011)

In terms of potential customers, the price of the service, as related to their purchasing power, is a key factor to take into consideration (Interview, Kituyi, 2011; Miller, 2011). The cost of handsets is also a crucial factor since impact would be restricted by the fact that large parts of the potential market is very price sensitive with both a low ability and willingness to pay (Interview, Sequeira, 2011; Wesonga, 2011; Milewa, 2011; Källbäck, 2011). Affordability is affected by the lack of insurance cover, with its current high focus on corporations and the general resistance to buying cover (Interview, Lester, 2011; Gichuhi, 2011). Those with smartphones are also those with insurance cover, which may imply that the need for cheap services among this group is lowered (Interview, Kahindi & Mutengi, 2011). Further the Kenyan population is likely to demand a service that investigates genital problems and addresses the concerns of worried mothers. (Interview, Bradley, 2011; Lester, 2011)

Kenya has a small segment with the ability to pay for a service like iDoc24 if it is set-up equivalently to the Swedish business model. This segment includes some organizations. Previous similar solutions have been well received in pilots, both by patients and health workers – if developed together with those groups. Through getting access and support, patients felt that someone cared. (Interview, Iveroth, 2011; Lester, 2011)

In terms of competition, the market needs to be defined. In the Kenyan health care market, the iDoc24 service would compete against pharmacists, due to the lack in regulations, and they do not have the incentive to use the service since they are mainly profit driven. (Interview, Kituyi, 2011) Further, marketing and publicity would be of importance, as when addressing any new market. In order to increase the spread of information, advertising and promotion directed to patients can be used. As mentioned above, word of mouth is however likely to be a very efficient tool taking Kenyan culture and societal structure into account. The packaging of the product – the service bundle – is also important. At the same time it is important to remember that marketing is slightly more complicated within health care, since it may decrease trust and increase skepticism (Interview, Liko, 2011; Mrema, 2011; Milewa, 2011; Magolo, 2011)

4.4.12 Thoughts on the iDoc24 service in Kenya

One of the main challenges would be to guarantee the medical quality of the service at a low enough cost to make it viable on the Kenyan market. In many similar applications, the service is linked to a follow-up plan with further information and notice regarding how to behave and who to turn to. In

terms of whom to collaborate with, the agendas of the different actors on the market has to be considered. Private actors could probably be targeted first, using the service as a tool to increase profits and provide even more efficient health care to their customers. The government on the other hand, usually needs very solid proof of the impact before adopting any new solution. There is also the issue of the role of the patient-doctor relationship, and whether focusing only on dermatological problems is a successful and/or necessary strategy. (Interview, Sundsmo, 2011)

Regarding the possible price level of the service, it is likely that it has to be at least equivalent of a visit to a general practitioner in order for the service to become an attractive alternative for patients seeking health care as the price level is described as something that people care a lot about. Suggestions have therefore been around 100-500 KES. (Interview, Kituyi, 2011; Wesonga, 2011) If targeted towards the poorer parts of the BOP segment in Kenya, for example the population in Kibera, one of the largest slums in Nairobi, price levels would have to be around 20 KES in order for the service to be able to compete with local alternatives (Interview, Magolo, 2011).

The iDoc24 service has yet another possible use within education, for example of health care workers. It could be developed into a teaching platform and help creating networks. Additionally its potential increases, as it is possible to combine tools such as Internet and mobile phones with face-to-face meetings. When focusing on information, it is possible to limit the abuse of drugs and make patients request the correct tests etcetera. Another application is for it to be used as a reminder service. (Interview, Ogara, 2011; Kahindi & Mutengi, 2011; Kinuthia, 2011; Otieno, 2011)

5.0 Analysis

This section presents the factors that have been identified in the empirical material and relates them to theory. Firstly, findings are categorized in a table that relates the twelve BOP principles to the factors identified in this study in order to assess their importance. Their relative importance is then highlighted in a graph. In order to reach a deeper understanding of the reasons behind those results and the characteristics and interconnectivity of the factors, they will be analyzed with the help of the Diffusion of Innovation and BOP frameworks.

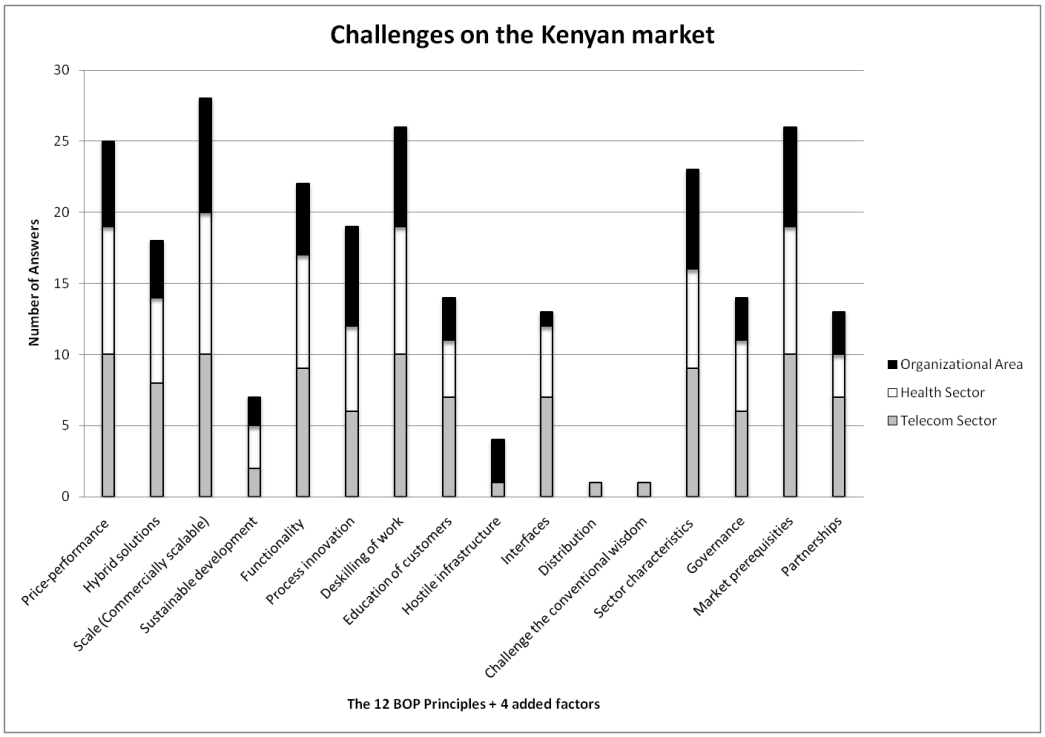

Figure 9: *Challenges on the Kenyan market.*

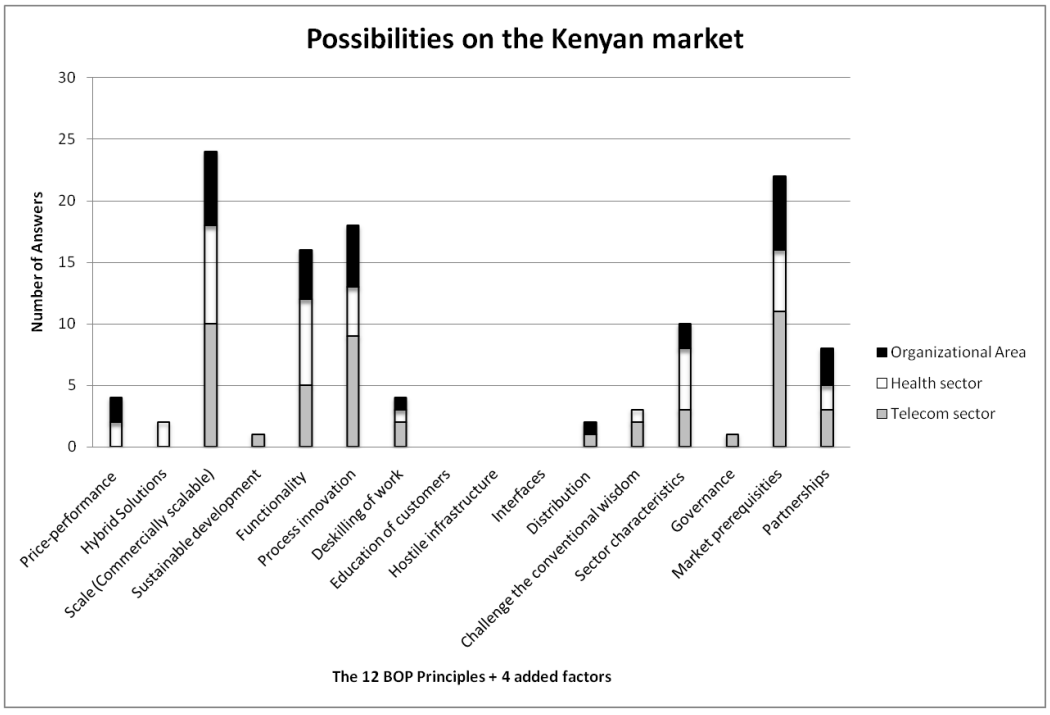

Figure 10: *Possibilities on the Kenyan market.*

5.1 Charts

Figure 9 and 10 present the number of times that a specific factor has been mentioned by the interviewees, and the division between the figures depend on whether the factor was described as a positive of negative aspect of an establishment situation. Within the figures, the interviewees are divided according to their area of expertise; organization, health or telecom. This makes it possible to identify discrepancies in the views of the different groups of experts depending on their background. The factors consist of the twelve BOP factors, which is the theoretical framework that is the base of this part of the analysis. Those factors are followed by four additional ones that are partly discussed both in the BOP and the Diffusion of Innovations frameworks. The importance of those four factors has also been identified based on the extent of which they are brought up in the interviews, as a part of the answer to the research question of this study. The overview in the form of histograms makes it possible to comment upon the relative importance of the factors, represented by how much they are emphasized in the empirical material of this study. A complete table with the names of the interviewees along with their answers, as well as the categorization of factors, can be found in the appendix.

Factors are in general brought up more often in the form of **challenges** rather than possibilities. This may be due to how questions were phrased in the interviews, along with the mind-set of the interviewees, but it can also be thought of as an estimate of the actual importance of the factors and the way they should be interpreted. As presented in the figure, the main challenges that are emphasized by all three groups are *price, scale, deskilling of work* and *market prerequisites*. The factors that are estimated to be least important are *distribution, challenge the conventional wisdom, hostile infrastructure* and to some extent *sustainable development*.

When comparing the emphasis that is put on different factors depending on area of expertise among the respondents, the distribution is fairly equal. In this evaluation, the fact that 7 experts represent the organizational area while the telecom and the health sector are represented by 12 each that have been taken into account. The equal distribution between factors strengthens the credibility of the factor prioritization in the sense that experts with a broad knowledge base within all the three areas that are relevant for an establishment of iDoc24 in Kenya have converging opinions. However, some small differences can be noted. Firstly, the telecom experts are the only ones mentioning *distribution* and *challenge the conventional wisdom* as relevant factors. They also put larger emphasis on *education of customers*, user *interfaces* and *partnerships* than the other expert groups. It is also worth noting that telecom experts are the only expert group that mentions all 16 factors. Concerning the organizational experts, they put relatively lower emphasis on *interfaces*, and larger on *infrastructure*, which is not mentioned at all by health experts. This last group has a slightly larger focus on *scale*, compared to the other factors.

In terms of **possibilities**, the main factors emphasized are *scale, market prerequisites, process innovation* and *functionality*. As previously noted, factors are discussed fewer times as possibilities compared to when they are brought up as challenges, and *interfaces, hostile infrastructure* and *education of customers* are not mentioned as possibilities at all. Further, low levels can be found for *governance* and *sustainable development*, which are only discussed as possibilities by telecom experts. *Hybrid solutions* also experience low levels and are only brought up by health experts, a group that does not mention *distribution* at all.

The factors are further analyzed and discussed under the following headlines, equivalent to the factor labels in figure 9 and 10. In this part, the question of why those factors are considered crucial for an establishment is answered through the analysis of the empirical data with the help of both theoretical frameworks used in this study. Within the analysis, the underlying aspects that do not contribute to the understanding of the factor and the answer of the research questions have been left out.[15]

5.2 Price – Performance

The main relative advantage of the iDoc24 service is in terms of economic gains and convenience, which can be thought of as another form of economic gain in this case, since the service lowers transaction costs for the user. This fact is at the core of the potential of the service, and could be used in order to prove the value of it in a convincing way. The same relative advantage is true for the Kenyan market as it is for the Swedish one, since it is linked to the characteristics of the service itself. Even though market context differs, those differences are not estimated to affect the inherent value of the service.

