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Master's Thesis

mHealth Solutions for Africa. A Qualitative Analysis of European-Based Approaches

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Abstract

Since the beginning of this millennium, mobile phone penetration has risen remarkably worldwide and has been accompanied by an associated increase in mHealth solutions. These technological solutions are believed to enhance access to healthcare. Not only are institutions from Africa implementing these services for African societies, but also institutions from the Global North. Research has found that the consideration of local contexts and collaboration are crucial steps in the creation of mHealth solutions, which raises questions about the motivations and ways of working of European institutions. This thesis aims to answer why mHealth is perceived as a relevant solution for Africa and what factors are influential in mHealth and to shed light on the humane aspects around mHealth.

Keywords: mHealth, health, Africa, European-based, technology

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Abbreviations

CHWs	Community health workers
eHealth	Electronic health
GDPR	General Data Protection Regulation
ICT	Information and communication technology
ICTD	Information and communication technology for development
LMIC	Low- and middle-income countries
mHealth	Mobile health
NGO	Non-governmental organization
WHO	World Health Organization

1 Introduction

1.1 Background

Since the beginning of this millennium, mobile phone penetration has risen remarkably worldwide (World Bank, 2021a). In recent years, this has been accompanied by an increasing number of mHealth solutions introduced to the global as well as the African market. These new technologies have had a large impact on society and opened up new opportunities in terms of communication enhancement and information provision.

"mHealth" is an abbreviation for "mobile health", meaning that users can access health services via their phones or tablets. Furthermore, mHealth is part of eHealth and digital health solutions: "the use and scale up of digital health solutions can revolutionize how people worldwide achieve higher standards of health, and access services to promote and protect their health and well-being" (WHO, 2021). This reflects the enthusiasm and hope that surrounds these services. Patients, as well as healthcare personnel, can use mHealth services and there is a variety of application fields, for example, client education and behaviour change communication, reporting and collecting data, and communication among providers (Labrique, Vasudevan, Kochi, Fabricant, & Mehl, 2013b). mHealth programs can therefore act as an extension of healthcare and potentially increase the coverage of access to associated services among a population. Over the years, many studies have been conducted which explored the feasibility of these services and focused on their effects on healthcare (Agarwal, Perry, Long, & Labrique, 2015; Krah & de Kruijf, 2016; Njoroge, Zurovac, Ogara, Chuma, & Kirigia, 2017), whereas less research has been conducted on the inventors and implementers at an individual level. However, Tamim and Grant (2017) have explored what methods health practitioners use in mHealth design, to further "contribute to the research-to-practice cycle by exploring the work of practitioners" (p. 128) in order to affect procedures in the future. My underlying assumption is, that the creation of technology is a complex endeavor, involving decisions made by humans. This is why my research focuses on decision-makers and I aim to shed light on their ways of working within mHealth and its implications for users.

My research trajectory was sparked by an internship I did in the Collaborative Research Group Pioneering Futures of Health and Wellbeing at the African Studies Centre of Leiden University, which lasted for three months. In the last year, the researchers of this group were working on further developing a humanities approach to eHealth. Within that context, questions regarding

the motivations of European institutions to invent and implement eHealth in Africa arose. This thesis aims to shed light on these issues and provide first answers.

1.2 Problem Statement and Research Questions

As Heilbron, Leliveld, and Knorringa (2017) commented, "the innovation landscape in many African countries is changing dramatically" (p. 96). Much hopes has been placed in the development and penetration of mobile technology, and mHealth has been on the rise, but it has also been found that evidence of its impact remains scarce (Krah & de Kruijf, 2016), projects fail to scale where major barriers are of an economic or social nature (Sundin, Callan & Mehta, 2016), that longer-term effects needed to be further explored (Aranda-Jan, Mohutsiwa-Dibe, & Loukanova, 2014; Hall, Cole-Lewis, & Bernhardt, 2015) and that many mHealth projects have not lasted long (see Labrique, Vasudevan, Chang, & Mehl, 2013a).

In addition to these issues, more voices have been raised to (increasingly) consider contexts and integrate those who are affected by the services during the development or implementation of these services (Kendall & Dearden, 2020; Krah & de Kruijf, 2016; Navarro et al., 2018; Whittaker, Merry, Dorey & Maddison, 2012). Not only have Africans themselves invented an abundance of mHealth solutions, but European stakeholders, such as non-governmental organizations (NGOs), companies and donors are increasing their presence in Africa. The question that arises here is: How do European institutions and their members involved in the mHealth solutions perceive key steps such as integrating local contexts and stakeholders? In this thesis I aim to examine this, but also want to research how the institutions and engaged people put into practice the aspirations they have. This seems essential, since, with regard to health technology, "there is a growing awareness that the human factors are significant in relation to development, implementation, evaluation, use and outcome", to achieve improved health for populations as well as individuals in more cost-effective ways (Botin, Bertelsen, & Nøhr, 2015, p. 3).

According to Garsten and Nyqvist (2013), "organisations may be seen as circuits of power, in which normative frameworks are produced and globally diffused, where knowledge is crafted and circulated and from where packages of ideas are diffused" (p. 4). Hence, in this thesis I use an anthropological approach to explore this "knowledge" and aim to investigate institutions, respective members and their innovative healthcare solutions that are designed for Africa. IN addition to analyzing emerging themes in narratives, analyzing language use is also key, since

language lies between thoughts and speech (Hall, 2005). Specifically, the approaches by people in higher positions and their ideas on mHealth as a means to enhance development and improve health are explored. Furthermore, with this thesis I present how their ways of working relate to previous findings on mHealth. However, it needs to be mentioned that I did not conduct an evaluation research of actual outcomes which are, for example, based on reports.

As Garsten and Nyqvist (2013) commented, "there was a time when we could claim with some confidence that the anthropological study of formal organisations was young and innocent. This is no longer the case" (p. 2). Indeed, with an anthropological approach, several researchers have already studied institutions, such as NGOs, as well as "development" (see Gardner & Lewis, 2015; Lewis, Kanji, & Themudo, 2021; Mosse, 2011; Mosse, 2013), or the personal beliefs and lives of development workers (Fechter & Hindman, 2011).

My research trajectory is also related to "treating development as a category of practice" (Mosse, 2013, p. 230) and the so-called "aidnography", where anthropologists ethnographically research the people, who work in international development, as well as their knowledge and practices (Mosse, 2011). In a similar way, I aim to study the motivations and practices of mHealth creators and implementers who engage in developmental activities.

Moreover, I aim to research the work of businesses engaged in mHealth, since, besides the engagement of NGOs, "business has moved into development" (Mosse, 2013, p. 238). However, companies have different ways to combine aid and business. They may work with strategies such as public-private partnerships (Mosse, 2013), which are "loosely defined as cooperative institutional arrangements between public and private sector actors" (Hodge & Greve, p. 545), or believe in corporate social responsibility (Mosse, 2013; Rajak, 2011). Another strategy is the social entrepreneurship, which "encompasses the activities and processes undertaken to discover, define, and exploit opportunities in order to enhance social wealth by creating new ventures or managing existing organisations in an innovative manner" (Zahra, Gedajlovic, Neubaum & Shulman, 2009, p. 519).

Finally, with this master's thesis I aim to answer two central questions: why do institutions and engaged people, who implement or propose mHealth as useful, perceive mHealth as a relevant solution for Africa? Furthermore, what factors influence them in their work? To answer these

questions, several sub-questions arose, which are specifically addressed in the chapters. After reviewing the relevant literature, these aspects seemed to me to be crucial elements of mHealth.

1.3 Thesis Outline

This thesis has a strong multi- and interdisciplinary character and aims to develop a multifaceted view on mHealth. By integrating the expertise on mHealth's issues and potential benefits from various disciplines, it tries to create a more comprehensive view on mHealth and prevailing concepts in European-based institutions.

Chapter 2 describes the methodology used by explaining the data collection methods and analysis choices, as well as reflections on my own positions. In the following chapters, the findings are presented. In Chapter 3, the distribution is visualised, as well as the prevailing ideas and language use. A linguistic approach served as a starting point, to reveal more about the engaged people's ideas on mHealth. This is follwed in Chapter 4 by an analysis divided into topics and aspects. First, I address the question of what engaged people's initial motivations and thoughts on mHealth were. Second, the country choices are explored, and third, the co-creation and collaboration with Africa are dealt with. In the thesis I discuss then how and to what extent information was obtained in advance, as well as how the solutions were planned to function within the societies. Subsequently, the topics of perceived impacts and whether mHealth is believed to be the best solution to improve health are addressed. In Chapter 5, the findings are discussed and in Chapter 6, conclusions are drawn and future prospects provided.

2 Methodology

2.1 Methods

This master's thesis is characterized as a descriptive as well as an exploratory research. It is based on seven interviews which are analyzed in two major parts. First, in Chapter 3, the findings are visualized. The geographic distribution is presented with a digital map (Piktochart, 2021). Then the useage of language and words is portrayed with wordclouds (Wordcloud) and analyzed using the concept of linguistic expression, following Hall (2005), and a discourse analysis (Brown & Yule, 1983). For each interview, a wordcloud on a webpage (Wordcloud) was created and analysed, in combination with applying the discourse analysis, in order to identify the interviewees' essential concepts. These wordclouds demonstrate how frequently certain terms were used. I inserted the interview answers into this program and filled Africa's geographical shape with it, to visualize and illustrate the language use. The inclusion criteria were as follows: words had been used at least eight (the figure of the insurance platform, since this interview was somewhat shorter than the others) or nine times (all others) during the interviews. The exclusion criteria were: the institution's name or their solution's name, filler words as "uhm", "yes" and "yeah" were deleted.

I also conducted a close reading and content analysis of the interviews and the findings are presented as narratives in Chapter 4. The interviews were transcribed and are available in a continuous text version. Subsequently, to obtain an overview, I created an Excel file which describes each institution and their characteristics, and summarizes views and approaches to certain themes and topics summarized. For Chapter 4, the continuous text version as well as the overview were consulted and the findings organized into several topics. Together, emerging themes but also variations in individual approaches were identified. The findings are also discussed in relation to and embedded in the existing research.

2.2 Data Dollection

In February 2021, the search was begun for institutions which develop or implement mHealth solutions in Africa was started. The word "institution" is used here as a generic term. An institution in this context can be an NGO, a business (association), a start-up, a foundation, an organization, etc. The selection criteria were that institutions either have their headquarters in Europe or have donors or partners from Europe.

The search was conducted in different ways. First, teachers based at Leiden University were contacted. They suggested several organizations and gave tips on whom to contact. Second, the online library at Leiden University was used. A search was conducted for articles that deal with mHealth solutions and involve their evaluation or feasibility. However, the discussed mHealth solutions were either African-based or from the USA and hence not included here. Third, the search for the European related mHealth institutions or solutions was conducted using Google. I aimed to find websites from the institutions by using key words such as "mHealth organization," "mHealth solution," "mHealth NGO," "mHealth business," "mHealth Europe," etc. Many institutions were contacted via email and eventually seven interviews were conducted with people in different higher positions in the chosen institutions. I chose these interviewees since they are engaged in decision-making positions, and I believed that they have shaped mHealth to a certain extent. Six of the institutions developed and implemented their own mHealth solution(s) for Africa. The services are diverse and deal with different health topics. Only one institution falls outside this narrow definition, as it does not implement its own mHealth solution. However, it has its own publication, which includes articles on various health topics and is written for different stakeholders. Parts of a recent issue were dedicated to mobile technology.

Due to the COVID-19 restrictions, interviews were conducted only via Skype and Zoom and took between 30 and 60 minutes. The interviews were planned to be semi-structured and certain questions were prepared in advance. The aim of the interviews was to research motivations, ideas, beliefs and perceptions in regards to mHealth, why I believed the method of having a personal conversation, though digital, to fit the context. The questions were centered around five topics; the complete list can be found in the appendix.

