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Digital Transformations

Master Thesis by Micha van den Akker

How to get sub-Saharan African SME's to Join the Digital Revolution.

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Abstract

The role of IT- and digital possibilities in businesses in rather developed countries have grown to be important on operational, tactical and strategic level. Many of these solutions have proven to be useful, provided that these are implemented, used, and governed in the right way. Although the fact that many IT- and digital options exist, these are not/little used by African SMEs. The African culture and civilization differ much from their counterparts in developed countries. Many struggles exist, mostly due to fact that it is poor and less organized. In contrast, Africa offers opportunities for locals and businesses, such as the relatively young and growing population; and the rise of a growing middle class, resulting in an increase in spending. Despite the growing amount of theories, methods and models about digital transformation, the literature still suggests the need for more in-depth research in the context of Africa. The low amount of IT-related research in SMEs in Africa is regrettable, given that many experts of African business environment state that these companies can boost the overall development and wealth of this region, resulting in an overall better standard of living. This study aimed to put known literature about digital transformation in the context of sub-Saharan African SMEs, looking at fitting IT- and digital possibilities and the role local IT-companies can play to guide the process.

The literature review showed multiple definitions of the concept digital transformation. For this research the following definition was selected: "*a process that aims to improve an entity by triggering significant changes to its properties through combinations of information, computing, communication, and connectivity technologies*". Scholars do not agree on the exact difference between IT- and digital, but all agree that digital transformation can be seen as an evolution of IT-enabled transformations, and that these are closely related. Therefore, the literature study aimed to identify benefits, possibilities and related capabilities for both IT and digital. Besides, it looked into both IT- a digital strategies, and change management. Furthermore, the literature study elaborated on the sub-Saharan African culture and its business environment. In addition to the literature study, the thesis included empirical research, looking into four aspects influencing the digital transformation of the SMEs, and the guiding process of local IT-companies: the current situation of the SMEs; the type of technologies beneficial for the SMEs; reasons of hesitation towards digital strategies in SMEs; and cultural aspects of the interaction between IT-companies and SMEs. The empirical research was conducted in Ghana and included 19 interviews at SMEs; 6 interviews at IT-companies; and an ethnographic observational study.

The study found that most SMEs have a lot of room for improvement, using no IT at all or only using the Microsoft Office package. Besides, 89 percent of the interviewees stated that most of their employees have/had no experience with IT. The reason why so little IT- or digital options were deployed were the financial situation, thinking that investments would not outweigh the costs; and the fact that they think change is not really needed. Furthermore, trust in- and the personal relation with the IT-company are seen as important aspects to choose an organization; and is unburdening the SMEs very important. Applications should be usable, low in costs, and have clear goal. The use of internet is seen as expensive, and a continuous, good connection is not available in all regions.

The results were used to create a roadmap, including guidelines and a framework for a digital transformation workshop. The guidelines inform IT-companies on four topics. First, the current situation of the SMEs, elaborating on the room for IT- and digital based improvements. Second, creating a sense of urgency, informing about how they can take away the hesitations many of the owners/managers of SMEs have. Third, the fitting technologies, explaining the different IT- and digital possibilities and how they fit in the context; and last, implementation and aftersales, providing insights in guiding the implementation and the aftersales phase. The empirical research showed the lack of IT- and digital solutions within SMEs and showed multiple reasons why they haven't implemented them yet. In order to guide these SMEs towards their next (and often first) digital/IT implementation, a framework is created. The framework can be used by IT-companies to create a workshop for managers and owners of SMEs, to help them see how the different possibilities can benefit their company.

The workshop proved to increase the participants perceived level of knowledge about IT; the importance they attach to IT in their company; and their eagerness to start using IT. Furthermore, one of the six participants took their next digital step by implementing a website, as a direct result of the workshop.

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1 INTRODUCTION

The research before you started off with a conversation with Diana van der Stelt, a Dutch-Ghanaian entrepreneur. As she is actively supporting different IT related organizations, she has a good perspective on how this branch operates in the West African region. Multiple topics were discussed and one in particular lingered and evolved into this the issue addressed in this report. The following problem was formulated:

> "*Ghanaian IT-companies struggle to market their services and software to small and medium enterprises*" (Diana van der Stelt, personal communication, 27-02-2019)

The remainder of the report seeks to address this problem in the form of a scientific study.

1.1 RESEARCH CONTEXT

People who live in rather developed countries tend to not see the technological luxury they live in, overwhelmed by their day-to-day life and tight schedules. These technological luxuries were not born in a day, but evolved, almost naturally, over the years. As late as in the mid 50's, information technologies started to find their way into our (business) world. In these days information technologies started with substituting simple but tedious task. In the following years costs decreased and the computing power improved dramatically, resulting in an increasing amount of attention, especially in the bigger and financially stronger companies. The main focus started from a rather internal perspective, optimizing processes and managing knowledge. After IT proved to be beneficial, changes started to happen fast (Stair & Reynolds, 2012). Besides the internal view, businesses started to use IT for communicating with external parties. Supply chains got more efficient trough shared knowledge; customers were reached through applications like websites; and customer relations were managed, supported by IT. Furthermore, communication evolved with the rise of online possibilities, nullifying physical distances and enabling mass global operations. The increasing amount of data raised the importance of thought-out decisions, and got a rather personal customer focus. Besides, more and more applications were stored externally and exchanged data through internet connections. Online platforms and services popped up and made it easy to reach a massive part of the global market. Eventually, and this is where the term digital shows up, IT was not only supporting organizations, but rather it changed complete business models and enterprise architectures (McDonald, 2012). The number of physical stores and jobs decreased and were replaced by cheaper or more efficient digital/IT solutions. For instance, bankers who handled transactions were replaced by internet banking. Technologies like the cloud, artificial intelligence, and bigdata changed the business environment, as gigantic amounts of data and computing power created possibilities. Companies in developed countries are nowadays to some extend obligated to make use of these technologies, because the political- and social systems obliges them and/or competitors will overrun them otherwise. IT- and digital solutions are proven (in science and within the business environment) to be useful, provided that these are implemented and governed in the right way (Beek, 2010; Cohan, 2013; McKeown & Durkin, 2017; Recker, 2015).

Although the fact that many IT- and digital options exist, these are not/little used by African SMEs. The African culture and civilization differ much from their counterparts in developed countries. In order for these regions to get on the same business- or living standards, things have to change. Can Africa leapfrog and make use of the latest technology trends or do they have to start where the, in the meantime developed countries, were 20 years ago? During this master thesis sub-Saharan African (SSA) SMEs in relation to IT- and digital opportunities are investigated from an IT-company point of view. What are the reasons why African managers and owners have or have not yet implemented IT systems? And what can local software companies do to persuade and help them reach better performance with the help of digital solutions?

During this research the current situation of sub-Saharan African SMEs is investigated in order to gain a broad figure of its condition. During a literature research and a field trip to Ghana the current (digital) business culture with related enablers and problems are mapped from both the IT-company- and the business perspective. The knowledge gained during the study is used to create guidelines and a method for local IT companies to use during the era of digitalization.

1.2 SCIENTIFIC RELEVANCE AND PROBLEM STATEMENT

The spacious 30 million squared kilometers make Africa the second biggest continent in the world. Its surface is bigger than Europe, the US and China combined, and it has a population with over 1.4 billion people. The biggest part of the population, 1.250 million people, live south of the Sahara, also known as sub-Saharan Africa (SSA) (UN, 2017).

Africa is known as the poorest region in the world. In 2012, 46 percent of the population lived in poverty with less than 2$ to spend per day. Although this percentage is slowly decreasing, the total amount of poor people is not. The population growths faster than poverty decreases, resulting in an increasing amount of people who have less to spend than two dollars per day (Beegle, Christiaensen, Dabalen, & Gaddis, 2016). Justin Lin, Chief Economist of the World Bank, stated in 2008 that we must focus our efforts especially on helping sub-Saharan Africa, because improvements fall behind compared to other under-developed regions (Lin, 2008). SOS Children's villages (2018) listed four of the worst problems in this region:

- More than a quarter of all hungry people in the word live in Africa, and an estimated 20% percent of all people in Africa are considered malnourished;
- One out of eleven children die before reaching the age of five;
- 59 million children between the age of 5 and 17 work instead of playing and going to school; and
- 25 million Africans are infected with aids, including approximately 2.9 million children.

Although Africa has long been regarded as the world's weakest region, and even has been called as 'the hopeless continent' in a highly regarded journal as The Economist, its business appearance has changed over the last decade (Lem, van Tulder, & Geleynse, 2013). The GDP increased with 5,4% from 2000 to 2010 and with 3,3% in the following five years. High percentages compared to most other regions. In fact, this development makes it the second-fastest growing economy in the world, right after Asia (Bughin, Chironga, Ermias, & Jacobson, 2016). Besides the growing economy, Africa offers more opportunities. McKinsey Global Institute (Bughin et al., 2016), discussed, among others, the following topics:

- The region has long-term economic fundamentals, such as a young, growing population and the fastest urbanization rate in the world. By 2034, Africa is expected to have a larger workforce then either China or India and, so far, job creation is outpacing growth in the labor force;
- Customer- and business spending is increasing fast, from 4 trillion dollars in 2016 to an estimated 5.6 trillion in 2025; and
- Africa has the potential to almost double its manufacturing output from $500 billion to $930 billion in 2025, provided that countries take decisive actions to create an improved environment for manufacturers. Which could create between 6 and 14 million stable jobs.

To summarize, Africa struggles with problems mostly due to fact that it is poor and less organized. In contrast, Africa offers opportunities for locals and businesses, and thereby for digital transformations.

Despite the growing amount of theories, methods and models about digital transformations, the literature still suggests the need for more in-depth research in different contexts around the world, especially in the African region. No to little factors are known to guide transformations in small and medium enterprises in sub-Sahara Africa, where compared to the western world different problems occur. The low amount of IT-related research in SMEs in Africa is regrettable, given that many experts of African business environment state that these companies can boost the overall development and wealth of this region, resulting in an overall better standard of living (Abor & Quartey, 2010; Olawale & Garwe, 2010; Smit & Watkins, 2012).

1.3 OBJECTIVE AND SCOPE

The objective of this study is to provide guidance for digital transformations of SMEs in sub-Saharan Africa. The scope of digital transformations is taken broadly, as the most beneficial technologies and methods for the specific context were not yet known. A more focused approach of digital transformations could have resulted in missing, important knowledge. The context is scoped more clear: small and medium enterprises in sub-Saharan Africa. Although this region is still big, many overlapping problems and opportunities occur.

Four different perspectives are investigated during this research. The first two perspectives, investigated by literature research, are about digital transformations and the sub-Saharan African business culture. The latter two perspectives, investigated with empirical research in Ghana, focus on both situational elements of sub-Saharan African SMEs and contemporary digital transformation initiatives of IT companies, including business culture, occurring problems/stumbling blocks, current local transformation processes, and success- and fail factors. The scope of the empirical part of the research focusses on African SMEs and local IT companies, in order to stimulate *their* economy. The term "IT-companies" is used because the research focuses on more than just software development. If significant results will be achieved, and non-African software companies value these, this is seen as a nice bonus rather than a success. The results will exist of the following aspects:

- An analysis of the current IT/digital business environment in sub-Saharan Africa;
- Guidelines for sub-Saharan IT companies on how to act in the era of digitalization; and
- A method which can be used by IT-companies to help local SMEs in their starting phase of their digitalization process.

1.4   LINE OF THE REPORT

The remainder of the report starts with a description of the research approach in Chapter 2. It elaborates on the research questions answered during the research and the methods used to answer them. Chapter 3 gives a theorical background of sub-Saharan Africa, including a short overview of it's historical- and political evolution; its current culture; and its business environment. Chapter 4 elaborates on the current state of the art of digital transformation, explaining the definition and the different elements it includes. Both Chapter 3 and 4 end with a summary of the findings. Chapter 5 and 6 show the results of the empirical research executed in Ghana. The first shows results gathered by the means of interviews, and the latter shows results from ethnographical observations. Chapter 7 describes how the results relate to the design of the artifacts. It shows the analyzed results and the requirements that derived from them. Chapter 8 shows the artifacts itself, written with employees of IT-companies as audience. The validation of the roadmap is elaborated in Chapter 9. The report ends with the discussion in Chapter 10 and the conclusion in Chapter 11.

2 RESEARCH APPROACH

This chapter describes the research approach that is used during the thesis project. The first section, Chapter 2.1, elaborates on the research questions. The remainder of the chapter describes the research method.

2.1 RESEARCH QUESTIONS

The problem context as described in Chapter 1 gives the direction of the research. In order to get a more detailed approach, a set of research questions are formulated. The main research question is given first, followed by the four sub-questions, formulated to break the question in easier to grasp parts. The main research question of this research is as followed:

MRQ: 'What are digital opportunities for sub-Saharan African SMEs and how can IT-companies guide and steer a digital transformation process within these SMEs?

In order to answer the MRQ, four main topics are investigated by answering their related sub-questions (SQs).

SQ-1: 'What are typical situational elements of African SMEs?'

The outcome of the first sub-question gave insights in the context of this thesis, sub-Saharan African SMEs. Multiple topics are covered, such as: a general introduction of the region; a description of the types of enterprises and its employees; and the business culture including their current relation to IT.

SQ-2: 'What is the current state-of-the-art in the field of digital transformation?'

The second sub-question resulted in a literature overview regarding digital transformation. More specifically, it elaborated on the differences and similarities of IT- and digital solutions, the benefits of using these technologies; the different technologies themselves; the relation between business-, IT- and digital strategies; IT-capabilities; and change management.

SQ-3: 'What are contemporary digital transformation initiatives of African IT-companies?'

The third sub-question is about contemporary digital transformation initiatives in Africa. It differs from SQ-2 qua perspective. Where the second sub-question focused on the internal elements of the African SMEs, the third questions took an external perspective, looking at the situation from an IT-company point of view. It tries to map problems IT-companies encounter and looks into what experience they have had regarding SMEs.

SQ-4: 'How can African IT-companies guide and steer digital transformations of African SMEs?'

The last sub-question is answered with the creation of two artifacts. The knowledge gathered by answering the first three sub-questions is combined, analyzed and set down in such a way that it helps local IT-companies foster digital transformations of SMEs. The exact form of the elaboration depended on the results of the other sub-questions.

2.2 RESEARCH METHOD

The topic investigated in this research is: digital transformations of small and medium enterprises in sub-Saharan Africa. The research aims to provide guidance for local IT-companies executing these kinds of projects. Because the research focuses on both the problem and the solution, it can be classified as applied research (Wohlin & Aurum, 2015). During this thesis project there is no hypothesis that has been tested. Rather, the research resulted in a conclusion derived from specific observations, theoretical as well as empirical. Wohlin and Aurum (2015) describe these kinds of researches as inductive. During the time of the project background information is gathered and explained; characteristics of the problem are investigated; and relations between the different findings are be described. In the research landscape this thesis project could be described as exploratory, descriptive, and explanatory (Wohlin & Aurum, 2015). The knowledge gained is qualitive rather than quantitative as it focusses on social- and cultural aspects.

The main research methodology used is Design Science as described by Wieringa (2014). He describes Design science as the design and investigation of an artifact in a certain context. These kinds of projects have multiple phases: problem investigation, treatment design, treatment validation, implementation and evaluation. Due to the timespan of the project only the first three phases were executed. **Error! Reference source not found.** shows the research method in the form of a product deliverable diagram. The remainder of this sub-chapter elaborates on how the phases are executed.
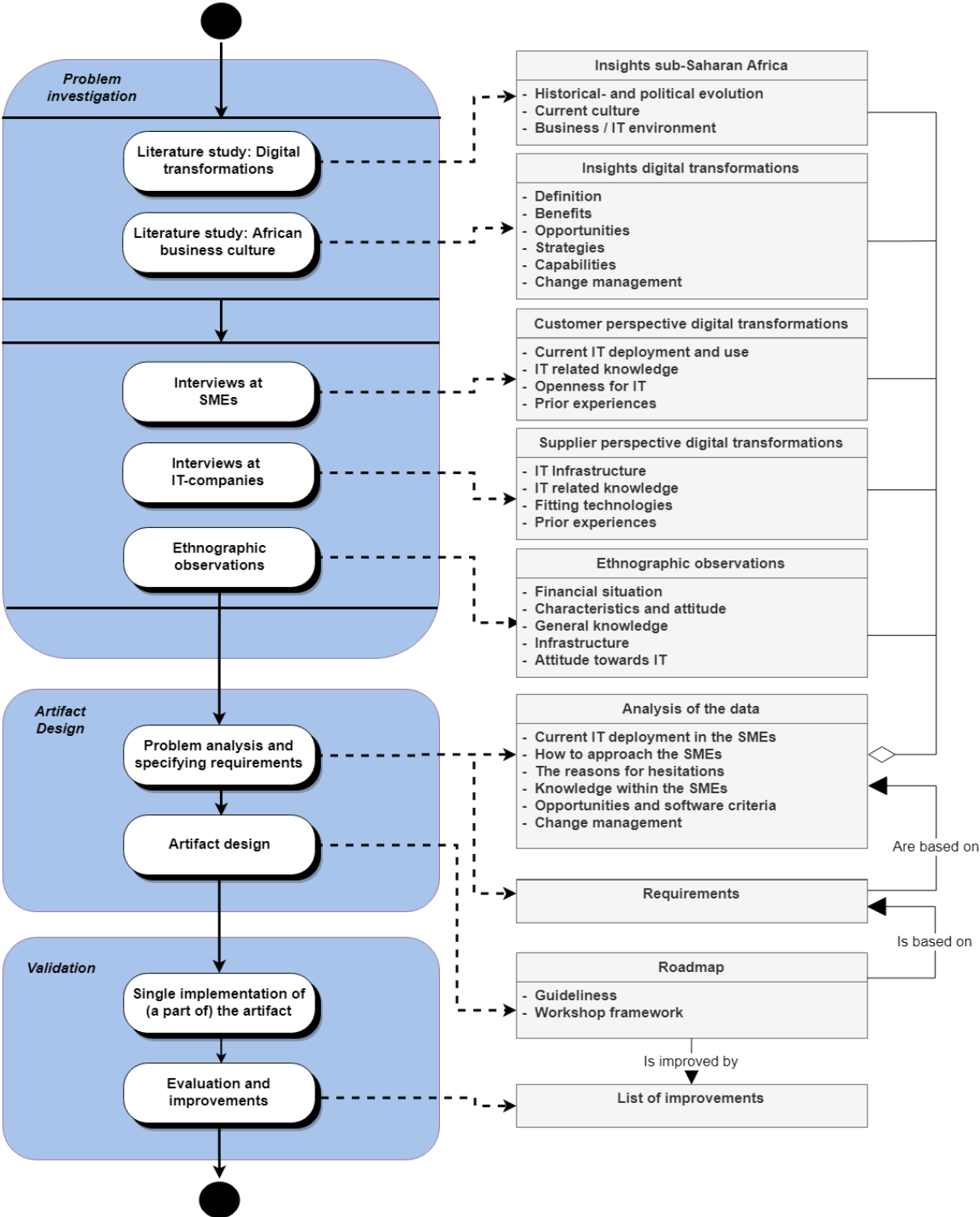

Figure 2-1. Product deliverable diagram of the research method.

2.2.1 Problem investigation

Wieringa (2014) describes the goal of the problem investigation phase as follows:

"The goal of problem investigation, by contrast, is to prepare for the design of a treatment by learning more about the problem to be treated." (Wieringa, 2014)

In this research, the problem investigation consists of five main parts to gain knowledge about the problem at hand. The first and second part, conducted during the first part of the thesis, are the result of a literature review and describe the state of the art of digital transformations and describe sub-Saharan Africa. The third, fourth and fifth part, in the second phase of this thesis project, are investigated in Ghana, and looked at the problem as previously described. All three of the parts executed in Africa can be described as empirical research. The third part investigated digital transformations from a consumer point of view (sub-Saharan African SMEs) and the fourth part looked at the same topic, but from the perspective of local IT-companies (the suppliers). The last part looked at the context by the means of an ethnographical study.

2.2.1.1 Literature review

The literature review gives insights in the current state of the art of digital transformations and the context of the research: sub-Saharan Africa. Both of the topics are fundamental for this research as they show the gap in literature. The literature studies help answering sub-questions 1 and 2.

As the scope of the research is rather broad, multiple concepts are investigated during the literature review. The different concepts can be generalized into two main categories: sub-Saharan African SMEs and digital transformations. Both literature reviews end with a summary, describing the most important findings. The literature about the African SMEs is done first, in order to give directions to the literature research about digital transformations. Table 2-1 gives an overview of the investigated concepts concerning sub-Saharan Africa, with the related reasons.

Concept	Reason
Sub-Saharan African historical- and political evolution	To gain a deeper understanding of the origin of African values and to portray the context of their current situation.
Sub-Saharan African culture	To gather knowledge about the African culture influencing digital change.
Sub-Saharan African business environment	To gain knowledge about the business culture of African SMEs and its relation towards IT- and digital possibilities.

Table 2-1. Concepts of the literature review about sub-Saharan African SMEs.

Table 2-2 gives an overview of the topics discussed in the literature review about digital transformations and the reasons why these are investigated.

Concept	Reason
Digital transformations	To give a clear view of the definition used during this research.
Benefits of digital transformations	To give an overview of what properties of enterprises are affected by digital transformations and how this relates to the business' success.
Digital possibilities	To give a non-exhaustive enumeration of IT- and digital solutions which might fit African SMEs.
Digital strategies	To explain digital strategies and its relation to business-, and IT strategies.
IT capabilities	To give an overview of capabilities needed for using IT- and digital opportunities

Table 2-2. Concepts of the literature review about digital transformations.

To gather the information, multiple search engines and books were used. Google Scholar is used for a rather broad research as it includes multiple search engines and topics. DBLP, IEEE and ACM are used to check if no IT-related literature is missed. For a more hands-on view on some of the topics, books from the library of the Hogeschool Utrecht were used. In order to gather the literature, a predefined set of concepts is used which is

supplemented with literature recommended in personal conversations with experts, and literature found by using the snowballing technique as described by Wohlin & Aurum (2015).

2.2.1.2   Empirical research

The second part of the problem investigation took place in Africa. In fact, a trip of three months to Ghana was organized to gather knowledge additional to the data found in the literature research. During these three months, three perspectives of digital transformations are investigated: the customer-, the supplier and the researcher's perspective. The first two perspectives were investigated by using interviews. The literature study showed that planning meetings in African countries works best on short term (see chapter 3.2.7). With this in mind, the choice was made to arrange the interviews short before the trip to Ghana and during the trip itself. To keep as many options for interviews open, both the IT-companies and SMEs were addressed during the same period. The third perspective, the researcher's perspective, is investigated throughout the whole period in Ghana and looks at the cultural context. In order to find subjects, make arrangements and help with personal daily needs (think of transport, housing, etc.), a partnership was established with Maxim Nyansa. Box 1 explains the role of Maxim Nyansa and the partnership further.

Box 1: Maxim Nyansa

Maxim Nyansa is an Ghanaian based non-profit organization with the mission to create a career perspective for young Africans with interest and backgrounds in IT. They believe that it is possible to equip and prepare these young people for the new African job market, by giving them access to valuable and affordable practical resources and training. In order to prepare the local youth, they support them in two ways. First, they offer multiple trainings to just graduated university students. These include courses like IT-professionalism, software development, data-science and hardware & networking. Second, they help transforming the learning environment of high school students by providing and setting up IT-hubs; offering digital educational material; training teachers in digital literacy, and if needed providing training for students.

The partnership between this research project and Maxim Nyansa creates benefits in both directions. The insights gathered from the results will supplement the training courses with knowledge about stumble blocs for local SMEs and their relation to IT. Furthermore, many young Africans related to Maxim Nyansa are active in local software-companies, which encounter difficulties selling their products to the hesitating enterprises. Finding out what holds back these SMEs in this region can help these young professionals reaching this market and overall stimulate the branch.

The other way around, Maxim Nyansa provided a big part of the network needed to gather data, these include IT-companies and local SMEs. Furthermore, they offered practical support concerning housing and logistics.

During the literature study (see Chapter 4) it became clear that a digital transformation can be seen as a process of change to improve an entity (Vial, 2019). The online oxford dictionary (2018) gives the following definition for change: *"make or become different".* The definition implies that change has to deal with two situations, a starting position and a new, different position. When combined with the chosen definition for digital transformation (Chapter 4), which states that that the change need to improve an entity based on a combinations of information, computing, communication, and connectivity technologies; three aspects come forward. First, the starting position; which in the context of the research is the current situation of the SMEs. Second, a different, improved position; in the context of this research improved SMEs. Last, these changes need be done based on a combination of information, computing, communication, and connectivity technologies.

The current situation is investigated based on two aspect that came forward during the literature research. First, the deployment of the technologies as described by Vial (2019) in the SMEs are mapped. Second, the IT capabilities within the SMEs are measured, as literature argues that human-IT skills are positively related to the firms performance (A. S. Bharadwaj, 2000; Dale Stoel & Muhanna, 2009). The different, improved position is analyzed by mapping which type of technologies are beneficial for the SMEs as these can help to transform to the

improved situation. Furthermore, the main research question states: "..how to guide and steer a digital transfor-mation..". During the research the following definition of guidance is used:

> *Advice or information aimed at resolving a problem or difficulty, especially as given by someone in au-thority*. (OED, 2018)

The definition states that *guiding* is about giving advice and providing information to resolve difficulty. The infor-mation to resolve the difficulty in this context includes two topics. First, the guidance needs to include the infor-mation about improving the SMEs based on the technologies as described by (Vial, 2019). Second, it needs to address the reasons of hesitation towards the digital change in the SMEs, as these reasons holds back the change at this moment. Furthermore, the main research question tries to find a way on *how* the IT-companies can guide the transformation. Therefore, the empirical research looked at cultural aspects of the interaction between the IT-companies and the SMEs; based on their prior marketing and communication experiences. Last, prior, general experiences about IT-related projects are investigated, as knowing best practices and fail factors can be taken into account by future digital transformation projects.

To summarize, the empirical research looks into the following points:

- The current situation of the SMEs;
    - o Deployment of the technologies;
    - o The human IT skills;
- The type of technologies beneficial for the SMEs;
- Reasons of hesitation towards digital transformations in the SMEs;
- Experiences during prior IT-related projects with SMEs.
    - o Cultural aspects of interaction between IT-companies and SMEs;
    - o Best practices and fail factors during these projects.

All the knowledge described above are investigated by the means of interviews with SMEs (the customers per-spective); interviews with IT-companies (the supplier perspective); and an ethnographic study (the researcher perspective).

Customer perspective

The first perspective on the problem is investigated by means of interviews with sub-Saharan African small and medium enterprises. SMEs are defined in multiple ways in literature. Abor and Quartey (2010) elaborated on the subject and state that different scholars rank enterprises on different aspects. Some of the common aspects they found were the number of employees; contribution to the national GDP; capital assets; and turnover level. During this research the number of employees is chosen as measurement criteria as other measurements are more difficult to use in this thesis' context. The exact number of employees for the different kind enterprises do differ amongst scientific papers, and some even divide developed- and underdeveloped countries. The following clas-sifications, based on Abor and Quarey (2010), is used during this research:

1. Small enterprises   5 – 29 employees;
2. Medium enterprises   30 – 99 employees.

Furthermore, Abor and Quartey (2010) describe criteria enterprises have to meet in order to act like an SME. These enterprises can only have a relatively small share of the marketplace; must be managed in a personalized way; and need to be independent (in the sense of not being part of a bigger enterprise). These criteria are taken into account by the cases used in this project.

In order to extract information out of these SMEs, meetings were organized in order to interview owners, man-agers and/or employees of the SMEs. As described above does the research look at the current situation of the SMEs, based on deployment of technology and human IT skills; the type of technologies that would benefit them; the reasons for their hesitation; and experiences during prior IT-related projects. In order to extract this infor-mation, the following four themes were discussed during the interviews: (formulated different because these are more accessible for the interviewees):

- Deployment and use of IT- and digital possibilities;
- IT related knowledge;
- Openness for IT/digital possibilities; and
- Prior experiences with IT-companies.

The Interviews were semi-structured as described by Oates (2006). The main benefit of these type of interviews is that, although led by themes with related questions, the flow of the conversation can still feel rather natural. Besides, it gives room for additional information that in the case of a structured interview could be missed. A last argument for using semi-structured interviews, is the fact that this type of interview better fits in the African culture, where relations, and thus good conversations, are more important than tasks based results (see section 3.2). A total of 19 interviews were held at different SMEs. This part of the empirical research helped to answer sub-question 1. The interview protocol used during the interviews can be found in Appendix A.