The price-performance factor is largely dependent upon the organizational set-up of the service. Several different payment models are possible, including sliding payment schemes where customers pay depending on their ability, willingness and evaluation of the service. The factor is linked to market readiness, through the role of the characteristics of the customer groups that are to be targeted. In this sense, the relevance of the factor is almost entirely dependent upon the characteristics of the customer segment. As such, the challenges and possibilities that are linked to price are directly linked to the customer's ability to pay, which within some groups in Kenya is not that different from Sweden. However, since the general income level is much lower in Kenya, and the health sector is experiencing severe resource constraints, challenges are likely to be large within the market. Cost has been brought up as one of the main general challenges for the Kenyan health sector, and resources are unevenly distributed among both end-consumers (patients) and health care facilities. Investments in the health sector are lacking and high-end technology represents a relatively high-cost alternative. This fact makes it even more evident that the iDoc24 service has its origin in a developed market where affordability of the service and the ability to pay are less crucial concerns than on a developing market, especially when targeting the BOP segment.

The suggested price of 100-500 KES can be related to the cost of the service in the current set-up in Sweden in order to highlight the challenge of delivering high quality service at a price affordable to a reasonably large segment of the Kenyan population. In order to be able to compete with less educated actors on the Kenyan health market, it is possible that even lower prices would be necessary. When discussing this, one also has to take the cost of the device into account, which represents yet another threshold in terms of access to and affordability of the service in cases where the customer does not already own a mobile phone that is advanced enough.

One of the main costs in the set-up of the service would be the salary of dermatologists. Even though engaging local personnel would be the best alternative both cost- and quality-wise, the current lack of ability to pay competitive salaries within the Kenyan health sector indicates that the financial structure and lack of resources on the market represent a great challenge within the business model.

[15] See Appendix 3 – Factor division by each respondent

Necessary investments and financing that covers the cost of running the technology would also have to be secured.

In terms of the business model, price and performance is at the core of launching a sustainable version of the iDoc24 service on the Kenyan market. The sustainable business case has to reconcile social and financial goals in order to be able to move beyond the pilot stage and reach the volume that is necessary for it to be viable. The identification of target segments and the adaptation of both payment and business model depending on their characteristics is one of the most important tasks in terms of the set-up of the service. The aim of launching the service in a developing country also lies within this issue, linked to the balance between making profits and helping people that lack the possibility to get proper health care.

In terms of price and performance, it is worth noting that the service does not reach break-even on the Swedish market today. One of the main reasons behind this is the high cost of health care in Sweden, which within the current business model is put entirely on the patient. The challenge of meeting high costs is prevalent also in the Kenyan context but with one large difference; people are more used to paying for health care services, since the insurance system is incomplete. This means that demand may be higher than in Sweden within the part of the population that have the ability to pay. However, the Kenyan market, and especially the BOP segment, is clearly a lot more strained financially, which is likely to have large implications on demand, behavior and ability to use the service at all.

Further, just like in Sweden, there are potential business models involving insurance companies and/or the public health system as the actor paying for the service. These kinds of partnerships are however not as crucial as in Sweden, since the Kenyan health market has a much higher prevalence of private actors and self-financing. As has also been the experience on the Swedish market, performance and securing quality are vital aspects in order to create trust in the product and the actors behind it. This trust can be seen as a necessary base in order to get buy-in in a new market. Trust is extremely important for long term viability of the service, since mistakes in the delivery of medical services are likely to have more severe consequences than other areas. The link between performance, trust and sales has also been evident during the launch of iDoc24 on the Swedish market.

When analyzing the price-performance factor as a possibility, some important aspects appear. The Mpesa example represents a low price ICT solution that has been able to grow way beyond the pilot stage, and as such it represents evidence that it is possible to create solutions that are sustainable from a commercial point of view while achieving social goals at the same time. One of the core characteristics in this case is simplicity. Favorable for the iDoc24 service is the fact that many possible set-ups and solutions of ownership exist, increasing the flexibility of the process of establishment and organizational structure. For-profit models have however been found to be both efficient and sustainable.

Concerning performance and quality of delivery of the service, other factors such as partnerships, educational level and local infrastructure are likely to affect service reliability. Prahalad argues that BOP market characteristics represent increased pressure on the development of truly innovative

solutions. This aspect of the development process is somewhat altered in the iDoc24 case, since the service is already created within the context of a developed market. In terms of processes, organizational set-up and business model, modifications can however be made in order to adapt to the Kenyan market prerequisites. The primary characteristics of the innovation, defined as inherent and constant characteristics, are determined through its technology and cannot be altered. This fact restricts the potential for the service in terms of adaptation of price and performance to the Kenyan context through a localized bottom-up development process.

Prahalad discusses the need for large and global markets when targeting the BOP segment, in order for returns to be in line with risks. This is an aspect that is true for iDoc24, since the service is based on technology that makes it global from the start. Further, the business strategy has from the beginning been to become the leader within the specific niche of the service on a global level, providing advice on skin concerns independently of country of origin. This argument is further strengthened through the current expansion to several European countries. As has been brought up by Prahalad, margins are likely to be low on BOP markets, and therefore the perspective of a global market within the business strategy is of essence in order to get the volume necessary to reach break-even and create long term sustainability for the service. This is also in line with the prediction that profits are likely to be lower in Kenya compared to Sweden.

As has been theorized by Wejnert, both costs and risks are likely to influence the adoption decision, depending on the economic situation of the actors. Rejection is then directly linked to the resources of the actor that is to adopt the new solution. In the case of iDoc24 in Kenya, such actors would be the potential customers in the form of health NGOs, health care facilities and/or end-customers, videlicet patients. Large emphasis is put on affordability and ability to pay, including the general lack of resources within the Kenyan health system, in both interviews and case studies presented in this study. This indicates that Wejnert's argument holds to be true also in this case.

In terms of the potential diffusion process of the iDoc24 service in Kenya and how that process is linked to the price-performance relationship, the aspects discussed here indicate that price plays a critical role for the potential success in terms of sustainability and diffusion of the service. It has one of the highest ranks among challenges according to the respondents in this study and a low level in terms of possibility. Further, sector and country specific factors such as supply of resources, as well as experience from other projects and pilots point towards that direction.

5.3 Hybrid Solutions

The necessity of hybrid solutions, videlicet the combination of existing infrastructure and new technology, for BOP markets is linked to the need for adaptation of solutions to the local context. In the iDoc24 case, since the service has not from the start been developed on the Kenyan market, the development process therefore becomes increasingly important. As Ormrod argues, innovations need to evolve in their environmental context, and a successful transfer of an innovation from outside of this context depends on the suitability to the new environment. The importance of this adaptation has been confirmed and emphasized within the empirical material of this study. The main aspect that has been brought up is the need for a context specific, iterative development process, creating adaptation of the service through bottom-up strategies that include a lot of interaction. The problem of harmonizing the extensive amount of solutions and pilots within Kenya, originating both

from inside and outside of the country, also highlights the importance of successful adaptation that incorporates the creation of new, innovative ideas use the base of existing technology.

In the merger between the BOP and Diffusion of Innovations frameworks, the hybrid solution factor is linked to the compatibility of the innovation, videlicet the level of alignment of the innovation to the norms and values of the social system. Compatibility also includes the time aspect, in the past and current values and experiences of potential adopters towards the innovation preferably should harmonize in order for it to be diffused as quickly and successfully as possible. The strategy of developing hybrid solutions is one way of describing the need of taking the social context into account. In terms of the diffusion process, including time as an important dimension, the compatibility of the innovation is also linked to the factors functionality, commercially scalable and education of customers within BOP theory. This means that the more an innovation fulfills the specifications of those factors, the faster the rate of adoption is likely to be.

The compatibility aspect of the innovation affects the persuasion phase and convinces actors whether they should become adopters of the innovation. Basically, if there is a need and benefit linked to the innovation, it is more likely to diffuse quickly. In terms of this, the challenge for iDoc24 in Kenya is to truly get to know the local infrastructure in order to adapt the new technology and make it suitable to the Kenyan context and needs. However, experiences from the Dalberg case study points towards the inherent potential in terms of the increased capacity of international solutions on the Kenyan market.

iDoc24, also being an outside solution, would not need as much incorporation and harmonization with existing platforms and health information systems, since it is not focusing on collecting and categorizing information. The possibility of working together with those systems instead of having to become a part of them represent a potential for the service, in order to make it even more attractive and easy to use for potential customers in the form of health institutions. Homegrown solutions are at the same time requested by Kenyans, who have experienced a lot of unsuccessful, top-down implemented solutions. Those have often failed to customize enough to achieve understanding and usability. There is a large potential in using local capacity in order to build locally adapted solutions from scratch. The policy recommendation from Dalberg, summarizing experiences from about 60 mHealth projects is also in line with the interactive development process argument presented above since it emphasizes cooperation among multiple stakeholders. The importance of using open-source platforms is less relevant for the iDoc24 service, since its goal is to provide more or less real-time medical advice, and not to collect and categorize information in order to make it available to actors and institutions on the health market, as most of the current mHealth projects in Kenya do.

The necessity of adapting mHealth projects to the local context has been brought up repeatedly by the respondents of this study. Solutions should be simple, and preferably use only one tool in order to become as user friendly as possible. When using technology that may be quite new on the market, as ICT still is newer to Kenyan consumers compared to their Swedish counterparts, this may represent a challenge in terms of design. Further, the use of existing technology and resources along with integration into existing systems has been recommended. The design of the service needs to be centered around the patient, and therefore needs to take local health system and health seeking behavior variables into account. In order to increase the uptake of the solution, it would have to be

tailored around the bulk of phones, in this case low-end phones. The success and potentially large-scale impact of the WelTel solution also points in this direction.

In terms of the development process, cooperation with the user in order to suit the service to work processes and habits has been recommended. Such bottom-up development strategies are in line with the importance of interactive development processes as a determinant of the speed of the diffusion process as well as the quality and success of the outcome of those processes. Lessons from previous projects and suggestions for the iDoc24 service in Kenya have been along the lines of achieving customization of the design of the service through the help of extensive feedback. There are several limits to pre-designed solutions, especially when addressing complicated conditions or problems. Further, technology needs to be adapted to current health systems through cautious software development.

iDoc24 in Kenya is currently in the problem solving phase of the innovation generation process and at this stage, development process strategies become even more important, as they form the base for the implementation phase. The service is currently moving towards this last part of the process, which determines the rate of diffusion of the innovation the most. The feedback process described above is, as theory predicts, likely to be influenced by both technical knowledge and economic and social use of existing products and services, both of which alters over time. The tendency of respondents to emphasize customization and interaction in the development process confirms the theoretical statement that such aspects are at the base of recognition of the need for new products and services.

From the perspective of hybrid solutions as a possibility, it can be noted that there is an inherent potential in the iDoc24 when it comes to the combination of existing and new technology. Aspects of this are the design of the application, the potential for integrating solutions and variations of the offered service.

5.4 Commercially Scalable

According to BOP theory, scale is a prerequisite in order to create a business case in BOP markets. Since the iDoc24 service in Kenya would not only target BOP customers, but possibly also other segments, and since the service itself is provided on many markets simultaneously, this argument becomes less relevant. The iDoc24 service is an example that contradicts theory in that it does not need high levels of market penetration in Kenya specifically in order to be viable on a global level, due to the unique and global characteristics of the service, as has been argued above. In that sense the potential for scale should be evaluated and determined globally, and not only on the Kenyan or Swedish market.

The compatibility of the innovation is not only linked to whether it is a hybrid solution or not, but also has direct implications for its commercial scalability. Further, the degree of observability is important, not the least in terms of creating buy-in in order to reach scale. Other aspects to take into account are the norms of the social system, represented by culture and behavior and for example expressed in the level of tolerance for deviancy. Further, in terms of the adoption decision of an individual, who could either be an end-consumer or a decision maker within an organization, aspects

such as personality characteristics and social characteristics along with the perceived need for the innovation are influencing the outcome.