The first aspect concerned co-creation, more specifically which stakeholders were involved and how, and what their roles were. The second aspect was "value sensitive design", which relates to processes that ensure that innovation takes account of the local context. The third aspect was anchoring – how the innovation is planned to function in the society. The fourth aspect was the model of delivery and the fifth the (perceived) impacts. As mentioned above, the interviews were semi-structured and often did not follow the question list strictly, which meant that in some cases that certain (sub-)questions weren't necessarily addressed. Interestingly, some interviewees were eager to share much information on their own and I tried

to dig deeper when interesting aspects came up, while others relied more on me to guide the interview's direction.

2.3 Interviewees

The institutions and respective interviewees can be characterized as follows. The institutions in this thesis may be categorized as "European-based". In this context, this means that either the main office is in Europe and/or the institution is registered in Europe, and/or the innovators and responsible people are based in Europe, or that (in one case, listed as number 7 below) several funders and involved partners during the creation are European and the interviewee is from an office in the north, but the institution itself is an African-based NGO.
The institutions' names are not mentioned, due to ethical reasons and to protect the institutions and people. With this thesis I aim to research personal approaches and their implications by analyzing interviews, which nevertheless remain privately. It is not the intention to evaluate the mHealth services' outcomes. Therefore, other sources and publicly available websites or reports are not included in this thesis.

The interviewees are defined in terms of their technological solution and described according to the details that characterize them, to give readers an impression of what the institutions do and how they are composed. Throughout the thesis, when writing about the institutions, the terms explained below are used.

1.) *Mental Health App*: The interview was conducted with one of the innovators and co-creators this organization. Prior to that, he worked for another technological company in Africa and has an academic background in natural sciences and business. His approach is to invent innovative technical solutions that bring benefits for society. The *Mental Health App* was designed for companies and their employees and the companies pay for the app. The organization's teams are based in Europe as well as in Africa. Today, in 2021, their solution has only existed for a few years. At the time of the interview, the solution was offered in the Netherlands, Uganda and Kenya, where users need to pay, and in addition in a country in Southern Africa, where it is offered for free. The interviewee emphasized their belief in this concept of a social enterprise.

2.) *CHWs and Nurses Training Tools*: The interview was conducted with a marketing expert and project manager from this NGO, which focusses on empowering societies. The institution has two solutions: they offer an app to customers outside of Africa, but

the origins of the app are in Ethiopia. They also have training tools designed for community health workers (CHWs) and nurses in Africa. The training tools are offered in several African countries, such as Ethiopia and Rwanda. The NGO has developed several new solutions over the years and has existed for more than 15 years.

3.) *Children's Health*: This foundation did not invent their own solution like the other institutions, but has a publication in which parts have recently been dedicated to innovative mobile technologies. Philanthropic beliefs strongly characterize this interviewee's approach. The publication addressed, amongst other things, an mHealth solution for health workers in Kenya. Furthermore, the interviewee explained that they would have their team gather in an academic environment to think of innovative tools and see how they could reach scale. Thus, they are also partly active in the development of digital health solutions..

4.) *Health Insurance Platform*: The interview was conducted with a member of the management team of this business company. Previously this interviewee also worked for another organization related to healthcare in Africa. His background lies in business and he has been engaged in healthcare economics. On the insurance platform, which has existed for only a few years, money is saved, received and spent on healthcare and was designed for patients, funders and the clinic. The institution is from Europe but also has Africa-based offices. In Tanzania, Kenya and Nigeria, their service is offered for payment.

5.) *Health Advice Platform*: The interview was conducted with one of the four co-founders of this start-up. She has a social sciences background, whereas the others reportedly have a background in IT. The *Health Advice Platform* was created about five years ago and is an app where users can get health advice from nurses, doctors, etc. The company offers it for payment to employers, who then can provide access to health advice to their employees. This start-up has offices in Europe and Kenya. The solution is offered in several African countries, such as Nigeria, Kenya and Botswana. It should be mentioned, that the solution works cross-nationally, meaning that users from one country can be connected to health personnel from other countries.

6.) *Nutrition Solutions*: This institution is a mobile association which also has a development department where they do business outside of Europe. The interviewee worked in different positions in this business and her background lies in engineering. The health topic they focus on is nutrition, but they offer several solutions, from simple voice services to apps. The solutions are "business to customer" (B2C) but may also be designed for health personnel, depending on the region and were started more than five years ago. The mHealth solutions are implemented in several different countries across the African continent, including Malawi, Tanzania, Ghana, Kenya, Nigeria, Mozambique, Zambia and Uganda.

7.) *CHWs, Nurses and Midwives Apps*: This organization is based in Africa; however, it has several northern offices which are responsible for funding. The interview was conducted with a manager of a European office. She has a background in development studies. Two of their three programs involve other European organizations or foundations, which either funded the programs or play an active collaborative role in running the programs. For the sake of completeness, it should be mentioned that there is also an African public-private relationship. This NGO offers three different apps, which deal with training or are used as data collection programs for health personnel such as CHWs, nurses and midwives. These were launched between one year ago and – almost – ten years ago.

2.4 Limitations

Of course, this thesis also has certain limitations. As said before, names are not mentioned in this thesis, in order to protect the institutions and people. This may go against transparency and readers will not able to trace the institutions to search for further information. In addition, in order to prevent institutions and people being traceable, certain details were omitted, but overall I tried to balance the ethical concerns and still provide sufficient information. Another limitation is the number of conducted interviews, namely seven, meaning that the findings are not comparable on a larger scale.

2.5 Reflexivity

In this chapter I reflected on my own position as a researcher. Ellingson (2018) described different forms of stories, which may be postpositivist, interpretative, critical, postmodern or arts based. I would consider this thesis to be an interpretative research story. Ellingson (2018)

described interpretive researchers as "social constructionists," who "view the world as constructed through language and interaction, and they point to the grand narratives of culture that shape (and are shaped by) the stories told by individuals, groups, families, communities, and institutions." She stated:

> *[…] the lessons learned from the journey are explained in terms of the specificities of the context in which they were experienced. Language is rich and detailed, offering what anthropologist Clifford Geertz termed thick description of the research participants, who function as characters in the story (rather than merely sources of data) and often shape the plot in crucial ways. The moral of the story is what is learned about participants' lifeworld through the lens of the researchers' standpoints and expressed values.*

The word "culture" may be defined in many different ways. In this thesis, the term "culture" is not necessarily focused on. Rather, in this thesis I refer to the concepts of the Global North and the Global South, where the interviewed institutions come from the former and introduce technical interventions in the latter. In this thesis, the interviewees are considered as having a "common ground", in the sense that they are members or residents of the Global North. They are, with their institutions, *characters* active in the Global South who also *shape the plot*. Their engagement and thoughts on "development" may have similar characteristics, which, here, stand for the *grand narratives*. The stories they shared are here presented through my lens as a researcher with an academic background in both humanities (African Studies) and natural sciences (Biology).

3 Visualization

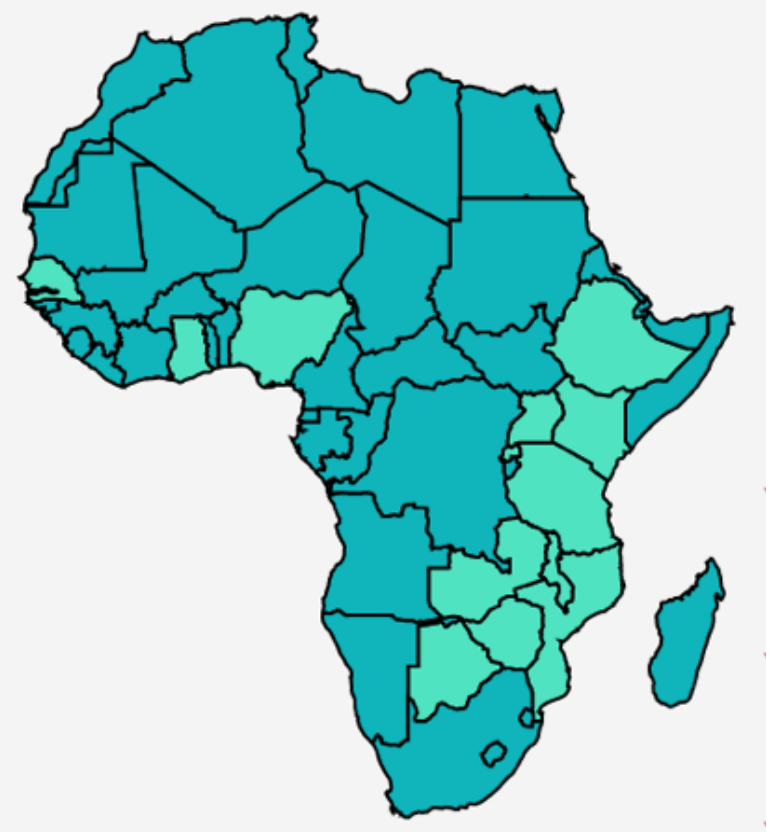
3.1 Geographic Distribution

First, it seems essential to have an image of the parts of Africa where the researched mHealth solutions were implemented. Figure 1 illustrates the (main) distribution of the institutions' discussed mHealth solutions in Africa, per country. Where solutions were active at the time of the interview, the country is marked in green.

The *Health Advice Platform* states on their website that they would be active in eight countries but only mentions the three countries where they are mainly active. The interviewee was contacted twice by email regarding the other five countries where they are active, but did not respond. Therefore, possible further countries are not indicated on the map.

Figure 1

Distribution of the institutions' mHealth solutions per country in Africa.



Note: The green countries (Botswana, Ethiopia, Ghana, Kenya, Malawi, Mozambique, Nigeria, Rwanda, Senegal, Tanzania, Uganda, Zambia and Zimbabwe) are those where at least one of the institutions has implemented an mHealth solution. The screenshot was taken from a thesis outline, which was created with the online program Piktochart (Piktochart, 2021). For the interactive map please click on the webversion: *https://create.piktochart.com/output/53989025-thesis-outline-janina*

3.2 Thoughts and Language

In addition to the geographic distribution, it may be necessary to create an image of the interviewees' languages, as "language and thought are central to all human activities, sincethey are the medium of our mental and social lives" (Lund, 2003, p. 1). While I was in the process of conducting interviews, the language use and expression, and specifically the interviewees' choices of certain words intrigued me and raised many questions. What terms did the interviewees use to speak about mHealth? In what terms did they speak about the human beings, the ones affected by the digital solution? Were they "people"? Or were they "customers"? Were they the central component or rather the characteristics of the digital health solutions? And where did the users live? In "markets" or in "countries"? And then, what did this say about the interviewees' approach, what was their focus?

According to Dummett (1996), language "[…] has two principal functions: that of an instrument of communication, and that of a vehicle of thought" (p. 166). Figure 2 depicts a model developed by Hall (2005), to illustrate that thoughts are encoded in language, and that this language is then expressed through speech or text. However, Hall (2005) argued that "language is neither the thought, nor its physical expression: it's the marvellous engine we use to transform one into the other." Based on Hall's concept, I argue that by analyzing the interviewees' depictions of (their) mHealth, respective thoughts and ideas may emerge. Yet, it should also be mentioned that, according to this concept, speech and text only acquire meaning, when they are transformed into thought through a listener or reader (Hall, 2005). This, in turn, points to my position and role, which is of an active as well as a subjective nature.

Figure 2

Linguistic expression, based on Hall (2005)

Note: Adapted from Hall (2005, p. 5)

To get closer to an answer of the research questions, a discourse analysis is used in this chapter. Discourse analysis is an "analysis of language in use" and "an investigation of what that language is used for" (Brown & Yule, 1983, p. 1). Furthermore, wordclouds are depicted, to allow for the interpretation of individual choices of specific words. These wordclouds are not

looked at in isolation, but contextualized, since "words, spoken aloud or rehearsed in the imagination, often accompany our thoughts, but in no way embody them" (Dummett, 1996, p. 166). The figures below present the most often used terms and the bigger a term appears, the more often it was used. This also allows for the comparison of words.