Supplier perspective

The second perspective investigated in Ghana, is about the experiences of the local IT-companies. With the use of semi-structured interviews, the experiences of IT-companies concerning transformation projects and insights in fitting technologies are gathered. The interviews focused on the following two research aspects, as previously described:

- Experiences during prior IT-related projects with SMEs.
  - o Cultural aspects of interaction between IT-companies and SMEs;
  - o Best practices and fail factors during these projects
- The type of technologies beneficial for the SMEs;

In order to make the aspects more discussable they are broken down into the IT-companies view on the IT infrastructure in Ghana; on aspects of fitting IT/digital solutions; and on best practices/fail factors of digital transformation initiatives. Just as the interviews with the customers, they were semi-structured as this fitted best in the context. The following three themes are discussed during the interviews:

- IT infrastructure;
- Fitting technologies; and
- Prior experiences with SMEs.

A total of six companies are interviewed. For the full interview protocol see appendix B. The interviews gained knowledge from the perspective of the supplier and helps answering sub-question 3.

The researcher's perspective

The last perspective looks into social, cultural and technical aspects of digital transformations of SMEs in sub-Saharan Africa. It is investigated by the means of an ethnographical study. Oates (2006) defines ethnography as the description of people or cultures. For such a study, the researcher has to take part in the life of the people there while carrying out observations. He argues that the setting must be natural rather than artificial, and a holistic description should be made including social, cultural and economic aspects. Oates (2006) discusses the fact that the method gets a lot of criticism in the scientific landscape. This comes forth of the role of the researcher as research instrument, making it impossible to be totally objective. Therefore, ethnographers must observe others and participate with them, while at the same time, stand back and observe themselves observing and participating. While reporting, ethnographers should include reflection on how the results are interpreted compared to their own culture. When done correctly ethnographical research has many advantages. It gives a rich and detailed picture of the situation and its context; it can include human, social, organizational and technical aspects of information system development; and it is possible to be applied in complex and embedded social systems that are not fully understood.

As the literature study about sub-Saharan Africa (elaborated in Chapter 3) identified multiple factors which might influence digital transformation in this region, these are reviewed and supplemented during the three month trip to Ghana. They help to substantiate the following three aspects as explained earlier in this sub-chapter:

- The type of technologies beneficial for the SMEs;
- Reasons of hesitation towards digital transformations in the SMEs;
- Cultural aspects of interaction between IT-companies and SMEs;

To investigate the type of technologies that fit the African context, observations were made about the financial situation (economical aspect) and the IT-infrastructure (technical aspect). The financial situation is observed because the literature argued that Africa is the poorest continent in the world (Lin, 2008). The IT-infrastructure is investigated as literature suggested that this is changing rapidly, especially concerning the internet (Porter et al., 2015; Sanou, 2017). The reasons of hesitation towards digital transformations is substantiated by observations about the Ghanaian attitude towards IT (cultural aspect). The last aspects, cultural aspects that might influence the interactions between the SMEs and the IT-companies, is observed by looking at characteristics and the attitude of the people in Ghana based on the models of Hofstede (2011) and Meyer (2014). The models are explained in-depth in Chapter 3.2. The observations help substantiate the answers on sub-questions 1, 3 and 4.

2.2.2 Artifact design

The second phase of the Design Science Method as described by Wieringa (2014) is the artifact design, and has as goal to design one or more artifacts that could treat the problem. In this research the artifact will treat the problem as found in both the literature- and the empirical research and aims to help IT-companies guiding SMEs towards their next digital step. In Wieringa's model (2014) the phase starts with specifying requirements, which should contribute to the goal as described at the end of the problem investigation phase. In order to apply this during the master's thesis the five perspectives (two from the literature- and three from the empirical research) are analyzed, and the relation to the requirements and the requirements themselves are elaborated.

The artifact consists of two parts: guidelines and a framework to set up a digital transformation workshop. The guidelines describe ways to interact with the SMEs; describe the best practices/fail factors concerning digital transformations; and give an overview of fitting technologies in the Ghanaian environment. During the research it became clear that most of the SMEs have not yet undertaken any steps towards a digital transformation. Besides, the literature argued that digital transformation have no clear end goal, but rather and with continuous innovation based on the technologies (Matt, Hess, & Benlian, 2015). With this in mind, the workshop framework is created to address the starting phase of the digital transformation, and aims to get the SMEs to take the next (or first) step towards the use of more IT- and digital options. The setup of the requirements and the design of the roadmap answer sub-question 4.

2.2.3 Validation

Wieringa (2014) describes validation as the justification of the treatment in the eye of the stakeholders. In this research the most important stakeholders are the IT-companies and the SMEs located in sub-Saharan Africa. The choice was made to validate with Technical Action Research (TAR). A TAR study can be seen as a single case study focusing on evaluating an artifact. The use of a TAR study was chosen because it follows the same process as evaluating an artifact after implementation, but on a smaller scale. As time did not allow to validate the whole roadmap, the focus is put on the use of the workshop framework. In collaboration with Trinity Software Center, a Ghanaian IT-company, a workshop is created and executed with real-world subjects: managers/owners of sub-Saharan African SMEs. The workshop is evaluated based on one of the four design science research (DSR) evaluation strategies by Venable, Pries-Heje and Baskerville (2016): the "Human Risk & Effectiveness strategy". The chosen strategy has as key purpose to provide evidence about the utility of the developed artefact. It is a systematic analysis to show if the artifact solves the problem described in the research and to see if improvements are needed. Because the workshop could be fully conducted in its real environment, including an employee of a local IT-company and owners/managers of SMEs, the naturalistic evaluation techniques were used. Two of these techniques are surveys and ethnographical observations. Two surveys are used; one of the surveys is given to the subjects before the workshop, and the other afterwards. After the workshop the observations are discussed with the co-trainer from the IT-company. The surveys can be found in appendix E.

3 THEORETICAL BACKGROUND – SUB-SAHARAN AFRICA

As briefly explained in the Section 1.2 Africa's situation is two sided. On the one hand it is one of the poorest regions of the world, with many problems like poverty, illnesses and bad societal systems, and on the other hand it offers many business opportunities. Lem, Tulder, and Geleynse (2013) state in their book: 'Doing Business in Africa', that there is a wide gap between our perceptions of Africa and the reality on the ground, with our perceptions often too negatively. Therefore, this chapter will give a short overview of sub-Saharan Africa. It starts with covering the universal culture of sub-Saharan Africa and will it work its way to the African business environment. The reason for this line of reasoning is the relation between the business environment and the general culture.

3.1 HISTORICAL AND POLITICAL EVOLUTION IN A NUTSHELL

In order to gain a deeper understanding of the generic values of modern west Africa it is important to know some of its history, where big parts of the current values originate from. In this section the history is briefly explained to give a feeling of the context. Note: whole books can be written about the history of Africa, this section only explains some of the (in my opinion) most influential full events.

We can go back as far as the hunter-gatherers. These nomadic societies are believed to be related by kinship and tended to be cooperative and relatively egalitarian. As time moved on an increasing amount of these societies settled and turned into more hierarchical and organized communities. Respect was earned mostly by age, gender, and wealth reflected by ownership of livestock. Leadership was mostly ascribed by patrilineal inheritance. Age was related to wisdom and seniority, and leaders were playing the role of mediators creating consensus amongst their people (Wanasika, Howell, Littrell, & Dorfman, 2011). Besides valuing age, gender, wealth and position another important aspect played a big role during this time, namely, religion. The early African people mostly believed in the spirt of nature, that all living things had a soul, or as it is called, animism. As time passed animism got extended by the believe of shamanism, ancestor worship and afterlife, which focused mostly on the soul of the living people and of important people that passed. They strongly believed that these souls, or 'high gods', played a decisive role in human affairs (Peoples, Duda, & Marlowe, 2016).

These believes and values stayed relatively the same until the late 18th century, when colonization, slave trade and European influences disrupted the continent. In 1884 a conference was held by German Chancellor Otto von Bismarck, who invited European countries, the United States and the Ottoman Empire with the objective to share the African territory in a structured way, later referred to as the scramble for Africa. The arrangements made during this conference had far-reaching, sociopolitical consequences for Africa. The western societies ignored ethnic and historical boundaries and values, and dominated huge parts of the region. The biggest changes concerning culture and value were Christianity, Commerce, and Civilization, also known as the three C's. Traditional chiefs were used to gain power and they took over structures in which they could own property and gather taxes. The founding of African countries split ethnic geographical boundaries, created rivalries, and created new political systems that still influence post-colonial Africa today (Wanasika et al., 2011).

As a result of political priorities of western countries (think of the Second World War) and more educated and political active locals, many regions in Africa became independent around the 1950s and 1960s. Many African politicians, influenced by education in missionary schools, got a spirit of nationalism. Becoming independent went not without problems. One of the biggest problems were the boundaries of the new states, mostly created during the 'scramble of Africa'. These borderlines did not take into account any racial or tribal division, resulting in many wars and rivalries. Most African countries evolved into democratic states and became somewhat more peaceful (Jameson, 2008).

Although many African countries currently address themselves as democratic - or presidential republics, it is important to know how these vary from our system. People tend to think of 'voting for a government' as the most important part of the democracy, but there is more to it. Former UN Secretary general Kofi Annan stated it as follows:

"Democracy is not just about one day every four or five years when elections are held, but a system of government that respects the separation of powers, fundamental freedoms like the freedom of thought, religion, expression, association and assembly and the rule of law. Any regime that rides roughshod on these principles loses its democratic legitimacy, regardless of whether it initially won an election." (Annan, 2015)

Many African countries have, although many people try, hard times fulfilling all those principles. In the book: 'Business, Politics and The State in Africa', Tim Kelsall (2013) elaborates on the political systems in Africa. His research found that most countries have a pathological form of governance, called neo-patrimonialism. For those who do not know the term, these are systems of a social hierarchy where patrons use state recourses in order to secure loyalty of clients in the general population. In other words, a system where people use power and access to governmental financial resources to stay in their position, related to a population who have few other choices than to follow. Systems like these often exhibit a variety of common characteristics such as power concentration, also known as big man politics, and power informalization, where informal practices are more important than formal rules. Furthermore, power in these systems is often exercised in non-transparent and illegal ways, the boundaries between public and private spheres are blurry, resulting in rent-seeking and corruption. The priorities of the *big men* are often short term, and favor campaigning above long term country development goals.

Although neo patrimonialism often mostly favors those high up in the hierarchy, Dr Kelsall also described the other perspective. The power of the big man could be used for the good of a country's business environment. See for example Asia, where several countries have made rapid economic progress while they have a political system and governance arrangements far from the western good governance ideal.

3.2   CURRENT AFRICAN CULTURE

The current cross-country culture of Africa is the result of a mix of values from early African inhabitants combined with the influences brought by Europeans, the US and the Middle East. As national cultures have many aspects, they can be hard to describe. In this section the sub-Saharan African culture is mapped based on two models. The first model is the 6-dimension model of Hofstede (2011). To create this model, Hofstede investigated the need for universal cultural categories. In his paper, 'Dimensionalizing Cultures: The Hofstede Model in Context Dimensionalizing', he explains the six dimensions and their origin. The second model, similar to Hofstede's model, is the Culture Map described by Erin Meyer (2014). In contrast to Hofstede's model, it is more business oriented, and gives a clear view about how to do business in these regions. The elaboration of sub-Saharan Africa based on these models, will help by creating the roadmap.

The 6-D model as described by Hofstede consists of six dimensions: power distribution, individualism, masculinity, uncertainty avoidance, long term orientation, and indulgence. Each of these aspects can be used to map national cultures. In addition to his model he, together with his team, created an overview of ratings for a considerable amount of countries (Hofstede, 2019). Erin Meyer has a model somewhat the same, but with different aspects. Her model exists of leadership, communicating, evaluating, persuading, deciding, trusting, disagreeing and scheduling. Just as Hofstede did, she evaluates different regions in the world, among which a few African countries.

3.2.1   Power distance

Power Distribution is the first of the six cultural dimensions described by Hofstede. He describes it as follows:

*"Power distance has been defined as the extent to which the less powerful members of organizations and institutions (like the family) accept and expect that power is distributed unequally. … It suggests that a society's level of inequality is endorsed by the followers as much as by the leaders." (*Hofstede*, 2011)*

An important part of this aspect, power distribution, is the fact that it is two sided. Not only is it about the actual distribution of power and its inequality, but it is also about the fact that it must be generally endorsed, accepted and known by the people who have less power. An example of how this reflects in society is income distribution. In low power distance countries this is rather equal compared to the bigger differences in large power distance

countries. From a family perspective the difference can be seen in how parents treat their children, in low power distance countries parents treat their children more like equals in comparison to the large distance countries.
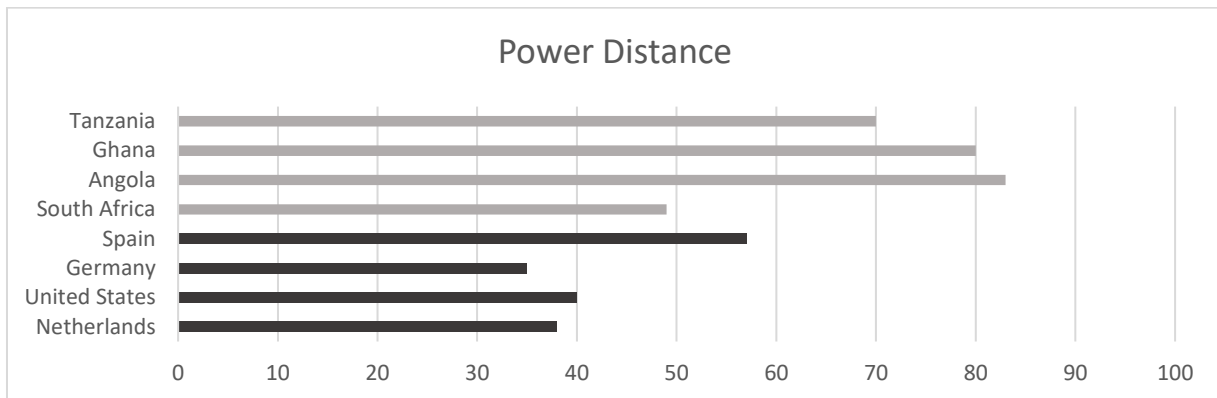

Figure 3-1. National level of power distribution (Hofstede, 2019).

Figure 3-1, shows that on average the power distance is bigger in African countries. Considering the knowledge obtained in section 3.1, this seems logical. The African people tend to value age, wisdom and hierarchical structures. Besides the average comparison, it shows that South Africa rates less distance compared to Spain and the other African countries. One of the reasons for this is that South Africa is the most developed country in the region, with the second biggest economy, right after Nigeria (IMF, 2018).

Erin Meyer describes a similar aspect, under the name: leadership. She scales cultures from Egalitarian to hierarchical. Egalitarian cultures are the ones where the distance between a boss and a subordinate is low. A good leader in this culture can be seen as a facilitator among equals. On the other side, are hierarchical cultures ones where this distance is high. Status is important and organizational structures are layered. Most African countries score rather high on this scale compared to Western countries, resulting in leaders with the power to make decisions. Furthermore, she describes that consensus plays a big role in Western cultures. African leaders often put low value to consensus amongst their subordinates (Meyer, 2014).

The African cultures have, compared to western cultures, more power distance and are more hierarchical composed. Where Western countries value consensus about decisions, Africans do less.

3.2.2   Individualism
Individualism, the second dimension in Hofstede's model, is the opposite of collectivism. Hofstede describes the aspect as follows:

> "Individualism is the degree to which people in a society are integrated into groups. On the individualist side we find cultures in which the ties between individuals are loose: everyone is expected to look after him/herself and his/her immediate family. On the collectivist side we find cultures in which people from birth onwards are integrated into strong, cohesive in-groups, often extended families (with uncles, aunts and grandparents) that continue protecting them in exchange for unquestioning loyalty, and oppose other ingroups." (Hofstede, 2011)

When rating on this aspect, a low score means rather collective as a society, and a high score means an individualistic attitude. Some aspects that are related to a high score are privacy; tasks prevail over relationships; personal opinions; and freedom of speech. On the contrary are aspects like relationships; harmony, and a we-consciousness common in the low scoring cultures.
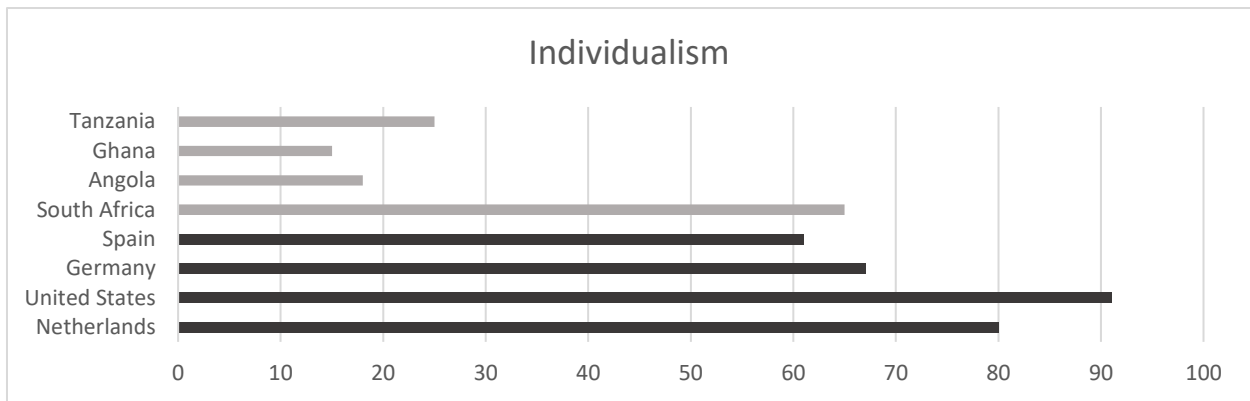
Figure 3-2. National level of individualism (Hofstede, 2019)*.*

Figure 3-2 displays that most of the African countries are way less individually orientated, or in other words more collective. This is indicated by the importance of family and relationships. For people who come from more individualistic countries it is important to keep this in mind when collaborating in these regions, because miscommunications can happen easily. A good example is that in these cultures that the (business) relationships are valued more than some small project delays or some extra costs (Henk Bosch, personal communication, 01-09-2019).Furthermore the figure shows, again, that South Africa differs from the other three African countries, which, because of less influences from the European business market, stayed closer to their (collective based) traditional values.

Erin Meyer (2014) agrees with Hofstede. She describes African culture as more relationship based than task based. Important aspects of these cultures are about building trust by sharing meals, visits, and spending personal time with each other rather than relationships build on business-related activities. Delivering good work is less important than knowing someone.

African culture is more about relationships and collectivism compared to the western cultures which put more value on business results and individualism. In western cultures, people need to take care of themselves and their families, whereas African people often have extended families and care for a bigger circle of people.

3.2.3   Masculinity
Masculinity, Hofstede's third dimension, is all about how assertive and competitive cultures are. High scoring countries tend to put much value about their tough reputation and influence on other countries. Hofstede does describe masculine countries as more assertive and feminine countries (the contradict of masculine) as more caring countries. In most masculine countries there is a taboo around this dimension.

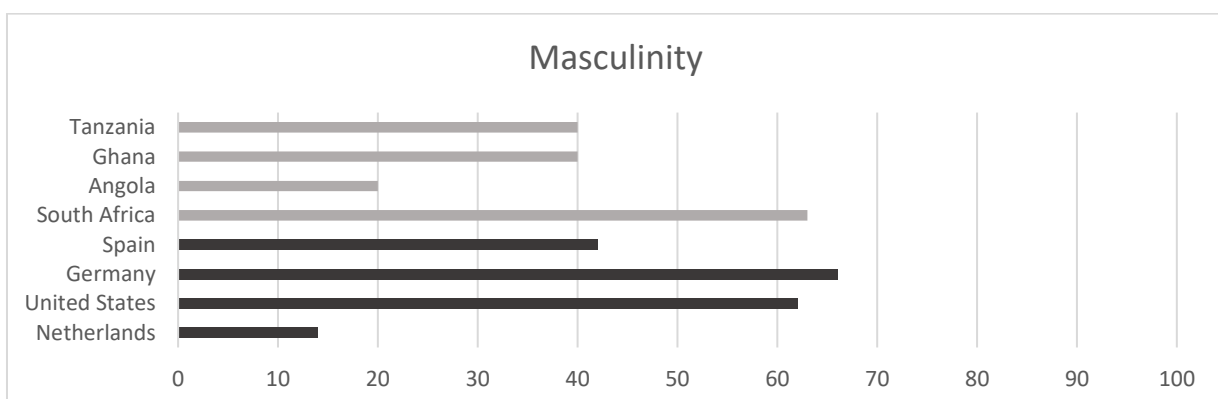

Figure 3-3. National level of masculinity (Hofstede, 2019)*.*

Somewhat surprisingly considering the 'big man politics' as explained in section 3.1, there is little difference between the Western- and African countries concerning masculinity (see Figure 3-3). South Africa is, again a notable country as it is sizable more masculine. Overall the African Countries rate rather more feminine and

caring than the Western world countries, which manifests itself in gender equality, non-aggressive attitudes and pretty peaceful forms of religion. Note that these findings are on a national scale, and it therefore also reflects the nations attitude towards other countries, and not only their internal political systems.

3.2.4 Uncertainty avoidance

Uncertainty avoidance is about the extent that a culture feels threatened by unknown situations and have created believes and laws to try to avoid these. Hofstede described uncertainty avoidance as follows:

> *"Uncertainty Avoidance is not the same as risk avoidance; it deals with a society's tolerance for ambiguity. It indicates to what extent a culture programs its members to feel either uncomfortable or comfortable in unstructured situations. Unstructured situations are novel, unknown, surprising, and different from usual. Uncertainty avoiding cultures try to minimize the possibility of such situations by strict behavioral codes, laws and rules, disapproval of deviant opinions, and a belief in absolute Truth; 'there can only be one Truth and we have it'."* (Hofstede, 2011)
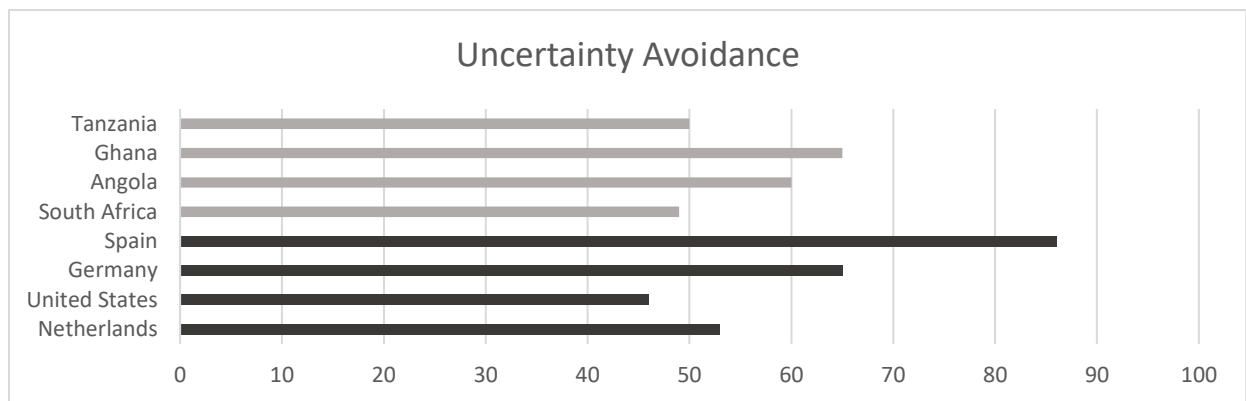
Figure 3-4. National level of uncertainty avoidance (Hofstede, 2019).

In Figure 3-4 the uncertainty avoidance of the eight countries is shown. Just as at the masculinity dimension, Africa does not differ much from the Western countries. The figure shows that the African countries are rather in the middle of the chart, all closely centered around a score of 50. The score that Hofstede gave, argues that they do not apply many rules to keep the country from surprising changes and that the people in these cultures do not think that they have all the answers. As a result, they are somewhat open for change, and believe that they can develop by learning from other opinions bedsides their own.

3.2.5 Long term orientation

Long term orientation is a pretty straightforward dimension, the opposite of short term oriented. Hofstede gives as example for short term-oriented cultures the following aspects: traditions are sacrosanct; a good person should stay the same; and social spending and consumption is normal. For the high scoring, long term cultures, he states that they change traditions more easily to the circumstances; that they save and invest their money rather than spending it on social goods; and that it is good for all people to change, even for those who already made it in life.

Figure 3-5. National level of long term orientation (Hofstede, 2019).

Figure 3-5 shows that the African countries, on average, have a more short-term attitude. Considering the findings in, this is not that strange. The countries in this region have to deal with way more day-to-day problems, such as poverty and diseases like aids. This results in, as a Dutch saying goes, putting out fires, instead of investing in long term development goals. On a more personal scale, this makes families act mor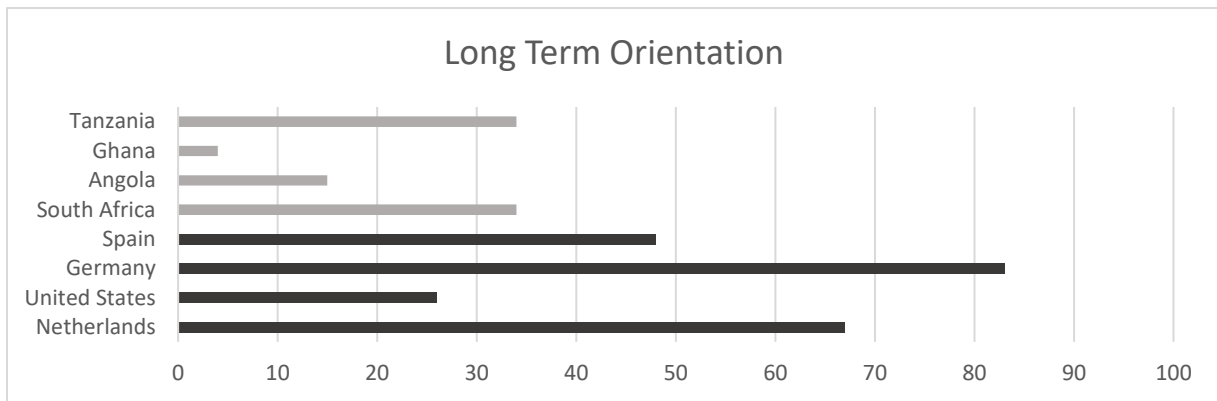e guided by imperatives rather than by shared tasks; and gives them, in generally, goals that are more focused on service to others than on thrift and perseverance (Hofstede, 2011).

3.2.6   Indulgence

The last dimension described by Hofstede is indulgence, and is, as he states, weakly negative related to the previous dimension, long term oriented. The Oxford English Dictionary describes indulging as follows:

"Allow oneself to enjoy the pleasure of" (OED, 2018)

In the context of the 6-D model of Hofstede indulgence is placed in the context of nations. It has to do with the allowance of a relatively free gratification of basic and natural human desires related to enjoying life. A high rating of country means that is easier to enjoy life. The opposite of indulgence is restraint, which stands for a society that controls gratification of needs and regulates it by means of strict social norms. In his paper, Dimensionalizing Cultures, Hofstede argues the following:

> "Indulgence tends to prevail in South and North America, in Western Europe and in parts of Sub-Sahara Africa. Restraint prevails in Eastern Europe, in Asia and in the Muslim world." (Hofstede, 2011)
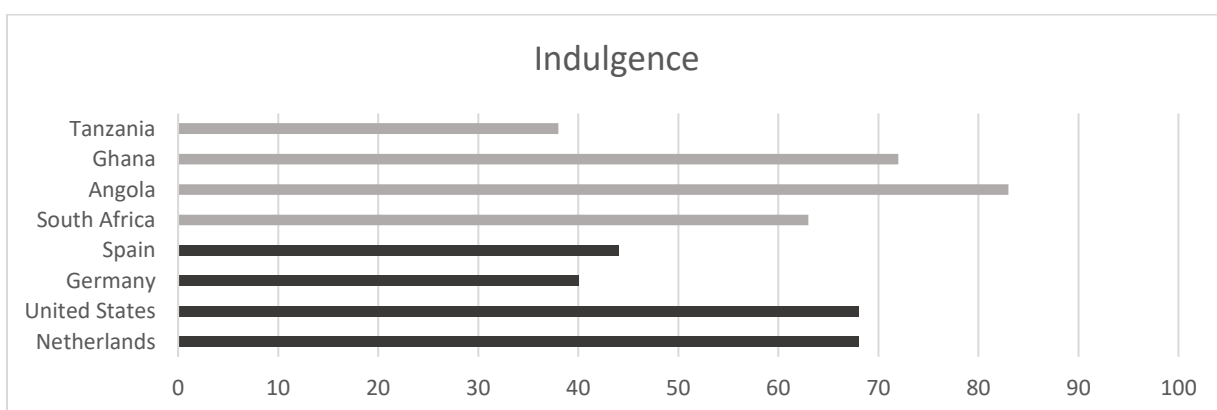

Figure 3-6. National level of indulgence (Hofstede, 2019).