End-consumers on BOP markets are described as becoming increasingly connected in networks, increasing the acceptance and exchange of information in networks. This is confirmed in favor of the iDoc24 service in the description of Kenyans as fast adopters of technology and the high level of acceptance of new solutions. People are used to the mobile phone as a tool, not the least through the widespread use of Mpesa, and the willingness to learn is high. Solutions to real problems are embraced. However, as mentioned previously, the capacity to consume is in the end determined by affordability, access and availability as well as awareness of the service.

The Dalberg report notes that homegrown solutions may lack the capacity of reaching large scale, which would be an argument in favor of iDoc24 as a solution with the potential of high impact. The Changamka service represents an example of a similar innovation that has been able to launch on the Kenyan market, being a for-profit set-up and using digital tools for health services. However, the low tendency to save for future returns within the Kenyan culture is still a challenge. One equivalent to this challenge in the iDoc24 case would be demand for face-to-face meetings, based on the habit of conventional visits to the doctor. Further, other cultural aspects may be that customers are not used to the technology as well as reluctant to pay digitally.

Further, the Dalberg report highlights the need for sustainable business models, and to develop them in cooperation between stakeholders in order to achieve this sustainability. This is in line with the conclusions made by both theory and the respondents of this study, and therefore the report strengthens this argument further through representing conclusions made from a large number of mHealth projects implemented within the Kenyan health market prerequisites. Further, the need for scalability and replication is also emphasized.

The potential for scale is closely related to the potential level of health improvement that the service would contribute to. If large contributions can be proven, the whole process of scaling up is facilitated, since proving the efficiency of the service helps creating the necessary buy-in among the different stakeholders. In the Kenyan context, the efficiency of the iDoc24 service depends on for example the disease environment and current lack of treatment, which can be compared to the situation in Sweden and how it has affected the diffusion of the service on the Swedish market.

Another aspect affecting the potential for scale on the Kenyan market is funding and payment model. In order to grow, the service needs not to be too resource intensive, and in order to increase the potential uptake and use in the market, the price need not to be too high. Further, capacity to deliver even at larger quantities and a sustainable organization and business model including successful skill transfer are important aspects. Scale has in itself been argued to be a necessity in order to achieve the competitive advantage necessary to compete successfully on the market.

5.4.1 Buy-in

As for the role of funding, the market is currently scattered. There is a general need to gather information and evaluate projects in order to fund the projects that address the true needs of the population and health systems, as has also been mentioned previously. If iDoc24 can prove that they

fall into this category of projects, a potential for at least temporary financing opens up. It is also important for any project to maintain clear organizational goals that are aligned with funding, if this possibility is to be exploited. This would in that case be one part of creating buy-in in order to overcome challenges linked to initial investment costs and establish the service on the market. For long term sustainability of the service and in order to reach a large scale on the Kenyan market, the business model is however likely to have to be financially self-sustaining.

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As for the adoption decision that is linked to the diffusion of the innovation, it is worth noting that the adoption of new innovations results in organizational change that might affect the performance of the organization itself, either positively or negatively, which may be a concern. Out of the three stages of the adoption process; initiation, development and implementation, the implementation phase represents the crucial point in time in terms of measuring adoption.

However, the decision itself is no guarantee that the innovation is actually implemented. Other requirements for this are acceptance within the organization and modification of its procedures. Basically, the only correct outcome measure is the number of organizational members that have started to use the innovation long-term. Those aspects are likely to affect the decision of any organization that is a potential customer to iDoc24. As the service is currently in the development stage on the Kenyan market, buy-in that is created this early may help overcome such reluctance and limit the challenge that it represents, making it even more important. The iDoc24 service represents an incremental, technical product innovation, even though it is likely that there will also be a need for administrative changes within any organization that adopts the solution, as is stated by Damanpour and Evan.

Communication plays an important role in the process of getting buy-in in order for an innovation to diffuse on a new market. Rogers argue that face-to face communication is more persuasive for individuals. This is confirmed by the respondents within this study, especially when targeting BOP customers that often do not have access to traditional media channels. The social change that is the result of the diffusion of the innovation is based on its newness and leads to uncertainty in terms of lack in structure, predictability and information, as Rogers theorizes. BOP customers would in this setting gain a positive attitude towards the service from two-way communication through direct contact with people in which they trust, and that could help convincing them to adopt the service through decreasing the uncertainty about its consequences. Finding such spokespersons is therefore crucial in order to create buy-in and diffuse the iDoc24 service on the Kenyan market, representing the persuasion phase of the diffusion of the innovation.

The political perspective of creating buy-in becomes relevant in this context. The social context, in this case represented by informal structures, means that an innovator has to identify, meet and

create relations with informal leaders that are powerful within the community of the consumer groups in order to convince them to adopt the service. Respondents have highlighted the need of finding gatekeepers, brokers, within the informal networks who facilitate the adoption, along with the reasoning by Rogers on change agents within organizations being the ones who adopts innovations that align with the needs of the unit. It is also in line with theory on social networks by Valente, Burt and Granovetter. The role of a gatekeeper or broker is within this context not much different from that of a change agent, who would represent an early adopter of the innovation. This is another argument for why opinion leaders within local communities in Kenya are a crucial part of creating the relationships and trust that is needed for the service to have a significant uptake, as they are providers of information and advice within the social system.

Marketing represents another form of communication, which has been shown to be important in this setting, for example in the Changamka case. The service may be put together with other solutions in a bundle, which is then marketed towards specific groups. As has already been mentioned, word of mouth is emphasized as a marketing method, but nevertheless, advertising may be just as important. This form of marketing is however complicated within health care, since patients may be skeptical towards actors and institutions that market themselves extensively.

Other actors that are crucial to target in terms of getting buy-in for the service are health care workers and doctors. Among this and other groups, there is a need for evidence and follow-up in order to prove the efficiency and value of the service. One of their main concerns may be the possibility of the service altering current financial and incentive structures, creating personal loss for the people that are potential and crucial adopters. For example, piloting the service in the local context may be recommended in order to be able to identify all challenges that are linked to the establishment of the service in Kenya properly. In the buy-in strategy, previous success stories on the local market may be of help, even though they are currently somewhat lacking, especially low cost solutions. Basically, identifying and motivating the advantage and viability of the service and then communicating this in order to convince people to use the technology is the essence of a successful buy-in strategy, along with maintaining interest in the service over time.

In terms of getting buy-in from the different categories of adopters, the iDoc24 service has the advantage of being backed up by scientific evidence, which would attract the first people adopting the service. At a second stage, in order to reach the next group, strategies involving addressing the social aspects of the diffusion process, videlicet building relationships as described above, are necessary. The major takeoff in the diffusion of an innovation is reached when a high enough number of early adopters are using the innovation. When analyzing which segments and actors to target first, iDoc24 needs to keep this in mind, a fact that in this case would speak in favor of targeting innovative companies and individuals with the ability and willingness to take risks and pay for new services. At a second stage, the service could then diffuse and reach the BOP segments of the Kenyan market, both in rural and urban areas. This argument is in line with some of the empirical material of this study, but evidence is mixed, since the recommended strategy depends on the goals and vision of iDoc24 as a business on the Kenyan market.

5.4.2 Time

Time is a factor that is especially highlighted when analyzing the development of an innovation as a process. Several stages form part of this process. Design and development is followed by and linked to the set-up for commercialization of the product. Within the second phase that is adoption, initiation includes awareness, attitude and evaluation by an organization or individual, and implementation contains the trial of the service that in the end is either sustained or not. The success of the implementation is measured through the extent of integration of the innovation and its contribution to organizational conduct and outcome. Within this process, aspects such as local culture are likely to affect the success of an establishment of the iDoc24 service on the Kenyan market. Continuous feedback between the different stages of the process has been recommended, and flexibility in terms of allowing the attitude and evaluation of early adopters to influence design, development and set-up for commercialization is likely to affect the potential for a successful establishment. One of the main challenges when considering the time aspect of the adoption process is to find its optimal speed. Communication along with creating trust and buy-in and changing the mind-sets of adopters are all time-consuming activities. However, in order to achieve the correct commercial timing and get a head start towards competitors, a sense of urgency may be necessary. The emphasis that the respondents within this study have put on creating buy-in and trust through building relationships confirms the argumentation of Valente, on the importance of the social system and such relationships in order to increase the speed of diffusion.

One of the cultural aspects that have been emphasized as important to consider in the Kenyan context is the role that traditional medicine still plays within the society, especially among BOP customers. Competition from herbalists when it comes to reaching this group is likely to be harsh, since their costs are low, which means that the can fit prices directly to the customer's ability to pay. Further, other cultural challenges may be linked to motivation and a lack of awareness about mHealth along with adopters seeing ICT as an end to itself. Social barriers to the acceptability of the service may include preferences for calling instead of texting. In terms of intra-organizational structures and behavior, the Kenyan society is still suffering from a quite high rate of corruption, as well as a lack of basic organizational structures. This may in some cases lead to the possibility and prevalence of lies and fraud. All of those aspects are likely to affect the speed of diffusion negatively.

5.4.3 Trust

BOP theory emphasizes the need to create trust between customers and the market itself, as represented by providers of products and services. This need is likely to be prevalent on any market, even though they ways of successfully creating trustful relationships may differ depending on other factors. Since such relations are often based on communication, the unique ways of communicating successfully with any specific target group, depending on infrastructure and culture, are important to identify. In the case of iDoc24 in Kenya, ensuring and communicating the quality and reliability of the service is crucial, including both the quality of health care and money transfers. Further, it includes for example the quality of photos and confidentiality of data transfer. Any form of guarantee linked to the service would probably increase trust and as has been mentioned before, word of mouth is important especially in order to build relationships with customers in rural areas. Important for the level of trust in the service is also the reliability of the organization behind it, along with its cooperating institutions. Legitimacy has to be high, since the patient-doctor relationship is built

without face-to-face meetings. This can be achieved through building relations to people in the health care system in the creation of networks.

5.4.4 Attitude towards Change

Theory claims that organizations have to change both in the technical and administrative category in order for a service to reach its full potential impact. They may be reluctant to do so, but simultaneous development is necessary in order to increase efficiency. The iDoc24 case in Kenya confirms this line of reasoning, including the fact that an adaptation of the service to align with current work processes may help this transition.

As for the behavioral side of achieving change, people are likely to be reluctant, and sometimes even scared, of new products and systems. This means that it is sometimes necessary to force people to adopt new solutions, also because of the fact that norms may create barriers and resistance towards changes. Some of the aspects that have been brought up concerning iDoc24 in Kenya and that are linked to this are reluctance to pay over Internet, general mind-set and doctors feeling undermined if tools are replacing their work, all of those being factors that may result in a need to push the innovation to the market. It may be the case that those aspects lead to a situation where it takes more time to find a strategy and make people adopt the innovation than it would have taken to build the solution from scratch locally, either within an organization or independently. However, the Kenyan social system and norms is characterized by rapid uptake of new technological solutions, along with a positive attitude towards solutions that are proven to work.

5.4.5 Potential for commercialization

It has been argued that some of the potential demand for the iDoc24 service in Kenya stems from a fear among the population of going to the hospital. Further, the potential of getting access to experts is another factor increasing demand. Similar solutions have been well received in pilots, by both patients and health care workers, even though working closely together with those groups in the development of the solution was a prerequisite. Also, the current overconsumption of health care within the country indicates a high demand for services within the area and the fact that Kenya is experiencing an increased use of technology, especially when it comes to mobile phones, is further strengthening the potential for a successful commercialization of the iDoc24 service.

The market itself has the facilities that are necessary for scale, and the iDoc24 service has been judged to have the potential of being a cost effective solution also for governmental institutions. The market potential would increase if the innovation was based on the SMS service, since a much higher share of the Kenyan population has access to the tools necessary for this, but nevertheless, Kenya being early with mobile solutions and the rapid diffusion of high-end phones are factors that speak in favor of a favorable trend. The fact that one of the main benefits of the iDoc24 service is differentiating between disease cases further adds to its potential through the large impact this has on health care delivery. This is also linked to the current high level of mistreatment within the Kenyan health care system – an important problem to address.

5.5 Sustainable Development

Prahalad argues that BOP markets need sustainable and ecologically friendly solutions, which implies using resources in an innovative way, for example in terms of packaging. The prerequisites on BOP markets are also said to boost the development of such solutions, and their use on developed markets. As BOP markets grow, the prevalence of sustainable solutions will grow with them.