3.2.1 Medical Condition and People's Perceptions

The wordcloud presented in Figure 3, based on the interview from *Mental Health App*, indicates that *mental* was used very often when compared to other terms. This results from the organization's thematic focus in their app. It also reflects their efforts to obtain a great deal of information in advance and the perceived importance of the innovation procedure.

Figure 3

Mental Health App Wordcloud.

Note: Created with Wordcloud https://www.wordclouds.com

Though the appearance of *mental* is quite intriguing, the term needed to be avoided since the interviewee found that there was considerable stigma attached to it:

> *People that have a mental condition in many places in Africa they are locked up, they are locked away and so they are in prison. Or they don't lock them up but then for example the brother of the one with the mental condition needs to be always there to guard the person. So, this is really about the clinical psychological problems but later we went to the depression and anxiety type of things, the common mental disorders.*

Mental reflects the interviewee's emphasis on the medical condition they are targeting. He dedicated much time to talking about this health aspect – and related previous research – and explaining the procedures to me. This is in a juxtaposing position to the narrations represented

in, for example, Figures 4, 5 and 6, where, the medical conditions did not play a central role but rather the system and contextual factors.

The interviewee's strong emphasis on the research and development process also explains the frequent use of "Kenya," which is where they conducted the research. In his role as a technically skilled innovator, the contextual factors, such as the country, were also central. Another major part was the "people." In the explanation of his technological solution, he indeed also focused much on the actual users, revealing that they play an integral role in his views on mHealth. In the sections 4.3 and 4.4, it will further be demonstrated how people in different positions (users, workers) were engaged in the development. The humane part of the technology was not neglected; rather, he chose to give much emphasis to people.

3.2.2 Health Personnel and Systems

Central words in Figure 4, based on the interviewee from *CHWs and Nurses Training Tools*, are "Ethiopia," "people," "eLearning" and "training," as well as "need". The term *need* was used in various ways: the interviewee did speak about the *need* they saw among healthcare personnel. They found that there was a *need* to integrate training about different health topics, which served as incentives to initiate the different programs. In her work, being engaged in an NGO, she found herself then in the role of reacting to those *needs* and developing appropriate solutions.

Figure 4

CHWs and Nurses Training Tools Wordcloud

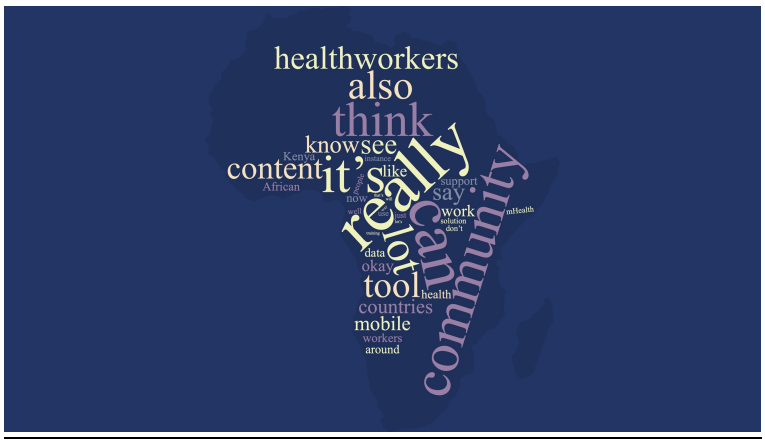
Note: Created with Wordcloud https://www.wordclouds.com

Also the *people*, the end-users, received significant focus in the description of their work. Further, on the one hand, she talked about the circumstances of their projects and what users would *need* in order to access the mHealth. They would need, for example, electricity, internet or certain devices, which reflects that the technological infrastructure plays an important role and this local context was taken into account. On the other hand, she also seemed to be reflecting extensively on herself and the organization's role. She talked much about their work and the process of implementing mHealth. She referred either to procedures they, as NGO, would *need* to adapt, or features of the services they would *need* to change, which indicates her emphasis on individually contextualized designs. In summary, it can be said that the explanations very much focused on the system, with its humane actors and technological contexts.

The end-users were also important actors in the narrations of the interviewee from the African NGO (*CHWs, Nurses and Midwives Apps*). Figure 5 indicates that the word "community" was used very often, resulting from the interviewee's emphasis on the community health workers.

Figure 5

CHWs, Nurses and Midwives Apps Wordcloud



Note: Created with Wordcloud https://www.wordclouds.com

Similar to the previous example of the European NGO (*CHWs and Nurses Training Tools*), the narration of the interviewee from the African NGO (*CHWs, Nurses and Midwives Apps*) reflects a very user centered approach. As Chapter 4 will demonstrate, this interviewee paid much attention to community health workers and elaborated on how and where they operate.

This is similar to the European NGO's focus on explaining the structure of the system and how the CHWs are embedded in this system.

3.2.3 Design Complexity

The wordcloud of *Children's Health* in Figure 6 might not seem to reveal a definite focus at first. Quite notable, however, is that the word "people" appears very small. Compared to other wordclouds, the *people* received little attention in this interviewee's elaboration on mHealth. Since this institution focuses on children's health, one might also assume that *children* would be mentioned more often. Rather, the interviewee explained the whole structure of health technology extensively, from the development to the implementation. In this sense, *different* was used often, as she explained the need to contextualize and incorporate local factors into innovations. Although she envisioned scalable innovations, *different* adaptations seemed crucial to her, in order to have appropriate solutions.

Figure 6

Children's Health Wordcloud

Note: Created with Wordcloud https://www.wordclouds.com

The humane actors themselves did not play a central role, yet the content that needed to be tailored for them was central in this interviewee's narrations. Also, the *information* played a vital role, since she emphasized the data that people are feeding into health technologies. She strongly focused on the benefits for health workers, who would have access to patient data, but was also concerned about privacy issues, which will be discussed in section 4.4.

3.2.4 Efficiency and System

In addition to the word "people", the word "money" played a crucial role in the story of the interviewee from the *Health Insurance Platform*, just as much as the word "health" did, as can be seen in Figure 7. The interviewee spent much time to explain health *insurance* and (health) systems (note the appearance of *system*). We spoke little about health itself, as one might assume when looking at the wordcloud. His focus was more on the whole *system* and explaining the mechanisms when implementing healthcare solutions. In this context, *money* was used quite often. The interviewee strongly emphasized making the system more *efficient* and believed that the "economic rationale" and business models would work best to bring equality within health systems. Also, *trust* was mentioned quite often by the interviewee. He believed that his platform could increase *trust,* as they promise transparency of *money* flows within their solution, which in turn would lead to people spending *money* more easily on healthcare. These explanations did however reveal a great deal about his approach to anchoring the solution and reflected his thoughts he has on reaching people.

Figure 7

Health Insurance Platform Wordcloud

Note: Created with Wordcloud https://www.wordclouds.com

Besides this broad explanation of health economics, mechanisms and systems, there was no space for *health* itself and not a single medical condition was mentioned in this context, which stands in contrast to the other interviews. Almost no attention was given to previous research and very little to perceptions of mHealth solutions among patients and the possible impacts on individuals. Indeed, *people* were mentioned frequently, but they were seen as participants in a business framework, rather than as individuals. This fact is interesting, as the mobile association (Figure 9 *Nutrition Solutions*) also has a business approach, but the interviewee

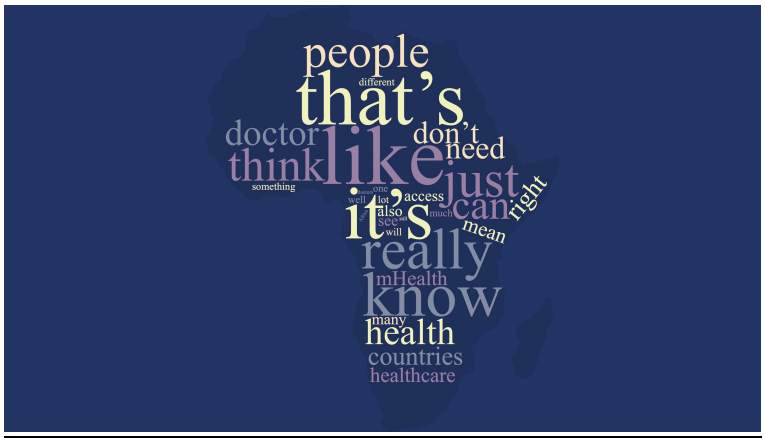
told several personal stories and related her experiences of business in mHealth to specific examples.

3.2.5 Actors and Examples

The wordcloud presented in Figure 8 is based on the interview with a European start-up, which aims to provide a platform where patients in Africa can talk to African medical professionals. *Different* did not have a central focus in this one. The frequency of using the word *different* does not come anywhere near that of the frequency indicated in Figure 6 and 9. Rather, this is a solution for all, although patients accessing the platform indeed receive tailormade advice from a health professional assigned to them. Therefore, it can be said that the *content* indeed differed, depending on the individual request for a doctor's advice. Yet the platform, the solution, was not *different*; depending on the specific country, it was the same for all the countries where it was introduced.

Figure 8

Health Advice Platform Wordcloud



Note: Created with Wordcloud https://www.wordclouds.com

What the wordcloud shows, is, that the *people* and the *doctor* received a great deal of attention in the interviewee's narrations and hence are perceived as essential. The interviewee focused on the patients receiving advice, their possible experiences with the app and how the app could be beneficial in daily situations. Similar to the *Nutrition Solutions* interviewee, she gave individual examples of how she envisioned the technology could improve daily life. She also spoke much about the other side in the app, those who give the advice, was talked much. She emphasised the advantages for the doctors, such as treating more patients and avoiding unnecessary follow-ups.

3.2.6 Markets and Contents

Concepts such as "markets" were very important for this interviewee (*Nutrition Solutions*) and hence mentioned quite often during the interview. This already reflects the institution's approach, which is a business approach. They use mobiles and their solutions to do business with a "social goodness" and "for development" in *markets*. The European business association entered this market with their own initial business idea; however, they planned on leaving this *market* in Africa, after successful collaboration with local *partners,* who would then continue offering the *services* in the long term.

Figure 9

Nutrition Solutions Wordcloud

Note: Created with Wordcloud https://www.wordclouds.com

Another important word was "different," as can be seen in the visualization. The association collaborated with several *different* local mobile operators and created *different* solutions for their development, or health, initiative, in *different markets*. The association apparently specified the individual solutions, depending on where they were implemented with whom and for whom. "Content" also played a central role in their approach. The *content* was *different*, tailored to the specific *market* and the given circumstances. The association reported to have strongly focused on this aspect during the development process, which reflects its strong emphasis.

Summary

Based on the statements and theories by Dummett (1996), that words accompany thoughts, thoughts are encoded into language (Hall, 2005), and the importance of language and thoughts in our lives (Lund, 2003), I tried to grasp, at least some, of the interviewees' central ideas about

mHealth. Further, I aimed to reflect on individual word choices and which actors and aspects were of fundamental importance in the different narrations. Of course, the mHealth solutions are themselves all very diverse. Yet, it seems as if stakeholders received different attention from interviewees as well as the solutions' complexity, for example in terms of local adaptions. themselves. Similar to Garsten and Nyqvist (2013) (see section 1.2), I believe that the interviewees play integral parts, have power and produce knowledge, and hence their thoughts and approaches are assumed to have an influence on mHealth and implications for its users.

4 Aspects and Meanings in the Global North's Approaches

As explained in the methodology chapter, this chapter describes the institutions' individual approaches to, and views on, certain topics based on the answers the interviewees gave. The similarities, differences and varieties among their approaches will be identified and compared.