The four African countries do not differ much from the four Western countries considering their indulgence (Figure 3-6). Countries that rate high on this dimension tend to declare themselves happier; put more value on leisure, are often more actively involved in sports, and have the feeling that they control their life.

3.2.7   Communication and scheduling

Erin Myer (2014) has three 'dimensions' which are related to communication. First, she argues the differences between cultures based on the importance of context. In low context cultures, like for instance the Dutch culture, communication is pretty straight forward. People tend to be precise, simple and clear about what they want to tell. In African countries, which have rather high context cultures, the context is more important. The key messages are often not clearly expressed. Communication is more sophisticated and layered, and messages are often implied and told 'between-the-lines'. The second aspect is about evaluation, and focusses on negative feedback. The differences between cultures comes forward in how direct people dare to tell something they disagree with. Within African cultures negative feedback is very indirect. People from these 'indirect' countries often see western people as rude and arrogant, while this is not the intention. The last difference Meyer describes, is about disagreeing and is closely related to the other two communication aspects. Most western cultures appreciate a good debate, and see disagreement as a good thing as they can learn from each other. In these cultures, this does not affect the personal relationship. In the African region, they tend to avoid confrontation. They see disagreement and debate as a bad thing for the organization and inappropriate. They avoid it as much as possible because it will break group harmony.

Concerning time management, Meyer (2014) distinguishes linear from flexible. Western cultures lean toward linear time schedules compared to Africans who see time as something way more flexible. If you planned a business meeting after lunch in Africa, you should not be surprised to wait until late in the afternoon before everyone is present and the meeting starts. A scenario which would be strange in western cultures, where the meeting will start at the appointed time. Furthermore, it is not rude in flexible cultures, like the African culture, to be interrupted during important meetings or to postpone a deadline last minute.

3.3   BUSINESS ENVIRONMENT

Where the last sub-section elaborated on the general culture of sub-Saharan African countries, this part of the research will focus on the business environment. What is to be expected when one would operate in these regions, and what opportunities do occur. The focus will be put on small and medium enterprises.

3.3.1   Small and medium enterprises

The business environment of Africa has long been depicted by its abundance of recourses and its lack of productivity. In contrast, as mentioned in the introduction of this report, Africa offers way more than most Europeans imagine. One of the main differences within Africa's business environment is the split between the urbanized- and the rural enterprises, where the companies in big cities are overall more developed. Small and medium enterprises in these regions can be divided into "organized" and "unorganized" enterprises. Where the organized enterprises have paid employees and registered offices (more relatable to western SMEs), the unorganized mainly consist of artisans who work in open spaces or at home and employ few or no salaried workers (Abor & Quartey, 2010). In the rural regions, businesses are mostly made up of family groups and individual artisans. To make it more specific, some of the major businesses/activities in Ghanaian rural areas include: fabrics, clothing and tailoring, textile and leather, village blacksmiths, tin-smiting, ceramics, timber and mining, bricks and cement, beverages, food processing, bakeries, wooden furniture, electronic assembly, and mechanics. Besides these local started businesses there are organizations like churches, hospitals and schools (Abor & Quartey, 2010).

As African culture is way less individual compared to western culture, and most of the African SMEs are (extended) family businesses, they have some common elements. Moses Acquah (2011), described some of these major characteristics. The first, and most important one is about the relationship between the owners/managers and employees. He describes the relationship as paternalistic, where people higher in the hierarchy have clearly more power, but treat their employees generously and with care. This results in long-term and personal work relations. Secondly, he describes some of the main capabilities which often occur within these (extended) family companies. Trust, inspiration, motivation and commitment amongst the workforce are common, and most people in these business environments attach much value to customer relations. As these relations are important, many of these businesses have an overall trustworthy status, and low transaction costs. At last he states that these businesses keep control by prioritizing family members in top management and other sensitive functions.

These tactics, consciously or unconsciously, result in lower recruitment- and HRM costs. Al the characteristics create a unique and flexible environment that inspires employees to be motivated, committed and loyal to the business, and focus on the well-being of the customers (Acquaah, 2011).

Although these SMEs have committed and motivated employees, they face some major challenges. One of the most obvious, is the fact that most companies lack financial recourses (Abor & Quartey, 2010; Olawale & Garwe, 2010; Smit & Watkins, 2012). This problem relates to many other problems that occur, for instance the lack of skilled employees. Although most managers and employees are eager and motivated to work, they are undereducated. The absence of managerial-, technological- and analytical skills make it hard to compete with developed companies in the cities or from other regions in the word. Problems occur in making strategic decisions and analyzing the market. Furthermore, the lack of knowledge about operating in the international market gives many small and medium enterprises a handicap compared to multinationals. Consulting and hiring people with the right capabilities is often no option, as costs are too high and other priorities crop up (Olawale & Garwe, 2010). Another problem that arises within SMEs, is that many managers, who have most of the power to make the decisions, do not see the need to invest in skilled workers. They don't think it is worth the money and they have a rather short term orientation (Abor & Quartey, 2010; Hofstede, 2019). Besides the disquietude toward trainings and educations, this attitude is also forthcoming when it comes to technology. Many African managers are interested but start to hesitate when deals come to close (Smit & Watkins, 2012).

Some other challenges, which are less in control of managers/owners, are economic and industrial based (Smit & Watkins, 2012). Small and medium enterprises are heavily affected by local economic conditions. So, when local markets experience difficulties, SMEs will struggle accordingly. The same relation applies to industrial factors. Scenarios in which competition increases or demand decreases can be catastrophic for enterprises who depend on sales. The main reason for this is the lack of collateral. Low sales results in low incomes, and with no to little savings it is hard to keep the business up and running in these times (Smit & Watkins, 2012). Many owners of enterprises in African countries therefore split risks by running multiple (micro) companies at the same time (Diana van der Stelt, personal communication, 02-18-2019).

Another risk factor for many SMEs in developing countries is the weather. Hess, Richter and Stoppa (2002) state the importance of agriculture in developing countries. Many families and businesses depend on this sector as prime source of income. The risk in this field of business is the uncertainty. Almost all of the agriculture in developing countries is inherently dependent on vagaries of weather. Unexpected and extreme weather circumstances can result in bad harvests, which influences people who work in this sector, and thereby the local economy (Hess, Richter, & Stoppa, 2002).

3.3.2   IT-business environment

Before explaining the IT-business environment in the sub-Saharan African region, it is once more important to stress out the differences between the urban and rural areas. People within the big cities of Africa have, compared to the more rural areas, less problems like poverty and bad access to healthcare, and are more familiar with computer technologies. The people living in the rural areas have less IT capital, but know most of its possibilities. Most African people see computers as a luxury for the rich and not many Africans possess one. Mobile phones on the other hand, are common, and almost all African people have, or know someone who have one. In fact, more Africans have a phone than have a toilet (Hampshire et al., 2015). Furthermore, there has been a major growth in areas covered by mobile networks. Many researchers describe the eagerness of people in the rural areas to join the digital revolution (Acquaah, 2011; Honig & Acquaah, 2016; Kyem & LeMaire, 2006; Porter et al., 2015). The main driver for the open attitude towards IT is the young part of the population. They see, by the use of internet, how other parts of the world are developed, see the differences and want to close the gap (Honig & Acquaah, 2016). Another noteworthy fact is that the African continent has a relatively new and growing middle and lower class. Developments like the increasing number of phones and connectivity, boosts the appetite of this middle class for goods, services and appropriate technologies for their particular environments.

The fact that most African people have a phone but no computer, makes their situation different from the western world where computers were introduced first. In the last decades an increasing amount of rural areas were connected through internet. Although land lines are standard in developed countries like the ones in Europe,

African rural areas are mostly connected by wireless connections like 3G and 4G. The International Telecommunication Union stated that 40,3 percent of the Africans aged between 15 and 24 use the internet (Sanou, 2017). The increased connectivity of rural regions resulted in more virtual relationships. Relationships originated from friends, businesses and family are more easily maintained over large distances. One example of how this helps the development, is the scenarios where producers can ask fair prices based on information otherwise not reachable (Kyem & LeMaire, 2006). In another research, scholars (Porter et al., 2015) investigated and described how/what kind of relations were formed. So used primary school pupils in rural regions phones to call their peers to consult on homework problems; were secret assignations between boys and girls facilitated by pre-meeting calls; were better-resourced family members called for school recourses like uniforms and fees; and were young people often seen as information hub by elderly, in order to gather information from people to far to speak to face-to-face.

Another service that emerged by the means of mobile phones and connectivity, is about payments (Porter, 2012; Diana van der Stelt, personal communication, 02-18-2019). Mobile financing is used throughout Africa. The benefit from mobile banking comes forward from the fact that it only needs a connected phone. An old Nokia with the ability to sends SMS messages is enough to transfer mobile pre-paid credit, but many other methods and applications exist. This is particularly beneficial in poorer regions where there are limited physical banking services. Furthermore, transaction costs are lower through these channels and is money which is stored online less vulnerable for theft and extortion.

3.3.3 Looking forward

Africa is still behind on many fronts and is seen as an underdeveloped country. The differences with more developed countries are often described under the term: gap. In order to overcome this gap, countries in this region must do some catching up. In literature and online many scholars and institutions talk about leapfrogging, jumping over this gap in order to connect to the developed situations. In the next sub-section, the main enablers and disablers for such a development leap are discussed.

The first enabling trend occurring in SSA is the young population and related growing labor force. A recent report by Bughin et al. (2016) stated that Africa will have the largest workforce in the world around the year 2034, larger than either China or India. Many millions of young Africans will be entering the workforce. This comes with the challenge for Africa to ensure that its economy continues to create sufficient jobs and help them to develop the right skills. Bughin et al. (2016) wrote that, so far, signs are positive. Job creation has been outpacing growth in the workforce. In contrast to many developed countries, this young population in Africa is an advantage. Whereas the percentage of retired people increases in developed countries, the ration of working- and retired people in Africa is in favor of the workers. Although this workforce is seen as an advantage and an enabler for overall demand and economics, they address the importance to guide this young group in forms of education and professionalization.

A second enabling trend still going on south of the Sahara, is the urbanization. This is an enabling trend because productivity is found to be up to three times higher in cities compared to rural areas. In McKinsey Global Institute's report: Lions on the Move II (2016), they state that an estimated additional 187 million Africans will live in the urban areas over the next decade. This group will contribute to the growth in consumptions by households and businesses. Between 2010 and 2015 household consumptions grew at 4,2 percent, and reached 1.2 trillion euros in 2015 (Bughin et al., 2016). The economic growth in combination with the urbanization of Africa has helped reduce poverty and increased the size of the middle-class (Ncube, Lufumpa, & Kayizzi-Mugerwa, 2011). In their report, Ncube et al. (2011), understate the middle class as a key-source for the growth of the private sector as they count for much of the demand for goods and services. The increased customer spending has a positive relation with the overall development.

The African continent has yet another long-term fundamental benefit. It still has significant resources (Bughin et al., 2016). An estimated 60 percent of all unutilized but potentially available cropland is located in Africa, and it holds the world's largest reserves of diamonds, gold, cobalt, aluminum, chromium, phosphate and more natural resources. Besides, the continent is responsible for around the 10 percent of global exports of oil and gas. In their report, Bughlin et al., argue that the government should ensure that the exploration and investments in the

sector gets more attractive, even in the weaker environments. Besides, companies should review their approach to engage the community, in order to gain support of locals.

Another emerging trend which could positively affect the development of Africa and leapfrog towards a more wealthy and stable society, is the use of IT. As previously described is the use of computers rare, but having a mobile phone can be seen as normal. Besides, with the use of wireless networks an increasing amount of Africa is covered with an internet connection. Pre-paid credit can be obtained all around the region and mobile financing is interwoven in many African lifestyles. For many companies within Africa many, proven, optimization options are still open. Kyem and LeMaire (2006) discuss that IT should not only be seen as solutions, but rather as a threat. Countries with unlimited access to internet and other ICT products can compete better within the global market. The ones with a low ICT penetration may fall behind, and may thereby be excluded from some of the major economic and social benefits it offers. If some of the poorer regions do not catch up, there is a chance that the digital divide will get bigger, resulting in the poorer getting poorer and the rich getting richer. Furthermore, they argue that the access to technology is not the real problem. Rather, they call it a more 'economic development problem'. As an example, they give the mobile phones, which nowadays, are physically present. The use of these phones is mostly private; most of the earnings go to companies which are already rich and familiar with the technology; and the use of mobile phones is little- to not integrated into productive economic ventures.

Although not catching up can be seen as a threat, Kyem and Lemaire (2006) also describe some of the benefits that could be exploited more. They state that the way Africa evolved in the last years changed how individuals, businesses and society work in general, communicate and interact. IT already plays a major role the relation of African businesses within the global economy by making it possible to share information and services. It helped many ventures to improve efficiency, effectiveness and quality of products; it extended reach and distribution; and ensured equity in the distribution of goods and services. Some companies have better overview of inventories by the use of computer systems and many agricultural extensions offered timely information on weather, crop and soil contents. Furthermore, phone calls are used as substitute for travel, resulting in savings of time and travel costs (Kyem & LeMaire, 2006).

IT and digital solutions can have the potential to boost the development of regions in Africa, but the use of technology is not enough. Adam and Wood (1999) write about some of the major challenges some of the countries must overcome. They divide it into five categories: social, political, technical, infrastructural and economic challenges. Their research showed lack of human capacity and skills in innovation as the main problems concerning useful implementations of IT systems. In order to support IT and change the quality of life, their Ghanaian subjects, believed the following aspects to be important: increasing management awareness; improving local content; knowledge and learning; and the development of infrastructure (think of internet, roads, public transport, etc.). Bughin et al. (2016) also stated a few priorities for African countries in order guide overall development. They aimed on what governments can do: mobilize more domestic resources, diversify economies, accelerate infrastructural development, deepen regional integration, create tomorrow's talent, and ensure healthy urbanization.

3.4 SUB-SAHARAN AFRICA - SUMMARIZED

In order to summarize the findings of the literature this subchapter will give an overview based on a SWOT-model adapted to this research's context. SWOT analysis focusses on four aspects: strengths, weaknesses, opportunities and threats. These aspects come forward out of two indicators: internal- verses external influences and positive- verses negative influences. Internal analysis focusses on strengths and weaknesses of enterprises, and the external analysis is based on the market and economically environment. In this summary, the internal analysis will be about general strengths and weaknesses of African SMEs and the external analysis about the business environment they operate in. See Figure 3-7.

	Positive factors	Negative factors
Internal	- Paternalistic - Collectivism / extended families - Employees are committed - High value towards customer relations - High value towards partner relations - Easily adaptable to change	- Big man politics / power distance - Short term orientation - High context communication - Flexible scheduling - Lack of financial resources - Lack of educated employees - Management skills - Technological skills - Analytical skills - Lack of international experience - Managers don't see the need of investing in education for employees - Hesitation toward technology
External	- Increasing internet coverage (4G and 5G) - Usage of mobile phones - Mobile payments - Personal/business relations - Available knowledge - Young population eager to join the digital revolution - Rising middle class / growing economy - Growing labor force + job creation - Beneficial ratio of working- vs retired people - Stable urbanization rate - Abundant amount of natural resources - No/few legacy systems (room for innovation)	- Bad infrastructure - Little governmental support - Flexible scheduling - Fragile economy - Rivalries / wars - Neo-patrimonialism - Agriculture influenced by weather - High competition - Educational system

Figure 3-7. Overview sub-Saharan African business culture.

4 THEORETICAL BACKGROUND – DIGITAL TRANSFORMATIONS

The meaning of a transformation can be rather varied. The definition given by the Oxford English Dictionary (OED, 2018) is as follows: "*a transformation is a marked change in form, nature, or appearance*". Transformations are thus some kind of change. By putting the scope on business transformations, the definition does not get much clearer. Even within the business environment there is no clear adoption for the term transformation. Many definitions take on different perspectives on topics like the objective, the scope or the outcome of the transformation. Furthermore do they variate by the external triggers and internal factors that creates the need for change (Safrudin, Rosemann, Recker, & Genrich, 2014). In essence, a business transformation can be defined as the orchestrated re-design of (parts of) the architecture (Morgen & Page, 2008).

The variety of definitions also applies for digital transformations. Vial (2019) elaborates his findings on this topic. He compared 28 articles and found 23 different definitions for a digital transformation. Three main observations were made. First, most definitions spoke of organizations, only two out of the 23 referred to something else (society and industry). Second, some important differences existed in the types of technologies used for- and the nature of the transformations. There is no clear line on what exactly transforms and with what technologies. Third, he argued that in spite of the differences, many definitions used similar terms such as "digital technologies". In order to build a working definition, he systematically decomposed all definitions, and identified four properties: (1) the target entity (e.g. business, society or industry); (2) the scope (the extend of changes); (3) the means (technologies used for the change); and (4) the expected outcome. With these four properties he created a conceptual definition for a digital transformation:

> "*a process that aims to improve an entity by triggering significant changes to its properties through combinations of information, computing, communication, and connectivity technologies*" (Vial, 2019)

The definition of Vial (2019) provides room for further refinement and opens question like: what properties can be improved? And, what technologies can be used? In this chapter this definition will be elaborated within the scope of the thesis project. The first property of the definition, the entity, is left out in this chapter because the targeted entities are the sub-Saharan African SMEs, and these are investigated throughout the whole report.

Before elaborating on the definition of digital transformations, the difference between IT and digital is explained because its border is vague and different opinions exist. Some scholars argue that the main difference isn't the technology used, but rather the business level it is used for (Matt et al., 2015; Smalley, 2018). If the information technology reaches a strategic level, and thereby affects a company's business model, it is called a digital solution. In conversation with Klaas Brongers an overlapping definition came forward. Whereas IT solution support existing process of enterprises, digital solutions are leading processes. He gave the following example:

> "*When Ahold optimized existing inventory and logistic processes of Albert Heijn it used IT opportunities. When Ahold bought Bol.com to reach new customers through online channels, it used digital opportunities.*" (Klaas Brongers, personal communication, 02-13-2019)

In contrast to these definitions, McDonald (2012) argues something different. Whereas IT strategies involve substitutions for the real world and known processes, digital strategies involve solutions that would not even be possible without integrated and connected computer systems. Big data analyses, for example, wouldn't be possible without gathering massive amounts of data through IT systems and are not necessarily changing business models. They are rather a supportive tool for decision-making. Both views lead to the observation that digital transformation can be seen as an evolution of IT-enabled transformations, and that these are closely related. Vial (2019) concurs with this view, and adds that digital transformations, although close related, have a more strategic role; have a bigger scope and often take place faster.

During this research the digital transformations will include technologies for both supporting existing processes and creating strategic value. IT- and digital solutions will be used interchangeably.

4.1 BENEFITS OF OPERATING DIGITAL

As the definition of digital transformation discusses, it aims to improve enterprises. Many perspectives exist on digital businesses and its benefits. In this subchapter some of these perspectives are elaborated.

The first perspective on why an enterprise should go digital comes from the multinational consultancy McKinsey. With over 25.000 employees they have a well-formed perspective on what digital opportunities can do now and in the near future. They give the following description:

> *"It's tempting to look for simple definitions, but to be meaningful and sustainable, we believe that digital should be seen less as a thing and more a way of doing things. To help make this definition more concrete, we've broken it down into three attributes: creating value at the new frontiers of the business world, creating value in the processes that execute a vision of customer experiences, and building foundational capabilities that support the entire structure."* (Dörner & Edelmand, 2015)

In their definition they stress out the importance of digital as more than mere options, but rather a style of doing. The main benefits they describe are about creating value, focused on new frontiers (think of business channels), the customer experience, and the enterprises capabilities. Westermen, Bonnet and McAfee (2014), partly confirm on these three points, by stating that digital masters (successful businesses who work digital) mostly get value out of customer interactions and efficient internal operations.

> *"Digital Masters see technology as a way to change the way they do business—their customer engagements, internal operations, and even business models. To these companies, new technologies such as social media, mobility, and analytics are not goals to attain or signals to send their customers and investors. These technologies are tools to get closer to customers, empower their employees, and transform their internal business processes."* (Westerman, Bonnet, & McAfee, 2014)

Box 2: Netflix' success story.

With a recorded profit of over €13 billion in 2017 is Netflix one of the most successful video streaming companies of its time. Their vision has always been the same and rather straight forward: *Watch movies as easily and comfortably as possible and whenever you wish – at a fixed price.*

Although they are a video streaming company now, this haven't always been their business model. In fact, Netflix started off as mail-ordered DVD rental provider. From their beginning Netflix endeavored to improve on the mainstream, and rented out DVDs long before DVDs were common. An strategic and risk full decision, but the right one.

When more and more households got internet, they wanted to stay ahead by using this (digital) opportunity. The first concept they were working on was about downloading films overnight so they could be watched the day after. Internet connections were way slower back then. But as they were working on their concept, internet connections got better, and an increasing amount of smartphone and tablets were used. During this time YouTube got quite popular and consumers loved streaming videos. These trends resulted in a change of strategy, Netflix as streaming site.

Besides using the internet in combination with their (web) application as digital innovation, Netflix did more to be successful. Their user interface improved drastically over the years, with one of the most important features, watch-recommendations. Netflix added an algorithm, named Cinematch, to predict what users would like to see. Personalized recommendations, based on the actions of the user. In order to improve their software they even organized an competition for developers who could their algorithm. With a $1.000.000 prize for the winner.

Their futuristic attitude, combined with the fact that they embraced the latest technology, were major factors in Netflix' success so far, and helped by creating a billion dollar empire. (Cohan, 2013; Netflix, 2019)

This statement, compared to McKinsey's one, explains more about the digital technologies. They gave as example social media, mobility, and analytics, with the goal to get closer to customers, empower employees and transform businesses. To complement these definitions, Accenture (2019), an IT-focused consultancy company with an annual revenue of almost 36 billion euro, explained their digital offerings by saying that they supports every phase of the digital journey, with complete services that span customer experience, connected products and systems and that it supports intelligent analytics, which provides the foundation to drive successful business outcomes. A successful and relatable digital story is the one of Netflix, see box 2.

Comparing the different perspectives, digital transformations have two categories of benefits. First, internally, it could create efficient operations and empower employees by providing knowledge and support. Business processes could be more effective as IT can be used for automation, and employees can make better choices based on analysis and knowledge. Secondly, digital opportunities offer external benefits. They create new ways of communication with customers and can improve their customer journey. Some digital possibilities offer additional features for products or new products that wouldn't exist without it.

4.2   Digital possibilities

As previously described in this chapter, digital transformations change some properties of entities trough combinations of digital technologies. This subchapter elaborates on some of the key properties information- and digital technologies can change within enterprises. Furthermore, it enumerates some of the IT- and digital opportunities that might fit within the context of sub-Saharan African SMEs.

A clear first property influenced by information technology is the governance and use of data. Using IT changes the way in which data is used, processed and can be communicated (Stair & Reynolds, 2012). Van Beek (2010) writes about the importance of IT and digital opportunities for what he calls: intelligent organizations. He defines an intelligent enterprise as one that makes (strategic) decisions based on available knowledge. He emphasizes that in the last decades the time to make decisions decreased while the amount of available information increased, and that this gap will only grow in the future. Business systems, which should support these processes, have three main tasks before a company can make knowledge-based actions. First, it should manage the data. This involves registering, saving, and communicating of data used corporatewide. Besides storing data, it is important that this information is managed. The data needs to be controlled and deployed throughout the organization, partners and even customers. An important part of information management is the design and governance of the IT-infrastructure in such a way that it supports operational, tactical and strategic processes. When information is communicated well, knowledge can be created. As third, systems have to support knowledge management, which is about creating and sharing new knowledge obtained from information. Based on this knowledge, companies can make well-argued change and innovation happen. Recker (2015) confirms that digital infrastructures play a major role in in enabling the use of evidence-based decision making. In his article, he argues the differences between evident-based knowledge, existing of causalities and facts, and expert knowledge, which is always somewhat biased and made of assumptions. In order to manage and govern knowledge within enterprises, many possibilities exist. In remainder of this sub-chapter, a non-exhaustive enumeration is given of some of the possibilities, which might help African SMEs improve some of the properties and reap benefits described above.

4.2.1   Communication technologies

Communication is one of the key activities in enterprises and is easily facilitated by information technologies. Many applications exist and are globally used. Although the use of technology for communication can be seen as less personal, it is used much because of the practical benefits (Laudon & Laudon, 2014). One of the main benefits is that it cancels-out geographical distances, and thereby minimizes the efforts to reach one another. Many applications also reduce temporal distances, that is, the fact that actors can communicate over time and when it fits them best. Person A can leave a message, which person B could read and process hours, days or even weeks later if it suits him/her better. Many communication tools also provide functionalities to reach multiple people at once, for instance, e-mails could be sent to whole communities or throughout whole organizations. Some of the major communication tools are:

- E-mail services;
- Video call services;
- Chat services;
- Planning services;
- Forums; and
- Intranets.

The thresholds of these technologies are very low, and the applications are rather generic. Most of the applications are easy to use because of the simple interfaces. Many free and usable applications (WhatsApp, Skype, Slack, Trello and MailChimp among others) exist, but more extended applications are also on the market.

4.2.2 Management systems

As companies grow, it gets harder to manage aspects like employees, processes, customers, inventory and finance. In order to keep track of all the business activities many management systems are developed over the years (Snijders & Bast, 2012). Some of these systems focus on particularly jobs and some are more enterprise overreaching. Laudon and Laudon (2014) distinguish four different enterprise broad management systems.

Firstly, Enterprise Resource Planning (ERP) systems. These systems (can) support activities such as: sales, inventory management, production planning, logistics, purchase, marketing and financial administration. It helps the employees by reducing work through atomization or it helps to provide the right knowledge for decision-making. These systems are company broad, and helps communication at different departments.

Secondly, they describe supply-chain-management systems. These systems are often linked to the ERP systems and focus on supporting all activities related to suppliers, distributers and logistical partners. It exchanges information about products, inventory and planning in order to improve decision making for planning, production and distribution amongst the whole supply chain.

The third category system Laudon and Laudon (2015) describe is CRM. Customer relationship management systems help by keeping overview over business relations such as customers, suppliers and partners; and takes care of additional information. It supports enterprises with marketing, sales, service, the overall optimization of customer- satisfaction and retention.

The last system they elaborate are about knowledge management. KMS (knowledge management systems) helps organizations to gather, store and access knowledge throughout the company. It supports business processes and strategic decision making. One of the much used applications for knowledge sharing is with intranet, web-based sites only accessible for employees (Laudon & Laudon, 2014).

Most of the systems described above are rather general. Companies can add and connect different modules to make these systems fit their business. The implementation of these systems can be complex as many companies have to deal with legacy systems and the transmission of massive amounts of data. The threshold is way lower from a starting point with no to little legacy systems. Some of the major applications in the field of management systems are rather expansive, but simpler and less expensive systems exist nowadays. Systems mostly relied on internal storage and networks, but this is shifting towards more web-based applications. Programs are responsive and accessible on phones, tablets and computers, which make the use of these systems powerful, supportive tools.

4.2.3 Cloud computing

The technologies previous described started of running mostly on internal systems but in the last decade a shift has started. Besides internal IT-structures, an increasing amount of services moved towards the cloud, including applications and storage of data. Cloud computing made it possible to access all applications and data from anywhere in the word with the use of internet. Wu, Ping, Ge, Wang and Fu (2010) identified the key technologies and listed the main benefits. By making the data available in the cloud it can be more easily accessed often for lower costs, increasing its value by enabling opportunities for enhanced collaboration, integration and analysis. Furthermore, storage and computing power is more easily scalable, and maintenance is taken care of. The general term for cloud technologies is IT-as-a-service (ITaaS). Four main types of ITaaS exist: infrastructure-, platform-, software-, and storage as a service. Infrastructure-as-a-service manages a set of computer resources, such as storing and processing capacity. Platform-as-a-service offers another abstraction level. Instead of supplying an infrastructure they provide a platform where systems run on. In these cases, the applications make use of servers for computing power. Another abstraction level higher are software-as-a-service implementations. In these scenarios the application, computer power and storage all run on servers of the service provider. These applications are often used by multiple companies as the applications are in ownership of the provider. Last, storage-as-a-service provides the storage and accessibility for customers. These services include primary storage,

back-ups and archives. The user experiences the storage just like a normal server, but in reality the user's data could be stored on any one or more of the computers used to create the cloud. The actual storage may differ day to day as the cloud dynamically manages available storage space.

Cloud solutions are rather low threshold as the implementation costs and knowledge needed for maintenance are low compared to internal and company specific applications. Especially when software is designed in a generic setting, which can be used by multiple organizations. Company specific applications are more expensive as development costs are not divided. Most generic cloud software solutions come at a fixed price per month, years or days. In conversation with Balt Leenman, A sales-force consultant with expertise of the African market, these fixed prizes came forward as beneficial in the African context as this reduces financial risks (Balt Leenman, personal communication, 11-2-2019).