It is possible to look at the iDoc24 service either from the perspective of it being a recently developed, sustainable and environment-friendly solution, which would make it an example in line with BOP theory. However, it has been developed for the Swedish market to begin with, indicating that it has not in this case been the demands on BOP markets that have shaped its design and development, but that the characteristics that make the iDoc24 service suitable for BOP markets are rather a coincidence. As scarce resources is a prerequisite within institutions delivering health services in any country, the need for development of efficient solutions that save costs prevails all over the world. Further development of the service within the Kenyan context may however be shaped by the lack of facilities, supplies and other resources along with unsustainable health care costs within the Kenyan health sector, as challenges are still somewhat different between resource scarce and resource abundant countries. Recently, Kenya has had an increased focus on sustainability, increasing local resources and knowledge within the area.

Further, sustainability as a factor is less relevant for the iDoc24 service, since it is an ICT service that consists of information. The waste linked to this kind of service would be indirect - in terms of devices. However, the service itself is good for the environment in the sense that it decreases the need for transportation. Since means of transport are often linked to a lot of pollution in developing countries, the gain from solutions like this when it comes to the environmental aspect is even higher on such markets.

5.6 Functionality

The functionality of a solution focuses on its level of adaption to the needs of its users. It highlights the need not to have a mind-set stuck on developed markets when developing new solutions for BOP markets, but to instead strive to understand the way in which the local population will use the service. This principle of innovation for BOP markets has a clear link to the compatibility of an innovation as described within the theory on diffusion of innovations. Further, functionality is also related to whether an innovation is commercially scalable, and a higher level of functionality facilitates education of potential customers and users.

The emphasis put on addressing existing needs has been described above, one example being the policy recommendation within the Dalberg report, and has implications also for the functionality of the iDoc24 service in the Kenyan context. This can be linked to the need for an interactive development process in order to increase the functionality of the service. One of the main implications of this for the iDoc24 service in Kenya is that the need for the service is directly linked to health care seeking behavior and the priority of problems among the population. In some cases, it might be a problem that other needs have to be addressed before the value of the iDoc24 service is considered, because of prioritization of very scarce resources. Examples are other, more severe diseases, often quick-killers, such as Malaria and Tuberculosis. People may also sometimes wait a long time before they seek health care, due to cultural or other reasons.

Functionality would be evaluated in terms of to what extent the service is able to solve a problem for the user. The better this solution, along with its fit, is the higher the willingness is to pay for the service. In the iDoc24 case, this may also include the needs of doctors, including dermatologists. Increasing access to health care in general, along with performing market research in order to understand the patient, is recommended. This include not having technology inhibiting meeting the patient, taking away the placebo effect of a visit to a doctor, which may be even more important in the often informal settings of the BOP customer segment.

Further, the iDoc24 service in Kenya would have to adapt its functionality to the local disease environment. This includes a higher prevalence of a lot of severe infectious diseases compared to Sweden, for example HIV and Malaria. This is a fact that increases complexity and the need for diagnostic precision. HIV prevalence creates a need for counseling and feed-back, even more so since some skin diagnoses are very strong indicators of being HIV positive. Further, HIV is still a cause of social stigma in parts of Kenya. All of this increases the necessity of profound knowledge about the local disease environment and its dermatological cases among the providers of the service. To some extent, it may be the case that the prioritized and most important cases are not skin conditions.

On the positive side of the functionality of the iDoc24 service in Kenya, there is the fact that the current lack of structure within the health system result in limited possibilities of referral. This creates an increased need for the iDoc24 service. It is easier to transmit information than patients, and the knowledge of the very few local dermatologists could be more efficiently used and reach even the rural population. A general global trend of patients paying more for health care may also affect demand, adding to the fact that skin conditions are linked to a lot of stigma, which would increase demand for a service that in many cases contains simple and quick solutions to such problems.

The iDoc24 service also has a possible use within education and diagnosing, in terms of becoming a teaching platform and educating health care workers. Focus could be entirely on information, in order to limit the abuse of drugs or get the correct tests etcetera. The combination of communication tools such as Internet, mobile phone and face-to-face meetings has a potential of high impact on service delivery. All of this would improve the functionality of the service.

At the base of this argument lies the fact that technology is improving the efficiency in the health sector, through increase in speed and access to information along with the reduction of transaction costs. Today, this full potential is not leveraged, and there are few android implementations. There is generally a large potential for telemedicine, including tools such as videoconferencing that would be very beneficial especially for the population in the rural areas. The iDoc24 service also has a strong business case in those areas, since dermatologists rarely travel there, even though the problem of ability to pay within the rural Kenyan population remains. However, information can be diffused, and the service could complement the normal examination, making health service provision less dependent on personnel and in the end governance, which may sometimes be lacking.

In general, the incidence of skin cases is one of the main determining factors of the functionality of the iDoc24 service on the Kenyan market. The main areas suggested are reassurance cases, rashes, HIV and genitalia cases, along with advice on whether to visit a doctor or not. However, the segment

with the ability to pay for this functionality is limited, even though organizations may be beneficial to target as customers. Another solution is that those with the ability to pay support the development costs of the service, making it possible to sell it at a reduced price to the BOP customers.

5.7 Process innovation

The role of process innovation is to achieve the functionality and commercial scalability that is aimed for in order to improve the quality of life of the BOP customers while not interrupting their lives, something that would decrease demand for the innovation. Developing processes that are suited to infrastructure and creating logistics that enables the product or service to reach out to the target segment is part of this effort. One of the challenges linked to this factor when it comes to the iDoc24 service in Kenya is the distortion of incentives within the structure of the health sector. This means for example that costs that should be covered by society are put on patients, and that proposals from NGOs sometimes are related to the agendas of the donors, and not the needs of the population. The health care provision becomes skewed and overly profit-driven. Such characteristics of the structure of the health system need to be taken into account in order to achieve a successful set-up of the iDoc24 service in Kenya.

In terms of the possibilities that are linked to the process innovation of iDoc24 in Kenya, the technological capacity and communication infrastructure within the country is improving all the time. During recent years, fiber optics has been introduced and there have been large drops in calling rates, as well as on mobile phone devices, decreasing operative costs for any business using those tools. There has also been a shift towards mobile solutions as a norm, allowing feedback and interaction that increases the quality of services. This shift has also increased the level of local competence and human resources within the technological field. Further, the use of ICT solutions mean that some facilities already have systems in place from previous projects that may be of use in the future.

Further, the infrastructure in terms of transport, roads, network coverage and electricity is limited. Concerning this, it is worth noting that problems with the previous rather increase demand for the iDoc24 service, while the latter obstructs reliable service delivery. There is also to some extent a lack of fundamentals for technology to work with, in terms of projects and basic infrastructure as well as a limited spread of IT in hospitals. Thereby the lack of governance also has implications for the distribution of resources between rural/urban and private/public domains respectively.

5.8 Deskilling of work

The respondent group, and especially the telecom experts, sees the deskilling of work as one of the largest challenges. If iDoc24 wants to target individuals and reach the majority of the population, it is crucial to customize the application to the target group. The Dalberg report, among other sources, points out the importance of increasing educational level and literacy in ICT among the potential users, in order for as many as possible to benefit from the application. Prahalad's argument is in line with this, suggesting that the design of a service need to consider the educational level and poor infrastructure as well as the access to rural areas.

One successful Kenyan example that has been discussed earlier is the money transfer application Mpesa, which is used by everyone and targets individuals on the Kenyan market regardless of

educational level. By customizing innovations, in this case the iDoc24 service, the diffusion of the product or service will be affected in a positive way as there is no need for the adopters to develop new skills, which implies that the learning curve will not be too steep for the individuals. Another aspect to take into consideration is the age of the potential customers and to which extent they are used to technology.

According to the majority of the respondents there is a fairly low training and competence among the medical personnel in Kenya, creating incentives to develop solutions that are able to solve those problems within health facilities. One clear example of such an application is briefly brought up in the theory concerning treatment of Cholera in Peru. The example is a proof of how small solutions can add to the quality of health care provision. Brain drain is a common problem in Kenya that will affect the distribution of the service along with the limited number of dermatologist in the country. BOP markets are mostly seen as scarce when it comes to talent and Kenya is no exception, making the design of the service even more important as the current set-up is developed for the Swedish market.

Even if the iDoc24 service was to be used within an organization and handled by medical staff, it is important to customize it, as well as considering the same aspects that has been discussed when targeting individuals. This is especially true if the service is launched in the rural areas, where the level of human capacity limits the use of and access to technology more than in the cities, where the highest competence is centered. Thus, there is a need to make the application less complicated when targeting areas with lower level of competence.

Customization does also affect the possibility of maintenance, which is another challenge brought up by the respondents. By customizing an innovation to the market and local resources the probability for local staff to take care of the solution and keep it ongoing increases. Compared to when innovations are pushed into the market, there is a risk for short-term usage, as there may be a lack of access to resources (competence, financials, and human capacity etcetera). This implies the importance and need of interaction between markets, in this case the importance for iDoc24 to cooperate with actors on the Kenyan market to be able to customize the service.

Contrasting the reasoning above, some respondents highlight the relatively well-educated medical staff in Kenya, especially when compared to the neighboring countries, in terms of possibility and potential for the iDoc24 service. When comparing literacy levels in African countries, Kenya is also performing well, with its 85 percent of the population over 15 years old who are able to read and write. However, since the iDoc24 service has initially been created for a developed market with high educational levels, this line of reasoning is likely to be less relevant for the establishment of this service on the Kenyan market. The respondents who describe the deskilling of work as a possibility are fewer than those who regard it as a challenge, and the latter group is also more equally distributed among the areas of expertise.

5.9 Education of customers

The Changamka service has experienced challenges on the Kenyan market, one of which was convincing the population about the value of the service. This was partly addressed through educating their customers with the help of marketing. When comparing the health insurance service

of Changamka with the iDoc24 service, they are similar in the way that the services are new to the population, they both target the health sector and they want to reach the bigger mass - the people at the BOP. In the case of iDoc24, costs have been a challenge, as discussed above. Concerning the value of the service and making people have the service on top of their minds is still a challenge for iDoc24 in Sweden, which confirms that the challenge is not limited to the Kenyan market. Further, theory argues that it is important to explain the benefits of using a product or service as a prerequisite in order to approach the customers on BOP markets. This is in line with the case of Changamka. As for the iDoc24 service, highlighting the benefits would imply communicating the decrease in transaction costs, access to specialists and flexibility of the service as well as the fact that temporary connectivity problems don't represent limitations to the service.

Another aspect is the quality of the service, which needs to be as high as possible since the accuracy of the advice is directly dependent on the quality of information. This is in turn affected by the knowledge of how to use the tool in order to get the best quality as possible, something that is also brought up within BOP theory. When it comes to diffusion of the innovation there is a need to understand the existing adaptation of technology among end-customers as well as their attitude and behavior towards new technological services. If the customers understand the benefits mentioned, the innovation will diffuse more easily on the market due to the level of alignment between existing and new norms and values in the current system, labeled as compatibility in the Diffusion of Innovations theory. Linked to this is the challenge of reaching the percent of the Kenyan population that still visits traditional healers instead of formal health care providers, mostly due to tradition, access and price.

As discussed previously, an alternative set-up would be to use the service within an organization instead of targeting the end-customers directly. This would make it necessary to train the medical staff within an organization, a setting that has the advantage of being more organized. Also, doctors giving advice would have to receive some training in order to use the tool and website properly. Challenges linked to intra-organizational training are likely to have a similar extent to those faced in the Swedish context, due to the similarities in profession characteristics and education regardless of geographical location. When it comes to the end-customer part, however, cultural aspects, behavior and educational levels are likely to play an important part.

This reasoning implies that training in one or another way is necessary in any launch of a new ICT solution. Both patients and doctors, also at district level, are in need of face-to-face training in order for a solution to increase its impact. On BOP markets, training is mostly carried out through collaborations between the private sector, NGOs and the public authorities, increasing the importance of networks and partnerships. Several interviewees mentioned that the closer the contact during the implementation phase is the better. Further, development of supporting documentation is preferable, along with re-training and the identification of people that know how to operate a phone. The device needs a learning curve that is not too steep.