4.1 Relevance of and Motivations for Introducing mHealth

At the beginning of each interview, the interviewees were asked, why, in general they thought that mHealth would be relevant and beneficial for Africa. This question might appear simple. However, in this context it is a crucial one and was specifically asked to start the discussion and see on what they wished to focus. It invited the interviewees to share more about their initial motives and thoughts, and to talk more about what gave the impetus to start their projects. The reasonings, that the interviewees gave and the stories they told me were quite diverse. Each institution had its own individual motivation which arose from widely varying contexts, but they also have some certain similar characteristics.

Scale

The European innovator who was involved in developing the *Mental Health App* has been active in an innovation department in another technology business before. He reported that, when he was still in that position, a funder from Northern America, who supports mental health programs, approached him. The funder was looking for business models and upscaling opportunities for one of the programs they were supporting. The choice of which one should be upscaled and further developed fell on a non-digital health solution from Southern Africa.

Upscaling was also a motive for another institution. The interviewee from the European foundation (*Children's Health*) explained that they were "constantly scanning for innovation." They believed that technology had the potential to reach scale, which is why they chose to dedicate parts of their publications to shedding light on health innovations and (mobile) technologies. The matter of scale has already been addressed in research (Sundin et al., 2016), due to the emergence of a large number of pilot projects which were implemented initially, of which numerous failed to scale, leading to the discussion around "pilotitis" appeared (Labrique et al., 2013a).

Innovative Character and Empowering

mHealth's innovative character was appealing for the founder of the European NGO (*CHWs and Nurses Training Tools*). According to the interviewee from the NGO, their founder, a medical doctor, wanted to train communities. However, she explained that she wanted to do it in an innovative and digital way. The idea was to empower communities and create an impact using modern digital health techniques. Chang et al. (2011), Abejirinde, Ilozumba, Marchal, Zweekhorst, and Dieleman (2018) and Stanton, Molineux, Mackenzie and Kelly-Hope (2016) have found mHealth indeed has the potential to empower and motivate, but there is no general answer, as it was also demonstrated to have no influence on the motivation of community healthworkers (Vallières, McAuliffe, van Bavel, Wall & Trye, 2016).

The co-creator of the *Health Advice Platform* also found health technology quite appealing and was fascinated by it. Due to university obligations, the co-creator had an experience in Africa, where she came in contact with "health-tech." The interviewee described it as "amazing" and wanted to delve deeper into this topic and get more information. Thus, the impetus to start a health start-up arose from personal feelings and experiences. The specific reason for developing their health advice app was that they found many Africans looking for health advice on Facebook where, according to the interviewee, "myths are spread." In addition, they saw "a bunch of people with smartphones" who do not have proper access to healthcare. These facts made mHealth seem very relevant for African societies and hence they tried to tailor a product as an answer to the issue they identified.

Combining Business and "Social Goodness"

A more business-related reason to start mHealth was given by the European business association (*Nutrition Solutions)*. The interviewee explained that they aimed to extend their mobile business but with "social goodness." They wanted to "serve the needs of those who are underserved" and this would happen within the department dedicated to development activities. Compared to the previous example, where the interest arose from a very personal feeling, this interviewee's tasks were directed by the business she works for; however, she also demonstrated a personal and extensive engagement in "development activities," and appeared to strongly identify with her work.

Inclusiveness and trust

Terms such as "inclusiveness" and "trust" were associated with mHealth by the interviewee from the *Health Insurance Platform*. He stated that mobile technology "is bringing people

together" and that the sim card could function as a bank account, which would be very "inclusive." These circumstances, together with his previous engagement in health economics and developmental work in Africa, led him to start an mHealth tool. However, mobile technologies may not be as inclusive for the overall population as they may promise to be, since there are advantaged people, who can afford sophisticated technology and those who cannot, which may represent a division (see Warren, 2007) within society (see more in section 4.2 Selected Locality – Reasoning).

Efficiency through Digitalization

The African NGO with *CHWs, Nurses and Midwives Apps* has been working with community health workers in Kenya for some time. There, they "saw a need" and responded by incorporating mHealth. The interviewee pointed out that these community health workers are spread all over the country and sometimes need training, for which they needed to leave the workplace, which is a time-consuming and expensive procedure. One of eHealth's promises is increased efficiency, as it may reduce costs (Eysenbach, 2001). With mobile training, the interviewee reasoned, health workers could be reached everywhere and messages, but also training content, could be shared easily. Another explanation was that data collection was still paper based. Collecting data with mobile phones would prevent the workers from having to carry logbooks. They could analyze data at the facilities digitally, which would also be more efficient, according to the interviewee. The interviewee elaborated extensively on this procedure and ways of thinking. She emphasized that they, as NGO, were inspired by their experiences in the field and they wanted to create efficiency through digitalization.

Summary

These seven stories indeed have very individual characteristics and histories. However, the common ground is that they all developed out of a context where the interviewees were active in Africa. In addition, there were circumstances that had been identified as problems and that needed to be overcome with innovations. Furthermore, the interviewees share a faith in the mobile phone being able to reach people and in digital health solutions to impact and improve health issues. The examples of the *The Mental Health App*, *Nutrition Solutions* as well as the *Health Insurance Platform* share another feature: They all seek to bring innovative solutions to low- and middle-income countries (LMIC) which serve as markets. As Mosse (2013) stated, "business has moved into development" (p. 238; see also Blowfield & Dolan, 2014; Dolan, 2012), whereas especially health has become a marketable good (Cross & Street, 2009).

4.2 Selected Locality – Reasoning

Areas with more infrastructure

The institutions' choices of countries range from selecting only three until up to eight countries. Within these selected countries, some institutions have different target groups. The *Health Advice Platform* and *Mental Health App* are primarily focused on paying companies with smartphone-owning employees, which means they may be situated in more urban areas and/or affluent areas. These may, for example, be insurance companies. However, rural areas and/or poor areas do not have these market opportunities. The *Mental Health App* makes use of these paying users in order to provide the tool for free in another African country, where users might be less capable of bearing the costs. The interviewee strongly believed in this idea of creating revenue in higher-income areas and then being able to fund a social enterprise elsewhere.

The question as to whether the focus lies on urban or rural areas was not specifically answered by the *Health Insurance Platform* interviewee, although he explained that they would "focus on people that have a job or an employer." Therefore, the solution might exclude people in informal markets, but also those from low-income areas.

Aside from the Capital

Solutions which aim to train (community) health workers, may cover larger and also rural areas in the countries; the African NGO (*CHWs, Nurses and Midwives Apps*) is an example of this. Also, the European NGO associated with the *CHWs and Nurses Training Tools*, has not only focused on urban centers, or the "capital," to quote the interviewee. In consultation with local partners, they have looked at regions where "the most need is" and specifically gone there. The mobile association with *Nutrition Solutions* used the CHW model in some cases, but in other cases also applied a direct customer approach, resulting in a variety of areas where solutions are offered.

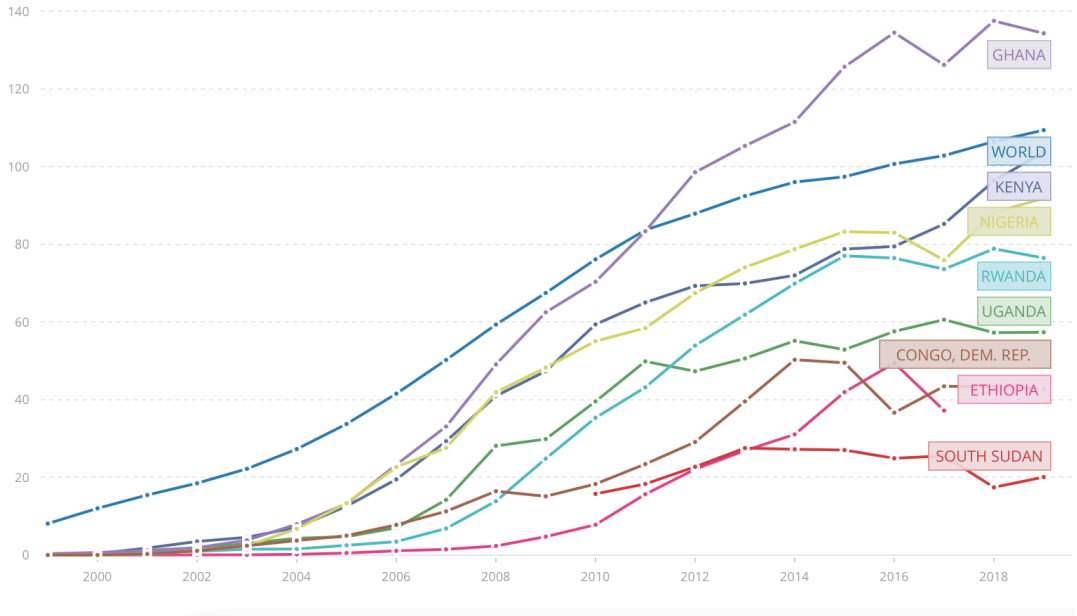
Accumulations

What is notable is the focus on East and Southeast Africa. Although Nigeria and Ghana were chosen for implementation by several interviewed institutions, the distribution in Western Africa – besides Ghana and Nigeria – is low, and barely existent in Central and North Africa. Low-income countries, such as the Democratic Republic of Congo and South Sudan were not mentioned by the interviewees. As can be seen in Figure 1 above, when it comes to the geographic distribution of solutions, almost the whole East coast is highlighted. Especially

Kenya has a high frequency, where six out of seven institutions have touchpoints, but also Uganda was chosen by several institutions. Larger cities in Kenya and Uganda, as well as in Nigeria and Ghana, are innovation hubs and have an associated infrastructure and reputation. Especially in Easte Africa, and specifically Kenya, the telecommunications market has been growing (Omamo, Rodrigues, & Muliaro, 2019). However, also Ghana and Nigeria have been developing their (urban) infrastructure, as reflected in Figure 10, illustrating the high mobile phone penetration for these countries.

Figure 10

Mobile cellular subscriptions (per 100 people) – world, Uganda, Kenya, Ethiopia, Rwanda, Ghana, Nigeria, South Sudan, Democratic Republic Congo between 1999 and 2019.



Note: This graphic is a screenshot taken from the World Bank (2021b), retrieved June 30 2021, from https://data.worldbank.org/indicator/IT.CEL.SETS.P2?end=2019&locations=1W-UG-KE-ET-RW-GH-NG-SS-CD&start=1999

The figure illustrates mobile cellular subscriptions. However, a limitation of the graphic is that the whole country is portrayed, which may result in an overall distortion, as there are differences between regions of a country.

Reasoning and Implications

The existence of this well-developed telecommunications market, was, amongst other aspects, a crucial factor for the *Health Advice Platform*. For example, for the *Mental Health App,* the decision to introduce the mHealth in Kenya was, because, first, there were already connections and, second, there was an existing innovation network. The decision to extend the app to

Uganda was also related to the country's high phone penetration and, according to the interviewee, the "similarity" between Kenya and Uganda. Their decision to introduce the app in a country in Southern Africa was because someone had a non-digital mental health idea, out of which the digital solution arose. A similar reasoning can be noticed in the *Health Insurance Platform* interviewee's thinking. This businessman had been working for some time for another institution, that is active in health economics in Africa, so that the company could benefit from connections in Kenya and Nigeria. Also, the social scientist from the *Health Advice Platform* start-up mentioned, that the simple fact of having contacts and established connections was a main reason why certain countries were chosen. Also the European NGO associated with *CHWs and Nurses Training Tools* reasoned that the decision of locality very much depends on existing contacts and partners.

Summary

Factors influencing the decision of locality vary, from "convenient" opportunities resulting from previously established relationships and networks, to identifying where the "needs" lie, to taking phone distribution into account. Notable however, is, that the institutions have a strong focus on countries with a well-developed telecommunications market and less to no focus on lower-income countries. Several services are also offered via the internet, so that social disadvantages might be reinforced through digital exclusion (Warren, 2007). Warren (2007) has pointed out the less developed information and communications technology (ICTs) infrastructure in rural areas and addressed the issue of the "digital vicious cycle" specifically in regard to internet services. Njoroge et al. (2017) found for Kenya that a "myriad of eHealth projects [are] being implemented in urban centres rather than marginalised areas where geographical inequalities and inequities in access to health care exist." This contradicts the hopes that have been placed in mHealth to improve healthcare access for those who have limited access. As mHealth is tied to phone use, institutions might choose markets where phone distribution is higher. Due to this paradoxon, the institutions' agenda to bring improvements in healthcare excludes out a considerable percentage of Africa's population.