4.2.4   Analytics

Many system and channels previously described gather great amounts of data. All this data contains value for businesses, as decisions could be better addressed. In order to get good overviews of the contained knowledge within the data, analytics are important. Laudon and Laudon (2015) describe the importance of four types of analytics. First the most used analytical tool: *production reports*. These are predefined reports based on industry specific requirements. Some examples are sales forecast; customer satisfaction reports; service costs; supplier performance; order cycle time; cash flow; profitability; and employee productivity. These reports can be easily generated, provided that the system gathers the right data. Secondly, they describe *big data analytics*. This uses tremendous quantities of data gathered online to recognize patterns. A much-used application of big-data is individualized recommendations. Think for instance of the Netflix recommendation function. This uses data gathered by all users' choices, to analyze and recommend video's to users who fall into the same category. The third type of analytical tools described, is about visualization. One of the main benefits is that relationships between different data chunks are more easily spotted. Tools can help look for patterns by offering filter options or adding geographical data. This could create insights in the distribution of people, customers, resources, etc.

Another opportunity computer systems offer is foot printing (Recker, 2015). This technique uses system logs to analyze so called footprints. Footprints are created because all actions, decisions and processes in the digital environment leave a trace. The behavior of employees or customers can be tracked and studied ex-post or even in real-time. The digital footprints give a clear view of how the processes look based evidence and facts, and helps by optimizing internal processes or improving the customer journey.

Analytics can be powerful for organizations as they support strategic decisions and answer business questions. Many opportunities exist, from low threshold applications, like spreadsheets-tools, to complex automated recommendation systems based on big-data. Before analytics can be standardized within enterprises, the right data needs to be gathered and stored.

4.2.5   Customer channels

The way to reach customers has changed over the years. Physical stores and mail post were the state of the art back in the day, but in the last decades this had to make room for digital channels. The main reason for this shift was that these channels made it way easier to share information on large scale with less effort. One of the most used channels is websites. In the early days of websites this was mostly sharing information from host to client, but as technology evolved, options to communicate from client to host and client to client were added. A nice example if these possibilities is given by Laudon and Laudon (2014). They describe the immense grow of e-commerce, online shopping. The online expenses grew with 12 percent in 2014. Web shops like bol.com are good examples of the possibilities of websites. They share information (specifications about products), they let people share experiences (product reviews) and use the site as business channel (sale of products). Furthermore, do sites offer the opportunity to extract data which can be used for new business models like personalized advertisements and to gain knowledge with analytics.

Another channel that provides opportunities for enterprises are native mobile applications. These applications have a lot in common with websites or web-apps, as they often also share information between companies and users. Some companies use both channels in almost the same way (e.g. Facebook or most news-providers). The amount of mobile applications is increasing rapidly and in this highly competitive environment businesses need

to develop applications that comply with the needs of customers (Tarute, Nikou, & Gatautis, 2017). As mobile applications run on platforms like IOS or Android, development costs can be higher if the whole market must be reached. Mobile applications have as benefit that these perform often faster and more efficient as these work in tandem with the device they are created for and they are totally compatible its hard- and software (Charland & Leroux Brian, 2011). Also, they assured of quality, as users can access them only via app stores.

Both web applications and native mobile applications can help improve customer journeys as they provide them with information or platforms to communicate with others. They are rather low threshold as development costs are low for the market-reach it creates. A huge benefit in the context of this research is the fact that many Africans have a mobile phone, and can be reached. Furthermore, do these channels open opportunities to gather data.

4.2.6 Digital products

The previous described technologies mostly take a supportive role, and are not interwoven with the business models of the enterprises. Although these tools are powerful and reduce costs these do not necessarily increase revenue. Digital products, on the other hand, focus on creating new ways of making profit, by offering new products to consumers, or by facilitating trade and services. Many digital products are supportive to physical products, like app-stores related to for instance android devices or traffic support applications for navigation systems. Revenue is created by the use of personal data or subscription fees (Evans, Hagiu, & Schmalensee, 2006). Other business models are separated from physical products (think of Facebook or Tweakers), or provide platforms where suppliers and customers meet (think of: AirBnB or Uber). Many software platforms have created great wealth. Windows has provided about 40 percent of Microsoft Revenues in the last decade and helped Bill Gate to be the richest man in the world. Most of these products are steering rather than supportive, and whether companies join the digital revolution can be a matter of thriving or languishing (See the story of Netflix Section 4.1).

Because of the huge differences in digital products it hard to say if these are low- or high threshold. Some applications or supportive tools could be rather easy to make, but a thriving platform like AirBnB is not. Transforming from no to little IT towards a digital driven business could be hard process, but the few legacy systems, like they have in SSA, opens much opportunities.

4.3 DIGITAL STRATEGIES

The definition of digital transformation as previously stated in this chapter depicts it as a process of significant change. These change processes can be seen as complex, company broad an intensive projects and many scholars argue the need for a well formulated and executed digital strategy (Adam & Wood, 1999; Ebert & Duarte, 2018; Kane, Palmer, Phillips, Kiron, & Buckley, 2017; Matt et al., 2015; Vial, 2019). Digital strategies are something of the last decade, but are close related to business-, information system- (IS) and IT strategies. The relationship between IT and business evolved over time.

When the use of IT was still rather new within businesses, these technologies were managed per department or at the level it was deployed. For instance, in 1973, operational, control and planning all used different IT systems and were managed independently (Nolan, 1973). In the following years no enterprise-wide or long-term strategies on the topic of IT were used. In the 1980's when more basic processes were supported and automated, the important role for IT within the organization got an increasing amount of attention of businesspeople higher in the organization. Organizational wide systems with related strategies were the result. In order to manage IT throughout the business, multiple models and theories emerged to align the technologies with the business (Ward & Peppard, 2002). One of the first who wrote about this was Michael Earl, who, in 1987, made the distinction between IT-strategy, information system (IS) strategy and business strategy proposed. IT-strategies concerned the technology, the infrastructure and the business skills needed. IS-strategy manages the functionalities and applications needed to achieve the business goals; and business strategy concerned enterprise wide objectives. Other models exist, but all with the same vision, aligning the business with the right technologies and systems to optimize processes and reduce costs (Rijenen, 2018).

Although IT and business alignment strategies were accepted amongst scholars, another shift occurred in the last decade; the shift towards digital strategies. The main goal of these strategies is to guide companies through the digital evolution, and focusses on the products, processes and internal structures owing to new technologies rather than supportive applications and systems (Matt et al., 2015; Vial, 2019). These strategies are proven to work best with a rather long term view (Kane et al., 2017), and some even argue these strategies should be more like a continues process (Matt et al., 2015). The main reasons for the long-term orientation is the still ongoing digital revolution. Mat, Hass and Banljan (2015) discuss that it is of high importance to think of a strategy before starting such a change process, and that the goals, related to these strategies should be reassessed throughout the course of events. Products, processes, organizational structures and management concepts will change over time. The scope of digital strategies is more broadly designed and includes many customer aspects like end-user products and customer channels. Furthermore, they indicate the relation between the general business strategy and the digital strategy, as these interact constantly. See Figure 4-1.
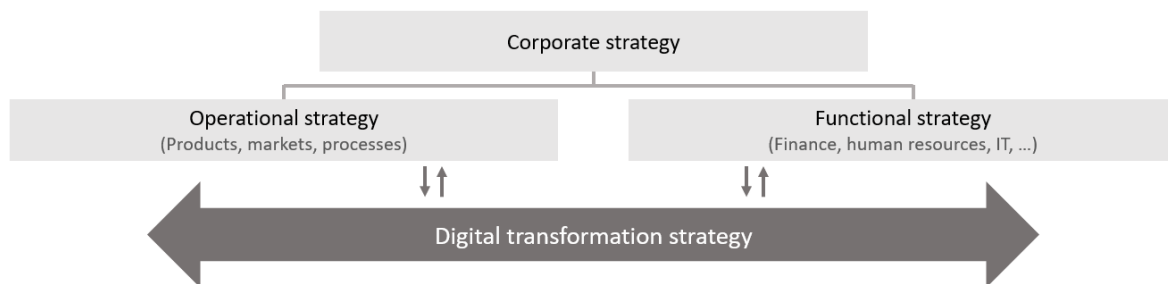

Figure 4-1. Digital transformation strategy in relation with the corporate strategy (Matt et al., 2015)*.*

To specify the relation between the corporate- and the digital strategy they added a layer between the two, consisting of the operational- and the functional strategy. The digital strategy defines current and future operational activities, the necessary application systems and the infrastructure needed to carry out organizational operations. Furthermore, should it guide companies towards innovative products and processes.

As the definition of Mat at al. (2015) describes, is a digital strategy more than aligning IT with current business. Bharadwaj, El Sawy, Pavlou and Venkatraman (2013) confirm this by stating that the time of aligning IT- and IS-strategies has passed. Up until recently these strategies were always seen as somewhat inferior to the business strategies, but the rapid technological changes have led them to believe that these can't be seen as two different things anymore. IT-, IS- and business strategy are equally important. They define digital business strategy as: *"An organizational strategy formulated and executed by leveraging digital resources to create differential value"* (A. Bharadwaj, El Sawy, Pavlou, & Venkatraman, 2013)

McKeown and Durking (2017) take a rather hands on view compared to Bharadwaj et al. (2013). They define digital strategy as *a plan of action to give direction to overcome defined, specific challenges, and in conditions of uncertainty to achieve specific outcomes*. Their definition includes a plan of action to (a) overcome challenges and (b) achieve specific outcomes. They describe three categories of principles that guide towards a good digital strategy. First, internal principles, to gain knowledge about the organization, its capabilities and its resources. Second, external analysis, to see the current position of the enterprise in its environment, and to show what areas within the company can be used to grow. Lastly, the strategy implementation, which focusses on the actual operational tactics that are going to be employed to reach the goals.

Comparing the different views on digital business strategies, multiple observations were made. First, digital strategies cannot be distinguished per department or business level, but concern the enterprise as whole. Second, digital strategies concern more than only aligning businesses with IT. They rather focus on digital processes, products and customer interactions. furthermore, they describe a long-term plan, to create differential value.

As this master thesis includes IT solutions as well as its digital variant, the alignment of IT and the African SMEs is also taken into account.

4.4 IT CAPABILITIES

The main goal of this research is to create guidance for digital transformations. In previous sections of this chapter benefits and opportunities are elaborated. However, multiple scholars argue the need for digital strategies, and discussed the relation with the firms (IT) capabilities. In this section the notion of IT and digital capabilities are analyzed in a companywide perspective.

Bharadwaj (2000) is seen as one of the first to investigate the relationship between a firm's IT capability and its performance. His empirical research indicated that firms that differentiate themselves on the basis of their IT capabilities, tend to outperform competitors on a variety of profit and cost-based performance measures. He refers back to Nolan, who in 1994 demonstrated that IT capabilities were a differentiator within the banking sector. Furthermore, he discusses multiple aspects that influence a firm's ability to deploy IT for strategic objectives. Companies with a high level of managerial IT skills, for example, tend to have a sustained competitive advantage. Besides managerial skills are competent IT skills (human IT assets), a reusable IT bases and a strong relationship between the IT- and unit mangers, drivers for enterprise performance. He gives the following definition for IT capabilities: *"Abilities that mobilize and deploy IT-based resources in combination or with other resources and capabilities."* (A. S. Bharadwaj, 2000)

In addition, Bharadwaj found three main enablers for firms in this era to benefit from IT. First, the thriving firms had a flexible IT infrastructure on which application could easily be launched. Second, they had a competent IT skill base that allowed them to envision the strategic benefits of countering the competitor's strategy; and last, a strong customer orientation which enabled the strength of both the IT infrastructure and the IT skill base.

Stoel and Muhanna (2009) adhere with Bharadwaj (2000) as they agree on the relationship between IT capabilities and a firm's performance. They explicitly state the differences between IT capabilities and IT spending, as there is no proven relation between IT-investment expressed in money and firm performance. They give the following definition: "*IT capabilities are complex bundles of IT-related resources, skills and knowledge, exercised through business processes, that enable firms to coordinate activities and make use of the IT assets to provide desired results.*" (Dale Stoel & Muhanna, 2009)

They distinguish two types of IT capabilities. The first category is externally focused. These are IT-related resources, skills and knowledge that help the firm sense and response, in a timely way, to changes in its markets and shifts in the needs of customers and suppliers. Some examples are resources and skills to deploy or support market reach and CRM processes. Secondly, they categorize internally focused IT capabilities, with as goals to help the firm offer reliable products and services and minimizes overhead costs (back-office production, operational support and fulfillment processes).

Ramasubbu and Sambamurthy (2011) draw on the previous described findings, and agree with the fact that IT-capabilities influence firm performance. In their study they focus on the link of information management capabilities and firm performance. They define information management capabilities as the ability to provide data and information to users with the appropriate level of accuracy, timeliness, reliability, security, and confidentiality and the ability to tailor these in response to changing business needs and directions. They argue the positive relation between IT-enabled information management and higher-order business capabilities, which on their turn influence business performance. Chen at al. (2014) complement this in their research about IT capabilities and process agility. They found that as IT-capabilities improved, firms reaction time to turbulence (changes in external factors like economy, innovations and competition). IT capability positively influences business process agility, which positively affects organizational performance.

The definitions and concepts as described above may offer some different perspectives, but they agree on one fact. IT capabilities have a positive influence on a firm's performance. They argue the need for a combination of IT-resources, such as IT-infrastructure and human IT skills (A. S. Bharadwaj, 2000; Dale Stoel & Muhanna, 2009), and prove that IT-enabled information management helps steering firms in turbulent environments and changing business needs (Chen et al., 2014; Mithas, Ramasubbu, & Sambamurthy, 2011).

4.5 CHANGE MANAGEMENT

Digital transformations can be seen as a process of change (Vial, 2019). Ample theories and models exist guiding change management projects. In this sub-chapter a non-exhaustive enumeration is given of some these theories in order give an overview of what might or might not help when digitally transforming businesses.

One of the first models within the change management environment was reported in 1958. This model, designed by Kurt Lewin, exits of only three steps: unfreezing, changing, and refreezing. The first step is about minimizing barriers and increasing odds of successful change. It is about creating drivers that overweight restraining forces. Only after this happens, the change process should start. The change process itself is about learning the new behaviors or systems. If the changes are implemented, the last phase starts. During this phase it is important to gather feedback, to debug, and/or enhance the system (As explained in Levasseur, 2001).

In 1995, Johan P. Kotter, professor in the field of leadership and change management, describes change management in his article: Leading Change: Why Transformation Efforts Fail. In this report he describes eight steps to guide a change process, based on eight errors he encountered during his research and work in the field. See Table 2-1 for the steps and completion.

Step	Completion
1: Establishing a sense of urgency	Examining market and competitive realities
	Identifying and discussing crisis, potential crisis, or major opportunities
2: Forming a powerful guiding coalition	Assembling a group with enough power to lead the change effort
	Encouraging the group to work together as a team
3. Creating a vision	Creating a vision to help direct the change effort
	Developing strategies for achieving that vision
4. Communicating the vision	Using every vehicle possible to communicate the new vision and strategies
	Teaching new behaviors by the example of the guiding coalition
5. Empowering others to act on the vision	Getting rid of obstacles to change
	Changing systems or structures that seriously undermine the vision
	Encouraging risk taking and nontraditional ideas, activities, and actions
6. Planning for and creating short-term wins	Panning for visible performance improvements
	Creating those improvements
	Recognizing and rewarding employees involved in the improvements
7. Consolidating improvements and producing still more change	Using increased credibility to change systems, structures, and policies that don't fit the vision
	Hiring, promoting, and developing employees who can implement the vision
	Reinvigorating the process with new projects, themes, and change agents
8. Institutionalizing new approaches	Articulating the connections between the new behaviors and corporate success
	Developing the means to ensure leadership development and succession

Table 4-1. Eight steps of change (Kotter, 1995).

Whereas Kotter's model comes from the perspective of a leader, Hiatt (2006) takes on a rather personalized perspective. He presents the AKDAR model, a framework for understanding change at an individual level with as goal to guide successful change implementations. It consists of five building blocks, which all must be in place for a change to be realized. AKDAR is the abbreviation of the 5 building blocks and stands for: Awareness of the need for change; desire to participate in and support the change; Knowledge about how to change; Ability to implement change and behaviors; and Reinforcement to sustain the change. The factors should be applied on personalized level, so that each employee feels responsible and content with the change. If enough individuals see the need and benefits of the change, the enterprise will follow (Hiatt, 2006).

Although the models may seem different on first sight, all three have some common elements. First, they all have some kind of starting phase, before the actual change happens. This can be defined as unfreezing (Kurt Lewis' model), the first four steps of Kotter, or AKD (the first three building blocks of Hiatt, 2006), and all have the same goal: creating comfort and willingness amongst related employees. Second, they all have phases in which the change should happen. "Changing" for Lewis' model, step 5 and 6 for Kotter's model (1995) and the second A for Hiatt's AKDAR building blocks. These phases are all about acting, and changing current ways of working. At last, all models have included some kind of governance. The change should be refrozen, institutionalized and/or reinforced.

4.6 DIGITAL TRANSFORMATIONS - SUMMARIZED

This sub-chapter gives an overview of the most important findings of the literature research about Digital transformations. It provides the main enablers and disablers for guiding a transformation process and some of the aspects that should be investigated during the second phase of the project. The following definition of digital transformation is used during this research project:

> *"a process that aims to improve an entity by triggering significant changes to its properties through combinations of information, computing, communication, and connectivity technologies"*

As the definition states, will the term digital include information, computing, communication and connectivity technologies. With this reason, and the fact that literature suggest that digital transformations are seen as an evolution of IT transformations, the term digital will also include transformations based on IT-technologies.

Two types of benefits are found. First, internal benefits which include process efficiency operations by automating and empowering employees with knowledge and support. Second, external benefits, which include new ways of communication with customers and partners; improved customer journeys; and new features, products and business models. These benefits are achieved through six types of technology, all based on accessibility, communication and processing of data. The following six categories are identified: communication technologies, management systems, cloud computing, analytics, customer channels, and digital products.

In order to guide the transformation process it is beneficial to define a digital strategy, related or interwoven with the business strategy. Such a strategy includes a long-term plan on how to create differential value out of digital (or IT based) products, processes and customer interactions.

During transformation projects it is important to focus on the IT capabilities within the targeted company as these capabilities positively influence the firm's performance. The capabilities found in literature are a strong and flexible base of the IT-infrastructure; good IT-management skills; strong human IT assets; and a strong relation between IT-managers and other employees. Furthermore do they relate to other business capabilities such as: the ability to use knowledge to analyze changes in markets; to analyze changes in needs of customers and suppliers; to see opportunities in order to increase the market reach; and to link knowledge to improve CRM processes. These capabilities help companies to use the IT and digital implementations to optimize internal process by reducing overhead costs and help to steer the enterprise in the turbulence environment. From the IT company perspective, the capabilities mostly focus on how processes are organized. Different models exist and can be used when analyzing these enterprises. These are categorized in themes like: requirements engineering, release planning, product planning, supportive processes and portfolio management.

Concerning change management, many different models and method exist, but three general conclusions could be made. First it is of high importance to create willingness and understanding of the process amongst the employees. Second, the change process should be actively guided, and problem that occur should be handles fast to prevent loss in motivation. It is important to share the benefits, to make it more tangible. Last, after the change has happened it should be governed, and new opportunities must be looked into.

5 ELABORATION OF THE INTERVIEWS

During the field trip to Ghana a total of 26 semi-structured interviews are held to gather data for answering sub-questions 1 and 3. Semi-structured interviews are used for two main reasons. First, this technique fits better in the context of Ghana, where the business culture is relationship based rather than task based (Hofstede, 2019; Meyer, 2014). Second, semi-structured interviews leave room for more additional information compared to structured interviews (Wieringa, 2014). The intention was to record all interviews, but it turned out that not all interviewees were comfortable with this idea. During all the interviews notes were taken and all the interviews were elaborated on the same day they took place in order to keep the data as accurate as possible.

Sub-questions 1 and 3 aim to identify knowledge about different aspects on the problem context as described in chapter 1.2. Sub-question one focusses on the perspective of the consumers, in this case the sub-Saharan African SMEs; and sub-question 3 looks at the problem from the supplier perspective, the local IT-companies. Chapter 5.1 explains the topics discussed during the interviews with the IT-companies and shows the related results. Chapter 5.2 does the same for the consumer perspective. The chapter ends with an overview of all the gathered data.

5.1 LOCAL IT-COMPANIES

In this sub-chapter the data gathered to answer sub-question 3 is set out. The question focusses on digital transformation initiatives of sub-Saharan IT-companies for SMEs. In other words, it gathers data on digital transformation of SMEs from the perspective of suppliers. When using the term IT-companies; both software suppliers and consultants are meant, as these functions often coexist in organizations. It focusses on two aspects as in-depth described in the research method (see Chapter 2.2.1.2):

- Experiences during prior IT-related projects with SMEs.
  - o Cultural aspects of interaction between IT-companies and SMEs;
  - o Best practices and fail factors during these projects.
- The type of technologies beneficial for the SMEs;

This section elaborates on the experiences IT-companies have had operating in the local market. The knowledge gained in the chapter will be additional to the information extruded during the literature research. Where the literature research focused on digital transformations (technologies and change) this chapter will consist of real-world experiences IT-companies had when dealing with SMEs in Ghana. As the main research question of the thesis aims to help IT-companies in guiding SMEs with digital transformations, their prior experiences are rather valuable. The semi-structured interviews are guided by the interview protocol as found in appendix B. To make the topics more accessible for the interviewees the following topics are derived from the aspects described above:

- The type of technologies beneficial for the SMEs;
  - → The current IT-infrastructure in Ghana;
  - → The IT-capabilities of SMEs;
  - → Fitting technologies in Ghana;
- Cultural aspects of interaction between IT-companies and SMEs;
  - → Marketing and communication techniques;
- Best practices and fail factors during these projects;
  - → Best practices and fail factors during IT-projects.

During this research seven IT-companies were visited in Ghana. The following part of this chapter will consist of descriptions of the interviewed IT-companies and an overview of the relevant findings. For the full description of the interviews are shown in Appendix C. An overview of the results is given in Chapter 5.3.

5.1.1 Trinity Software Center

Trinity Software Center is a Kumasi based software company. It is founded in 2014 and focusses on the development of mobile applications, websites and web-based cloud applications. Besides building software, they lead

scrum teams for companies that need extra developers. They have as mission to give African graduates with less opportunities, a chance to grow and work. The company consists of six employees in Ghana and one sales representative in the Netherlands (April 2019). 60% of their customers are in Ghana and the other 40% are operating in the Dutch market. The company is officially registered as a fair-trade software company. During the visit to their office in Kumasi their 26-year-old CEO was interviewed. The course of the interview can be found in appendix C. The following findings were extracted from the interview.

1. Sharing flyers and trying to promote the company on the streets in Kumasi does not work as a marketing strategy. It did not bring them any new customers.
2. Small and medium enterprises mostly hesitate to buy their software because of costs; because they are cloud based; and that they don't think the change towards more IT in their company is needed.
3. Small and medium enterprises who lack experience with using the internet, see this as a problem. To be more specific: expensive and unreliable.
4. Just graduated IT-students in Ghana lack experience in programming, lack knowledge about the Agile methodology and don't have experiences with developing software for mobile phones.
5. For software to be accepted by the general population it is important to make it easy to use, low on costs and have a good first-time experience.
6. Most small and medium enterprises don't like monthly subscriptions fees. They prefer to pay once and upfront. Memberships scares (especially) the smaller companies as it requires them to have money ready every month.

5.1.2   Cervus

CERVUS is a Kumasi based IT-company, founded and managed by their current, 34-year-old, CEO. After he finished his university master's in computer engineering, he started working for InfoTech, an IT-company focusing on hospital software. After working there for six years he decided to start for himself and he founded CERVUS. The main reason to start for himself was because of his career perspective. He knew he would not promote to a higher rank in his previous company and that he had the skills to build his own (better and simpler) software. He is the only employee who worked for CERVUS on a 40(+) our bases and only hires employees in times of need. Cervus created a hospital management system which manages inventory, financials and patient data. The whole interview is worked out and can be found in appendix C. The main finding during the research were as follows:

1. Selling software is hard without brand awareness, Ghanaian people don't like to change to new brands and feel more comfortable with known brands.
2. The best way to reach new customers is via one's personal network.
3. Reaching out to new customers works best in a personal way and by building a relation rather than only promoting the product.
4. It is important to align your attitude and looks to the customer you are trying to sell the product:
   - "In Accra they prefer well-dressed man with a big car while in less urbanized places they prefer shorts and a shirt. "
5. Applications in Ghana should be very usable, cheap, valuable and should have a clear goal (optimizing the core processes).
6. After software is implemented and running, it is important to keep supporting the customers. Help them manage the change and help them to use the system as it is intended.
7. Satisfied customers are an important factor in branding and networking.
8. People in Ghana hesitate when you start talking about computer software and often feel more comfortable with mobile applications.
9. The Ghanaian culture is reluctant to change.

5.1.3   Viamo

Viamo is a Ghanaian company which is founded in 2012. As of 2019 they operate in over 30 countries (mostly in West Africa) and employ around 120 employees. Their company focusses on communication between companies and people in rural areas. They describe their main product as a communication platform. Nowadays they operate mostly in the banking and healthcare branch, but they state that it is applicable in all sectors. Their main service is gathering and sharing information, which often goes side by side. They connect people by using local

voice-call-software, SMS and USSD (SMS tags which provide notifications including information). They operate in local languages because they (also) want to reach non-English, native language speaking citizen. As the business model might be hard to grasp, an example of one of their services is given in box 2. The interview at Viamo turned into a group discussion with in total three men. The CEO, one of the product managers and a back-end developer. The whole interview description can be found in appendix C. The main findings of the interview were as follows:

1. It should be very clear for Ghanaian customers which problem the application solves or why it has value.
2. Small and medium enterprises need a lot of attention (relatively) compared to bigger companies. This results in higher costs.
3. In the more rural areas of Africa still a big part of the population has a hard time reading and writing. If focusing on these segments, make applications usable without too much of these skills needed.
4. Mobile communication is more accessible than communicating via a computer or laptop, especially in the rural areas.
5. Support and trainings during and after the implementation are of high importance as many customers lack experience concerning all facets of IT.
6. Applications should have low entrée barriers and should be easily to use.
7. Many Ghanaian people have trust issues when it comes to IT (especially when money is involved).
8. Ghanaian people do not really like change, they are very conservative about brands.
9. The first experience with the applications is very important.

Box 2: Example of one of the services of Viamo

One of the uses of Viamo's platform is reaching out to pregnant women in rural areas. After these women go the hospitals for a check-up, they are asked whether they like to subscribe to the free pregnancy information line. If they want, they give their phone number and their pregnancy status. This data gets added to the Viamo platform, which will inform the women via automated calls with the right information at the right time of their pregnancy. It informs them about certain changes to their body and gives advise on how to deal with the situations that might occur. At the end of the call there is a short multiple-choice survey, which they can reply to by simply pressing the number on their phone. No smartphone is needed. These kinds of programs are financed by non-profit organizations. They help the woman in need and gather knowledge about these topics, to improve their services.

5.1.4   ViTech

ViTech is young, Accra based IT company. It is founded by five friends who met at their master's Computer Science. They are currently working on their first application ViniPay. An all-round map-based market platform, consisting of three types of users: stores & restaurants, their customers, and the deliverers. Besides connecting the companies, drivers and customers via the applications, it also consists of an online wallet which can exchange credit with mobile money (much used sim-connected payment structure in Ghana), bank accounts and other wallets. The full elaboration on the interview is shown in appendix C. The following findings were extracted from the interview:

1. Many of the IT-graduates lack practical skills (e.g. programming, working together and the agile methodology).
2. Ghanaian people don't like to change and often do not see the need for change.
3. Ghanaians have different levels of experience and knowledge of computers and mobile phones. This depends highly on the location and education.
4. Usability is most important factor for applications (use of pictures and animations).
5. An increasing number of Ghanaian customers are slowly adapting to the mobile application landscape.
6. Support and training are very important for customers.
7. A low entrée barrier to use the application helps people to start using it.