Diffusion of Innovations theory states that knowledge about an innovation reduces uncertainty about it, which increases the speed of adoption. Training and education of customers plays an important role in this process. In terms of the third type of knowledge within the innovation decision process, principal knowledge, training lowers the risk of misuse that is linked to a lack of this kind of

knowledge. In the case of iDoc24 in Kenya, this aspect is even more important as it affects the sustainability of the service on the Kenyan market.

5.10 Hostile Infrastructure

On BOP markets there is a need for innovations suit the environment, often dusty and characterized by abuse and scarcity of electricity. Few respondents within this study have pointed out hostile infrastructure as an important factor, even though it has been mentioned by Prahalad as one of the principles for innovations on BOP markets. The challenges that have been brought up by the respondents are the tropical climate, access to clean water and problems with sanitation and nutrition. However, those aspects have been brought up by less than five of the respondents and might therefore not be seen as crucial to consider for an establishment of the iDoc24 service on the Kenyan market. The lack of basic needs requires people to prioritize, especially the people at the BOP, which in turn affects the adoption of the iDoc24 service.

5.11 Interfaces

The interface was foremost seen as a challenge by the interviewees, who mentioned the risk of information loss in the service, especially when working far away from patients, diagnosing dark skin and relying on the quality of pictures. Another important aspect to take into consideration is the disease environment per se and that it might require a face-to-face meeting in order to carry out lab tests or collect a complete anamnesis. Kenya has a complex disease environment, making the process of giving medical advice through mobile phones more complicated. These are aspects to take into consideration before designing an innovation for the BOP markets, though in the case of iDoc24 it rather creates a need for modification of the service as it is already developed with the Swedish market in mind. BOP theory thus highlights the importance of researching the nature of the consumer population and taking this knowledge into account when adapting consumer interfaces. Understanding the environment of the target population and at the same time making the innovation easy enough for them to use are important parts of this.

Taking behavior into account when designing an innovation is crucial, along with to what degree the population is comfortable with using technology. This is especially relevant for health issues, where the alternative may be to meet a doctor face-to-face. In order to be able to develop an innovation that is adapted to market characteristics and increase knowledge about the environment as well as the behavior of the population there is a need to pilot and test the innovation in the context of use. An optimal case is where an innovation is tried out during the time it is developed in order to make the process of diffusion easier during the time when it enters the market, something that is referred to as trialability within theory. The interaction between developers and adopters of the service that occurs during the trialability phase decreases the risks of mistakes, due to the possibility of making adjustments parallel to the use of the product or service. The WelTel pilot was developed through interaction between the stakeholders in order to decrease the costs and reach a widespread usability. This strategy had an impact on the life of the patients and resulted in a successful outcome in terms of improved health within the test group. The interaction made the patients more involved in the project and the developers took advantage of the feedback, increasing the quality and performance of the service as well as making sure that it was used by the test group. The increased interaction between patients and nurses also created a better and more trustful relationship

between the stakeholders. In the case of iDoc24 there is a need to observe and interact with possible users on the market parallel to developing the service for the Kenyan market.

Further, theory explains in what way individuals evaluate innovations. The early adopters are those relying on research and more willing to take risks. These people are important to find in order for a new innovation to reach a market. In the case of iDoc24 the early adopters can differ, either being the 20 percent having a smartphone, living in the cities and being up to date, or the BOP segments of the market. The first of those groups would more or less be the same people that are using the service in Sweden. Another group of early adopters in Kenya would be organizations, probably a private clinic or an NGO, using the service in order to reach higher competence in an efficient way.

The theory divides technological innovations into two types of components; hardware and software. In the case of iDoc24 the software component is the information and the picture provided by the users, and depending on its quality it affects the possibility for the dermatologist to give a proper medical advice. The hardware would be the mobile phones or the computer on which the service is used. In the case of iDoc24 the software is the most critical component as it affects the quality of the medical advice and the next step for the user.

5.12 Distribution

The distribution system on BOP markets often represents a challenge that is important to address. In Kenya there is lack of bodies and communities to establish and implement through, which makes it hard to find suitable partners to cooperate with in order to make an innovation reach the market, which verifies BOP theory. Further, innovations must reach possible customers in urban as well as in rural areas, indicating the importance of distribution. This creates big challenges for innovations from the outside in need of partners to reach the market. The HLL example described in chapter 3 is one way of solving such a challenge, while at the same time empowering the local population.

There is an ease of diffusion as well as a great uptake of innovations in the urban areas, making it less challenging to distribute to those areas compared to the rural ones. However, the majority of the Kenyan population lives in the rural areas, so in order to reach the big mass at the BOP iDoc24 would need to find ways to distribute to those areas as well. Further, it can be noted that this part of the population are the ones that would benefit the most from the iDoc24 service. This is partly due to transaction costs and lack of access to health care provision, especially when it comes to the limited number of specialists, who are centered in urban areas.

5.13 Challenge the Conventional Wisdom

BOP markets can be very fast when it comes to uptake, if emphasis is put on the broad architecture and finding of new solutions. This factor was brought up a few times by the respondents within the health and technological areas. One of the challenges within the Kenyan health sector is that the sector is quite slow in receiving global changes, even though there are some exceptions. The WelTel pilot is a success example of how to find a solution to a problem that result in improved health by creatively approaching the market and designing a solution suitable to its characteristics. The eHealth area in Kenya is also currently catching up and the Ministry of Health is trying to achieve alignment between the actors in order for them to take advantage of and learn from one another.

5.14 Sector characteristics

The Kenyan market is currently scattered, especially when it comes to the funding of projects. Further, there is a general need to gather information and evaluate projects in order to fund the projects that address the true needs of the population and health systems, as has also been mentioned previously. If iDoc24 can prove that they fall into this category of projects, a potential for at least temporary financing opens up. It is also important for any project to maintain clear organizational goals that are aligned with funding if this possibility is to be exploited. This would in that case be one part of creating buy-in in order to overcome challenges linked to initial investment costs and establish the service on the market. For long-term sustainability of the service and in order to reach a large scale on the Kenyan market, the business model is however likely to have to be financially self-sustaining.

The Kenyan Ministry of Health is currently developing guidelines in order to gather actors and stakeholders on the market and streamline the goals of different projects. Sector characteristics are not extensively discussed as a factor in the Diffusion of innovations theory, even though it is mentioned. Rogers describes a set of interrelated units as a social system where actors cooperate towards the same goals by joint problem solving in order to maximize their resources and efforts and increase efficiency within the sector. Further, sharing the same objectives makes the interrelated units stay together. Through structuring the market, the Ministry of Health wants to harmonize the sector and intertwine the agendas of the actors as a way of preventing the overlapping of work that occurs today. Further, the Dalberg report requests cooperation between actors in order to take advantage of all the knowledge that is available on the market and to influence the development of mHealth applications. The organization and structure of the sector influences the diffusion of new innovations in terms of accessibility of information, knowledge and suitable partners.

Within the mHealth area in Kenya, regulations and legacy systems are to a large extent created in cooperation with the actors within the sector. In terms of regulation, one of the main issues is the secure transferring and storage of sensitive data on servers. This is partly under development by the Ministry of Health parallel to the harmonization efforts. There is for example a procurement process in order for the government to be able to control if a project is in line with the current needs and goals of the sector, and any registration of a new project includes a follow-up process.

Today, external donors constitute a challenge at the same time as they are important sources of financing. Most of the time the donors have their own interest and agenda, which in turn affects the agendas of those actors on the Kenyan market that are in need of capital. This means that there are a lot of ideas, but that the actual needs might not be taken into consideration, something that is highlighted in theory on the basis of commercialization reasons. In order for the Ministry of Health to create an agenda of its own in cooperation with the actors it is important to understand the situation on the local market. Kenya is quite affected by global events, as is any open market, represented by for example the actions of donors and creation of new innovations. As argued in theory, organizations need innovation infrastructure in order to undertake innovative activities, which means that there is a need of scientific markets and knowledge sourcing that is somewhat limited in the Kenyan context. This is especially true within the health sector, where the lack of local research links to the creation of solutions that are suitable for local conditions. Kenya has not invested much in research on health issues, probably mostly due to the existence of more pressing issues that receive

the limited resources. This can be seen when solutions are rather pushed than pulled into the market, as is the case especially when they are suitable for developed and resource rich countries.

In Kenya as well as in Sweden, the iDoc24 service would help health care providers to segment the severity of the concerns and thereby lowering the workload for specialists. However, Kenya is currently having problems taking care of all the people that visit health care providers, due to scarce resources. This is especially true for public health care facilities.

5.15 Governance

The scattered Kenyan health sector is the consequence of both bad management and sometimes a complete lack of management. As it is today, the actors on the market are not coordinated, at the same time as there is a distortion of incentives as well as gaps in regulations, follow-up and accountability. This is mostly the case for the health sector but it is also true for the administration. The lack of governance has a negative effect on the market and its social system when it comes to creating common goals. Governance is not brought up as one of the 12 BOP principles, even though the theory more or less indicates that the factor is an underlying challenge on BOP markets, more or less affecting every actor and also being linked to partnerships.

The legal issues in Kenya are different compared to Sweden, and fewer of the regulations are followed due to a dysfunctional market. However, the legal framework represents an important part of the social and institutional context. In Sweden, iDoc24 currently follows the legal concept behind Vårdguiden and Mina Vårdkontakter, services that are provided by an authority. Patients are anonymous, which create less trouble, and no responsibility for follow-up etcetera. However, the anonymity limits the service, for example in the case of prescription, which represents a potential add-on service that could increase the value of the current service. This is in line with comments from interviewees in Kenya, where the regulatory framework is less harsh and ICT solutions within health care are seen as having large potential. Institutions are in many cases working together with actors in order to shape a framework that enables the impact from those solutions to be as large as possible. Further, deregulation of the ICT market has nourished its development, an example of which is the sharing of infrastructure between operators that makes it easier for the population to change from one operator to another in order to increase connectivity.

Most BOP markets are regarded as dysfunctional markets, with corruption as one of the underlying factors. Corruption is prevalent within Kenyan institutions and has been described as an important obstacle for development and poverty reduction, in line with BOP theory. It also affects the long term thinking that in turn has an impact on the sustainable development in the country. Most of the respondents identify more challenges than possibilities within governance, which is in line with dysfunctional and scattered characteristic of the Kenyan market when it comes to governance, structure and evaluation.

5.16 Market prerequisites

Market prerequisites is another factor that is not included among the 12 BOP principles that are suggested by Prahalad, even though it is brought up as an underlying factor within the theory as a whole. The Diffusion of innovations on the other hand, discusses the importance of social systems in order for innovations to diffuse more easily. The social systems are indirectly influenced by market

prerequisites as the systems per se consist of actors and stakeholders that are active on the market and have to adapt to its rules.

The fact that the level of mobile penetration on the Kenyan market is 55.9 percent increases the possibility for diffusion of mobile solutions. Even though the current set-up of the iDoc24 service is adapted to developed markets, there is still approximately 20 percent of the Kenyan population that own a smartphone with gives them the ability to use the application version of the service. This indicates that the challenges that the service is facing on the Swedish and the Kenyan markets may be intertwined. This is for example represented by the challenge of advertisement of the service being more important than the type of phone even though the majority of the population in Kenya, especially in the rural areas, has a low-end phone. Most of them can still use the service via the MMS set-up, but there may be a risk of gaps in the information given by the patient regarding the concern that is due to low educational level. This in turn affects the quality of the answer from the dermatologist. In the long run this will have consequences for the reputation of the service, potentially creating distrust due to low quality answers. At the same time, the service may have the highest impact in the rural areas due to their high transaction costs, lack of human capacity and limited access to knowledge. The possibilities of availability continuously improve along with the expansion of the mobile network in Kenya, increasing the potential for the iDoc24 service to reach very remote areas and the people at the BOP.

The number of skin concern cases that occurs on the Kenyan market will also affect the use of the iDoc24 service. During the pilot study in Sweden, three areas where the service would be useful were identified. Such evaluation and investigation would potentially also be needed on the Kenyan market, in order to find suitable target areas and market segment for the service. However, some of the insights from the Swedish study are likely to be applicable on the Kenyan market as well, for example the potential of targeting worried mothers and patients with genital problems.