4.3 Co-creation and Collaboration when Developing and Managing Solutions

As stated above, there is not much literature on the very personal approaches and motivations of individuals and institutions implementing mHealth. Nevertheless, Tamim and Grant (2017) explored how health professionals created eHealth and mHealth interventions and examined whether they used theories or models used during these inventions.

The technology development in the Global North for the Global South does not only involve theories in terms of technical design, but also aspects of power relations. Participatory design and power relations among involved people within general ICT design and ICTD havealready been critically addressed by Kendall and Dearden (2018; 2020). They have suggested co-design for actors from the Global North, in order to have sustainable development, which would require "not only individual commitments to participation and inclusion of other values, but also structural changes to our projects and our ways of working" (Kendall & Dearden, 2020, p. 92). With the aim of expanding insights on the development process, this section presents processes and factors that were important for the interviewees.

Gradually Increasing Collaboration

As explained in section 4.1, the *Mental Health App* resulted out of a context where a funder brought two people together, one with a non-digital idea and one who was supposed to scale it up and develop it further. The interviewee mentioned, that, after that, "we started to try to basically modify the intervention and make it digital and there we had a lot of co-creation." He elaborated on the process of the development: The analysis of this interviewee's narration is presented in section 3.2.1, and demonstrated that various people played a key role during the development process.

Subsequently, his emphasis on people in Kenya is further demonstrated. Reportedly, the innovator and his team held a "hackathon" session in Kenya, after which a first prototype was created. According to Angelidis et al. (2016), "a hackathon brings people from various backgrounds together for problem-solving" and they are "organised as intense, short-duration competitions where teams generate innovative solutions" (p. 393). This model "integrates collaboration, idea generation and group learning by bringing together different stakeholders in a mutually supportive setting" (Angelidis et al., 2016, p. 393). The interviewee elaborated that CHWs also played a role. Reportedly, they would have been trained in the method intended for use in the app, and they started doing experiments at a clinic where they tested non-digital methods, such as how communication works among health personnel and patients. After this proved to be successful, more and more CHWs were trained and also gave feedback on how to proceed. According to the interviewee, "they have been an important factor in guiding the further development." Also, the users, the patients, were reported to be involved in giving feedback. It can be interpreted that the innovator had a leading role but allowed the stakeholders to guide the process. This is in accordance with the findings by Whittaker et al. (2012), who

consider it crucial to involve the target audience "in order to ensure the intervention is engaging and useful" and "input should be appreciated and should be able to be acted upon by altering the intervention accordingly" (p. 18).

The formation of the European NGO associated with the *CHWs and Nurses Training Tools* happened when a doctor initiated digital training. Following this idea, people from higher institutes became involved in writing the courses. The interviewee explained that, after that, gradually the NGO moved to the countries themselves and increasingly cooperated with local experts in order to make the training tools applicable. The interviewee explained that now, when new training courses are developed, the organization starts them but then gives the material to local partners to revise them and further work on the content, to "really customize the content to the local setting and the local situation." The role of the local experts, who reportedly may be either midwives or gynaecologists when the module is for medical staff, is, to make the solution applicable. The interviewee emphasized this shift to incorporating local stakeholders, and seemingly sees herself as being in a position to make a start but then withdraws to leave major parts to local partners. Local circumstances and regulations differ per country, why she thinks that "you need a local expert to tell you this and to really make the course applicable to this country." The interviewee's use of the term "need" was presented in chapter 3.2.2 and reflects her viewpoint to really reflect on steps that need to be taken in the whole system and the development process. She stated that locals would then have the ability to delete a template and write it from scratch or accept and adapt it. If there is new content to be developed, the interviewee said, they would involve stakeholders and discuss what needs to be included in the new courses.

Often local mobile operators have a broad customer base (Karippacheril, Nikayin, de Reuver, & Bouwman, 2013) and service-providers, in this case the institutions, may collaborate with the mobile operators, since this means a wider reach for them. *Nutrition Solutions* took advantage of this opportunity. In regard to the content, they partnered with local health experts in a similar way as the European NGO. The interviewee explained:

> *... we had a global content partner and we had local content partners. Local content partners all had experience in nutrition, they had experience and health consultants that were working with them. They worked with, you know, the local potential users of these solutions, to test the content and so forth. So, they did some of the health expertise. In our team we also had our content experts and this specimen was responsible for ensuring*

> *consistency across the markets, uh, quality ensurance across the markets, so basically just checking that what we are putting out there is accurate and isn't harmful in any way and so making sure, the diligence we needed for delivering sound content.*

She also mentioned that government departments needed to sign off the solutions, which is similar to the approach by *Children's Health*, where the interviewee repeatedly referred to their relationship with the government. The *Nutrition Solutions* interviewee further explained,

> *So we had all the health expertise in-house but we had a lot more in-market health expertise with contextual understanding of cultural norms, um, behavioural norms, these sorts of things and so they brought all of that. We also had other partners that were extensively based within the health system. They were integrated and entrenched in the health system.*

She and her team initiated and monitored the projects, while local experts came on board and then engaged in and comprehensively influenced the process.

Distinct Roles Among Involved Partners

A contrary concept, where information and content do not come from the place where it is introduced, is used by the *Health Insurance Platform*, which works with African mobile operators. The European interviewee explained that their role "was to bring on top of the mobile money, the information flows of health insurance." The role of the local stakeholders was to open it to local telecommunication companies and the "mobile payment side." It was made clear what the roles looked like. Yet, although local partners have indeed been incorporated, how effectively co-creation has been remains debatable. The interviewee did mention the roles of the partners, who were perceived as important and played a significant role, but the collaboration was not perceived as needing to be addressed during the interview.

Non-African Creation – African Team Mmembers Now

An approach where the development was mainly non-African based was taken by the *Health Advice Platform*. As presented in section 4.1, the impetus to start the program arose from a very personal experience and also the creation process remained on a small, personal, scale. They have four co-creators and co-founders. The interviewee had a social sciences background whereas the others reportedly are IT experts. The question as to whether co-creators are based in Africa was answered by the interviewee by pointing at the personal background of one co-

creator who had a parent from Africa, but basically all co-founder did not live in Africa and no African-based organizations or stakeholders were involved during the development.

African creation – Several Involved European Stakeholders

The African NGO associated with *CHWs, Nurses and Midwives Apps* emphasized that "to develop and implement the mHealth solution really wasn't a decision made in the Netherlands." Yet, several European institutions are involved, but their role in the development was rather limited. Some institutions' role is restricted to providing financial support. One is also interested in going beyond this role and reportedly wants to provide content; however, the interviewee explained that the content would not be relevant and therefore has not been included yet, but ways to make it work are part of a discussion. One European institution is actually a partner and helped them "with a number of things." According to the interviewee, one task was to help develop a "business case" for them, since they also "want to move away from really the traditional donor-funded projects, where you have to wait for a donor to give us a bag of money." The interviewee said that they, as an African organisation, wanted to become more "self-sustaining." She also emphasized that with their tools they handle sensitive data, which is why the institution was also involved in providing privacy expertise. The African team was connected with the privacy experts from the European institution and together they "worked on developing a privacy policy." In other words, the European partner received a collaborative role in the African NGO, which set the agenda. However, the interviewee strongly emphasized the leading role of the African NGO and seemed dedicated to keeping it that way, but to include foreign expertise in order to improve work on the African ground.

Summary

Devotion to co-creation with Africa seemed to be limited in the start-up's answers. A juxtaposition can be found in the approaches of most other interviewees, the *Mental Health App, CHWs and Nurses Training Tools*, *Children's Health*, *Nutrition Solutions*, *CHWs, Nurses and Midwives Apps*, and partly in the *Health Insurance Platform*. Extensive explanations regarding their work indicated that they are engaged in decision-making at the start and during the development. Yet the interviewees also revealed a commitment to incorporating local circumstances and local stakeholders, who were given the ability to influence the solutions. This aligns with research findings on proposing to consider context and including the target audience (Whittaker et al., 2012) and the need to "establish partnerships with local governments and nongovernmental organisations to secure funding, leadership, and the

required infrastructure" (Kruse et al., 2019). According to Sundin et al. (2016), "the most successful mHealth and telemedicine systems partner with other companies, non-profit organisations or governments, both locally and internationally" (p. 452). Also Schee genannt Halfmann et al. (2018) have called for early dialogues. They undertook a comparison of health innovations from Europe as well as Africa and researched their creation and maintenance, and found different strengths and limitations. To address these, they suggest "innovation-friendly environments and public-private partnerships, besides the early dialogues (Schee genannt Halfmann et al., 2018).

4.4 Information Obtained

Questions regarding what kind or how much information about the local context was obtained in advance, whether research was undertaken in the target locations and to what extent, seemed as if this truly invited most of the interviewees to elaborate on their individual approaches. One interviewee (*Health Insurance Platform)* did not elaborate extensively. However, both kinds of reactions are answers which indeed reveal individual approaches and allow one to draw conclusions.

Little referring to obtained information

The interviewee (*Health Insurance Platform*) who did not properly address this aspect mentioned that they had been active in Kenya before. Regarding the question as to why Nigeria was chosen and how much they had informed themselves, he also noted that they had been active "there" for quite a long time. Moreover, he said that they "have been running insurance schemes.". However, this did not properly answer the question regarding the obtained information, but re-emphasized the role they had already established. This limited emphasis on the actual question created the impression that the interviewee did not consider this aspect of much relevance for the interview, regardless of whether they did or did not obtain much information priorly. For example, in the context of health economics, which the interviewee wanted to explain properly, he gave a broad explanation of different forms of states' objectives and roles, and the philosophies and structure of health economics. As can be seen in the wordcloud in section 3.2.4, the word "money" was ubiquitous in his narration, which indicates how strongly he focused on explaining prevailing systems and money flows. This different emphasis on the various aspects of the solution demonstrated the differing attention to topics and how much focus was placed on each.

Extensive Elaboration on Obtained Information

A quite extensive elaboration on what kind of and how much information had been obtained in advance was given by the mobile association with *Nutrition Solutions*. Not only was the answer very detailed and long, but also the research itself. The association had three different research streams: "content," which was about the health and nutrition content of solutions, market engagement, as well as "insights," where they generated "social insights around the program and the project and mHealth as a concept". The extensive explanation of their engagement before the actual implementation is reflected in the interviewee's language use, presented in section 3.2.6. She emphasized that the content needed to be different in each of the markets they aimed to work in. Although researching the local "markets" was emphasized in her narration, she also showed an interest in the humans in those markets and complex structures among communities. The interviewee pointed at the specific time they started their programs, which was still early on in mHealth development; hence they considered research to be crucial. This institution and also the interviewee personally indeed paid much attention to the obtained information, which indicates the value they attached to this aspect within the mHealth implementation procedure.

The interviewee from the institution offering the *Mental Health App* elaborated thoroughly on their approach to obtaining information on local circumstances and perceptions on health, and the ubiquitous use of the word "mental" (see section 3.2.1) reflected this extensive research. Literature has shown that there prevails stigma around mental health and the health seeking behaviour may be low (Bonabi et al., 2016; Morgan, Stanfield, & Durtschi, 2021) and that young people rather contact family or friends in this regards than health services (Umubyeyi, Mogren, Ntaganira & Krantz, 2016). However, as discussed in previous sections, mHealth requires a consideration of contexts and efforts to conduct research in advance may improve a solution's appropriateness.