8. Personal network is very important when promoting your product.

5.1.5 Bluespace

Bluespace is a company founded in 2015. Since then it grew into an organization with 30 employees. Their business aims to help digitally transform banks and governmental organizations. One of the biggest banks in Ghana and the Ghanaian ministry of finance are their top customers. They offer their IT solutions in a three steps way. First, they check and help improve the data infrastructure. As stated during the interview: "The very first start of all our projects is to ensure the right foundations" (Ammishaddai Ofori, 14-05-2019). Such a foundation consists of the right data set, good security and most of the time a good cloud-based infrastructure. After the data infrastructure is ready and of high quality, they move on to the business intelligence stage. In this stage they optimize the current processes by using the data within the company. The last phase, value added services, provides innovation and new kinds of digital products. During the visit at the BlueSpace headquarters, Ammishaddai Ofori was interviewed. Besides his job at Bluespace, he gained a lot of knowledge about SMEs during two other functions. One of these was the development of FlippyCampus, an application for university students to see their grades and schedule, and the other function was as volunteer at the Ghana Innovation Hub. The full description of the interview can be read in appendix C. The main findings from the interview are as follows:

1. Ghanaian people tend to see usability and data usage as important criteria for applications.
2. Many Ghanaian people (also entrepreneurs) have only used software for pleasure and don't know how it works or most of its possibilities.
3. A big part of the young population is eager to learn about IT and how it can be used.
4. Marketing of products and yourself in the job market works best on personal basis or by building trust (e.g. portfolio and certificates).
5. Ghanaians trust companies with a specialization or a unique selling point more than those companies with a broad product/service range.
6. IT-graduates lack practical skills.
7. In general university graduates have little experience with IT, because it is not/barely used during their time in college.
8. Simple applications are preferred over fancy looking applications (user experience).

5.1.6 AppsNmobile

AppsNmobile is a, in 2015 founded, company active in the financial market in Ghana. It focusses on connecting end customers, organizations and businesses with financial institutions like Banks, mobile money providers and providers of wallets on other applications. In Ghana, this is more relevant than in the Netherlands, as there are many ways and companies involved in payments. AppsNmobile provides a platform connecting all these different methods with each other. Businesses with for instance a web-shop can use their API to provide different payment methods to their customers, and receive all transactions on one bank account. Furthermore, the platform provides a real time overview of which payments are made with related information. Within four years the company grew to 25 employees. The interview was held with the 39 years old marketing/sales manager. See Appendix C for the description of the whole interview. The findings of the interviews are shown below.

1. IT-businesses in Ghana have a lot of competition as many companies operate in the same market (especially the financial market).
2. The awareness for the need of IT and digital possibilities within SMEs is growing.
3. Most of the employees are hired after graduation and trained within the company (on the job).
4. Finding motivated employees with experience and/or the right attitude is hard in Ghana.
5. Usability is the most important criteria for software.
6. Customers like it to be unburdened because of the lack of IT related knowledge.
7. Demonstrating the service/product to customers and personal communication works best in Ghana as it provides trust and a good relation.
8. Patience and attention are very important to get customers.
9. Meeting with people in charge combined with other people with influence (often IT employees) at once helps during the sales process.

10. For small companies it is most easy to find customers via personal networks and random visits to companies.
11. After a company has multiple customers "word-of-mouth" marketing (or: referrals) is very important.
12. In Accra marketing via social media works as an increasing amount of businesspeople start using these channels.

5.1.7 Hubtel

Hubtel is the biggest IT-company visited during the research trip to Ghana. They provide a standardized e-commerce solution for shops. Their solution includes a webshop, financial/payment system and offers logistics. Because the financial system is included, they also provide hardware for payment with credit- and visa cards. Just like AppsNmobile they make transactions via most of the important payment methods (mobile money, bank accounts and wallets) possible. As extra service they also provide software to analyze the shops financial situation and to manage employees. The company was founded in 2005 under the name SMSGH. Back then they focused on communication for businesses and their customers via SMS. Until 2010 this was their only business. As they worked a lot with banks as well as telecom providers they were closely related with the technical advancements in the branch and were closely involved when mobile money was developed. They experimented a lot with cashless payment methods in combination with communication and e-commerce. During this period money transactions became their core business. In 2017 they decided that their current name did not fit anymore, and they changed it to Hubtel. During the day of writing (17-05-2019) they had just over a hundred employees. During the visit to Hubtel on of the co-founders and CEO of the company was interviewed. The full description can be found in appendix C. The main findings are given below.

1. Getting skilled or experienced employees in Accra is hard as many big companies are interested.
   a. Hubtel offers education to all their customers to fill the gap with lacking experience.
2. Simplicity and clear goals are beneficial aspects when selling software to SMEs.
   a. Starting with the basics and offering extra modules for interested companies keeps IT understandable for people with less IT knowledge.
3. At the beginning phase of IT-companies selling products via the personal network worked best. Furthermore, conferences with potential customers work because of the face-to-face communication.
4. Bigger marketing strategies (e.g. radio and tv) works to create brand awareness and works best in the phase where companies already have a steady amount of (satisfied) customers.
5. Trustworthiness and a clean brand name are among the most important factors for customers to choose a service provider. Takeaways after reading5.1?

5.2 SMALL AND MEDIUM ENTERPRISES

This sub-chapter shows the data gathered needed to answer sub-question one. It aims to identify situational elements of sub-Saharan African SMEs that play a role by their digital transformation. As in-depth described in the research method (Chapter 2.2.1.2), these include the following aspects:

- The current situation of the SMEs;
  o Deployment of the technologies;
  o The human IT skills;
- Reasons of hesitation towards digital transformations in the SMEs;
- Experiences during prior IT-related projects with SMEs.
  o Cultural aspects of interaction between IT-companies and SMEs;
  o Best practices and fail factors during these projects.

The knowledge elaborated in this chapter is additional to the findings in the literature. The literature study showed a lack of existing knowledge about the current IT-related situation of SMEs and their attitude towards digital transformations. Furthermore, are the results about the interaction with IT-companies an addition on the description of the sub-Saharan African culture based on Hofstede (2019) and Meyer (2014). Where the literature research focused on aspects of the sub-Saharan African culture, the results of the interviews focused on the communicational aspects between IT-companies and SMEs; and prior experiences. The interviews are guided by

the interview protocol as shown in appendix A. In order to extract this information, the following four themes were discussed during the interviews: (formulated different because these are more accessible for the interviewees):

- Deployment and use of IT- and digital possibilities;
- IT related knowledge;
- Openness for IT/digital;
- Prior experiences with IT-companies

During the research a total of 19 interviews were conducted. The whole interviews are elaborated and can be found in appendix D. The interviews are categorized based on their branch or type of company. An overview of all the data from the interviews is given in Chapter 5.3.

5.2.1 Preliminary high schools

The first category of SMEs described are the private primary high schools. These schools educate children with an age of 6 up to 15. All schools that were visited were privately owned. All interviews held during the visits were with the headmasters, ICT employees or the ICT teachers, and are elaborated in appendix D. A total of seven schools were interviewed, all located in Kumasi. See Table 5-1 for an overview of the different schools.

School	Students	employees	Computers	Use computers
Nana Quainoo Memorial School	200	25	12	Education (basics*) Administration (excel)
The African Child School	1000	35	30	Education (basics* and office) Administration (Management system)
Unico Model School	400	26	0	None
Sunshine State School	285	16	10	Education (basics*)
Brightanic International School	90	7	1	None
Golden Gate School	160	23	4	Education (basics* and office) Administration (management system)
SSNIT Presbyterian Model School	700	42	40	Administration (excel and grading system) Education (basics* and office)
*basics include: Turning the computer on/off and handling the mouse and keyboard				

Table 5-1. Overview of visited preliminary high schools.

Organizational use of computers

The use of IT for organizational purpose differed heavily per school. Out of the seven schools only four used it for administrative reasons. The three schools using no IT to manage their operations offered two related reasons. First, they stated that they do not have the financial resources to buy a system as they have other day-to-day priorities. During the visits to these school this was clearly visible. The building, furniture and school materials all looked rather old and many of the goods were nearly enough for all the students. Besides the financial problems they did not really see the need for an IT system to manage their operations. All three school had their student data written down manually in books. Finding the right information could take a lot of time, but they did not need their historical data often, this was not really seen as a problem.

Two of the subjects used excel to manage their student's data like name, address, age, school progress and school fees. In both cases the ICT teacher was responsible for the digital overview. They used Microsoft Excel as a substitute for manually keeping track of the information. Besides digitalizing the data no further functions were used. The reason for keeping track of this data was to create a clear overview of the current status of the school and to keep the data in an archive after the students were graduated. One of these schools also used a system keeping track of the grades. This was a customized application and included the names and the grades ordered per school year. Besides storing the information, the system had one other function, namely, printing the reports for the students. Both the schools did not upgrade their system as they think the costs do not outweigh the benefits.

The biggest school, the African Child school, used an offline system to manage their data. The interview took place in the administrative office and the headmaster explained that with the number of students it was not possible to manage the school without system. The system they used operated offline on an internal network. They used a standardized system including all the basic data of the students, their grades and the financials. Because of the number of students, they could effort investing in IT.

The golden gate school was by far the most advanced school in the field of IT. They used a cloud-based management system which not only helped by managing their data but also offered functionalities for the customer experience. The system was implemented because the headmaster was tech-savvy. He had worked in the UK in the tele-sector. His main reason to implement an online system was to show students, parents and his employees how IT could be used. He thought of it as part of the education. The system manages all data of the school; can be accessed via the internet browser; and communicated grades and presence to parents via an online portal.

IT knowledge of employees

Most teachers in the schools had no to little experience with computers or laptops. The IT knowledge available in the school mostly centered around the ICT teachers, administrative staff and some other individuals. From all the teachers an estimated 60% had a smartphone, but in most cases, these were only used for WhatsApp and calling. The school employees working with administrative software were trained by the software company delivering the systems. The headmasters all told that with the right training and enough support afterwards they learned rather quick. Some of the older teachers, who struggled with the systems, were supported by colleagues. During one of the interviews an administrative manager told that this worked, but created a risk as these non-technical teachers shared their passwords without hesitation.

Experience with prior IT projects

From the interviewed subjects there were three with experience around the implementation of an IT system. All of them were rather positive about how it went down. In two of the cases was the hardware needed for the system also installed by the IT-companies. The fact that they delivered a full working package was a must when they bought it. They wanted the IT-companies to take care of the whole implementation. The thirds school was already in possession of computers and only requested a simple management and grading system. In order to find the right company to provide the software they all explored options via their personal networks.

Employees at all the schools followed training courses given by the IT-companies. After the training many follow-up sessions and the support on short notice, helped them to use the system in the right way. The fact that problems were mostly solved within a few days was important to them. One of the schools also delivered much feedback, which was used by the IT-company to improve their system. The close and personal relation with the IT-company was seen as the most important aspect after the implementation.

5.2.2 Prince Emanuel clinic

The Prince Emanuel Clinic is an herbal hospital located in Ghana. The company does exist of two locations, one in Kumasi and one in Accra. As an herbal clinic they provide health consultation and natural medicine. The medicine they use are both purchased and self-grown. Some examples of products are lentil- and sunflower seeds, different kinds of natural tea and vitamin pills. The company has five different departments. The production, the main storage, the laboratory, consulting, and the pharmacy. Both the clinics were visited, and two semi-structured interviews were held; one with the son of the owner, who works at the hospital in Accra; and the second with the operational manager at the location in Kumasi. The full description of the interviews can be found in appendix D. The main findings are given below.

1. The main reason the Prince Emanuel Clinic started to use IT was because of an influent person who learned the possibilities of IT in college; the son of the owner.
2. They addressed multiple IT-companies known via their personal network to come up with a project proposal. Trinity Software Center won because of their approach (Agile way of working), plan for support after implementation, and the price.
3. The whole implementation process was experienced as good. The agile way of working in combination with providing the hardware and trainings were pros. The all-round communication was good.

4. The use of an all-round IT system improved the efficiency of the clinic as well as the visibility of proceedings of the employees.
5. They use smartphones to communicate via WhatsApp and Calls.
6. The personal relations between owner and employees, and the overall management skills keep the system from its full potential. Many employees don't use the system as they should, but the management can track down where it goes wrong.

5.2.3 Kumasi Hive

Kumasi Hive is a company based in Kumasi, Ghana. They describe themselves as an innovation hub. Their core business is guiding start-ups. Some of these are part of the Kumasi Hive community and some of them are independent. Besides supporting in developing ideas, they also rent out offices and rooms for training. They started in 2016 and helped over 50 projects grow to healthy organizations. During the visit we spoke to the 20-year-old women who does administration and manages the spaces in the building. As she is one of the founders of Kumasi Hive, she has a lot of knowledge about their way of working and projects they have done. The main process of Kumasi Hive is a series of events they organize each year. This starts with three months of training for just graduated students, about how to develop business plans and run day-to-day operations. After these trainings, they organize a hackathon in which all the trainees develop their project and present their ideas. The best ideas can get a fund and will be part of the Kumasi Hive community. After the hackathon more guiding is given to these teams and they can use the office to work at. The full description of the meeting can be found in appendix D. The most relevant finding of the interview are as follows:

1. They use a basic planning system to keep track of the rooms available for renting, and mobile phones to communicate with each other.
2. Many of the just graduated entrepreneurs mis practical skills like programming or setting up a business plan. They know how it works in theory but struggle to apply this knowledge.
3. In general employees of SMEs do not have much knowledge about IT and training is always needed. Starting with relatively simple but effective applications such as Microsoft Office is recommended.
4. Most of the SMEs encountered by the Hive community do not keep track of much administrative data, and don't use data to improve their business.
5. Applications targeting SMEs should be easy to use, should be cost effective and should really help with core processes of the enterprise.
6. Marketing of products is most easy via the personal network and referrals of the services and/or products.
7. The use of social media as marketing platform works best for the young population, students and in more developed areas like Accra and Kumasi. Besides these targets not many people do use social media for business purposes.

5.2.4 CeRIT

CeRIT (Center for Research and Information Technology) is a company focusing on the use of data for research purposes. They offer two core services. First, they consult students and researchers on what data fits their research and how it can be used most effectively. Second, they provide training for people who want to learn about data management and data analysis. The company consists over 5 employees and 5 people doing their National Service (obligated internship to repay Ghana's government for study costs). During the visit to the company the 30-year-old CEO and founder of the company was interviewed. The full overview of the interview can be found in appendix D. During the interview the following relevant results were found:

1. Many scholars (who do not study IT) lack IT skills concerning data management. This is not included in the colloquium of most studies.
2. Marketing of trainings work best via personal networks, the university (events like meetups and conferences), Facebook and WhatsApp Groups. These fits best for the target group: scholars.
3. Using posters and flyers does not work.
4. The interest and skills in IT are growing rapidly in Ghana. Scholars increasingly encounter these technologies.

5.2.5   BlueSparkTechnology

BlueSparkTechnology is a just founded business (2018) who sells water recycling systems. These systems clean water in order to make it usable again. The cleaned water is not drinkable, but usable for e.g. washing cars. So far, only one system is sold. The company does not build or engineers the systems, they act as the middleman. It consists of three employees. The interview was held with the employee who was in charge of the administration. The elaboration of the interview can be seen in appendix D.

1. Because of the size of the company they believed there is no need for the use of more IT besides Microsoft Excel and WhatsApp.
2. Knowledge about using a more sophisticated system would be easily gathered by basic training.
3. As an administrative employee she did not ask for a better system. This would be a choice of the CEO.

5.2.6   Forestry and timber companies

The forestry is a governmental commission founded to keep track of the conservation of the forests, the flora and the fauna. The forestry itself does not account as a small or medium enterprise but they work closely together with local timber companies. During the visit in Sefwi Wiawso, in the Western Region in Ghana, the headquarter of the forestry was visited and a total of five timber companies were interviewed. Although the Forestry does not account for a small or medium enterprise, the description of their process (regarding to the timber companies) is included. The process gives context additional to the finding of the timber companies.

The forestry in the western region manages their land by dividing it into reserves, which are smaller lots within their region. These reserves are appointed to timber companies by contracts. Each of the reserves is divided into even smaller segments (they call them compartments) which are used to communicate how timber companies can act. The forestry examines the status of the forests, and dictated which trees (types of trees and amounts) can be cut down. This is regulated very strict, because most of these trees take about 100 years to grow. In order to manage this, the threes are numbered. The timber companies keep track of which trees they cut down and paint the number on logs of the trees. The forestry has checkpoints alongside of the roads, to audit the logs when they pass by. They write this down manually. Three times a week, the ICT officer of the forestry visits these checkpoints to transfer the data from the book to the application using a mobile phone. When asked to one of the forestry-checkpoint employees why he did not put the data it in the application himself, he answered the following:

> "It is not my job. I'm not an ICT officer, I don't know those things." (personal communication, forestry employee, 8-5-2019)

The man in charge of the checkpoint had no smartphone, and had never used one. After the logs are milled into planks, a similar situation occurred in relation with the timber companies. The timber companies manually write down what planks evolved out of the logs, and the ICT manager visited them in order to upload the data to the system.

A total of five timber companies were visited to gather information about their companies and their deployment of IT. All the companies were located in the Western Region and together account for half of the timber companies in this area. All five of the companies have the same core process. Cutting down and logistics of the trees; milling them into different sizes of planks and selling the goods. An overview of the different timber companies is given in Table 5-2. As some of the companies wanted to be anonymous the names are not included. The fifth and last company has 153 employees and cannot be seen as a SME. As this company was the only one who used IT on a large scale the decision was made to go there for interview.

Company	Employees	Use of IT
1	98	Microsoft Excel for the administration of the production
2	71	Microsoft Excel and Word for HRM and accounting practices.
3	32	None
4	88	Microsoft Excel for the administration of the production
5	153	Different customized management systems keeping track of inventory, mainte-nance, HRM and accounting. Furthermore, technology used for measuring and accurate milling.

Table 5-2. Overview of the five timber companies visited.

After comparing the different timber companies the following results were found:

1. From the five visited companies does only one uses IT corporate-wide. The other four don't use any software or only applications of the Microsoft Office package for their core processes (production and HRM). The most developed company regarding IT is also the biggest (and does not account as an SME) and uses management software for all departments. The ICT-manager of the forestry confirmed that these statistics are quite representative for all of the timber companies in his area.

2. The biggest company showed, besides the best use of IT, also the best management practices. This was noticeable by the number of employees sitting organized in their offices and the way the visit was organized. During the visit multiple employees were introduced and communication within and with the company was clear. Especially compared to the other companies the conversations were much clearer and they understood the questions and the research better.

3. In the four companies where IT was less interwoven into their business, only one or two people per company had experience with software/computers. During the interviews it became clear that most of their employees had no history of education after high school. The main reason for this was that these jobs did not require any finished study. If the current employees would have to work with software in the future, all managers said that training, from the basics to the needed level, would be needed.

4. The managers of the companies thought of two benefits when asked about what software could bring:
   a. An organized overview of the inventory, related costs and revenue; and
   b. An archive which makes it (more) easy to find data.

5. None of the companies with mentioned a more efficient way of communicating with the forestry or their customers.

6. One of the main reasons why most of the companies did not use more IT is because of the costs and day-to-day priorities that occur. They thought of investing in IT as a big risk they could not financial afford.

7. The managers of the four timber companies without much IT thought that many of the employees would hesitate if applications were introduced, but that would accept it when they get used to it. Furthermore, would it need to be obligated by the management.

8. Software should safe data automatically because light-offs (power outages) occur often in these regions (outside of the two main cities).

9. None of the four companies see the benefit of a cloud-based solution. The main reasons were the risk of being hacked (security), the costs of data, and the unstable connection.

10. All four SMEs would prefer to do the pay once for a system instead of monthly costs.

11. The company who used IT for all(most) all their processes was working mostly on the international market and did this as first in the region. Besides the fact that IT is used to be more efficient, it is also needed for obligated certificates.

12. Support and training during and after the implementation of the system is seen as one of the most important factors of the change process.

5.2.7 Big foot safari lodge

The interview at the Big Foot Safari Lodge was held with the 35-year-old manager. The lodge is located in Wli, a touristic village near the border of Togo. As Wli has the highest waterfall of west Africa it is a well-known place for travelers enjoying nature. A total of six people work at the lodge and it has place for 22 guests. During the interview we spoke about the use of IT within the organization, the level of knowledge the people in the area

have and how the manager would look into new possible management systems. The main findings of the interview are as follows:

1. The lodge uses a laptop and mobile phones to communicate with guests. The mobile phones are privately owned by three of the employees, and the laptop is in possession of the organization. Furthermore, do they have website with the general information of the accommodations.
2. The laptop is used for keeping track of some administrative data with the use of Microsoft Excel. The Excel is used in a very basic way: as substitute of a notebook.
3. The internet connection in the area is very bad. From Ghanaian providers there is no reception most of the time. The connection with Togonese providers is somewhat better but still unreliable.
4. Most of the work with internet is done around midnight, as the internet service works better around this time.
5. The level of knowledge of the people in the Wli area is very low. Most of the people only use a (smart)phone for calling and WhatsApp. The people who know more about IT mostly have some basic knowledge about Microsoft Word and Excel, and now how to surf the internet.
6. The school in Wli does not have a computer resulting in a lack of IT knowledge amongst the youth.
7. The manager of the lodge thinks that they do not really need an overall management system as their current way of working goes rather well, and the costs would not outweigh the benefits.
8. Looking for a good company to provide software would be done via Google and by looking for companies in the bigger cities. Bigger companies with multiple customers would be important as this provides trust.

5.2.8   Kpedze Senior High School

The interview at the Kpedze Senior High school was held with Yussif Ousman. He ICT teacher at the school, computer science graduate, and ex-trainee at Maxim Nyansa. The interview was held at the campus of the school, which consists of just over a thousand students. The school was founded in 1962. The interviewee was one of the three ICT teachers and was also trying to improve the use of IT within the school (for administrative tasks as well as for the students). The following findings came forth during the interview:

1. Senior High Schools teach the basics of hard- and software as this is obligated by the government.
2. The school has 23 computers to help teaching the students about ICT.
3. The school provides no internet for students or employees.
4. The use of IT for management and administrative practices is very low. They only use Microsoft Excel to keep track of some basic data about students.
5. They use mobile phones to communicate with each other, but all are privately owned an no costs are taken into account.
6. Most teachers have little experience with computers, but would probably be able to learn it easily if they were trained.
7. A possible management system would be very useful as there is a lot of data within the whole organization.
8. A management system must take into account that the internet and electricity availability is not reliable.
9. Security is an important aspect when designing a new system. There should also extra attention to the human side of security.
10. The search for a good company would be done via the personal network and referrals of others.

5.2.9   Entrepreneur Bonny Nti Mensah

The interview with Bonny Nti Mensah deviated from the other interviews. Bonny (29 years old) is a, as he called it, Dutch Ghanaian. He is born in Ghana and moved to the Netherlands when he was 16. After studying computer science, and working in the field of IT he moved back to Ghana. In Ghana he is looking into two business opportunities. The first opportunity he is looking into is about university management systems in the cloud, based on Google's G-suite. His main motivation is the fact that we use the cloud in all Dutch Universities and that this is proven to be efficient. The second market he is looking into is about entertainment. In Ghana, so he said, are very little options for people to entertain themselves. Think of clubs, cinema's and swimming pools. The IT

knowledge Bonny has in relation with the Ghanaian and Dutch culture were thought of as very valuable for the research. The following findings were discussed during the interview:

1. There is a lot of room in Ghana for improvements with IT. A good example is the use of cloud systems for universities.
2. The people in the Ghanaian culture are very practical minded, meaning that they only want a product or a service when they are convinced that it really improves their current way of working.
3. Face-to-face communication is the most important way of reaching out to customers and/or partners.
4. When trying to convince people in Ghana it is very important to do follow-ups. These are, compared to the Netherlands, not seen as rude or impatient, but rather as someone putting effort into the relation.
5. It is for IT-companies in Ghana important to make use of a website as well as hardcopy materials, to share information.

5.3 OVERVIEW OF THE GATHERED DATA

The results of the interviews at the IT-companies and the SMEs give a good overview of some of the important aspects on how their operations relate to IT; and how they experienced different IT projects. In this sub-chapter an overview of the gathered data is given based on the different aspects influencing digital transformation in sub-Saharan African SMEs, and the role of the IT-companies. The aspects derived from the main research questions in combination with the definitions of digital transformation (Vial, 2019), change (OED, 2018) and guidance (OED, 2018); as in-depth elaborated in the research method (see Chapter 2.2.1.2). The following aspects are used to categorize the findings:

- The current situation of the SMEs;
    - o Deployment of the technologies;
    - o The human IT skills;
- The type of technologies beneficial for the SMEs;
- Reasons of hesitation towards digital transformations in the SMEs;
- Experiences during prior IT-related projects with SMEs.
    - o Cultural aspects of interaction between IT-companies and SMEs;
    - o Best practices and fail factors during these projects.

The remainder of this section gives an overview of the data gathered during the interviews. Note that in this sub-chapter all the gathered results are shown without further contextual information. In Chapter 7 the results are elaborated with the context, interdependence and the design of the artifact taken into account.

5.3.1 The deployment of IT within the SMEs

A total of 19 different SMEs was interviewed and their deployment and use of IT is mapped. Figure 5-1 shows the results. From the 19 organizations there were five who did not use any software on a computer, laptop or tablet; accounting for 26,3 percent. All other companies at least used the Microsoft Office package, including Word, Excel and/or Mail. From the companies who used IT there were eight companies with software besides the Office package, representing 42% of all the organizations. These applications varied from a simple grading system at one of the schools, to a full working ERP system at one of the timber companies. Besides, in 15 out of the 19 organizations were smartphones used for business purposes. In all the cases this was for making calls or using WhatsApp. Five of the companies have a website.

A noticeable fact about the companies who use the Office package, is that these are often used in a very basic way. Most of the companies used Microsoft Excel as a substitute for their manual books. Little to no functions or strategies were used to create new insights from the data. The reasons for using the Office package was mostly to store the data and for communication. The data was not used to look for trends, opportunities or to improve the business' process.
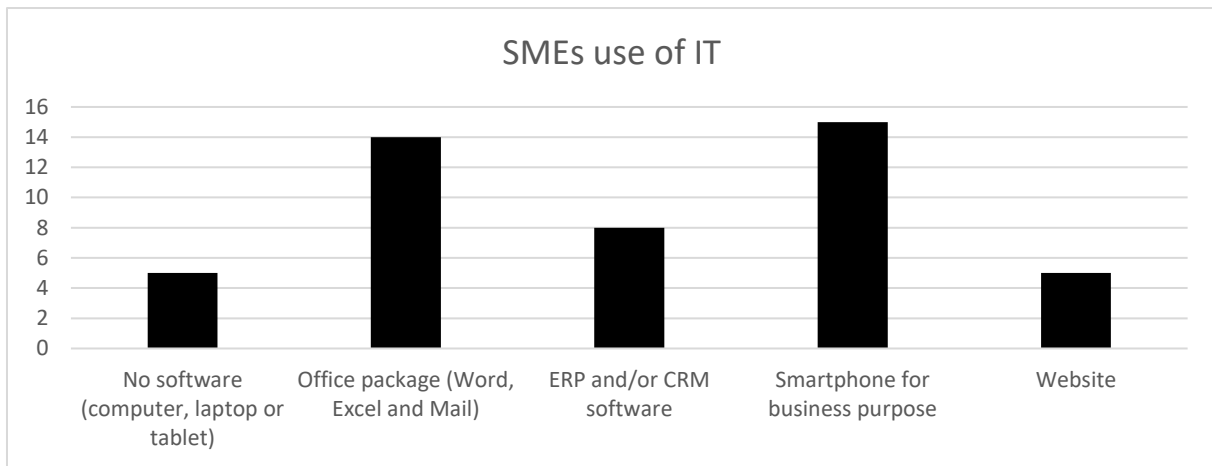
SMEs use of IT

Figure 5-1. The deployment and use of IT in the SMEs.

5.3.2 Human IT skills

One of the themes during the interviews with the small and medium enterprises was about the employees' knowledge concerning IT- and digital possibilities. As the interviews were semi-structured, different perspectives on the subjects are discussed. The interviews are analyzed and the answers are categorized. See Figure 5-2 for the results.
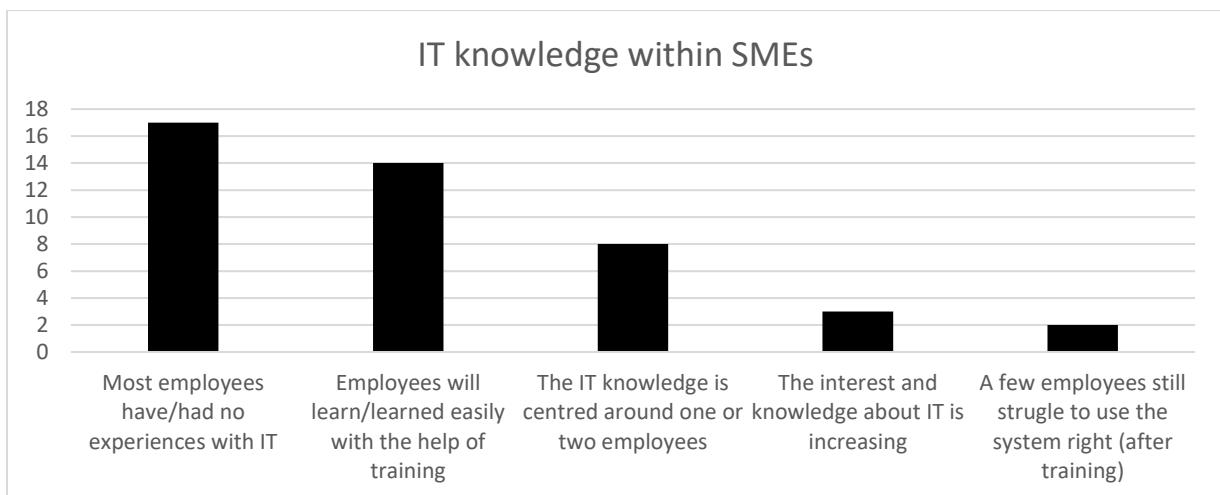

IT knowledge within SMEs

Figure 5-2. IT/digital knowledge of the SMEs' employees.