Extensive bureaucracy along with the slow governmental system and the lack of statistics are all factors that have been discussed above and that represent challenges for any actor on the Kenyan market. The lack of statistics makes it especially difficult to harmonize and identify the actual needs on the market. External organizations may experience problems of finding market data as well as knowledge about what is demanded on the market in order to establish whether there is a possible business case in Kenya. This is also linked to the challenge of finding actors on the market to establish and implement through.

Further, BOP markets are often seen as dysfunctional, which makes it challenging to do business. The high transaction costs often mean that new organizations give up, which indicates the importance to focus on social capital acquisition, public-private partnerships, downscaling and infrastructure as well as information gaps and new mind-sets in order to educate and empower the poor and through this succeed on BOP markets. As pointed out by the respondents it is crucial that the needs and resources available, including connectivity and network coverage, are identified and taken into consideration in the development of mHealth services. Even though it may be easy create solutions, there are still challenges linked to finding a suitable body or community to partner and implement through as well as to know whether people will really use the innovations. However, it is worth noting that it has been easier for Swedish companies to establish in Kenya recently, partly due to the level of

integration with the global market. On the other hand, the structures for starting businesses are somewhat lacking and the estimated time to start a business in Kenya is 34 days.

Developing economies tend to have weaker suppliers and distributors than in develop countries. The pools of vertical intermediaries often play key roles in the degree of innovativeness by providing access to skills, equipment, and customers, which creates challenges when operating on BOP markets. At the same time, the most innovative solutions often tend to appear on those markets due to the pressure that is the result of the limited resources, an example of which is Mpesa.

The low rate of insurance coverage in Kenya represents one of the main institutional differences when comparing with the Swedish health market. The reluctance to buy health insurance indicates that there is still a long way to go before access to health care is secured on a structural level. Other types of aspects adding to the reluctance are the level of literacy, culture and trust towards the health sector among the Kenyan population. Those aspects along with price also affect the decision to visit a traditional healer before a pharmacist or a doctor, challenging improvements in Kenyan health care provision.

The challenges and possibilities discussed above are extra-industry factors within the environment influencing the speed and magnitude of diffusion of innovations between industries. Further, the technical knowledge and degree of economic and social use of existing products and processes are other aspects affecting the diffusion and resulting in the recognition of needs and wants for new products and processes. They are both continuously changing and not static factors, which means that the future situation may differ extensively from the current one, affecting the potential for the iDoc24 service in Kenya. Intra-industry factors on the other hand are met when the innovation is adopted and used within an organization, and they are therefore beyond the scope of this study when it comes to the Kenyan context. In the establishment if the service in Sweden, intra-industry factors have however been met through the testing that showed a positive impact for the county council, as they were able to decrease their costs while still providing quality care.

5.17 Partnerships

Partnerships, is the fourth factor that is not an explicit principle in order to develop innovations for BOP markets, even though it is a prerequisite within the BOP theory. The current networks between actors within the health sector on the Kenyan market are fairly good but still improving, especially within existing mHealth projects. Actors within a network, for example operators, health institutions or the government, can be different from each other but still wanting to achieve the same goals, which is stated as a social system by Rogers. Close partnerships facilitates the diffusion of innovations, as highlighted in theory, as well as the importance of foreign partnerships such as joint ventures, co-production and co-marketing in order to gain knowledge and develop new ideas. Further, local groups on the Kenyan market can use relationships with foreign organizations in order to gain the knowledge needed to develop and commercialize new ideas. There are also challenges with the partnering with foreign organizations that are linked to their risk of losing intellectual property, resulting in some organizations being reluctant to license in developing economies.

Close cooperation creates dependency and strong ties, which may limit the potential for an innovation to diffuse across subgroups according to Granovetter. In terms of relationships, collective

behavior may also affect the diffusion in the sense that potential adopters are likely to act in line with other people within the social system. Therefore, the network characteristics of the social system partly implies that it should be thought of as one unit, in terms of in which way innovations diffuse within the system.

Crucial partners for the iDoc24 service are actors that are related to the service, for example operators, health institutions and the government. Partnering with those actors would be an effective strategy for iDoc24, creating a network that combines necessary local actors related to the service itself and who are aware of the Kenyan market and culture. This was successfully achieved within the WelTel project.

Convincing local actors about the positive impact of the service, is important for both scale and commercialization, as focus on business cases and how to make profits may be valued higher than the potential creation of social value. There is however a need of collaboration with the strategic partners in order to be successful on BOP markets. Therefore, it is important to target early adopters, represented by both individuals and organizations that could be interested in the service, in order to initiate collaboration. The motivation for this is their tendency to be up-to-date when it comes to new solutions, along with their willingness to take risks.

The government is seen as an important actor to cooperate with in order to reach scale – a fact that does not seem to be specific to Kenya but rather to the innovation itself, along with its area and set-up. As the government is not known as an early adopter or a fast mover, it becomes even more important to pilot the service, evaluate the results and through this show the potential impact. A partnership with the government would lower barriers while other partnerships would bring knowledge and resources, which is also of value. One of the main reasons to form partnerships on the local market are sustainability and facilitation of operations through for example free tools and devices, to get outreach, construct payment models and to cooperate with insurance companies in order to get revenue. Dermatologists to cooperate with are estimated to be accessible, if nothing else internationally. Another possibility is to partner directly with Kenyan hospitals.

6.0 Conclusions and discussion

This chapter provides a concluding answer to the research question, through addressing the sub-questions one by one. The third sub-question is answered separately, as the theoretical and empirical implications of this study on a broader level are discussed. Following this is a brief discussion of the results of the study along with its limitations. Lastly, suggestions for further research are presented.

6.1 Answering sub-questions 1 and 2

Through this study, we aim to increase the understanding of the prerequisites for mobile health services in East Africa, and more specifically the Kenyan market. This is achieved through a qualitative research approach, by examining cases as well as gathering general information about the prerequisites for mHealth solutions in Kenya. We perform a broad analysis of the organizational, technical and sector specific conditions that are likely to influence the establishment and diffusion of the iDoc24 service on the Kenyan market. The collected empirical material is examined through the perspective of existing theoretical frameworks in the shape of BOP models of business solutions and strategy, as well as theories on the diffusion of innovations. Through this broad perspective, we aim to relate those areas to each other, and evaluate their relative importance in order to paint the wide picture. The purpose is to perform an explorative study that may give directions for future, more specific, research within the field.

The main research question, "*What are the prerequisites, in terms of challenges and possibilities, for an establishment of the Swedish mobile health service iDoc24 on the Kenyan market?"* has been divided into three sub-questions, of which the first two are answered in this section. Those two are addressing the identification of the important factors, along with the explanation of why they are considered crucial for an establishment of the iDoc24 service in Kenya.

The important factors, in terms of challenges and possibilities that have been identified by the respondents in this study, are several and highly intertwined. The challenges that have been emphasized the most are *price, scale, deskilling of work* and *market prerequisites*. Factors mentioned in terms of representing possibilities are *scale, market prerequisites, process innovation and functionality.* As noticed, some of the factors are brought up as both a challenge and a possibility, partly due to differences in insights among the experts within the three areas.

In addition to those factors, the importance of taking the social context into consideration when entering a BOP market has been shown. This is due to the need for extensive knowledge about the local market, both in terms of structure and behavior of customers. Further this is linked to the ability to create buy-in and sustainability, as well as the value to partner with actors on the Kenyan market. Partnerships would be of help when building trust, which is an important aspect in health care service provision.

Market Prerequisites are seen as both a challenge and a possibility for the iDoc24 service. This is partly due to the limited prevalence of smartphones, slow governmental systems and bureaucracy as well as the lack of statistics, complicating the situation especially for market research. On the other hand the penetration of mobile phones is quite high (55.9 percent), indicating the access to mobile phones on the market together with the possibility of linking applications, as the development of payment/credit systems like Mpesa and insurance health systems like Changamka shows. **Scale** is the

second factor seen as both a challenge and a possibility. The theory as well as the respondents indicates the importance of scale in order to create a business case on a BOP market. The social systems and norms on the Kenyan market are characterized by rapid uptake of new technological solutions along with a positive attitude towards solutions that are proven to work. However, the majority of the Kenyan population is limited in their capacity to consume, determined by the affordability, access and availability as well as awareness of the service.

The main challenges linked to a possible establishment of the iDoc24 service are price and deskilling of work. **Price** plays a critical role for the potential success in terms of sustainability of business operations and possible diffusion of the service, partly due to the consumer´s ability to pay. Within some groups, the ability to pay does not differ between the Kenyan and the Swedish market. However, since the general income level is much lower in Kenya, and the health sector is experiencing severe resource constraints, challenges are likely to be large within the market. The challenge of meeting high costs is therefore prevalent in Kenya, even though people are more used to pay for health care since the insurance system is incomplete. Further, **deskilling of work** implies the need of customization to target groups, regardless of whether the service targets individuals or health care facilities. The customization involves taking the level of education, language and age as well as literacy within ICT into account. According to BOP theory, most BOP markets are scarce when it comes to talent, and Kenya is no exception especially due to the problem of brain drain and the limited number of dermatologists within the country.

The possibilities linked to an establishment that have been identified in this study are process innovation and functionality. The technological capacity and communication infrastructure within Kenya is improving all the time. There has also been a shift towards mobile solutions as a norm, allowing feedback and interaction that increases the quality of services indicating the possibilities within **process innovation.** Further, the **functionality** of the iDoc24 service on the Kenyan market is positively influenced by the current lack of structure within the health system, as it is easier to transmit information than patients, creating need for the service. Another potential with the service is the increased accessibility of dermatologists, which is important due to their limited presence in the country. Further adding to the functionality is the fact that the service can be used within education and diagnosing within health care facilities.

6.2 Answering sub-question 3

The third sub-question addresses the theoretical and empirical implications for the iDoc24 service in Kenya. The identification of factors that are more or less important in the specific context that has been the focus of this study is of help in order to develop and adapt the theoretical frameworks through the addition of empirical knowledge.

One of the main theoretical implications is the four additional factors that have been identified within this study. Some of the aspects that have been emphasized here are likely to be more important than theory predicts. This is especially true for market prerequisites, which is not included among the twelve BOP principles of innovation. Further, sector characteristics, governance and partnerships have in this study all been identified as important factors affecting the establishment of the iDoc24 service in Kenya. Therefore, putting as much emphasis on them as is put on the twelve BOP principles and the characteristics of an innovation may be recommended. The four additional

factors are more specifically represented by for example knowledge about the local context, both in terms of the market and the health sector per se, as well as the ability to increase access to local resources through partnerships.

Combining the theoretical frameworks that have been used in this study as presented in figure 5 represents a way of identifying the relations between concepts within the theories, along with making theoretical connections. The gains from such connections are further shown through the way that they help increase the understanding of the factors that have been identified in this study, as presented in the analysis.

The study also leads to empirical implications for Kenyan mHealth projects generally as well as for the iDoc24 service specifically. One of those implications is the fact that solutions that are adapted to context specific characteristics have been identified as viable on the Kenyan market. Further, the development of successful mHealth solutions and services is a process that requires interaction with users and stakeholders such as local organizations and the government.

Yet another empirical implication of the iDoc24 service in Kenya would be its contribution to the reduction of the poverty trap, through an increase in accessibility of health care services and health information. This is part of the improvement of access to basic services that would reduce the prevalence of the poverty trap. However, the goal of the establishment is crucial in terms of whether it is to create a sustainable business model for the provision of the service on the Kenyan market or whether it is to help society on a large scale. Even if the service is not implemented within a large share of the Kenyan health care facilities, the provision of health care services through a sustainable private business may serve as a best practice example and inspiration. It would also stimulate the local economy and through this help the Kenyan society.

Based on this argumentation, it is likely that iDoc24 in Kenya would be an example of what Prahalad describes as the win-win situation of companies achieving sustainable set-ups through creating partnerships and engaging the poor. In this way, they make profit while involving the BOP customer segments in the global economy and improving their quality of life. All of those aspects are applicable on the potential case of iDoc24 in Kenya. As a best practice example, the service may also serve as an inspiration for successful and innovative entrepreneurship among the poor. However, as has been discussed in this study, a strategy of establishment targeting the rich customer groups on the Kenyan market would naturally limit the benefits for BOP customers.

6.3 Discussion of the Results

As discussed in the background of this study there is lot of potential for ICT solutions within developing markets, which is also highlighted in the empirical material. ICT solutions are able to increase effectiveness within processes, storing data and adding new data. In that way the ICT solutions can add and increase the availability of statistics and knowledge about the historical as well as the current situation within the country.