Although they offer one general solution, which is quite different compared to the *Nutrition Solutions*, the interviewee elaborated on the extensive research they did on people's specific perceptions on mental health in Ghana and Kenya during the process of developing their digital solution. Again, this strong emphasis demonstrated the perceived importance of considering local circumstances in the mHealth development process, both from the personnel perspective as well as from the user perspective. Integrating the perspectives of the latter is believed to be crucial (Charani, Castro-Sánchez, Moore & Holmes, 2014).

Whether local perceptions on health had been researched was answered in very different ways. The European NGO associated with *CHWs and Nurses Training Tools* informed themselves about health needs and structures in advance and perceived this as an important factor in the process. The interviewee claimed they did not research health from a humanities or a social sciences perspective, but the interviewee really sympathised with this idea.

"Start with Giving Healthcare"

A striking belief regarding health and humanities can be noted in the statement of the interviewee from the *Health Advice Platform*. She pointed out and emphasized the need for working closely with locals and the local context and mentioned having pilot runs. She explained that they, as co-founders, traveled to certain places in Africa, asked what "problems they were facing" and hoped to "continue tailoring the product also to the countries that we are working in." However, she claimed that approached the issue from a business perspective, felt that there were many barriers to healthcare and believed –

> *... it's a privilege for Westerners like us, to think of healthcare from a perspective, or like from an anthropological point of view, but when you don't have healthcare, you should start there.*

This quote indicates a strong belief in European medical care and that the biomedical part, giving access to healthcare, would be sufficient. However, research has shown, that phone use (Abdelbanat, Lalaye, & de Bruijn, 2019) as well as illness perceptions are complex and differ, depending on the context, while illness perceptions are associated with health-seeking behavior (see Kamat, 2006; Koffi et al., 2018; Uehara, 2001). Approaching illness from a humanities perspective is therefore not only a matter of epistemological research. Moreover, illness perceptions have implications in the real daily lives of humans who are affected by health problems, which in turn affects the uptake of health advice solutions. In addition, the reaction to a question regarding trust and data issues, also indicated the interviewee's confidence in European systems:

> *Not at all, because we're a European company, so we're complied to GDPR of course but then in each African country it's like, yeah, they have their own data privacy issues but they basically like GDPR. Um, so I don't see any issues there, so no, I think.*

The interviewee believes the European system would serve as a model for Africa. In contrast to this example, the matter of privacy and data security, is a major problem for mHealth for the *Children's Health* interviewee. Individuals may have issues with confidentiality and privacy when using mHealth solutions, as a study by Duclos et al. (2017) and review by Kruse et al. (2019) have found, which may have an impact on the people's willingness to use the solutions.

Extensive Research in Addition to Working in the Local Context

In contrast to the previous example is the approach of the African NGO (*CHWs, Nurses and Midwives Apps*). They are a well-known institution and have already had much experience in the local context. As can be seen in section 3.2.2, most of the stories that the interviewee told me involved the CHWs and their working conditions, showing much reflection on the mHealth users and the system the CHWs and technology are embedded in. The interviewee paid much attention to the aspect of obtaining information and she explained the procedure undertaken before developing the CHWs' training tool:

> *We really try to get the full picture, we do a lot of key informant interviews, we involve the local governments as well, we hold focus group discussions with these community healthworkers, we hold design workshops and then once we have a prototype let's say, we have it tested by the community healthworkers. So, it's really a thorough process and it starts with really understanding who is your end-user and what problems are you solving for them.*

Being engaged in this well-established NGO, she observed the ways in which other institutions approach mHealth and contrasted their own procedure with the foreign procedures. According to her, foreign organizations come up with gadgets first, before having understood the problems or informed themselves about the local circumstances. The interviewee sees "a lot of European or Dutch or American mHealth solutions, trying to make their way to the African continent and they often lack this context." However, the benefits of these may remain limited, since "telemedicine ventures need to ensure they are effectively leveraging their resources in the country of operation to overcome cultural barriers that could hinder development" (Sundin et al., 2016, p. 454). Furthermore, Sundin et al. (2016) believe that "even with highly sophisticated technology, telemedicine systems will never be able to scale beyond their pilot without thorough knowledge of socio-cultural dynamics and business practices" (p. 454).

Summary

The answers by the *CHWs, Nurses and Midwives Apps*, *CHWs and Nurses Training Tools*, *Mental Health App* and *Nutrition Solutions* indicate that during the interview there was a strong emphasis on how they each tried to understand the local context was quite strong. Different to these are the examples of the *Health Advice Platform* and *Health Insurance Platform*, where elaborating on this aspect was not paramount. However, research has shown the importance of incorporating local knowledge, and *CHWs and Nurses Training Tools*, *Mental Health App* and *Nutrition Solutions* expressed their motivation to do so. A study by Vélez, Boakye Okyere, Kanter, and Bakken (2014) has demonstrated how proposed mHealth designs and expectations from midwives can differ, implying that involving users in the design and acquiring knowledge in advance are important. Furthermore, van Heerden et al. (2017) believe that it is "important to elicit perceptions and opinions about mHealth from stakeholders across the spectrum, from decision-makers to CHWs and patients" (p. 103). Besides "technical issues and user criteria" also the "further cultural backgrounds," needed to be considered in the design and designers should cooperate with users (Niemöller et al., 2016, p. 11). According to Ilozumba et al. (2018) "program developers and designers need to explore contextual and implementation factors", since "a failure to do this could lead to an underestimation or overestimation of mHealth effectiveness". According to Sundin et al., (2016), entrepreneurs could "significantly benefit from understanding these failure modes before designing their own systems and business strategies" (p. 446). The extent wo which European-based institutions and engaged people' in higher positions acknowledge this before or during the implementation thus may have implications for the appropriateness and uptake.

4.5 Anchoring and Embedding, Obstacles and Adaptations

Sluiter (2016) researched the anchoring of innovations and stated that "in cases where innovation seems to fail or falter, it is frequently possible to point out where that human factor has been ignored or neglected." For that reason, the interviewees' views on how to embed and anchor mHealth are presented and discussed in this section. Furthermore, their approaches to reaching people and how mHealth would function within society are examined. Out of the different contexts they faced, endeavors to adapt mHealth may have resulted. Here again, the institutions' experiences and procedures differed extensively, as well as how much attention they paid to this aspect.

Adapting to the Socio-Technological Context

The interviewee who co-created the *Mental Health App* emphasized, as discussed before, the research they did in advance, to understand local perceptions of mental health. By understanding possible issues surrounding mental health and reacting accordingly, he believed that the solutions could be brought to the people more easily. During the research, they learned that sensitiveness is required when designing mental health solutions. They experienced what associations some communities have with mental health and explained the stigma attached to it. This is why they had to find ways to phrase their solution:

> *... because if you talk to people about mental health they think about what they call the crazy men on the streets. And they would not even admit to being depressed. In the Netherlands, that's no issue, okay that can happen, it's not that they are crazy but in this cultural context we had people who didn't want others to think that they are crazy. So, you couldn't say the word "depression."*

As can be seen in the quotes, the stigma around mental health was a major obstacle for the *Mental Health App*. The interviewee emphasized that they had to adapt to this, but also believes that within mental health innovation, this still remains a "key issue." Indeed, the organization changed from the start and adapted, which is why they label the mental health solution as a "well-being app" now.

Another idea, they came up with, in order to embed their solution, was to integrate WhatsApp in the app. As mentioned earlier, this interviewee has a background in technology and considered entrenching the solution in the given technological infrastructure. In the Kenyan context, they found WhatsApp to be useful because, it is "almost for free but with a normal app you have to pay the data that you use. So WhatsApp is of course preferred by people." However, this process indicates that their solution turned out to be embedded only among the smartphone-owning part of the population, which excludes parts of the population with fewer financial resources.

In regard to making use of the technological infrastructure, similar thinking can be found in statements by the philanthropic interviewee from *Children's Health*. Platforms such as WhatsApp and Zoom were also perceived to be instruments for reaching people, but this would vary from context to context. The interviewee supported this with experiences from online training for healthcare personnel and believes that

> *…every given context also needs to adapt a lot of that […] especially with applications, there is the need to adapt the content, the context, the culture, the language, the images, and we do believe that is an important step in the process of really universalising these apps in different places.*

The interviewee also believed adjustments to be crucial, insofar as she acknowledged the persisting gaps in technology access in the world, which would require one to look at each context specifically and adapt accordingly.

This issue was also adequately addressed by the mobile association with *Nutrition Solutions*. The interviewee considered embedding as an important factor and gave numerous examples of what they found during the implementation process, as well as how they responded. The provided content ranged from being accessible by dialling certain numbers and receiving a menu that they could read or listen to, to being integrated in an app. They selected eight countries for the implementation but tailored their services to the given technological circumstances, depending on the context and needs of each country. The services were coordinated with telecom providers who acted as partners in the different countries. Repeatedly, she used Malawi as an example, where phone ownership is low but the willingness to share was perceived as high. According to her, knowledge could therefore be disseminate easily and even non-owners have access to the nutrition content. She seemed to be quite fond of this development, that even the low resource areas could make use of their services. However, the literature points at the issues of privacy and confidentiality when phones are shared (Kaplan, 2006; Krah & de Kruijf, 2016), which might be even more problematic for solutions aiming to improve other health issues requiring more sensitiveness than nutrition services.

Create Revenue

The issue of "pilotitis" (Labrique et al., 2013a) was introduced in section 4.1.1 and refers to the discontinuation of many mHealth solutions in Africa, after funding ceased. The *Nutrition Solutions* interviewee acknowledged the issue of the many pilot projects, which is why they considered their own revenue creating business delivery model as appropriate. They only wanted to be there for the start and leave their partners with a sustainable business solution.

Finances also played a significant role in finding out how to embed the solutions in the *Mental Health App*. The interviewee explained that at the time of the interview they had eventually found a way how to bring their solution to society, but also explained the previous procedure:

> *... the first innovation that we tested in the clinic was in the slum, so this is the lowest income. So, that is one group that we still try to serve but the willingness to pay is a problem there. The poorest of the poor we need to provide free service. So, we do that but we find funding to help others for free and also we take profits from richer people so that we can help people for free."*

He proceeded with explaining that they also tried to reach users through social media, which did not lead to many people signing up, and that it would require a great deal of financial resources for a person to sign up. Also, they went to faith-based communities. The organization considered training the pastor, but the interviewee referred to other obstacles arising:

> *... what we found is that people then think okay I can just go to the pastor and it's for free, so why would I pay another community member, because we wanted to train others in the community so that they could help each other."*

After these steps and experiences, where in the end mHealth would not bring in revenue, they opted to offer it to companies in higher-income areas. However, in a country in Southern Africa they have been providing a free version, and he seemed convinced of the philosophy of running a social enterprise. This relates to the findings of Mangone et al. (2016), who stated that, in contrast to short-term models, "for long-term sustainability, the global mHealth community – including donors – must begin to discuss incorporating successful and socially desirable business models that can lead to profit generation."

<u>Create an Impact by Offering Free and Sustainable Solutions</u>

When I mentioned that I found out that their programs are for free, the interviewee from the European NGO (*CHWs and Nurses Training Tools*) explained her opinion on reaching people:

> *Yeah, so to have a wide reach, okay, of course someone pays for them, those are the funders of the projects, so we write them in projects, uh, but people in Sub-Saharan Africa, I think that was before my time, we tried to see if people could afford to pay for apps, but that was not possible and even if they could, it was only like such a minimum amount they could never cover any of the expenses that we make here, uh, yeah. So, you want to create an impact, you want a big group of people to get access to it, especially in the lower income, in the lower-educational level so then you need to make them free.*

This belief relates to other findings of the study by Mangone et al. (2016), who also believe that "in the short-term, donor funds are likely to remain an essential component of mHealth services targeting the poor and underserved in LMICs […]."