By far the most important question discussed during the third theme, IT-capabilities, is about the IT knowledge of the employees. All the interviewees were reasonably in line when talking about their employees. Most of the people who start working in SMEs have no to very little experiences with IT. 89,5% of all the interviewees stated specifically that, with exception of some individuals, none of their employees had experience with using software on a computer or laptop. In 42 percent of the cases there were one or two employees who worked with the computer. Some of the organizations had experience with implementing software in some way or another, and noticed that the basic skills needed to use these systems were learned rather easily. A total of 14 companies stated that the biggest part of their staff would be able to be trained without too much afford. Only in two of the organizations which obligated their employees to use software, they encountered real problems after people were trained and didn't seem to get it. Furthermore, three of the interviewees stated that the knowledge and interest in IT is growing, especially in the younger segment. During the discussions at the IT-companies the growing amount of interest in IT is confirmed. When looking into the locations of the interviews it was noticeable that the people in Accra and Kumasi were more used to working with computers compared to rural areas. The further away from the bigger cities, the less knowledge people tended to have regarding IT.

5.3.3 Reasons of hesitation towards digital transformations in the SMEs

During the interviews, questions concerning the reasons why many SMEs have not yet implemented more IT/digital solutions were asked. The different answers, derived from the 19 interviews with the SMEs, are categorized and set out in Figure 5-3.
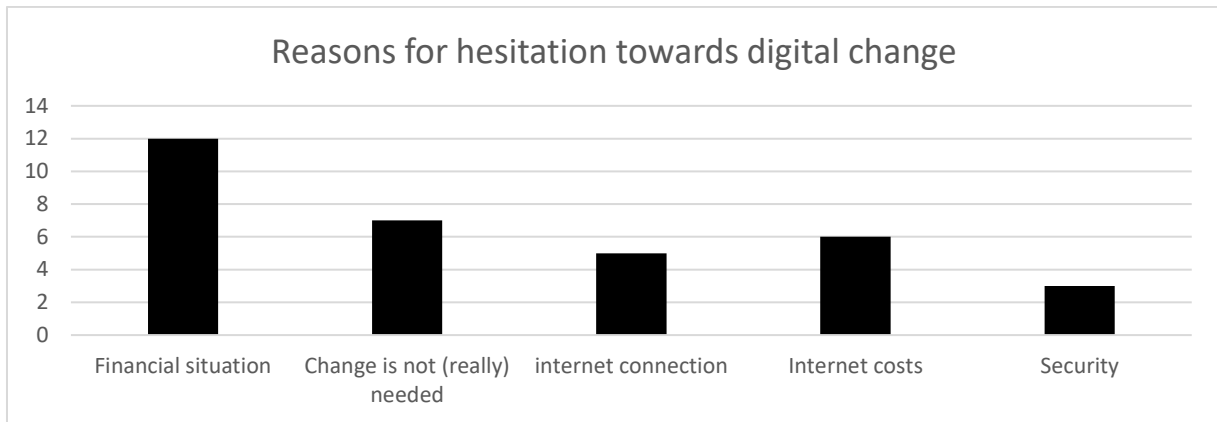

Figure 5-3. Reasons for hesitation towards IT- and digital options.

The reason brought up mostly is about the financial situation of the SMEs. Most of the SMEs stated that there was simply no money to invest in a system, or that the financial risk was too big. Others did not think that their company could benefit enough from such an investment to outweigh the costs. In many cases there were other priorities to invest in. In seven of the cases they thought that change was not really needed, as the current way of working is experienced as good enough. Internet connection and its related costs are also mentioned, as the conversation often led to cloud software. Five managers saw the internet connection as a reason not to go online, and six of the interviewees thought of cloud-based applications as to expensive. Furthermore, security was mentioned by three interviewees as a genuine concern.

5.3.4 Cultural aspects of interaction between IT-companies and SMEs

The interviews with both the IT-companies as with the SMEs included the theme "marketing strategies". The questions were focused on ways of promoting software, communication with the other party, and what methods were thought of as beneficial (enablers) and what methods did not work (disablers). Figure 5-4 shows the results from the IT-company perspective.
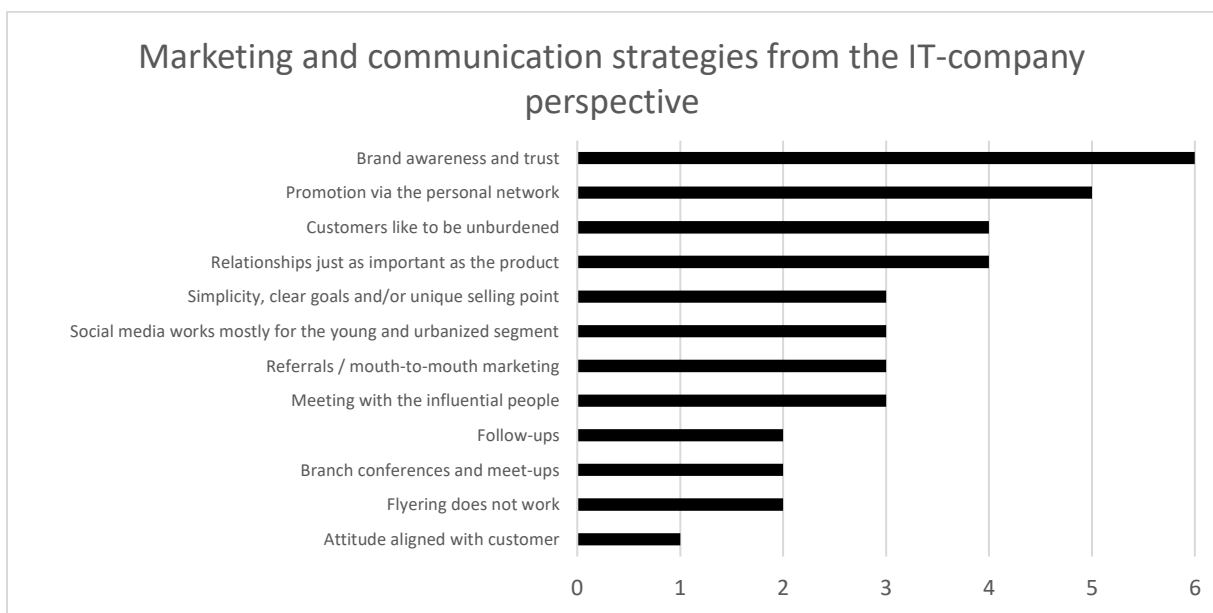

Figure 5-4. Experiences with marketing methods from an IT-company point of view.

From the seven interviewed IT-companies, five stated that the personal network was the most important way to reach out for potential customers. The three interviews at the biggest companies (Hubtel, Viamo and AppsNMobile) all agreed on this point, and specified that this works especially in the starting phase of the company. The phase where the number of customers and prior projects is still somewhat smaller. The second beneficial aspect, the personal relations, is closely associated with the first aspect. The fact that the relation with-, and trust of the company is seen as at least as important as the product itself. Furthermore is "unburdening" of the customer an important marketing strategy. As the knowledge of IT is relatively low at many companies, they like the IT-company to take control of the processes. Furthermore, did the interviewees talk about that it works best to meet with people in charge of the decisions about IT combined with their advisors. If this is not arranged, and the potential customer needs to communicate the proposal within the company, it often gets lost somewhere in the process. During the interviews multiple respondents also talked about the importance of following up on the proposals and having a patient attitude. At last, it is relevant to align the attitude of sales(man) to the type of company visited. This especially differs between the rural- and urban areas where customers have other interpretations of trustworthy suppliers.

The explanations given by the owners/managers of small and medium enterprises mostly overlap the answers that came from the IT-companies. Trustworthiness; people known via personal relations and unburdening all came forward multiple times. As many of them withheld from investing in IT because their financial situation, they were very specific about prices and the quality. Most of them preferred propositions of simple software's which were rather cheap. Too extensive software was often seen as too expensive. Besides referrals, also Google and the companies' websites are used to check out potential suppliers. One of the interviewees made their decision based on a proposal which used an Agile way of development, and specifically mentioned this as critical aspect for his choice. See Figure 5-5.
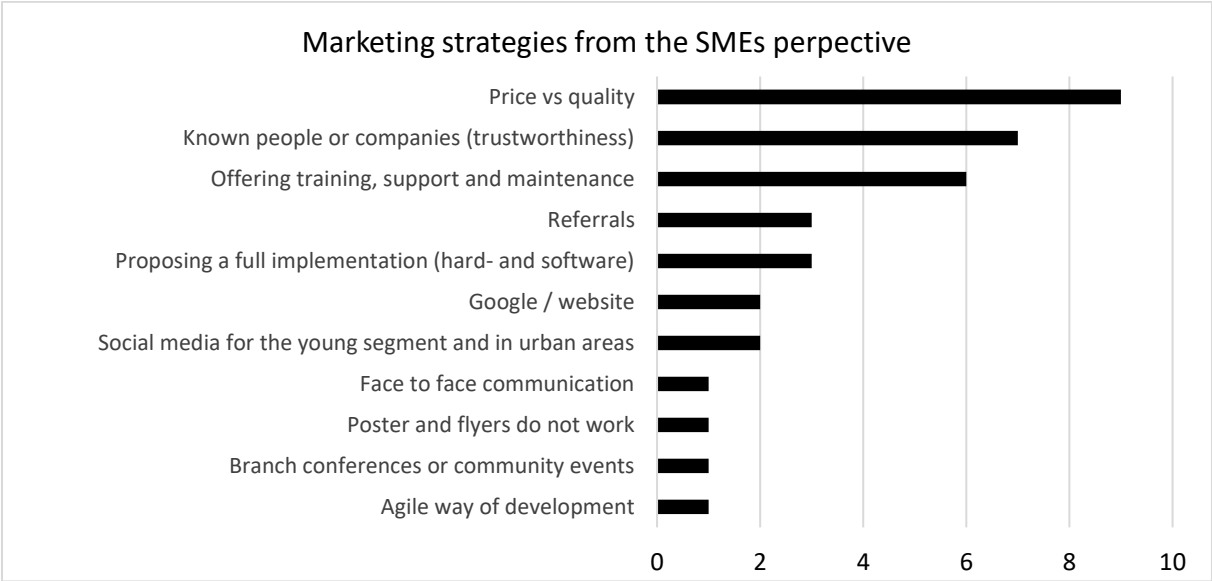
Figure 5-5. IT/digital marketing strategies from the point of view of SMEs.

5.3.5 The type of technologies beneficial for the SMEs

The fifth theme discussed during the interviews was about software design. To be more specific; the interviewees were asked about enabling- and disabling software criteria. The topic was raised during both the conversations with IT-companies and the SMEs. Figure 5-6 shows the results. As the data of both types of interviews is shown in one graph, it is important to keep in mind that only a total of seven IT-companies were visited and 19 small or medium organizations. The gathered data shows that usability is brought up most during the interviews, closely followed by costs. During multiple interviews language was also addressed as a problem for a lot of people in rural areas. Many, especially elderly, people in these areas lack English skills and communicate via one of the many native languages. One of the reasons for *costs* to get a second place may be the fact that the financial situation of the SMEs often was discussed prior to talking about this theme, and interviewees not always thought

of costs as a criteria. Apart from these two criteria multiple others were offered. With the value of the software, often pared with a clear goal, as third largest. Furthermore, Security and data usage are perceived as disablers.
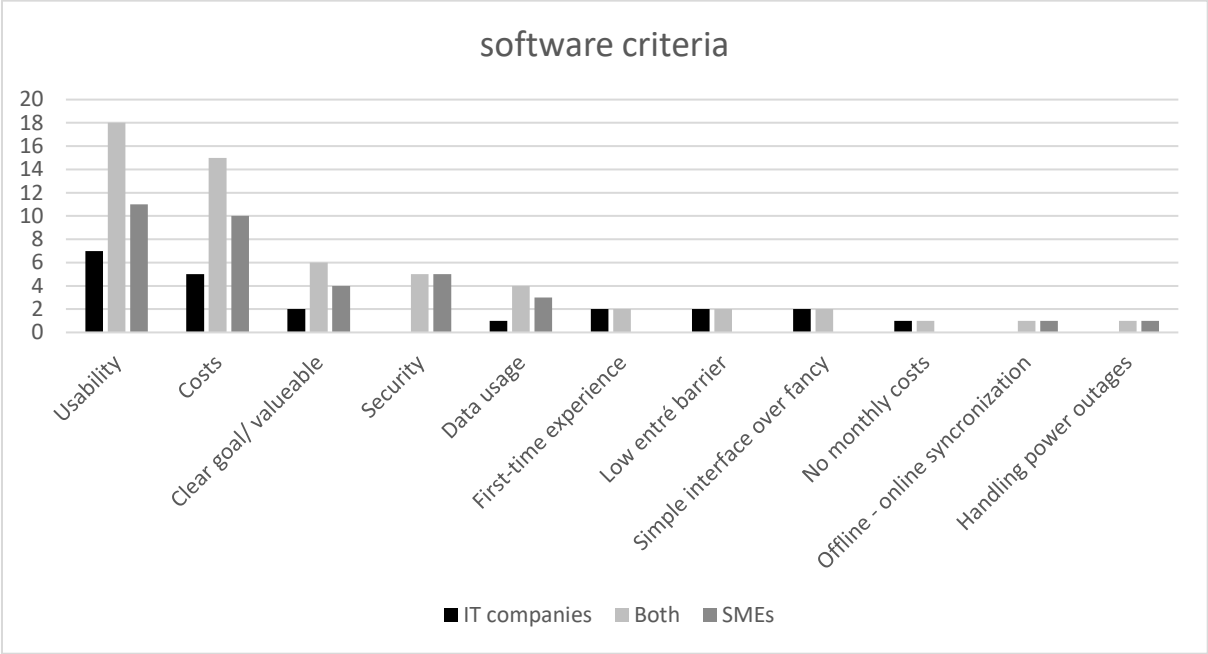
Figure 5-6. Enabling and disabling software criteria.

5.3.6   Best practices and fail factors during these projects

Another topic introduced during the interviews was change management, focusing on the transformation process as a whole. The interviewees were asked about their experiences of these projects, and what kind of activities they thought of as most important. The results of the interviews are presented in Figure 5-7.
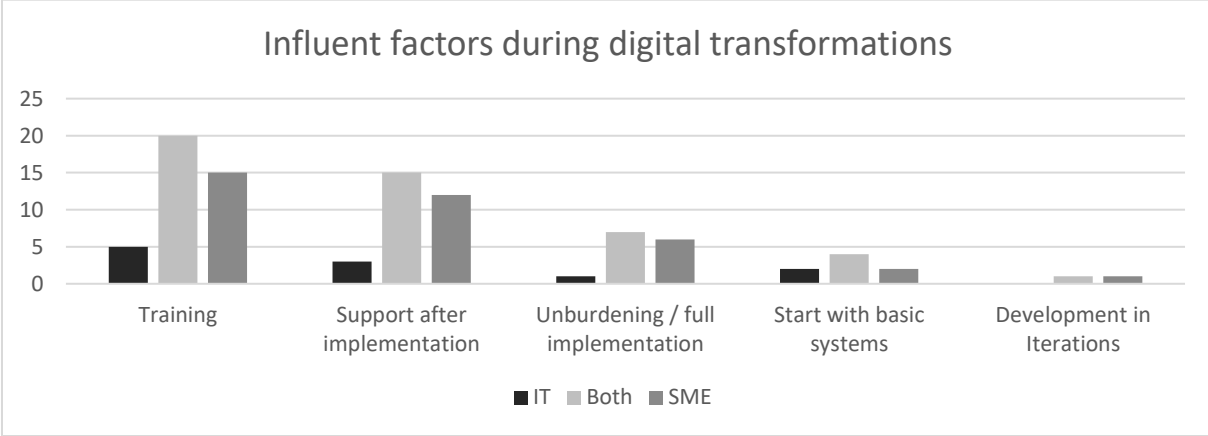
Figure 5-7. Influent aspects during digital transformations.

The gathered data shows that training is seen as the most important factor during the transformation process. 77% of all interviewees talked about it in one way or another. Furthermore, the support after implementation is also seen as crucial aspect. Both of the findings are close related as they help overcome lacking knowledge. Third, many interviewees talked about unburdening during the whole process. The IT company should take care of the full implementation, and should also provide hardware if needed. During numerous interviews, mostly with mangers/owners of the IT-companies, they talked about starting with the basics. No unnecessary functions and a good data infrastructure to start off with.

6 ETHNOGRAPHICAL OBSERVATIONS

Besides literature research and interviews, data is gathered based on ethnographical observations. It looks into different perspectives concerning social-, cultural- and technical aspects of digital transformations of SMEs in sub-Saharan Africa. Oates (2006) defines ethnography as the description of people or cultures. When done correctly ethnographical research has many advantages. It gives a rich and detailed picture of the situation and its context; it can include human, social, organizational and technical aspects of IS development; and it is possible to be applied in complex and embedded social systems that are not fully understood. During the three-month trip to Ghana observations were made to substantiate other findings of the problem investigation phase.

- The type of technologies beneficial for the SMEs;
- Reasons of hesitation towards digital transformations in the SMEs;
- Cultural aspects of interaction between IT-companies and SMEs;

To investigate the type of technologies that fit the African context, observations were made about the financial situation (economical aspect), the general knowledge (cultural) and the IT-infrastructure (technical aspect). The financial situation is observed because the literature argued that Africa is the poorest continent in the world (Lin, 2008). The IT-infrastructure is investigated as literature suggested that this is changing rapidly, especially concerning the internet (Porter et al., 2015; Sanou, 2017). The reasons of hesitation towards digital transformations is substantiated by observations about the Ghanaian attitude towards IT (cultural aspect). The last aspects, cultural aspects that might influence the interactions between the SMEs and the IT-companies, is observed by looking at characteristics and the attitude of the people in Ghana based on the models of Hofstede (2011) and Meyer (2014).

As the ethnographical study provides knowledge about the context of this study, it helps answering sub-questions one, two, and four. The gathered knowledge is taken into account when setting up the requirements for the artifacts.

During the trip to Ghana holistic observations could be made, as all stays and interactions were with locals (with the exception of interactions with a few tourists). An important factor as Oates describes that "taking part of the life of the people" is one of the characteristics during ethnographical studies. As the research method allowed for interviews all over Ghana, half of its regions were visited, giving the cultural observations a solid base. The remainder of this chapter describes observations about the financial situation; the characteristics and attitude; the general knowledge; and the IT related infrastructure in Ghana.

6.1 FINANCIAL SITUATION

The most clear and obvious difference observed, is about the financial situation of the people in Ghana. This situation differs with Western countries, but also between the urbanized- as in the rural areas in Ghana. Within the urbanized areas (referring to Kumasi and Accra) this becomes clear as soon as one leaves the airport. The airport of Accra and the surrounding industrial area is comparable to the Dutch standards. Buildings have up to 25 floors, are well maintained and people are well dressed and drive expensive cars. After less than five minutes driving the scenery changes dramatically. Between some well-maintained buildings and villa's roads become worse, many buildings are half finished and everywhere are people sitting in front of container-like buildings and huts, mostly used as shop and food stalls. Besides the contrast in buildings also the people differ amongst each other. On the streets you see people with suits or nice dresses (mostly sitting in the better places or on their way) and people wearing torn clothes (mostly sleeping, begging and working on the ground or at the shops. Outside of the urbanized areas the situation is a little different. Most people are poor and there are way less well-maintained roads and buildings. Instead an increasing amount of cheap buildings (from bricks, wood and mud) fill the street scene. Most of the people work at little shops, on clothing, agriculture or public. During the many visits in different places, it is noticeable that most of the organizations have a lot of aspects they could invest in. For instance, buildings, furniture, technologies, infrastructure and employees.

6.2 CHARACTERISTICS AND ATTITUDE OF GHANAIANS

In general, the Ghanaian culture is full of humor, hospitality and interest in others. The literature showed that most African cultures value collectivism over individualism (Hofstede, 2019) and this is appreciable when traveling through the country. For a foreigner it often looks like all Ghanaians know each other. One thing I noticed during the different meetings with people was that the level of motivation for change fluctuates a lot. During conversations it appeared to be closely related to the unawareness about a lot of things Western people see as general knowledge. For instance, people tend to be more motivated when they know how businesses in other parts of the world operate or know about problems as climate change. A good example comes forth of the interviews with headmasters and teachers of different schools. One headmaster used a cloud-based management system because he lived in the UK for over 20 years. He wanted his community to see what is possible and loved to communicate with some of the parents via the application (sharing grades etc.). Talking about developmental changes is also perceived as easier with educated people, they tend to be more aware of the possibilities and the need for improvement. The kindness of the people also showed itself daily. For instance, when trying to find new (business) relations. During many of the conversations new connections were proposed and immediately reached out to. The call to introduce the research and me were often held during the conversation itself. Another remarkable difference compared to our western standards, is the fact that many of the people invited me to their homes. During the travels for the interviews there was most of the time the option to eat and sleep at the houses of the interviewees, even after only meeting them for the first time. Their attitude also results in what they call *the extended family*. As a lot of people (families, neighbors, friends) grow up very closely together, they kind of act as a family. They take care for each other and often live together. By traveling through countries like Ghana, you can really start to notice how individualistic we in West Europe are. All these characteristics apply to both private as business situations.

6.3 GENERAL KNOWLEDGE

In all parts of the world people differ in the amount of knowledge they have about certain topics. During the trip to Ghana it became clear that the biggest differences in this country mostly exist on knowledge concerning specific topics. Some subjects like for instance management, IT, healthcare, climate change and world politics are far better discussable with educated people and those in the more urbanized areas. During visits in the poorer regions is became clear that a lot of these subjects just don't reach them. Especially the most relevant topic for this research, the possibilities of IT, are not known at all for some people. To be fair, before the trip to Ghana I underestimated this problem. Growing up in country where I've always been surrounded with IT, such as the Netherlands, made this the most normal thing in the world. This results in the fact that it is hard to grasp how many hours of experiences I've had and with how many different types of systems and applications I've worked. A big part of the citizens of Ghana, and especially elderly and in rural areas, have never really used a computer or a laptop, or used a very small amount of simple applications. The lack of experience and variety makes it hard for these people to imagen the different possibilities. Although many them lack, from a western country perspective, a lot of general knowledge, they are open to discuss these topics. In general, the people are very eager to learn.

6.4 INFRASTRUCTURE

Something what really should be considered when doing business in Ghana is the infrastructure. As the term infrastructure is a rather broad one, it will be explained by the three most important aspects for this research. The first, and most visible example in Ghana is about transport. Although generalized, it is rather safe to state that roads outside of the cities are rather bad. Many of the roads are old and full of potholes or are unpaved. Traveling can take a lot of time compared to western standards. As an example, it takes about six hours to drive from Accra to Kumasi, which covers a distance of about 250 km. The road within the cities are somewhat better, but still leave a lot of room for improvement. When traveling through the cities it is of high importance to leave on time, as these places can be very crowded, and you are often stuck in traffic jams. In Ghana it was noticeable that this is known by everyone, as it is one of the reasons why making appointments is rather flexible. At multiple occasions, for research- as well as private purposes, meetings were not planned based on a time, but rather on a daypart. Another aspect of the infrastructure which is important to keep in mind is about the availability of

electricity. Although this also differs per region it is safe to say that most places have daily light-offs (power outages), which can take between 30 minutes up to a few hours. Just like the electricity, the water availability is also not reliable. Even within the cities there is no constant current from the waterpipes. At some of the more rural places there is no connection at all and is water fixed through water pumps. The last aspect, and one of the more important related to the research, is about the internet. Although you can find an internet connection (h+ and 3g mostly) almost all over Ghana it is not reliable. At some places the connection is very slow and even in the cities it was down about once a week.

6.5 GENERAL INFLUENCES TOWARDS IT

During the visit In Ghana multiple factors were noticed which play a role in the adoption of IT and digital options in businesses. A few major aspects influencing factors every company has to deal with are the role of the government, partners and customers.

The first party, the government, has compared to the Netherlands, little control over his civilians. Few Ghanaian people have real identification, resulting in many unregistered people and companies. Besides, most of the people have no registered home address. This together with corruption, make trusting people via online channels hard compared to countries where online actions are often verified by many institutions. Furthermore, the government offers most of it services offline, which does not create the need to use computer systems in organizations.

The other parties, the partners and customers, do not really create provocation for intensive IT usage. As many companies still don't use computer systems, they don't create options for other organizations to communicate with them via the internet. This differs from countries like the Netherlands were companies are somewhat obligate to use systems, as partners often demand online communication, or other companies are chosen. This works in the same way with customers, with an easy notable observation about payment methods. Where customers in western countries expect to be able to pay with card or via online methods, this is not needed in Ghana where most people still use cash most of the time.

Although IT didn't seem as important for companies in Ghana compared to Western Countries, it was palpable that their use is increasing. During many conversations, it came forward that an increasing amount of people, especially the younger people, were eager to use IT. This was most visible by the use of smartphones. All over Ghana chat applications (mostly WhatsApp) were used and many people used social media.

7 ARGUMENTATION FOR THE ROADMAP

This chapter elaborates on the argumentation of the roadmap. On the one hand, it closes the problem investigation phase by analyzing the data from both the literature- and the empirical research; and on the other hand, it opens the artifact design phase by setting up requirements for the roadmap. Both of the steps are part of the design science method as described by Wieringa (2014). As the roadmap helps answering the main research question it should address digital technologies that would fit the African context, and should it address ways to guide digital transformations. Therefore, it is important to keep in mind the definition of digital transformation as used in this thesis. During the literature research the following definition was chosen:

> *"a process that aims to improve an entity by triggering significant changes to its properties through combinations of information, computing, communication, and connectivity technologies"* (Vial, 2019)

As the definition of digital transformation states that it is about improving an entity by changing its properties with the help of IT- and digital possibilities, it is important for the roadmap to address all the different elements. The analysis is arranged based on the different aspects of the main research question. Figure 7-1 gives a (noncomprehensive) illustration of the related facets of a digital transformation in the context of the research. The figure aims to show the gap between companies who use no IT- or digital possibilities and companies who continuously innovate based on the different possibilities. The continuous innovation derived from the description of digital transformation strategies by Matt, Hess and Benlian (Matt et al., 2015). The middle row of the figure shows some of the *information, computing, communication, and connectivity technologies* as described in-depth in chapter 4.2. As the definition of the transformation stated that is about the improvement of an entity, the top row shows some if the benefits as described by Dorner & Edelmand (2015) and Westerman et al. (2014). Furthermore, the figure shows the position of the SMEs, and the relation with the IT-company.
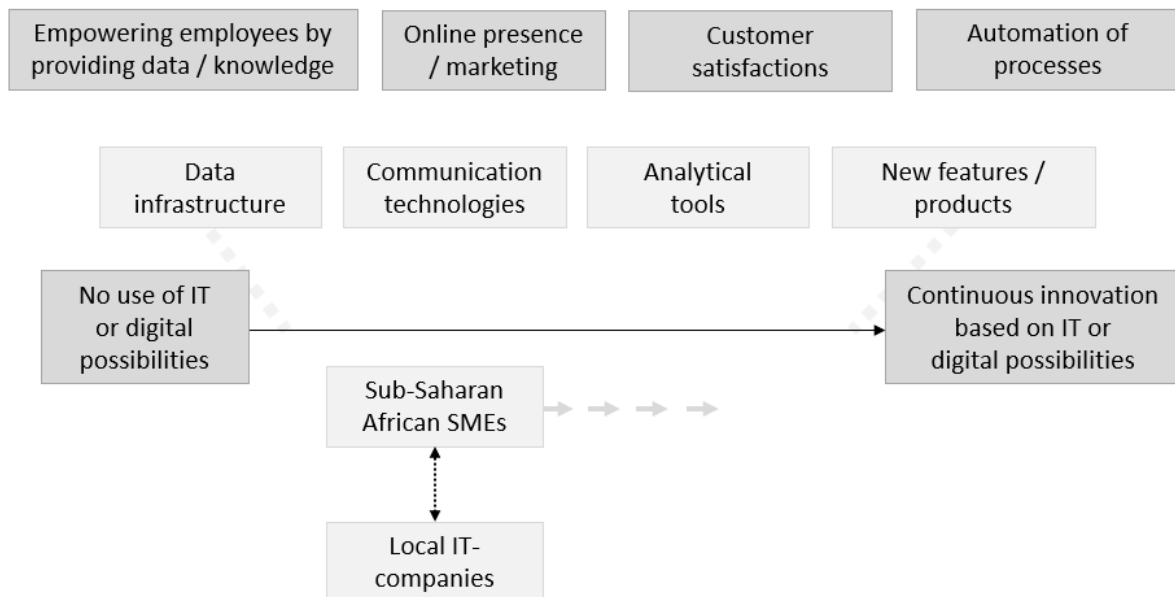
Figure 7-1. A noncomprehensive illustration of the related facets of digital transformation in the context of the research.