Naturally, there are disadvantages as well as advantages linked to entering BOP markets. The question is rather whether one of them dominates the other, which in turn affects the potential for an establishment on such a market. As has been highlighted within this study, such evaluation may

be difficult due to the close linkages between the factors affecting an establishment of a new service and whether they mainly represent a challenge or possibility. Therefore, such evaluation has to be made with much care and consideration of the unique aspects of the specific case and context.

The theory used in this study highlights the importance of several factors and aspects to take into consideration in order to succeed on BOP markets. As stated in the conclusion, four main challenges and four possibilities are emphasized by the 30 respondents. The potential of rapid diffusion of the iDoc24 service on the Kenyan market is directly affected by those factors, of which for example price may be difficult to affect. Further, the importance of market prerequisites and scale implies that external factors as well as the inherent characteristics of the design of the service are crucial for its success. Such aspects are fairly much beyond the control of the person or organization behind a product or service, especially when it is already developed and the issue at hand is the transfer and establishment on a new market. This means that the rate of diffusion is difficult to influence.

Based on the insights of this study, a possible strategy for iDoc24 on the Kenyan market would be to establish partnerships and through those pilot the service in order to increase knowledge about the local environment, market and prerequisites of the service. This would be of importance due to the lack of statistics along with the limited amount of both established and piloted mHealth solutions of this kind, which makes the iDoc24 service unique. Further advantages with a pilot would be the chance to actually conduct market research, along with the ability to modify the service to local resources and capacities. With such an approach there is a possibility for the iDoc24 service to meet the specific Kenyan needs rather than pushing another solution to the market. Keeping small scale also creates the possibility of using the platform and server in Sweden during the initial stage, while employing local dermatologists who answer the cases through the Swedish platform. In the next stage, a totally new platform would be developed, along with a server and web page for the Kenyan context and its set-up.

In order to overcome the identified challenges an outside solution entering the Kenyan market needs to create buy-in among potential customers, through investigating their preferences and demand of the service as well as their willingness to pay. This implies identifying the price-sensitivity of the market and the target group. Further there is a need to facilitate the access to market and trust through relationships with local actors and informal leaders. Those strategies are applicable on the iDoc24 case specifically but are also likely to be important to take into consideration in the establishment of other products and services on developing markets similar to the Kenyan one.

6.4 The Study's Limitations

Through the consideration of several crucial aspects during the research process, as described in detail in chapter two, the possibility of weaknesses within this study has been decreased. The research approach has been influenced by the scope of the study as well as the amount of time spent in Nairobi. This also contributes to the broad characteristics of the study in terms of the amount of detail that is provided concerning the possibilities and challenges linked to an establishment of iDoc24 in Kenya.

During the research process, we have been in contact with entrepreneur behind iDoc24 and this link probably has affected our view of the iDoc24 service. However, the perspectives of such contact

represent an important contribution to the study and are therefore estimated to be more valuable than complete independence. Further, we have tried to be as objective as possible during the interviews, informing the respondents about the nature of the study and the institution behind it.

The study consists of a lot of empirical data that instantly raises new questions, partly due to the broad approach and size of the area that is covered. The largest share of the interviews were held with people from other cultures, increasing the risk of misunderstandings due to cultural differences and affecting both questions and answers as well as the risk of information loss. Therefore, an interview guide has been used in every interview in order to increase the reliability of the answers and make them as unbiased as possible. Furthermore, the results of this study are related to innovations on the Kenyan market, and cannot without caution be generalized to all developing markets since they tend to put emphasis on context specific aspects. Nevertheless, there may be some similarities between Kenya and other developing markets.

6.5 Future Research

Based on the main conclusions from this study there are several aspects and factors that would be interesting to investigate in further detail. This study has a broad focus, and does not answer specific considerations regarding establishments of ICT solutions such as for example mHealth services, in developing countries.

A recommendation for future research is to investigate user interfaces based on the characteristics and preferences of the target customer segments and early adopters of mHealth services. Research can be based on case studies investigating the interaction between the user and the service. It may target people within organizations as well as end-customers, investigating the differences between the two contexts. Further evaluating the performance of existing mHealth projects is another interesting research area, especially in developing countries. This is also of special interest for actors within the health sector. Another area of interest is to investigate the role and effect of culture in more detail. To what degree does the culture affect ICT solutions as well as the prioritization between basic needs and technology?

In Kenya there is a mobile penetration of 55.9 percent. The population living on less than 2 dollar a day is about 16 million, of which some have access to a phone even though they lack food, indicating a skewed prioritization. It would therefore be interesting to investigate how that affects ICT solutions in general, and which factors that affect the prioritization and decisions among the population at the BOP.

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Börve, Alexander (2011, March 24th) Medical Doctor and founder of iDoc24, Gothenburg, Sweden. Personal Interview.

Gichuhi, Sheila (2011, February 17th) Head of Medical Department, APA Insurance, Nairobi, Kenya. Personal interview.

Holmgren, Gunnar (2010, December 29th) Specialist in Infectious Diseases, Länssjukhuset Ryhov, Jönköping, Sweden. Personal interview.

Imbugwa, Nicholas (2011, January31st) Program Manager, Democratic Governance (Head of Health before), Embassy of Sweden, Nairobi, Kenya. Personal interview.

Iveroth, Peter (2011, March 15th) Specialist in Infectious Diseases, Länssjukhuset Ryhov, Jönköping, Sweden. Phone Interview.

Jarlman, Olof (2010, December 28th) Associate professor in radiology at Lund University and consultant within eHealth, medicine and innovation, Lund, Sweden. Phone interview.

Kahindi, Garama S. and Muthengi, Sisinio (2011, January 26th) Medical Director/CEO Angelic Missions Hospital and Operations Director, Angelic Missions Hospital, Nairobi, Kenya. Personal interview.

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Kiarie, Vincent (2011, January 12th) Head of Management Information Systems Officer, Christian Health Association of Kenya (CHAK), Nairobi, Kenya. Personal interview.

Kinuthia, Jack (2011, February 14th) Head of Health Department. Jamii Bora, Nairobi, Kenya. Personal interview.

Kituyi, Ling, (2011, February 11th) Chief Medical Officer, Joint Medical Services, United Nations Office at Nairobi, UNON. Personal Interview.

Källbäck, Lisa (2011, January 17th) Project Leader, the Swedish Trade Council, Nairobi, Kenya. Personal interview.

Lester, Richard T. (2011, February 17th) MD, FRCPC, Clinic Physician Leader, STI/HIV Prevention and Control, BC Centre For Disease Control, Vancouver, BC. Clinical Assistant Professor, Division of Infectious Diseases, Vancouver, BC, Canada. Personal interview.

Liko, Agosta (2011, January 24th) Business Development Manager, PesaPal, Nairobi, Kenya. Personal interview.

Magolo, Wilson (2011, February 26th) Information Technology Lecturer, Jomo Kenyatta University of Agriculture and Technology, Juja, Kenya and Medical Officer at Angelic Missions Hospital, Nairobi. Kenya. Personal interview.

Milewa, Vincent (2011, January 17th) Business Development Manager, Multimedia and Systems Integration, Market Unit Sub Saharan Africa, Ericsson Kenya Ltd, Nairobi, Kenya. Personal Interview.

Miller, Robin (2011, February 14th) Consultant, Dalberg (Global Development Advisors), Nairobi, Kenya. Personal interview.

Mimano, Geoffrey (2011, January 28th) Technical leader, McLabs, Nairobi, Kenya. Personal Interview.

Mukabi, James (2011, February 2nd) Head of International Health Relations**,** Ministry of Public Health and Sanitation, Nairobi, Kenya. Personal interview.

Mrema, Kizito (2011, February 7th) Head of telemedicine, ELCT, Arusha, Tanzania. Skype interview.
Musomi, Johnson (2011, February 2nd) Outreach Manager, AMREF, Nairobi, Kenya. Personal interview.

Odhiambo, Frank (2011, February 2nd) Project Assistant, I.T/Clinical Outreach Program, AMREF, Nairobi, Kenya. Personal interview.

Ogara, Esther (2011, February 11th) Head of eHealth, Ministry of Medical Services, Nairobi, Kenya. Personal interview.

Otieno, Andrew (2011, February 14th) Manager, Jamii Bora bank, Funzi road Branch, Nairobi, Kenya. Personal interview.

Sequeira, Glenn (2011, January 31st) Technical Consultant/Entrepreneur, Nairobi, Kenya. Personal Interview.

Sundsmo, Aaron (2011, February 9th) Africa Regional Director, Danya International, Inc, Nairobi, Kenya. Personal interview.

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8.0 Appendices

8.1 Appendix 1: Overview of interviewees

Name	Position	Department/Organization/Company	Location	Date
Olof Jarlman	MD, PHD Associate Professor. Director, Program in Medical Informatics	Lund University	Lund, Sweden	28th December 2010
Gunnar Holmgren	Specialist in Infectious diseases	Clinic for infection diceases, Länsjukhuset Ryhov	Jönköping, Sweden	29th December 2010
Vincent Kiarie	Head of Management Information Systems (HMIS) Officer	CHAK, Christian Health Association of Kenya (CHAK)	Nairobi, Kenya	12th January 2011
Vincent Milewa	Business Development Manager, Multimedia and Systems Integration	Market Unit Sub Saharan Africa, Ericsson Kenya Ltd	Nairobi, Kenya	17th January 2011
Lisa Källbäck	Project Leader	The Swedish Trade Council	Nairobi, Kenya	17th January 2011
Agosta Liko	Business Development Manager	PesaPal	Nairobi, Kenya	24th January 2011
Judy Wawira	Medical Officer, Kiambu	District Hospital	Kiambu, Kenya	24th January 2011
Dr. Wilson Magolo	ICT Lecturer and Medical Officer	JKU of Agriculture and Technology/Angelic Missions Hospital	Juju, Kenya/Nairobi, Kenya	26th February 2011
Dr. Kahindi Garama Saedzach/Sisinio Muthengi	Medical Director and CEO/Operations Director	Angelic Missions Hospital	Nairobi, Kenya	26th January 2011
Glenn Sequeira	Consultant/Entrepreneur		Nairobi, Kenya	31st January 2011
John Wesonga	Technical Advisor	I-TECH, International Training and Education Center for Health	Nairobi, Kenya	28th January 2011
Nicholas Imbugwa	Program Manager	Democratic Governance (Head of Health before), Embassy of Sweden	Nairobi, Kenya	31st January 2011
Geoffrey Mimano	Technical leader	McLabs	Nairobi, Kenya	28th January 2011
Dr James Mukabi	Head/International Health Relations	Ministry of Public Health and Sanitation	Nairobi, Kenya	2nd February 2011
Frank Odhiambo	Project Assistant, I.T/Clinical Outreach Program	AMREF	Nairobi, Kenya	2nd February 2011
Dr. Johnson Musomi	Outreach Manager	AMREF	Nairobi, Kenya	2nd February 2011
Steven Wanjee Macharia	Technical advisor	I-Tech, International Training and Education Center for Health	Nairobi, Kenya	3rd February 2011
Aaron Sundsmo	Africa Regional Director	Danya International, Inc.	Nairobi, Kenya	9th February 2011
Staffan Wiking	Regional representative	East Africa, Swedish Red Cross	Nairobi, Kenya	9th February 2011
Kiziito Mrema	Head of telemedicine	ELCT	Arusha, Tanzania	7th Febuary 2011
Antony Kariri	IT Manager, Kenya AIDS Control Project	University of Manitoba, Kenyatta University/Hospital (WelTel)	Nairobi, Kenya	10th February 2011
Dr. Ling Kituyi	Chief Medical Officer	Joint Medical Services, United Nations Office at Nairobi, UNON	Nairobi, Kenya	11th February 2011
Dr Esther Ogara	Head of eHealth	Ministry of Medical Services	Nairobi, Kenya	11th February 2011
Jack Kinuthia	Head of Health Department	Jamii Bora	Nairobi, Kenya	14th February 2011
Andrew Otieno	Manager	Funzi road Branch, Jamii Bora Bank	Nairobi, Kenya	14th February 2011
Robin Miller	Consultant	Dalberg (Global Development Advisors)	Nairobi, Kenya	14th February 2011
Safaricom: Alvin Okari/Patrick Ng'ate	Senior Manager/Value Added Services Propositions Manager	Safaricom	Nairobi, Kenya	16th February 2011
Kiama William. M. / Sheila Gichuhi	Assistant Manager/Head of Medical Department	General Division, AKI (Association of Kenya Insurers)/APA Insurance	Nairobi, Kenya	17th February 2011
Dr. Richard T. Lester	MD, FRCPC, Clinic Physician Leader/BC. Clinical Assistant Professor	STI and HIV Prevention and Control/Centre For Disease Control/Division	Vancouver, Canada	17th February 2011
Maria Bradley	Associate Professor in Dermatology	Karolinska Institutet, Karolinska Hospital	Stockholm, Sweden	18th February 2011
Peter Iveroth	Specialist in Infectious diseases	Clinic for infection diceases, Länsjukhuset Ryhov	Jönköping, Sweden	15th March 2011
Alexander Börve	Owner and founder	iDoc24	Gothenburg, Sweden	24th March 2011

8.2 Appendix 2: Interview Guide

Questions

1. Personal Facts

- Professional title
- Background (education, earlier experiences)
- What do you work with?
- How long have you worked here?
- What did you do before?