When she was asked about anchoring and how they deal with existing structures, the interviewee did not address humane aspects but very much focused on "sustainability." She explained how they initiate new programs and what they consider during this process. According to her, "it's many times a day a difficult process to really embed eLearning in a country." The interviewee identified the donor dependency as an issue for the sustainability that they longed for. However, her previous quotation indicates the predicament the engaged people in institutions find themselves in, in order to provide acceptable solutions. Costs need to be covered, but – at least for some – mHealth access should not depend on one's financial situation. She gave the example of Ethiopia, where they were running an SMS service, but then they thought that their work is unsustainable. This led to the idea of investing in an app, which they thought would last longer, since, according to her, the app system could be created and then, contrary to the eLearning platform, would no longer be dependent on financial resources. It would require a high investment once, but then would take the financial burden off the users' shoulders.

The two last examples of institutions reflect the dilemma that the people engaged in running mHealth are facing. Different approaches and choices on how to manage an organization, eventually affect whom they can reach. Mangone et al. (2016) showed in their study on the cost-covery of SMS solutions that users needed to pay all costs in order to have a solution with a break-even point, but pointed out that this in turn might exclude a considerable number of people. This also relates to the examples that will follow subsequently.

Neoliberalist Ways of Working

Anchoring and embedding in the community were identified as "one of the major problems" by the *Health Insurance Platform*. The interviewee felt that the state and its role are major obstacles in healthcare, which is why they reportedly focus more on working with private insurance companies. Existing insurance systems and related payments as well as trust issues were also perceived to be major barriers. The interviewee reported that the state does not share the same interest in making solutions efficient and believed that they would have other objectives:

> *… the problem of bringing services to the poor is that the state needs to collect taxes and spend money on those people and they are not doing that. So, the only way to start, is to start at the other side and make it more efficient, so that you can reach more people within the private structure, that's our belief, and build an efficient machine …*

According to McGregor (2001), "neoliberalists fervently believe that private market mechanisms (supply, demand, price) are more efficient than public ones because they generate profit and allow the benefits (choice, quality, accessability [*sic*]) to trickle down to ordinary citizens" (p. 86). The interviewee believes in this business model and reasoned:

> *… the best providers of equity is efficiency. And then you get something that is not based on policy where in the end nobody gets anything, but is based on economic rationale, where equality and rights are a result of a business model, instead of policies made up outside of the country.*

As mentioned before in the section 4.1, the interviewee wants to tie their solution to the mobile phone sim-card since this would be "inclusive", whereas the issues around inclusiveness were discussed in section 4.2.

<u>One Solution for All</u>

The start-up's answers didn't indicate as much endeavor to locally embed solutions. As discussed in section 4.4, this institution did not conduct extensive research and justified this with limited funding and its start-up character. The interviewee has faith in a general mHealth solution, which could function across many countries. She mentioned Cuba and envisioned, " imagine if we could connect those doctors to patients anywhere in the world." As illustrated in the wordcloud, doctors were mentioned quite often and they played a key role in the narrations. Furthermore, she repeatedly made reference to the European system, which she would envision as a template:

> *We are trying to see if companies in Africa are willing to pay for their employees' healthcare. That's interesting from a sociological point of view, right, like, this shift in, uh, privilege actually. For a society to think, no, what can we do as a company, because in Europe, it's obvious, right? Like if you go work for a company, like, there's a discount for your health insurance or something. Ah but in Africa that's really not normal. So, I guess we are testing that out, we are trying to see, okay, uh is Africa ready? Are African businesses ready to start caring for their employees' health?*

Hobart (1993, p. 1) discussed the issues around developmental programs and respective involved "world-ordering knowledge." Parallels of such world-ordering and endeavors of knowledge transfer, in this case from the Global North to the Global South, can be found in the quotation and the interviewee's belief. The interviewee's moral laden quotation reflects the prevailing development agenda, as well as the issues that were "identified." A very general solution excludes local contexts and backgrounds that would need to be considered and that were discussed in the previous sections. Research has also shown that illness perception and health seeking behavior differ (see Kloos, Ouma, Kariuki, & Butterworth, 1987; Koffi et al., 2018; Yoder & Hornik, 1996). This may have implications for the appropriateness or limit the usefulness of such a general approach, where health personnel have divergent backgrounds and lived experiences.

Summary

The interviewees seemed to have experienced several issues with anchoring and embedding, given the numerous examples they provided and their extensive explanations. Yet the philosophies, attentions, as well as endeavors to adapt accordingly differ, while the little consideration of humane factors in anchoring may lead to faltering (Sluiter, 2016).

4.6 Perceived Changes in Society and Impacts

That mHealth has an impact on health, and in several cases the potential to improve health, has already been demonstrated in numerous articles. Different mHealth services have, for example, shown to have impacts on antenatal care (Lund et al., 2014), breastfeeding and contraceptive use (Unger et al., 2018), monitoring pregnancy and maternal and child health (Ngabo et al., 2012) but also opportunities and challenges for mental health services were discussed (Marzano et al., 2015). On one side, the potential of mHealth is acknowledged in research (Ag Ahmed, Gagnon, Hamelin-Brabant, Mbemba, & Alami, 2017; Hall, Fottrell, Wilkinson, & Byass, 2014; Ngabo et al., 2012). However, studies also found that there's not enough evidence for health improvements (Ojo, 2018), more evidence on the effects in the health system is needed (Hall et al., 2014) or that success factors (Ag Ahmed et al., 2017) and long-term effects as well as cost-effectiveness need to be researched further (Hall et al., 2015).

Rankings and Numbers

The question as to whether people benefitted from the *Health Insurance Platform*, was answered with "yeah, yeah, yeah," and in a very convinced manner by the interviewee. To

support this point, the interviewee mentioned that they were ranked among the top 10 on a Forbes list. *Forbes Magazine* is a well-known business magazine which ranks "leading" businesspeople and businesses from around the world in categories such as "the richest" or in regard to innovation. The interviewee stated, "we have millions of people on the platform, thousands of clinics, but people need to pay for each other and especially governments need to say, yeah, we want this." What can be concluded from this view on their impact, is, that benefits are calculated in numbers. The attention of reputable magazines and being included on a list are perceived as important and considered as a pro-argument. The interviewee did not refer to individual stories in this case, which would go beyond quantitative indicators.

"Broker of Knowledge"

The *Children's Health* interviewee was convinced that they have an impact on public sectors, health professionals, and also various other people, by introducing health innovations. However, she emphasized that only including evidence-based solutions is crucial.

Health Advisors Close at Hand, Anonymity and a Sense of Well-Being

A very contrary view on this aspect can be seen in the expressions by the interviewee associated with the *Nutrition Solutions*. The interviewee gave very concrete examples, which were for example quotes by individual users of their services, where one felt that the mobile phone was like a "companion" who helped to navigate them through daily issues.

The co-creator of the *Health Advice Platform* emphasized that people would have access to healthcare "from the palm of their hand," which is the "bottom-line" for the interviewee. The interviewee also strongly believes in efficiency, which is one of eHealth's promises (Eysenbach, 2001), as she perceived it as advantage that patients don't need to visit a clinic or doctor physically for every small concern. Her word use (see section 3.2.5) reflected a focus on patients and doctors, their relationships and the enhancements of efficiency which they both could benefit from. Regarding the question as to whether she perceives livelihoods to have changed, she believes that people might be happier and have a better day due to the easier access and saved resources, but noted that she is aware she cannot prove that. She stated that anonymity is important:

> *... on the other hand, people going through stigmatised health issues, taboos like sexual health, HIV, mental health also, [...] they either don't know how to address it or they are too embarrassed to address it. And now if you are putting in something at someone's palm*

of their hand, where they can literally use it from the comfort of their home, they are more likely to do that.

However, the interviewee emphasized that they had not studied this, due to their role as a start-up and limited financial resources, but referred to "other studies," which would show that there is higher confidence in mHealth when it concerns stigmatised health issues. Studies have indicated the potential of mHealth in regard to confidentiality and providing information on contraception information (Vahdat, L'Engle, Plourde, Magaria, & Olawo, 2013), and possibilities for mental health interventions (Heron & Smyth, 2010). Yet, despite the potential of mental health technologies, privacy concerns remain (Marzano et al., 2015).

Also the European innovator associated with the *Mental Health App* pointed at improved health outcomes. Furthermore, people would feel empowered but also learn a skill, how to deal with problems. He also pointed out the benefits of improving men's health and concluded that this would have an influence on "how they deal with women." Also, they could benefit from having a cheaper option than visiting a psychologist or psychiatrist and jobs would be created for the app's mental health trainers. Finally, he also mentioned that many people would have easier access to this health topic in general and that they would appreciate anonymity.

Community Health Improvements and Empowerment

One of eHealth's promises is to enhance medical education (Eysenbach, 2001). That mHealth can improve health workers' knowledge and skills was also perceived by the interviewee of the European NGO (*CHWs and Nurses Training Tools*). She referred to the accreditation system in Europe, where health personnel are required to regularly update their knowledge. Since, according to her, this situation is different in many countries, health workers could benefit from their services. Also, the self-confidence would improve after being trained. There are, however, as presented in chapter 4.1, varying findings in the effectiveness of empowering and motivating (Abejirinde et al., 2018; Chang et al., 2011; Stanton et al., 2016; Vallières et al., 2016). The intervieweee also believes that if health workers are trained and the community has improved health knowledge, they would reinforce each other and believes in a "boost" in quality of care.

Contrary to the *Health Insurance Platform* interviewee example above, the effects on society were not measured in figures by the European NGO. The interviewee referred to the

organization being affiliated with researchers from a university who conduct interviews and evaluate the service by applying academic methods. Also, after the training workshop, the organization asks for feedback from the workers. The "success" rates here are drawn from personal examples or based on the qualitative evaluations. Regarding the question as to whether livelihoods might change, she referred to the health app they introduced on another continent. She believes that this solution empowers; the aspect of empowering was also mentioned in the introductory question.

The African NGO's interviewee (*CHWs, Nurses and Midwives Apps*) had a similar opinion on the health workers' tools. She believes that the people and workers indeed benefit from the provision of better healthcare and health educations. This would have an impact on the livelihoods of people, but also the fact that young women may be "educated about the use of family planning" which would give "more freedom in life."

Summary

Interviewees seemed to put trust in their solutions and perceive them as beneficial. Studies have indicated that health personnel perceive the technology as useful (e.g. see Medhanyie et al., 2015) but that in-person care is still necessary (Krah & de Kruijf, 2016). According to Krah and de Kruijf (2016), especially for solutions which aim to improve communication and information for health care workers, non-technological barriers need to be considered. They state that, "rather than merely individual practice, the success of the intervention […] depends on the way in which these systems are organized, are able to facilitate change and, for instance, affect motivation of those involved" (p. 9). Hence, the benefits of health workers' tools would require further research and the consideration of contextual frameworks.

4.7 Assessment of mHealth and In-Person Care

The interviewees were asked whether they think mHealth is the best option to improve health or the situation in their respective case and, again, they had differing viewpoints.

Great Potential

First, to start with a view which can be found on the "positive" end of the scale, a statement by the interviewee of the *Health Insurance Platform* can be found below. As mentioned before, he strongly believes in mobile phones and sim cards, which would bring "inclusiveness." This explanation stands out in comparison to the others:

I think, in developing countries for sure. Because it entitles them, it empowers them, people who don't have any rights and suddenly have an identity, they exist.

The aspect of empowerment was also addressed by others and does not necessarily stand out when compared to the other interviews. "To empower" means, according to the *Cambridge Dictionary*, "to give someone official authority or the freedom to do something" (Cambridge Dictionary, 2021). The interviewee's statement points to the personal faith in technology, serving as an instrument to build an identity for people, which, however, goes beyond the concept of empowerment, but shifts to creating an *identity* and *existing*. Emphasizing that mHealth would especially be of help in "developing" countries refers to a categorization of the world into countries that find themselves in differently ranked development stages. Such terms and their appropriateness have increasingly been debated in the last years (see for example Khokhar & Serajuddin, 2015).