The analysis is arranged based on six different topics. First, all the data concerning the current use of IT- and digital possibilities of SMEs that need to be improved are analyzed. As shown in the figure above, this should place them somewhere on the line between using no IT and a company that continuously innovates with the help of IT- and digital possibilities. Second, the reasons that are holding them back are analyzed combined with all findings about communication and marketing. These topics are analyzed because for an IT-company to guide the SMEs (towards the right side of the figure), they need them to be open for their help and the digital transformation in general. Third, the results concerning the current IT knowledge within the SMEs are examined, as the literature showed that certain capabilities are needed for successful change (A. S. Bharadwaj, 2000; Dale

Stoel & Muhanna, 2009; Mithas et al., 2011). Fourth, the analysis focused on technologies that fit in the African context as many different options exist, and those who fit best will be most beneficial for the SMEs. The chapter ends with the analysis of the data gathered about change management, as some practices might be useful to apply during the transformations (again, to the right side of the figure). To summarize, the analysis is divided into the following six topics:

- The current IT deployment;
- How to approach the targeted SMEs;
- The reasons for hesitations;
- Knowledge within the SMEs;
- Opportunities and software criteria; and
- Change management.

7.1 CURRENT IT DEPLOYMENT

Before talking about improvements through the combination of information, computing, communication and connectivity technologies, it is needed to know the current situation of the targeted group: the African SMEs.

The findings of the literature research about digital transformation showed two types of benefits of using IT (see Chapter 4.1). Internal, by making processes more efficient and by getting the right knowledge to (the right) employees; and external, by optimizing communication with partners and customers, improving the customer journey, and by applying new products, features and/or business models. There are multiple types of technologies that can be applied to reach these goals but the literature research showed the importance of starting with a good IT- and data infrastructure for most of the options (Beek, 2010; Safrudin et al., 2014).

During the research it became clear that most of the targeted SMEs use no to little IT in their business, and just a small portion of them have systems that support multiple processes within the enterprise (see Chapter 5.3). The vast majority of the companies only use applications from the Microsoft Office Package: Word, Excel and in a lower amount also Outlook. They use these applications to manage inventory, finance and HRM. During the visits and interviews it became clear that these applications are not used to their full potential. They mostly use it as a simple substitute for how they worked manually, as notebook. They don't automate processes, create overviews, create new insights or communicate online with partners and customers. The exact use differs per company and those located in the urbanized parts of Africa tend to use more IT than companies located in rural areas. Furthermore, is the use of mobile applications very low. Multiple interviewees stated to use their smartphone for business, but only to make calls or communicate via WhatsApp. During all of the interviews not one organization used their phone with an application customized for their own business. The use of websites is similar, not many of the SMEs have one, and those who do have one use it only for one-way communication.

It became clear during the research that the IT infrastructure was very outdated and non-comprehensive (see Chapters 5 and 0). Most of the companies only used one- or very few computers; and in some cases employees used their own laptop to work with. This was different regarding mobile phones. Although these were not provided by the companies, most of the employees had one or two.

The roadmap will be targeting those SMEs that use IT in a basic way, like the use of Microsoft Office, or don't use IT at all. During the field research in Ghana it became clear that there are a lot of these companies out there. These types of companies are located in the both the urbanized- as the rural areas, but can be found mostly in parts of the country that are somewhat in between. When comparing the current status of these targeted SMEs with the findings of the literature, it becomes clear that it is important to start with basics: a good IT/data infrastructure. A beneficial finding during the literature is the lack of legacy systems and the fact that this creates room for improvement and a solid, future proof data-architecture. Furthermore, the current IT infrastructure (hardware) of the companies should be addressed and considered in the business case. Most of the companies do not have the (right) hardware to deploy software. The following requirements are formulated for the roadmap:

- *The roadmap should focus on those SMEs in sub-Saharan Africa that don't use IT, or use it in a very basic way.*
- *The roadmap should consider that the targeted SMEs don't have a solid data- or hardware infrastructure.*

7.2 HOW TO APPROACH SMEs

The prior sub-chapter described the target companies of the roadmap and their current deployment/use of IT, but not how to reach them. This part of the report will cover this by elaborating on the findings concerning marketing strategies and -experiences of the interviewed companies (described in Chapter 5.3); and some aspects of their culture (described in Chapters 3.2 and 6.2).

The literature research showed that the African culture values customer and partner relations over task based communication (Hofstede, 2019). Besides relations, it stated that people in the African (business) culture schedule rather flexible. This was nicely formulated by someone met during a networking event on the Dutch embassy:

> *"People in the Western countries have a watch, the people in Ghana have time"* (personal relations, 01-06-2019).

During the interviews with the IT-companies these results were confirmed. All of the interviewees talked about personal communication as basis of their marketing in Ghana. They told that it is very hard to reach customers via online platforms such as websites and online advertisement. Most of the customers, especially in the starting phase of the IT companies, were known via their personal connections and mouth-word marketing. As one of the interviewees called them: *"people in the sphere of influence"*. This is substantiated by the results that showed that people in Ghana tend to have a hard time trusting (IT) companies without knowing who works for- and runs the company. Another interviewee talked about a closely related subject: branding. Smaller companies are not trusted because they are unknown. During multiple interviews people stated that it works to show prior work or to create some kind of portfolio. In order to connect to potential customers, it is not only needed to meet face-to-face and in a personal way, but also to have the right attitude. One of the interviewees stated the following:

> *"In Accra it is better to show up in a big car and well dressed, it gives companies there the feeling that you are a professional. In the les urbanized parts of Ghana it is better to show up more casual and in a smaller car. The customers will feel intimidated and uncomfortable by big differences."* (30-year-old CEO of CeRIT, 23-04-2019)

During the trip to Ghana it became clear that most of the SMEs that used and invested more in IT, had an employee or an influent person who was motivated to improve the company (and often also the community) with the help of IT- and digital solutions. These people know the benefits of IT because of experience in other companies, education or visits to western countries. During one of the interviews it was stated that getting customers, is most easy when talking to the people who could make the decisions combined with the people they tended to ask for advice. If the marketing-visit does not include those people, they encountered answers such as: *"I'll discuss with the manager/owner/the IT guy and I'll get back to you."*, which they mostly did not do. Different interviewees also stated that follow-ups and/or a lot of patience is needed for getting customers.

Regarding the roadmap it is important to create a method that will address the potential customers (SMEs) in a personal way. The method should result in trust and a good relation between the IT-company and the potential customers. Prior work of the IT-company should be presented to create a sense of trust. As the target group is mostly located outside of the big, urbanized cities the attitude should be business casual in order to align and connect with the customers. The method should include something such as a portfolio to create a feeling of a strong brand, and should involve the influent people of the targeted company as well as the people they go to for advice about IT. The following requirements are formulated for the roadmap:

- *The roadmap should motivate IT-companies to reach out to SMEs in a personal way.*
- *The roadmap should advertise a trustworthy relationship between the IT-company and the SMEs.*
- *The roadmap should motivate the IT-companies to speak to the people with the power to make decisions.*

7.3 REASONS OF HESITATION

During the literature study (Chapter 3.3) as well as during the interviews (Chapter 5.3) it became clear that many managers of SMEs hesitate to adopt ICT. Knowing why they hesitate, and knowing if these hesitations are legit, are important factors when trying to help SMEs to start their digital transformations.

The literature research showed multiple aspects which have an influence on the attitude towards IT, all confirmed during the research trip to Ghana. The most obvious and known reason is the financial status of the companies. The literature research showed that in general these companies lack financial resources and during the interviews and ethnographic observations it became clear that this is true (especially compared to Western companies). Many of the interviewees talked about other priorities which they would invest in before they would even think about IT. They encountered day-to-day problems which have the priority. Another result found during both the literature and the ethnographical studies, was about the lack of educated people. The lack of education around the subject of IT, computers and digitalization results in managers who do not see the benefit of IT. The interviewees often lacked knowledge about how to apply IT in an efficient way and did not see (many of-) the possibilities. The lack of financial resources and knowledge about the benefits of IT are the main points of hesitation. They do not see that digital opportunities can repay themselves, or in other words, they think that the benefits do not outweigh the costs. Another reason that strengthen this, is their short-term orientation. The literature research already stated that these companies are rather short term oriented, and this was noticeable during all the interviews in Ghana. The IT knowledge itself is not seen as a problem by the interviewees. They all addressed training as something very important, but this was never reason for hesitation by itself. They were convinced most of their employees could learn the basics of IT rather easily. The only point of hesitation about the lacking knowledge, are the costs related to training. Another item of costs most of the interviewees saw as a liability is the use of data, especially as this is a continuous item of costs if the system needs internet.

Two other points during the literature research were the bad (IT) infrastructure and the lack of governmental support. Both of them were experienced during the trip to Ghana. The role of the government is not taken into account during this research, but the infrastructure is a problem that should be addressed. During the interviews it became clear that the interviewees were mostly concerned about the general infrastructure lacking in the steady/fast internet connections and electricity outages. Furthermore, multiple interviewees talked about security. They were afraid that people shared their passwords if they needed help, or that the system would be hacked. Especially when talking about "cloud" solutions they were not sure about the protection of their data.

The last point observed, is that a lot of people in Ghana are not enthusiast about IT. Besides not seeing the benefits of IT for companies, they do often not come in situations to really enjoy the possibilities. The overall limited experiences with IT in their personal development and day-to-day life make them to some extend aloof.

Regarding the roadmap it is important to address the points of hesitation that exist by the managers, owners and employees of the targeted companies. With by far the biggest concern being the costs of the opportunities in contrast to its benefits. The roadmap should include a way to help the targeted people see the benefits of the IT in the long term. Especially the financial benefits should be made very clear. Problems such as bad internet connection and light-offs, which could be encountered by a good software architecture, should be addressed. The customers should see that these don't have to be problems. The following requirements are formulated for the roadmap:

- *The roadmap should address the costs and benefits of the IT- a digital possibilities and emphasize on the long-term influences.*
- *The roadmap should inform the owners/manager of the SMEs of the different possibilities and motivate them to make a change.*
- *The roadmap should address the hesitation about infrastructural factors such as the internet and electricity.*
- *The roadmap should address security as this holds back many managers/owners to use the cloud.*

7.4 KNOWLEDGE WITHIN THE SMEs

As stated in the sub-chapter above the IT knowledge in Ghana rather is low compared to Western countries. Although it was not seen as stumbling block for the interviewees it is important to know what kind information and knowledge is missing. The roadmap should address that the SMEs need to get from their current level of knowledge to the level of knowledge needed to use IT in a beneficial way. During the literature study (elaborated in Chapter 3.3) it became clear that the missing knowledge is not only technological but also in forms of management practices and analytical skills. Furthermore, the literature states that many of the managers do not see the need to investing in education for their employees. The lack of knowledge was confirmed during the semi-structured interviews, but the later point, about investing in education, did not came forward. They see the need to invest in education for their employees, but just as with the use of IT they need to be shown that the benefits outweigh the costs. In addition, the literature shows multiple IT capabilities within enterprises for it to be used most beneficial (see Chapter 4.4). Good IT-management, strong human IT assets and a strong relation between the IT-managers and all the employees are needed. Many of those skills relate to other business capabilities such as the ability to use knowledge to analyze changes in markets; to analyze changes in needs of customers & suppliers; to see opportunities in order to increase the market reach; and to link knowledge to improve CRM processes.

The most important knowledge missing concerning this research is about IT. The ethnographical observations show that digital products and services are way less involved in the day to day life in Ghana, compared to Western countries (Chapter 6.5). Computers are not/barely used for pleasure, education and/or businesses. Compared to Western Countries, where almost everybody uses IT from when (s)he is a toddler, most Ghanaians simply lack behind qua experience. Just as noticeable in the Netherlands, there is deviation between the young people and the older ones. Younger people tend to have more knowledge about IT and are more eager to join the digital revolution. Although many Ghanaians lack experience, it does not mean that they cannot use it. Most of the people interviewed were convinced that with training all employees should be able to work with software.

For the roadmap it is important that it involves updating the knowledge of the influent people of the targeted companies. They should learn the basics of IT; should be clearly explained what kind of possibilities exist; and how some of these could benefit their own company. Furthermore, should the roadmap involve training of the employees on how to work with the system; how to manage the IT assets and should it involve support after implementation. The following requirements are formulated for the roadmap:

- *The roadmap should address the missing knowledge of managers/owners of SMEs, including: the importance of going digital; the different IT and digital opportunities; and their benefits and risks.*
- *The roadmap should include training to help manager/owners with the change process.*
- *The roadmap should include software-training and support during and after the implementation.*

7.5 OPPORTUNITIES AND SOFTWARE CRITERIA

Because the situation in west Africa differs from Western countries, other opportunities exist, and other software criteria might benefit them. In this sub-chapter the results surrounding this topic are analyzed. The results came forward during the interviews, literature research and observations; and interrelate to the findings described in the sections above.

7.5.1 IT- and digital opportunities

The literature research (Chapter 4.2) describes different IT- and digital possibilities. Not all of these possibilities fit all type of companies and business environments. This sub-chapter discusses the relation between the elaborated technologies and the situation of the sub-Saharan African SMEs as described before in the analysis (Section 7.1 to 7.4).

Most of the possibilities described require company data. Van Beek (2010) described three tasks for IT which help getting value out of the data. First, IT should manage the data, involving registering, saving, and communicating the data corporatewide. Besides storing data, it is important that this information is managed. The data needs to be controlled and deployed throughout the organization, partners and even customers. An important

part of information management is the design and governance of the IT-infrastructure in such a way that it supports operational, tactical and strategic processes. As third, systems have to support knowledge management, which is about creating and sharing new knowledge obtained from information. Based on this knowledge, companies can make well-argued change and innovation happen. When the three tasks of IT are compared to the findings about the SMEs in sub-Saharan Africa, it is noticeable that most of the SMEs just reach the first task, and that even this is badly supported by the infrastructure. This means that one of the major opportunities for the SMEs, starts with their IT-infrastructure and data management. Improving the data-infrastructure includes the use of (data) management systems. As described in Chapter 4.2, many types of systems exist, with often a lot of overlap. For the targeted SMEs especially ERP- and CRM systems could be very useful as these help manage their processes and business relations. Supply Chain Management (SCM) systems are less of an opportunity as many other parties in the supply chain don't have the systems in place to communicate with it. Furthermore, different analytical tools/systems are explained during the literature study. For the situation in sub-Saharan Africa, where finance and knowledge play a big role compared to Western countries, at least productions reports are a good option. These automatically generated reports can create, relatively cheap, insights in all facets the system has data of. Options such as: sales forecasts, customer satisfaction reports, service costs and order cycle time could help them improve their businesses. Other options, such as the use of big data, need a more extensive data set, often customer specif. This option is no real opportunity when looking at the current situation of the SMEs, but might benefit them in the future.

Taking a look at communication with customers, multiple opportunities were identified. Chapter 4.2 formulated the possibilities of websites and social media. Both of the two options could be implemented isolated of other systems that provide data. This could lead to an improved online presence, and new ways marketing. The sub-Saharan African situation does provide a solid basis for the use of these customer channels as mobile phones are used by a big part of the population, and most of the regions have internet coverage (Hampshire et al., 2015; Porter et al., 2015). When these options would be implemented in combination with the management systems as described above, many more opportunities arise. The customer journey could be improved by new ways of communication and interaction with the customers, and processes could be automated resulting in more efficient businesses (see Chapter 4.1 for more information). The research found that the use of mobile phones and the use of internet is increasing, making these possibilities increasingly important as time passes.

Besides communication with the customers, IT can be used for internal communication (see Chapter 4.2.1). One of the main benefits is that these systems cancels-out geographical distances, and thereby minimize the efforts to reach one another. Many applications also reduce temporal distances, that is, the fact that actors can communicate over time and when it fits them best. Many (free) tools exist such as: E-mail services, Chat services, Planning services, etc. These options fit very well in the African context because of multiple reasons: they are free or very cheap; help communication over distance (which in general take more time to cover, compared to Western countries); and have no need for an existing data infrastructure. Some of the options are already used by the SMEs, but for those who don't use them yet, these are opportunities.

Another category of technologies/digital options includes digital products and -features. Where the previous options described technologies which mostly take a supportive role, these tools play a more strategic role (Evans et al., 2006). Digital products focus on creating new ways of making profit, by offering new products to consumers, or by facilitating extra features and services. Many digital products are supportive to other core products and increase their value. One example is how app-stores relate to android devices, and making them incredibly more valuable. Many of these features have as goal to improve customer satisfaction; gather data about the customers; and/or help companies grow. The feasibility for these options for small and medium enterprises in SSA is highly dependent on the type of company and the product or feature. In many situations the costs are rather high, and not feasible in the short term; but this does not account for all cases. The increasing number of mobile phones and the growing area with internet coverage provide a solid base for these options, now and even more in the future. Just like with many other options, a solid data infrastructure is needed in most cases.

The last possibilities described come with the technologies involving cloud computing. Chapter 4.2.3 discusses multiple applications of having services in the cloud, making it possible to access data and services via the internet all over the world. Wu, Ping, Ge, Wang and Fu (2010) identified the key technologies and listed the main

benefits. By making the data and services available in the cloud it can be more easily accessed, often for lower costs, increasing its value by enabling opportunities for enhanced collaboration, integration and analysis. Furthermore, storage and computing power is more easily scalable, and maintenance is taken care of. The user experiences the storage just like a normal server, but in reality the user's data could be stored on any one or more of the computers used to create the cloud. Cloud solutions are rather low threshold as the implementation costs and knowledge needed for maintenance are low compared to internal and company specific applications. Especially when software is designed in a generic setting, which can be used by multiple organizations. When analyzing these possibilities in the context of this research, it is not possible to say that this is a beneficial opportunity for all SMEs in sub-Saharan Africa. The costs of data and the instable internet connection can be a real problem. For some of the organizations the benefits of having their systems and data in the cloud might outweigh the cost. It is important that per company the situation is analyzed, looking at the internet coverage in the region; looking at if the systems needs to be used in different locations; and if these benefits would outweigh the costs. Although an assumption, most of the interviewed SMEs would use their systems mostly in one location, and if not necessary, the safer option is to advise/design an offline system. On the other hand, the few legacy systems in the SMEs give rise to the opportunity to design the system architecture from scratch. In these cases, the opportunity to implement systems, easily convertible to the cloud in a later phase, is important. Besides, other options exist, such as creating systems that could be used offline and online, minimizing the data usage and problems that occur when the internet connection fails.

7.5.2   Design criteria

The most important software criteria, one that came forward in almost all interviews, is the usability of the software. As stated, the level of knowledge is often low amongst employees and they often lack experience of working with computers. When taking this into account, this results in applications with a simple user interface, focusing on the important features for the business. One of the interviewees stated the following:

> *"The software should be simple to use and should focus on the core processes. Employees will adopt it more easily if they see the value of why they use it" (Product manager, Viamo, 30-04-2019)*

As the citation above describes, are the core processes the first and most important parts of the company which should be addressed. Other possibilities, as gaining new markets, new features or totally new products are not the priority. A good example of usability was given about WhatsApp. In Ghana there are still a lot of people who do not know how to write or read, or who are insecure about for instance their English spelling. On top of that, these people are often unexperienced with IT. Although this makes it hard to use smartphones, they still use WhatsApp, but only with the voice message function which requires little IT- and linguistic skills.

A second criteria to keep in mind when creating the software is finance. Applications can be made to be operated in different environments and with all kinds of architecture. All aspects should be considered to create an application that is beneficial from a financial point of view. The use of online applications is quickly seen as too expensive as data costs money. During the interviews someone mentioned that fancy applications look expensive, and when used online also look like they use a lot of data. Simple applications that focus on their main goal are preferred rather than fancy applications with many options barely used. An application with a low entrée barrier, simple interface and aligned with the important processes works best. When creating or trying to sell an online application, it is of high importance to highlight why it is beneficial to use the cloud.

Furthermore, software should be designed in a way that is capable of handling power-offs and unstable internet. Functions like auto-save help reduce the loss of information if a computer should turn off because of the lack of electricity, and synchronizing between an offline application and the cloud could help in areas where the internet is less stable.

- *The roadmap should steer the digital transformation based on applications which are easy to use, focus on the core processes, and have a simple interface.*
- *The roadmap should emphasize the importance of training the SMEs employees.*
- *The roadmap should address that costs are an important factor of applications to be accepted.*
- *The roadmap should discuss the compatibility of applications with power- and internet outages.*

7.6 Change process

The definition of digital transformations describes it as a process of change. As the goal of the roadmap is to guide this change at SMEs, provided that it is beneficial, it is an important factor to address. The literature study showed different models and methods (Chapter 4.5), and many more exist. In general, three main conclusions were made: the importance to create willingness and understanding of the change process; the importance of actively guiding the change; and the importance to govern the changes and to keep looking for new opportunities. Although the knowledge about change management was not measured during the interviews, the assumption is made that it relates to the general knowledge, and should the roadmap include some of the basics of change management. For instance, about actively guiding the whole process and the short lines for support between the customer and the IT-company. During the interviews, the literature research and the observations, it became clear that West African people value personal- and a lot of communication. Training should be included during the implementation and support should be assured for as long as they use the system. Furthermore did multiple Ghanaians stress out the importance of a good working product by first use. Bugs and failures demotivate the targeted employees quickly. One of the interviewed called it the *"I-told-you-so" effect*. The transformations should start by going over the basics, such as the IT infrastructure and optimization of processes, but the architecture should allow for a relatively easy implementation of other options as creating new digital products or customer communication. One of the interviewees from an IT-company experienced that customers liked their three-stage method: starting with the data structure, moving on to business intelligence and from there on looking for innovation. The importance of laying a good IT-infrastructure as foundation was confirmed in the literature.

Furthermore, some of the cheap/free options should also be discussed with the SMEs. Opportunities, such as new internal communication channels and the use of social media, can benefit many of the SMEs.

The roadmap will take the suggestions as described in this sub-chapter into account. The knowledge about change management should be exchanged between the IT-companies and the SMEs, and the IT-companies should suggest starting with a good infrastructure. Besides, free/cheap opportunities should be addressed, as these can create financial benefits in the short term. The following requirements are formulated for the roadmap:

- *The roadmap should importance existing knowledge concerning change management, including the importance to create willingness/understanding amongst employees; actively guiding the change; governing the change; and the continues looking for new innovations.*
- *The roadmap should motivate IT-companies to keep the communication lines short during the transformation process.*
- *The roadmap should address the importance of the first-time experience of their applications.*
- *The roadmap should address the importance of starting with a solid basic system, opening options for business intelligence/process optimization and IT/digital based innovation.*

7.7 Requirements for the roadmap

The prior sections of Chapter 7 elaborated on the analysis of the data gathered in the problem investigation phase, and shows how it relates to the roadmap. This sub-chapter gives the direction of the design of the roadmap in the form of requirements, as suggested as start of the Artifact Design phase by Wieringa (2014). The roadmap helps answering the main research question, and in addition, it takes into account the problem which gave rise to the research direction. The problem was stated by Diana van der Stelt:

"Ghanaian IT companies struggle to market their services and software products to small and medium enterprises" (Diana van der Stelt, personal communication, 27-2-2019)

The roadmap will consist includes two parts: guidelines and a workshop framework.

7.7.1 The guidelines

The guidelines are formulated based on the results gathered during the problem investigation; and include different aspects IT-companies should consider when trying to guide SMEs in sub-Saharan Africa. They help answering the main research; implying that they should help IT-companies to guide digital transformations in sub-

Saharan African SMEs, and that they should show the IT-companies what opportunities fit in the contexts. Multiple research aspects were identified when setting up the research method, they derived from the main research questions in combination with the definitions of digital transformation (Vial, 2019), change (OED, 2018) and guidance (OED, 2018). They relation to the research is in-depth elaborated in the research method (see Chapter 2.2.1.2). The following aspects are used to create the requirements of the guidelines:

- The current situation of the SMEs;
    - o Deployment of the technologies;
    - o The human IT skills;
- The type of technologies beneficial for the SMEs;
- Reasons of hesitation towards digital transformations in the SMEs;
- Experiences during prior IT-related projects with SMEs.
    - o Cultural aspects of interaction between IT-companies and SMEs;
    - o Best practices and fail factors during these projects.

The following guidelines are formulated:

1. The guidelines should inform the IT-companies about the current situation of the SMEs;
2. The guidelines should inform the IT-companies on what (beneficial) digital options exist for the SMEs;
3. The guidelines should inform the IT-companies on what holds back the digital transformation of SMEs;
4. The guidelines should inform the IT-companies on how to reach out and communicate with the SMEs;
5. The guidelines should inform the IT-companies on best practices and fail factors during transformation projects;

As digital transformation is seen as a process of change (Vial, 2019), the three main phases of change management as described in the literature study are taken into account (see Chapter 4.5). These are: creating a sense of urgency; actively guiding the change; and governing the change. Furthermore, the roadmap addresses the struggle IT-companies have when marketing their product, resulting in information about how to find the right (potential) customers and the technologies that fit their situation. To summarize, the roadmap exists of guidelines divided into the following four sections:

1. *Sub-Saharan African SMEs*; describing the current situation of the SMEs, the benefits they still can achieve with the help of IT- and digital options, and how they can find them. *(requirements 1, 2 and 4)*
2. *Creating a sense urgency*; describing reasons the SMEs are at their current situation, and informing them how to help them overcome those hesitations. *(requirements 3 and 4)*
3. *Fitting technologies*; describing the technologies- and software criteria fitting in the context of sub-Saharan Africa. *(requirement 2)*
4. *Implementation and aftersales*; describing best practices and fail factors during transformation projects *(requirement 5)*

More detailed requirements are formulated to support the elaboration of the guidelines. As these requirements overlap with those of the workshop framework these are given in section 0.

7.7.2 The workshop framework

As the analysis in Chapter 7.1 showed that most of the targeted SMEs don't use any IT- or digital opportunity to their full potential, the workshop framework focusses on getting the SMEs to their next (and often first) digital step.

Digital transformations have no clear end goal, but should rather bring the company to a point that it keeps innovating based on new IT- and digital possibilities and arising opportunities (Vial, 2019)*. Therefore, it is important to help the SMEs start their digital transformation by taking a first (digital) step. The analysis in Chapter 7.5 showed the different opportunities and described the different situations in which they can be applied. The analysis showed that many of the opportunities need a solid data-infrastructure first. For most of the companies this is an important first step. Furthermore, did it show that some communication technologies can be implemented without this infrastructure, such as: websites, social media, video chat services etc.*

This first step is important, as the IT-companies have nothing to guide if the small and medium enterprises don't want to change. Besides the first step it is important that the SMEs look for more, future innovations based on the technologies. The following main requirement is set up:

- The framework should describe how IT-companies could give a workshop that motivates SMEs to take the next digital step;

If the companies see the benefits of taking a next digital step, new potential customers arise. The problem that led to the research topic raised the struggle that IT-companies have when marketing their products. The framework helps overcome this struggle by including the following the sub-requirement:

- The framework should describe how IT-companies could give a workshop that possibly results in new customers;

In order to meet the requirements, the framework exists of five main modules that should be included in the workshop (see Figure 7-2).
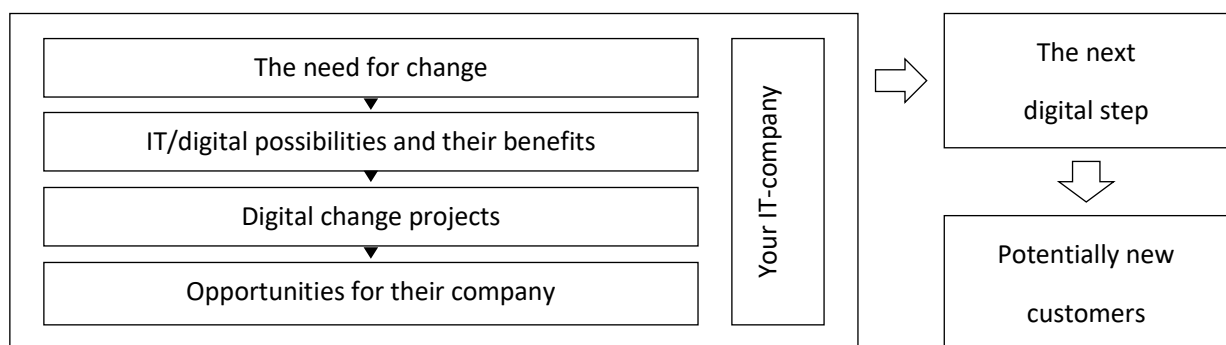

Figure 7-2. The Digital Transformation Workshop Framework.