2. The Health Sector (General), Kenya

- Comments? (on the topic, speak freely) – What would you say about the Health Sector in Kenya? Spontaneous comments.
- What have been the recent developments within the health sector in Kenya? (Preferably/mainly within the non-governmental part)
- What is your experience of the health care within NGO within health vs. public and private hospitals?
- What have been the recent challenges within the health sector? Problems?
- If you would compare regional and global developments within the health sector, what would your main conclusions/comments be?
- Do you know any previous examples of global developments within the health sector and how they have been received/spread in Kenya? Challenges?

(- How have "international solutions" been received so far?)

- How do the global developments affect/how have they affected the Kenyan Health Sector?
- What is the most common reason for why developments are rejected/prevented?

3. Organizational Aspects, Information Flow/Spread, Networks and Relations

- What does the organizational structure look like within your institution/company/hospital? Which are the responsibilities of the different units? How do they relate to each other?
- How have "international solutions" been received in the organization so far?
- Relations to partners and other actors on the market?
- How are you affected by regulations? Recent changes/developments?
- Business Development – Different strategies that you have used in order to develop your institution? How do you define your market? Market research? Challenges linked to the development?
- How do you identify your target segments?
- How are strategies as well as products/technical and service innovations developed? (i.e. is it the top-down or bottom-up)

-Which channels do you mostly use to communicate/spread information? Why those? Which kind of information in which channels? Describe the information flow/structure within your organization today (i.e. is it top-down or bottom up)

- How do you make sure that your customers and people you communicate with perceive/receive/understand the information you give the correctly (the way you want them to)
- What kind of feedback do you get from the units/personnel?
- What is your general perception/evaluation of how the communication is working? Any problems/ challenges?

4. The Technical Perspective (the phone, the network and how to use it)

- General technical infrastructure and prerequisites in Kenya? Network coverage, phone coverage, penetration, performance? Do any of these restrict your possibilities in terms of what you are doing? In which way?
- According to your experience how do you believe that ICT solutions have been received within the Kenyan health care sector? And what about within your own organization?
-Do you work with any other actors to address this/develop and overcome technology challenges?
-Have you seen customer/patient preferences and/or needs that you were not able to meet due to technical restrictions?
-What is your experience of the general use of mobile phones? (Does it include pictures, text, etc?) Is it used within your organization too? In which way?
- What does your technical systems look like? What are you using, which technical tools do you use for communicating? Do you see any problems, possibilities, future development of this? Any development strategy? Possibility of using the mobile phone more?

5. Their Own Experience (implementation, diffusion, change)

- Have you implemented new systems/solutions before (within the org.)?
(* If different than the organization described above, can you comment on the organization in which you did this? Describe it further….which is the relationship with the units? What does the organizational structure look like? What was your role? How much do you know about the conditions under which the units work?)
- How did it go?
- Any problems?
- Experiences?
- Lessons learned?
- Something unexpected?
- Easier than you thought?

6. Thoughts on our case (Show Application)

- Have you heard of a similar service before? Used similar service?
- What do you think about this?
    - Challenges, opinions, reactions, ideas? Comments on possible price level? Necessity of education? Reactions from patients?
- What would, according to you, be the main obstacles for this kind of service to be implemented within your health units? (In NGOs in general in Kenya?)
- What would, according to you, be the optimal strategy in order to get as much use/leverage as possible from this service in Kenya? Where to implement? (business, governmental or NGO sector) How? Who should pay?

8.3 Appendix 3: Factor division by each respondent

Possibilities on the Kenyan Market	Price-performance (cost, affordability)	Hybrid Solutions (bottom-up innovation strategies, iterative development process/ design in context of use)	Commercially scalable (ease of adoption, Transportable through country, culture, consumer attitude)	Sustainable development (scarce resources)	Functionality (Addressing existing needs/demand/willingness to buy/understanding of customer, adaptation to BOP market)	Process innovation, (suit the process to infrastructure, reaching out, logistics.)	Deskilling of work. (literacy, handling scarce talent, maintenance)	Education of customers. (Consumer training and skills,collaborations used (Diverse consumer groups)	Hostile infrastructure. (lack of basic resources, water etc)	Interfaces. (understanding the service/product, short learning curve)	Distribution (accessibility)	Challenge the conventional wisdom. (Creative access to markets, design & new ideas)	Industry/sector characteristics	Governance	Market prerequisities	Partnerships
											Easy spread/great uptake in the urban areas	Rate of development in healthsector	Harmonizing activities in Kenya	Political situation improving	Government structures - legacy system	partnerships
Pay through marketing of local doctors and ad's																
Donors willing to invest																
Many possible set ups/solutions of ownership/business model																
Mpesa																
Olof Jonsson																
Gunnar Holmgren																
Dr. Maria Bradley						1										
Dr. Peter Iveroth				1		1										1
Dr. Kalinoli (Mulenga)	1			1		1										1
Dr. Wilson Magolo						1										
Dr. Judy Wawira																1
Dr. Johnson Musonni							1					1				
Dr Ling Kituyi						1										1
Dr. Richard Lester	1	1	1			1										1
Dr. James Mukabi						1										
Dr. Esther Ogara						1										
Total Health	**2**	**2**	**8**	**0**	**7**	**4**	**1**	**0**	**0**	**0**	**0**	**1**	**5**	**0**	**5**	**2**
Nicholas Imbugwa	1		1		1	1	1									1
Aaron Sundsmo			1		1	1										
Robin Miller	1					1										
Andrew Ohieno																
Zack Kinuthia					1											
Staffan Wiking			1													
Lisa Kalleback					1	1						1				
William Kiama/Sheila Gichuhi							1									1
Total Organizational	**2**	**0**	**6**	**0**	**4**	**5**	**1**	**0**	**0**	**0**	**1**	**0**	**2**	**0**	**7**	**3**
Vincent Kiarie			1			1	1					1				
Frank Odhiambo			1	1	1	1										
John Wasonga			1			1						1				
Steven Wanyee					1	1							1			
Kizito Mwima			1		1	1										
Antony Karri			1		1	1										1
Geoffrey Mmano			1										1			
Vincent Mikewa			1		1	1					1					
Agosta Liko			1			1										
Glenn Saqueira			1			1										
Total Telecom	**0**	**0**	**10**	**1**	**5**	**9**	**1**	**0**	**0**	**0**	**1**	**2**	**3**	**1**	**9**	**2**

The Challenges on the Kenya market	**Price-**performance (cost, affordability)	**Hybrid Solutions** (bottom up innovation strategies, Iterative development process/ design in context of use)	**Commercially scalable** (ease of adoption, Transportable through country, culture, consumer attitude)	**Sustainable development** (scarce resources)	**Functionality** (Addressing existing needs/demand/willingness to buy/understanding of customer, adaptation to BOP market)	**Process innovation. (suit the process to: Infrastructure,** reaching out, logistics.)	**Deskilling of work.** (literacy, handling scarce talent, maintenance)	**Education of customers.** (Consumer training and skills,collaborations used (Diverse consumer groups)	**Hostile infrastructure.** (lack of basic resources,	**Interfaces.** (Understanding the service/product, short learning	**Distribution** (accessability)	**Challenge the conventional wisdom.** (Creative access to markets, design & new ideas)	**Industry/sector characteristics**	**Governance**	**Market prerequisities**	**Partnerships**
	Lack of financing in health sector	Adapt/design to local context	Marketing	lack of physical/[medical] resources (equipment/drugs etc)	Address/identify needs	Conservative health care systems	Lack of human resources/manpower	Training	Climate	User interface	Lack of bodies and organizations to implement through	Health sector slow in receiving global changes	Lack of local research	Governance	Competition	Partnerships
	Cost, divided into investment cost/variable cost (sustainability)	Software development	Culture -Intra-organizational structures and behavior	Lack of facilities	Disease environment	distorted incentives in the health market/sector, lack of regulations	Lack of **education** among population, also to receive technology		Nutrition	Trialability			Lack of efficiency	Lack of control and responsibility	Market readiness	
	Price	interactive development process	Buy- in - for scale- for establishment (time) - potential for scale - disturbing/altering financial structures - lack of success stories in ICT	Access to resources		Lack of fundamentals/development projects for tech to support	Lack of opportunities for young professionals		Sanitation				Lack of process management/work load	Corruption	Spread of smartphones	
	Funding/Financing		Overconsumption of health care	Differences between challenges in resources scarce and resource abundant countries		Infrastructure	Necessity of knowledge about the local health systems among specialists		Water				Lack of harmonization - scattered health sector/market	Lack of political stability and climate	Demography	
	Business model		Trust Creation	Unsustainable health care costs			Maintenance								Government structures - Regulation etc. (time of starting company)	
			Time and Attitudes towards change -												Lack of statistics	
			need to pilot												Mobile penetration	
			clear organizational goals												Healt Insurance coverage	
Olof Jarlman	1		1		1			1							1	
Gunnar Holmgren					1											
Dr. Maria Bradley							1			1						
Dr. Peter Iveroth	1	1	1		1		1			1				1		1
Dr. Kahindi /Mutengi	1	1	1		1								1		1	
Dr. Wilson Magolo	1	1	1		1	1	1						1	1	1	
Dr. Judy Wawira		1	1		1	1	1	1					1		1	
Dr. Johnson Musomi	1		1			1	1	1		1			1	1	1	
Dr Ling Kituyi	1		1	1	1	1	1			1			1	1	1	1
Dr. Richard Lester	1	1	1	1	1	1	1								1	1
Dr. James Mukabi	1		1				1						1		1	
Dr. Esther Ogara	1	1	1	1		1	1	1		1			1	1	1	
Total Health	9	6	10	3	8	6	9	4	0	5	0	0	7	5	9	3
Nicholas Imbugwa		1	1			1	1		1				1	1	1	1
Aaron Sundsmo	1		1			1	1	1					1	1	1	
Robin Miller	1	1	1		1	1	1	1					1		1	1
Andrew Otieno	1	1	1	1	1	1	1		1				1		1	
Jack Kinuthia	1	1	1	1	1	1	1						1	1		
Staffan Wiking			1		1	1	1		1				1		1	
Lisa Källbäck	1		1			1		1		1					1	1
Willian Kiama/Sheila Gichuhi	1		1				1						1		1	
Total Organizational	6	4	8	2	5	7	7	3	3	1	0	0	7	3	7	3
Vincent Kiarie	1		1		1		1	1		1					1	
Frank Odhiambo	1	1	1		1	1	1		1				1	1	1	1
John Wesonga	1	1	1		1	1	1	1		1			1		1	1
Steven Wanyee	1	1	1			1	1	1		1	1		1	1	1	1
Kizito Mrema	1	1	1		1	1	1	1		1		1	1		1	
Antony Kariri	1	1	1		1	1	1	1					1	1	1	1
Geoffrey Mimano	1	1	1	1	1		1	1		1			1	1	1	
Vincent Milewa	1		1		1		1			1			1		1	1
Agosta Liko	1	1	1		1		1						1	1	1	1
Glenn Sequeira	1	1	1	1	1	1	1	1		1			1	1	1	1
Total Telecom	10	8	10	2	9	6	10	7	1	7	1	1	9	6	10	7