The interviewee associated with the *Nutrition Solutions* also strongly believes in the effectiveness of mHealth. The interviewee argued that "there's still no other way of reaching everyone as easy" and "the beauty of mHealth is that you have ongoing interactions with the same individual." Advantages are, according to her, the high penetration rate of mobile phones and furthermore the opportunity to repeat and reinforce messages. The phone would be an "almost indispensable tool for delivering vital information" but, for mHealth to work, she pointed out the necessity of really having the solution embedded in the local health context.

Puzzle Pieces

A more cautious response was given by the other interviewees. That it would be "one of the options" was mentioned by the innovator from the *Mental Health App*, although it would depend on each individual person. The interviewee pointed out the advantages of mHealth being cheaper and easy to access, as well as the anonymity it provides the users, although he believes that sometimes in-person care would be better.

Healthcare was seen as a "puzzle" and "equation" by the social scientist from the *Health Advice Platform* start-up. The interviewee considered herself and the start-up as just a piece of the puzzle, although an important one. She acknowledges the role of other partners who were perceived as important to them. As an example she gave the role of insurance companies', which reimburse money in some European countries and therefore empower mHealth.

The *Children's Health* interviewee explained that technology is only as one part of a chain of value. In this chain, several pieces come together which "add value to a service." According to her, technology can be a supportive service in administration, yet the human connection is perceived to be essential to services. Similarly, the interviewee from the African NGO said:

> *But we've also learned that […] mHealth is never the solution by itself, I mean you cannot solve a problem just […] through this technology, you need to really look at the, the whole system, the ecosystem, and technologies can, can support and mobile phones can support but it's never the solution as such. So, it needs to be a part of a, of a, let's say a bigger intervention, I would say.*

The project manager from the NGO associated with the *CHWs and Nurses Training Tools* acknowledged that "there are so many ways" to improve health and the situation of the specific diseases. The interviewee had a more inclusive approach, since she repeatedly referred to people who live in lower-income regions or have lower educational levels, indicating that she envisions mHealth to serve a large group. An issue for her is the access to smartphones, which is sometimes lacking and which would mean that mHealth would not reach "the ones that are left behind," but believes mHealth can contribute.

Summary

Although all participants indeed seemed to believe in the efficacy of (their) mHealth solution, most hesitated and denied that it would be the best or only solution; others were emphasizing the positive role that mHealth could play. All in all, most of the interviewees were convinced of mHealth, whereas studies have also demonstrated the potential of it. Yet most interviewees appeared to be somewhat reluctant and point out other circumstances that need to be taken into account.

The concern about lack of access relates to the issue of the digital divide (Mutsvairo & Ragnedda, 2019), social disadvantage and related digital exclusion (Warren, 2007). The interviewees' statements and feelings are similar to what research found, namely that technology itself has a limited capacity to solve complex organizational issues in healthcare systems and that it needs to be entrenched in the system (Vallières et al., 2016). A literature review by Krah and de Kruijf (2016) also showed that "health workers emphasized the continuous need for person-to-person counselling coupled with, rather than replaced by, telecommunication" (p. 9). Both, research as well as the personal perceptions point to

technology's incapability to be a solution for itself but that many contextual factors needed to be considered.

5 mHealth Fashions – Discussion

As anthropologists, "we study groups of people in particular contexts" and "we try to describe how people form and then experience their world" (Sampson, 2017, p. 4). In the previous chapters I tried to examine institutions' and workers' viewpoints on mHealth and which factors are considered as important in their approach. I aimed to better comprehend their understanding of and ideas about mHealth and how they see the aspects, such as the importance of co-creation, that have been raised by academic research. This research trajectory appeared as relevant, as "organisations may be seen as circuits of power, in which normative frameworks are produced and globally diffused, where knowledge is crafted and circulated and from where packages of ideas are diffused" (p. 4). The discussed institutions and engaged people may therefore have global impacts in terms of disseminating their ideas and introducing their visions of mHealth.

The different approaches were portrayed but also contrasted. The findings indicate that there is a wide range of different personalities engaged in designing and implementing mHealth, as well as proposing the services as a useful option to improve health and grant access to healthcare. The "people in the background" all have their own individual stories and education, as well as backgrounds which may be commercial or philanthropic in nature, and they have quite different views on the people to whom they want to provide their services.

In the beginning, their language use was analyzed, following Hall (2005), who argued that thoughts are encoded into language, and language is expressed in speech. Using this analysis in Chapter 3, I analyzed the different approaches as starting point. In Chapter 4, I aimed to get a more in-depth understanding and ideas that had emerged during the interviews were discussed on the basis of seven main themes. By analyzing these personal motivations and the variety of factors the interviewees and institutions took into account, this thesis aimed to demonstrate that, in the world of mHealth, there are quite divergent ideas which result in differing courses of action.

Some approaches have illustrated that the concept of "development" is still prevailing in institutions in the Global North:

> *Since the emergence of the term* [development] *in its current usage after the Second World War, the concept of development went on to become one of the dominant ideas of the twentieth century, embodying a set of aspirations and techniques aimed at bringing about positive change or progress in Africa, Asia, Latin America and other areas of the world.*

> *Development brings with it a set of confusing, shifting terminologies and has been prone to rapidly changing fashions.* (Lewis, 2005, p. 472)

The discussion around development seems to shift from ideas around "development" to concepts of empowerment. Yet, development is not only a theoretical construct but moreover can be seen as a "category of practice" (Mosse, 2013) and the agenda to empower was specifically addressed by several interviewees. In some cases, mHealth is tied to business, while sometimes there is collaboration with local partners. Nevertheless, interviewees indicated that there was not only an intention to do pure business by offering the service, but moreover that there are positive, "developmental" impacts for society. However, this aspect also raised questions around how effectively co-creation took place, to what extent local contexts were considered and eventually how appropriate and beneficial the services are.

mHealth is still in its early stages and its long-term effects need to be explored further. There are no such internationally acknowledged guidelines on how to launch or manage projects, and "existing mHealth systems and apps vary greatly in quality and scope" (Marzano et al., 2015). As this thesis aimed to demonstrate, stakeholders from Africa, such as the patients, have in some cases remained excluded in the development process. Researchers have started to present ways to improve mHealth, such as Farao et al. (2020), who have applied a user-centred framework for mHealth design which is low-cost and addresses the local context, and Labrique et al. (2018), who have published the "best practices" to scale digital health. Five factors, which emerged after practical experiences are reported to be of relevance for upscaling: program characteristics, human factors, technical factors, healthcare system design as well as features of the "broader extrinsic ecosystem within which they operate" (Labrique et al., 2018, p. 2). However, as mHealth is still a "free market," these recommended steps and guidelines might be neglected in reality, which in turn would lead to services which miss the targets.

It was revealed that there are issues regarding coverage and reach among societies, which indicated that there is still room for improvement. mHealth may potentially grant easier access to health services, or even provide health services to those who did not have access before. As revealed, this works in many cases and mHealth can "fulfill its promise." However, mHealth is inevitably tied to the borrowing or owning of technical devices, which might exclude certain parts of a population. Ways to embed the services range from integrating the solution in the socio-technological context by offering it on Whatsapp, to offering it to companies and paying

users to create revenue, to offering free services and focus on low-resource areas. These different ways have implications for the users who can be reached, whether they are individual smartphone users who are financially well-off or community workers who disseminate knowledge. Due to the technical requirements of more sophisticated solutions, people in lower-income or rural areas may face disadvantages; hence, there is an issue around the real inclusiveness of mHealth. Yet, some interviewees demonstrated to have found ways to still grant valuable services. This may be the training of CHWs who are believed to have the power to disseminate knowledge, or very specific solutions adapted to the local underserved population where great hopes were placed in phone sharing.

6 Conclusion

Although mHealth services are technological solutions, providing natural scientific knowledge, one can see how people and ways of working within the institutions matter. Prevailing ideas and thoughts have been revealed to impact their agendas as well as the procedures of inventing and managing mHealth. The literature also indicated that technology cannot be a solution by itself, but that it can only be a tool to support, which was acknowledged by most of the interviewees.

It was also demonstrated that, despite the enthusiasm around mHealth's potentials, in reality there are still many obstacles. The promise to increase healthcare access may be fulfilled for some, but definitely not for all. Some areas with less ICT infrastructure may be excluded by implementers, especially by businesses. Furthermore, financially disadvantaged people might benefit less, specifically from user-centered services, which could pose the risk of a social divide. However, services for CHWs could be an alternative.

The world of mHealth is still in an early phase and unregulated, meaning that steps and factors recommended as essential by research may be neglected. Among these are – according to the cited studies in this thesis – the collaboration, obtaining information on socio-technological contexts and considering these in the implementation, the integration of local stakeholders and their respective knowledge, as well as taking into account that the technology may be a supportive device but that it cannot replace certain health services and the human contact. Many of these aspects were indeed perceived and realized in quite different ways by the interviewees. Innovators and users of technological services can benefit from the insights provided by academic research, as they may lead to more appropriate services. Thus, considering these aspects is essential for the future.

7 Literature

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Appendix

Topics and related question prepared as guideline for the interviews (not all questions were addressed specifically)

1.) The co-creation aspects:

- Who is or has been involved in developing the programme?
- Was there co-creation? What were the experiences with it?
- What was the role of the several partners involved?
- (Did your organization have experience in digital health solutions? Did you work together with other organizations or companies which have technical knowledge and experience?)

2.) Value sensitive design: relates to processes that make sure that innovation takes account of local beliefs and values, technologies, existing medical and social structures, etc. Everything that relates not to monetary value but to cultural and social specifics.

- (How) did you obtain information about the local people and setting initially? (for example social structure)
- Did you obtain information about local beliefs on the disease/medical condition and medical structure before the implementation?
- If not, why not?
  If yes, was this knowledge taken into account when designing the intervention? Why (not)?

3.) Anchoring: how is the innovation (to be) anchored in the community/society/ medical practices, etc.

- How did you plan the program to be anchored in the community?
- How did you promote the intervention? Did you have to convince people to use the new technological solution? Did it fit the local context?
- Did you expect that certain potential users would be averse to the new technological intervention?
- Did some users have problems with adopting the technological solution? If yes, how did you react to it? Or why didn't you react?
- Do you see any differences in the technology adoption, for example in different age groups or differences between gender? Where there difficulties in adopting?
  How do you want to avoid such possible adoption difficulties for certain groups?
- In some regions, not everyone necessarily has a phone but depends on others and needs to ask for permission to use this – how do you see this issue?

4.) Delivery models:

- How did you come up with starting this specific mHealth inititative? What where the reasons that introducing an mHealth program seemed relevant?
- How did you select the country and people whom you introduced to the program? What where the reasons for this selection?
  If program implemented in for example Kenya or Uganda: Why did you choose a country where there is already a well-developed telecommunication market? Why wasn't a country chosen with a less advanced technology market?
- Were there technical adjustments or adjustments in the promotion after the project has been implemented? If yes, why?

Or: did you plan on adjusting the technology or the promotion of the project, after its implementation?

- Research shows that a key challenge is to move mHealth projects to national scalable programs and many programs have stopped after several years of being in the pilot stage. Do you want to involve more villages/cities within the country or involve more countries and expand the project? What are barriers that you perceive in upscaling endeavors?
- (What is the intended project duration? Why don't you plan to let it run for a longer period?)

5.) (perceived and real) effects and impact:

- How would you say can people benefit from this initiative and how can your organization benefit from it?
- Did the project have the positive effects that you anticipated? How was the first feedback from people, did you evaluate this?
- Do you believe that the new technological intervention changes livelihoods? If yes, how?
  Do you believe that the new technological intervention changes the social fabric? If yes, how?
- Do you believe that the technological intervention had any negative impacts on the people and livelihoods? If yes, what kind of impact?
- Would you say that mHealth is the best option to improve health in this specific case? If yes, why?
- How would you say can the project be improved?