The four modules on the left side of the figure help reaching the first goal, to motivate SMEs to take the next (or first) step towards a more digital business. They take into account the different findings of the problem investigation phase, such as the reasons for hesitation toward digital transformations; their current IT-deployment; and the level of IT-related knowledge. The first module, the need for change, is substantiated by the problem context as described in Chapter 1. In this chapter, the role IT- and digital possibilities can play in the world and in the development of sub-Saharan Africa, is explained. The second module, about the different possibilities and their benefits, is backed up by the elaboration of the different technologies for digital transformations as described in Chapter 4.2. The module about digital change projects is derived from the sections 4.3 to 4.5, and aims to educate the participants on the different facets of change management. The bottom module relates the gained knowledge of the first three modules to the situation of the participants. In order to do this, the companies are analyzed based on the Business Model Canvas (Osterwalder & Pigneur, 2010) and fitting digital opportunities are looked for. The module that is left is about the promotion of the IT-company. It is placed sideways as it should be applied during the whole workshop. It is based on the results described in 7.2, explaining cultural aspects of interaction between SMEs and IT-companies. The whole workshop frameworks, and how to apply it, is described in chapter 8.5.

More detailed requirements, targeting the whole roadmap, are described in the next section (Chapter 0)

7.7.3 Overall requirements of the roadmap

The following list of requirements apply to the whole roadmap, including both the guidelines and the framework. They are a enumeration of the requirements as given before in Chapter 7.1 to 7.6.

Requirements based on the analysis in Chapter 7.1:

- *The roadmap should focus on those SMEs in sub-Saharan Africa that don't use IT, or use it in a very basic way.*
- *The roadmap should consider that the targeted SMEs don't have a solid data- or hardware infrastructure.*

Requirements based on the analysis in *Chapter 7.2:*

- *The roadmap should motivate IT-companies to reach out to SMEs in a personal way.*
- *The roadmap should advertise a trustworthy relationship between the IT-company and the SMEs.*
- *The roadmap should motivate the IT-companies to speak to the people with the power to make decisions.*

Requirements based on the analysis in *Chapter 7.3:*

- *The roadmap should address the costs and benefits of the IT- a digital possibilities and emphasize on the long-term influences.*
- *The roadmap should inform the owners/manager of the SMEs of the different possibilities and motivate them to make a change.*
- *The roadmap should address the hesitation about infrastructural factors such as the internet and electricity.*
- *The roadmap should address security as this holds back many managers/owners to use the cloud.*

Requirements based on the analysis in *Chapter 7.4:*

- *The roadmap should address the missing knowledge of managers/owners of SMEs, including: the importance of going digital; the different IT and digital opportunities; and their benefits and risks.*
- *The roadmap should include training to help manager/owners with the change process.*
- *The roadmap should include software-training and support during and after the implementation.*

Requirements based on the analysis in *Chapter 7.5:*

- *The roadmap should steer the digital transformation based on applications which are easy to use, focus on the core processes, and have a simple interface.*
- *The roadmap should emphasize the importance of training the SMEs employees.*
- *The roadmap should address that costs are an important factor of applications to be accepted.*
- *The roadmap should discuss the compatibility of applications with power- and internet outages.*

Requirements based on the analysis in *Chapter 7.6:*

- *The roadmap should apply existing knowledge concerning change management, including the importance to create willingness/understanding amongst employees; actively guiding the change; governing the change; and the continues looking for new innovations.*
- *The roadmap should motivate IT-companies to keep the communication lines short during the transformation process.*
- *The roadmap should address the importance of the first-time experience of their applications.*
- *The roadmap should address the importance of starting with a solid, data-system, opening options for business intelligence/process optimization and IT/digital based innovation.*

8 THE ROADMAP

The report before you is the result of a Master thesis research. During the research the digital transformation of small and medium enterprises (SMEs) in sub-Saharan Africa has been explored. It looked at different aspects of digital transformations and investigated them in the sub-Saharan African context. One of the goals of the research was to see how local IT-companies could guide these transformation processes. The research resulted in this report, from now on called: the roadmap. The roadmap consists of five different sections, written for IT-companies operating in sub-Saharan Africa. The first four sections are guidelines and give advice on how to act as representative of such an IT-company, focusing on digital transformations. The last section elaborates on a workshop framework, which can be used to convince potential customers (SMEs) to take their next step towards the use of IT/and digital options in their organization.

8.1 SECTION 1: SUB-SAHARAN AFRICAN SMES

During the research the interviews were held with SMEs and IT-companies in Ghana; and observations were made. The goal of these conversations and observations was to map the current IT- and digital situation of the SMEs. It turned out that most of the SMEs deployed and used very little IT- or digital options. Most of the companies only used applications from the Microsoft office package such as Excel, Word and Mail; with exception of a few cases who used additional software focusing on company specific processes. The data created in these applications was in none of the companies used for business intelligence practices like predicting sales or looking up trends. The main reasons for the applications was storage of the information, as substitute for manually writing things down and physical storage. Furthermore, the research showed that only about a third of the companies owned a website. The fact that most of the companies don't have a company broad management system; use the data to improve their business; and/or put effort in keeping up a professional website; shows that there are many opportunities for improvement based on IT. Current literature about the use of IT and digital possibilities state many proven improvements (Dörner & Edelmand, 2015; Westerman et al., 2014) such as:

- Empowering employees by providing knowledge;
- Optimization of processes;
- Improved communication with partners and customers;
- Automation of processes;
- Improving the customer journey; and
- Creating new features/products.

In addition, the literature study showed that, especially management systems, get more important as companies grow (Snijders & Bast, 2012). The bigger a company gets the harder it is to keep track of business activities like employees, processes, customers, inventory and finance. It is therefore wise to target those companies who are in need for IT. For example: private schools with less than a hundred students, managed by people from the local community, have less need for IT compared to schools in the major cities with over a thousand students. During the interviews it became clear that for the situation in Ghana these SMEs are mostly located in areas that are urbanized and/or growing; and the same is expected in many other countries in sub-Saharan Africa. These regions offer the best business environment for the enterprises to grow and people in these areas are more used to IT- and digital possibilities than people living in rural areas.

Furthermore, it became clear during the interviews that communication via a personal way is more effective than via digital methods. It is therefore strongly advised to look for customers by personal means. The sphere of influence is the best way to reach out to people who might become customers. In order for this network to grow, it is important to follow-up on possible leads, and to try and create personal relations. If people might be interested, they should be visited for a, not too much business focused, meeting. Talking about possibilities, their company and IT in general. References are a good way to grow a network, so customer satisfaction should be one of the priorities. As finance came forward as one of the main reasons why many SMEs have not yet implemented more IT- and digital opportunities, first meetings should be cheap or free. During these low barrier meetings, the need and urgency for the specific organizations can be analyzed and explained, as further explained in the next section.

8.2 SECTION 2: CREATING A SENSE OF URGENCY

The research showed multiple reasons why SMEs don't use (more) IT- and digital possibilities. These reasons are important to keep in mind when trying to get the SMEs to start their digital transformation. The main factors indicated by the interviewees that play a role in withholding the change, are the financial situation of the companies and the fact that they think change is not really needed. Two close related reasons as the need and benefits for change are often expressed in financial value. In order to initiate change, it is priority to show the targeted companies how IT can be beneficial for them. This is strengthened by literature as creating a sense of urgency is seen as the first step for successful change (Hiatt, 2006; Kotter, 1995; Levasseur, 2001). During the field research in Ghana it became clear that different tactics can be used to create the sense of urgency.

First and foremost, it is important to address the reasons why many managers and owners of SMEs hesitate. Most important is to show them the benefits of the different systems, as the interviewees at SMEs in Ghana indicated that they don't think that the benefits outweigh the costs. Show them how different systems can make their company more efficient as more insights and support can empower employees; and many processes can be automated to decrease the workload. Furthermore, the owners should be told how in a later phase, external benefits like new ways of communication with customers and partners; improved customer journeys; and new products/features/business models can help their business grow (Dörner & Edelmand, 2015; Westerman et al., 2014). Although these improvements have a price, these should result in a long-term financial advantage. In addition, there are also cheap/free options, such as: video chat services, planning applications and social media (Laudon & Laudon, 2014). It is important to make them enthusiast, and willing to change.

A second advise for convincing the people within the SMEs is by giving examples. During the interviews it became clear that showing prior work; and good references help creating trust in the IT-company, and the digital transformation overall. Try to keep customers happy as they can be used as model for future potential customers. Furthermore, it also helps to show them a demonstration of the products if available. When addressing their hesitation and showing prior work, it is important to meet with the right people within the SMEs. Arrange meetings with the people of the company who have the power to make the decisions about these kinds of investments and also try to get their advisors on board. Multiple interviewees in IT-companies complained that if this is not arranged, it will often occur that they say they will come back to you, which they don't because of other day-to-day activities.

8.3 SECTION 3: TECHNOLOGIES AND BUSINESS MODELS

Section one and two showed the current situation of the SMEs, including the fact that there are many opportunities; and provided guidelines on how to create the sense of urgency. During the research the context is analyzed to see what technologies and business models fit best for the small and medium enterprises in sub-Saharan Africa. The literature suggest multiple types of technologies (both IT and digital) to improve businesses (Evans et al., 2006; Laudon & Laudon, 2014; Recker, 2015; Snijders & Bast, 2012; Stair & Reynolds, 2012; Wu et al., 2010), but not all of them fit the context. In this part of the roadmap a noncomprehensive list of technologies as found in literature are explained and placed into the context of the sub-Saharan African SMEs. Furthermore, it explains the most important aspects that should be considered when designing software. Note, that the different possibilities described came forward during the research and don't have apply to all customers. Some situations might differ, and other wishes might exist.

8.3.1 Technologies and opportunities in the sub-Saharan African context

Most of the options that will be explained require data (think of customer-, employee-, sales-, financial data etc.). The use of IT changes the way in which data is used, processed and communicated (Stair & Reynolds, 2012). Data can be used to create knowledge, used for strategic decisions and other digital opportunities. Van Beek (2010) stated three main tasks IT supports concerning data. First, it should manage the data. This involves registering, saving, and communicating of data used corporatewide. Besides storing data, it is important that this information is managed. The data needs to be controlled and deployed throughout the organization, with partners and with customers. When information is communicated well, knowledge can be created. As third task, systems have to support knowledge management, which is about creating and sharing new knowledge obtained from the

information. When comparing the three tasks of IT to the situation of the investigated SMEs, it Is noticeable that most of them come as far as implementing the first task: registering, saving and communicating; and that even this task is poorly supported by a solid data infrastructure. To conclude, for many SMEs the data-infrastructure is an important first step before looking towards many other IT- and digital opportunities.

(data) Management systems

One of the most important systems to deal with data are management systems. Snijders en Bast (2012) describe multiple types of systems, such as enterprise resource planning (ERP) systems, supporting sales, inventory management, production planning, logistics, and marketing; supply chain management systems, focusing on activities related to suppliers and partners; and customer relationship management (CRM) systems, supporting business relationship activities. The implementation of these systems can be complex, as many companies have to deal with legacy systems and the transmission of massive amounts of data. The interviews with the SMEs showed that in the context of sub-Saharan SMEs these legacy systems are not existing in most of the cases, making the implementation somewhat easier. The costs to design and implement these systems can be rather high as these must align with organizational needs, but simple systems covering the basics should be able to outweigh the costs. These systems form the basis for many other beneficial options. More about design criteria for such systems can be found further in this section.

Analytics

The data gathered by management systems could contain value as decisions on all fronts could be better addressed (Laudon & Laudon, 2014). For this to work, data should be analyzed and turned into knowledge (manually or automatically). Low threshold analytical tools are production reports; predefined reports based on industry specific requirements. A few examples are sales forecasts, customer satisfaction reports, service costs and order cycle time. These reports are easily generated if the right data is collected. At a further stage, when more digitally mature, big data analysis can be used. This uses tremendous quantities of data gathered online to recognize patterns for applications like individualized recommendations to customers. When placing these techniques in the context sub-Saharan African SMEs, the first options can prove themselves to be useful. Most of the SMEs don't use this, relatively easy technique to create insights. To use the technique a data management system is required. The latter option, concerning big data, is for most of the SMEs still out of reach, as it requires big amounts of customer data. The options can prove itself useful in a later phase of the digital transformation, in combination with other possibilities such as mobile applications.

Customer channels

As regards to communication with customers, many IT/digital related options exist. Those options make it easier for the SMEs to communicate with a large amount of people at the same time or decrease the workload for employees (Laudon & Laudon, 2014). One of the most used channels are websites; not only for providing information to customers but also to create new ways to interact with them. In combination with a good data infrastructure this could result in automating processes like registrations or sales, or could it offer services involving communication of customers with other customers. The presence of mobile phones in combination with the increasing internet coverage in of sub-Saharan Africa (Porter et al., 2015) makes this option increasingly relevant. Besides websites, this also account for the use of mobile applications. These are often used for the same purposes, but have as advantage that these perform faster and more efficient (Charland & Leroux Brian, 2011). Both of the technologies help improve customer journeys as they provide customers with (extra) information and services everywhere they go. In addition, these options open the opportunity for SMEs to collect data about the user, which as explained before, could be used to improve their business. Another customer channel that could be used in the context of sub-Saharan Africa are social media. Social media provide platforms for marketing on a large scale, and in many cases for free. During the research it became clear that social media is used in Ghana, and that it this use is increasing. Especially the younger generation located in urbanized areas are active on these platforms.

Internal communication

Besides communication with the customers, IT can be used for internal communication (Laudon & Laudon, 2014). One of the main benefits is that these systems cancels-out geographical distances, and thereby minimize the efforts to reach one another. Many applications also reduce temporal distances, that is, the fact that actors can communicate over time and when it fits them best. Person A can leave a message, which person B could read and process hours, days or even weeks later if it suits him/her better. Many (free) tools exist:

- E-mail services;
- Video call services;
- Chat services;
- Planning services; and
- Forums;

These options fit very well in the African context because of multiple reasons: they are free or very cheap; help communication over distances; and have no need for an existing internal data infrastructure. The disadvantage of these communication techniques in the context of sub-Saharan Africa, is the unstable connection to internet.

Digital features/products

Another category of technologies/digital options are about digital products and features. Where the previous options described technologies which mostly take a supportive role, these tools play a more strategic role. Digital products focus on creating new ways of making profit, by offering new products to consumers, or by facilitating extra features and services (Evans et al., 2006). Many digital products are supportive to other core products and increase their value. An example is how app-stores relate to android devices, making them incredibly more valuable. Another example is about mobile applications of tele-providers. While providing an internet connection is their core product, the applications offers extra features as insights in the customers data usage. Many of these features have as goal to improve customer satisfaction, and help companies grow as this attracts new customers. The feasibility for these options for small and medium enterprises in SSA is highly dependent on the type of company and the product or feature. In many situations the costs are rather high, and not feasible in the short term; but this does not account for all cases. The increasing amount of mobile phones and the growing area with internet coverage (Hampshire et al., 2015), provide a solid base for these options, now and even more in the future. Just like with many other options, a solid data infrastructure is needed in most cases.

Cloud computing

The last possibilities described, come with the technologies involving cloud computing. The research discussed multiple applications of having services in the cloud, making it possible to access data and services via the internet all over the world (Wu et al., 2010). These options have multiple benefits. By making the data and services available in the cloud it can be more easily accessed, often for lower costs; increasing its value by enabling opportunities for enhanced collaboration, integration and analysis. Furthermore, storage and computing power is more easily scalable, and maintenance is taken care of. The user experiences the storage just like on normal servers, but in reality, the user's data could be stored on any one or more of the computers used to create the cloud. Cloud solutions are rather low threshold as the implementation costs and knowledge needed for maintenance are low compared to internal and company specific applications. When analyzing these possibilities in the context of sub-Saharan Africa, it is not possible to say that this is a beneficial opportunity for all SMEs. The interviews and observations showed that the costs of data and the instable internet connection can be a real problem. For some of the organizations the benefits of having their systems and data in the cloud might outweigh the cost, but this is highly dependent on the kind of system.

It is important that per company the situation is analyzed, looking at the internet coverage in the region; looking at if the systems need to be used in different locations; and looking if the financial benefits outweigh the costs. Although an assumption, most of the interviewed SMEs would use their systems only in one location, and if the cloud is not necessary, the safer option is to advise an offline system. On the other hand, the few legacy systems in the SMEs give rise to the opportunity to design the system architecture from scratch. In these cases, the opportunity to implement systems, easily convertible to the cloud in a later phase, can make it future proof. Besides,

other options exist by creating systems that could be used offline and online, minimizing the data usage and problems that occur when the internet connection fails. Using the cloud does also create another option. Standardized cloud based applications can reduce investment and maintenance costs, as these are divided amongst many user (Wu et al., 2010).

To conclude, many of the different technologies and digital options are rather feasible for small and medium enterprises in sub-Saharan Africa. As all companies have different business models, it is important to look for the right opportunities. Some of the cheap tools, like social media or skype can be easily used to improve customer reach and overall communication. Many other options need a solid data infrastructure before they can be applied in a beneficial way. As a solid IT-infrastructure is created, other options might prove themselves beneficial as they can optimize and automate process; empower employees; improve communication; and help companies grow. The benefits of putting the systems and data in the cloud depends highly on the context of the SMEs.

8.3.2   Design criteria

The research created a broad view on the situation of the sub-Saharan African SMEs, and resulted in insights of criteria which should be considered when designing software. The most important criteria are the usability of the software. Many employees in SMEs are not experienced with the use of computers for business purposes and have to learn the basics. Making a system that is easy to use really benefits the transformation process. Furthermore, the research showed that fancy looking applications are often seen as more expensive and data intensive. More simple interfaces are often preferred as this looks like they really support the right process without too many distractions, and they give less room for mistakes made by the end-user.

To build on top of the last argument, the data of the interviews showed that it helps to design systems with a clear goal related to the core processes. Create the application in such a way that the most important functions are in the foreground and don't add functions that are not really necessary. This keeps the system low in costs and new users will make less mistakes. When new customers are more used to the system, they might want to extend software with adding new functionalities. To make this easier and cheaper in the future, it is wise to design the architecture in such a way that it is extensions are added easily. Start with creating an application with a good data infrastructure/foundation. This foundation can prove very valuable for other possibilities like business intelligence and other innovations such as new features for customers.

The last aspects have to do with costs and the general infrastructure in sub-Saharan Africa. During the observational study it became clear that many areas in the West-African region don't have a stable internet- and electricity connection. This should be taken into account when designing the applications. Think of solutions like offline-online synchronization and autosave functions to overcome data loss. If systems are only used at one location, an offline application could be the better option. Keep in mind, that as told before, the option for future expansion (in this case to the cloud) should be possible. The cloud offers many opportunities for the SMEs using the software, as it improves data availability and the opportunity for enhanced collaboration (Wu et al., 2010). When designing online applications, make sure it doesn't use unnecessary data as data-usage (related to its costs) turned out to be a reason for many small and medium enterprises to not go digital.

8.4   SECTION 4: IMPLEMENTATION AND AFTERSALES

During the master's thesis, multiple aspects, important during the implementation and aftersales came forward. To minimize the risks during these phases it is of high importance for the SMEs to actively guide the change, and as an IT-company to support this as much as possible. First of all, it is important for all the employees in the SMEs to know the reasons for the digital transformation (Kotter, 1995). If they are convinced that the change will help them and the company, they will be way more motivated to make the transformation a success. The interviews and observations showed that most of the employees in SMEs have no to little experience with IT, which might result in skeptical users. Therefore, the first-time experience the users have with the software must be good. A well working system is therefore of a higher priority than adding many functions. The lack of experience of the end user also leads to the need for training, and most of the interviewees of SMEs see this as an important part of the sales.

As a supplier you want the software to run correctly. As this partly dependents on hardware, it is advised to discuss and check this in an early phase. Most of the companies visited during the research had a rather outdated IT-infrastructure, and indicated that they want the IT-company to take care of this part as well. They want to be unburdened. Furthermore, did multiple interviewees of IT-companies emphasize the importance of short-line communication with the customer. Meaning, that the IT-company must be reachable; and answers and support should be given sooner rather than later.

8.5   SECTION 5: THE WORKSHOP FRAMEWORK

One of the main drivers of "digital transformations for sub-Saharan African SMEs" as topic for the thesis was a problem stated by an entrepreneur who operates in this field. The problem was formulated as follows:

> "Ghanaian IT companies struggle to market their services and software to small and medium enterprises".

During the research it became clear that the current deployment of IT- and digital options in sub-Saharan African SMEs is rather basic and often don't go further than Microsoft Office and WhatsApp. Many of the SMEs have not yet taken their first step towards the use digital possibilities. As described in the previous sections, multiple reasons exist for managers/owners of these companies to not transform digital. In order for IT-companies to guide the digital transformation of the SMEs is important to start by their first steps. To guide this, a framework is designed which can be used to help SMEs overcome their hesitations and to show them what possible benefits IT- and digital options can bring for their company. The main hesitations that came forward during the interviews and observations with SMEs and are addressed in the framework are:

- The financial situation (costs versus the benefits);
- Not knowing where to start;
- The change is not needed; and
- Security.

The framework can be used to create a workshop, with as audience owners and managers of small and medium enterprises in sub-Saharan Africa. The workshop has one main goal, derived from the main research question of the thesis:

1) The workshop should help managers/owners of SMEs to overcome their hesitations towards a digital transformation;

If the SMEs see that the benefits outweigh the costs, and they want to implement IT- or digital possibilities, new potential customers arise. The problem that led to the research topic raised the struggle IT-companies have when marketing their products. To help overcome this struggle, the framework workshop has a sub-goal:

2) To make the owners/managers of the SMEs choose the IT-company as consultant/developer.

In order to reach these goals, the workshop consists of five modules:

1) Your IT-company;
2) The need for change;
3) IT/digital possibilities and their benefits;
4) Digital change projects; and
5) Opportunities for the participants company.

The different modules are shown in the framework in Figure 8-1; and will be further explained below. The first module describes the role of the IT-company and the trainer. The following three modules have as goal to educate the participants on three different fronts. The fifth and last module helps the participants to relate the gained knowledge to their own situation; The first module should be applied throughout the whole workshop and the later four modules should be addressed after each other in the order the framework shows.
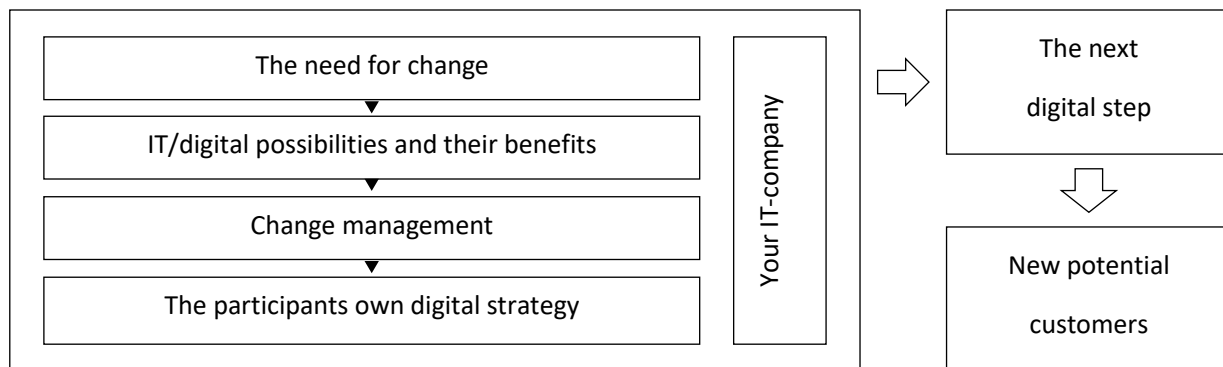
Figure 8-1. The Digital Transformation Workshop Framework.

8.5.1   Module 1: Your IT- company

The first module explained is about the IT-company giving the workshop. As stated before, struggles exist around marketing IT products and services to SMEs. During the research multiple reasons came forward, which will be addressed during the workshop. Some of the participants might come to see that their business could benefit from taking a next step towards a more digital business; and need an IT-company to guide the process or to provide software. In these cases, the IT-company could benefit from the situation. During the research some aspects came forward about why SMEs choose (or not) a certain IT-company. These should be kept in mind during the creation and execution of the workshop.

The first and most important factor is trust. During the research many interviewees argued the fact that they have a hard time trusting IT-companies. It is important to let the SMEs know that you have the best interest in mind for them, and that you are not only thinking about your own profit. The framework is designed in such a way that the participants learn the basics of IT- and digital possibilities; and see how these could be beneficial for their company. On top of that, multiple interviewees indicated that showing prior work, or a portfolio, helps to gain trust. This prior work could be shown during the explanations of different possibilities in the other parts of the workshop.

Furthermore, it is important to create a comfortable, friendly environment, as literature showed that sub-Saharan countries are relative collective and value relationships over tasks (Hofstede, 2019). Most of the participants will have no in-depth knowledge about different IT- or digital possibilities, possibly resulting in them having many questions. Answer the questions to help them overcome their hesitations. As the research proved that trust and personal relations are seen as very important it is good to start with a personal introduction. Introduce the situation, your company, let them introduce themselves, and tell them that they are not obligated to do anything. The workshop is created to help them see how IT could benefit their company and to make them think about their situation.

8.5.2   Module 2: The need for change

The second module has as goal to indicate the role of digital transformation in the fast-changing world. The participants should be educated about the strategic position of IT- and digital options in the business environment. As businesses all over the world evolve with the help of IT- and digital possibilities, not joining the digital revolution could result in falling behind (Kyem & LeMaire, 2006). IT- and digital solutions are proven, in science and within the business environment, to be useful (Beek, 2010; McKeown & Durkin, 2017; Recker, 2015). The biggest risk of not joining are competitors, and as found during the literature study of the thesis, do SMEs in sub-Saharan Africa operate in a market with much competition. It is proven that more digital mature companies outgrow non digital companies in the long run. Besides, it is important for the SMEs to move at the speed of the customer. The increasing use of smartphones and internet in sub-Saharan Africa shows the increasing value people put on digital options (Porter et al., 2015).

8.5.3   Module 3: IT/digital possibilities

The third part of the workshop has as goal to provide general knowledge about IT- and digital options to the participants. The observations and the interviews in the research showed, that in general many people (including those who work in SMEs) have little knowledge about these subjects, and hesitate to start using them because

they don't know what the options are or where to start. It is therefore important to explain the possibilities that exist rather general. As the workshop targets people from different companies, a variety of IT- a digital options should be discussed. This part of the workshop should show what different options exist; how those are applied by businesses; and why these can create an advantage. As there are many options, it is important to keep it short and clear. It should make them enthusiastic rather than overwhelmed. Giving examples proved to help make the options more relatable. Start the module by explaining the overall benefits of IT- and digital businesses (Dörner & Edelmand, 2015; Westerman et al., 2014) such as :

- Efficiency;
- Empowering employees;
- Improved communication;
- Improved customer journeys;
- Expanding/growth; and
- Marketing.

As the research stated that many managers/owners of SMEs focus on the short term, it should be emphasized that many of the benefits of digital options play a big role in the long term. The explained benefits can be used in addition of the explanation of the different possibilities. At least the following categories should be discussed:

- Management systems;
- Communication applications;
- Online presence and marketing; and
- New digital features / products.

For each of the systems that you explain talk about why they are used; the benefits; the risks; and the costs. Start off with the important options, like management systems. Discuss benefits they bring like the possibilities to automate processes and the use of data for analytics. Furthermore, educate about communication technologies such as: video chat applications (e.g. Skype), planning services (e.g. Trello) and/or Chat services (e.g. WhatsApp). Educate about their online presence, and the importance of websites and the use of social media. At last it is good to show them possibilities which may be less feasible for now, but can inspire companies for future projects. For instance, creating new features such as customized applications, where customers can find their personal information. During the explanation of all the possibilities it is important to use examples and show the relation between different applications/systems. An example of how to explain an opportunity; in this case combing management systems with new customer communication channels, is shown below. A more extended overview of different technologies is given in section 3 of the roadmap.

> Example: KLM, a Dutch airline offers the option to book tickets online. On the website you can book tickets, and without the help of employees all the data will be automatically registered in the ERP system of KLM. They send you the ticket to your mailbox, and also offer to send it to you via WhatsApp. Right before you have to go to the gate, they will send you a reminder via WhatsApp with clear instructions. The system does this all automatically and is seen as useful by most of its customers. These new features and communication channels make KLM more efficient and improved the customer journey.

After the need to change, the benefits, and different possibilities are known; it is time to relate them all to the right context: sub-Saharan African SMEs. The following topics, which came forward during the interviews as reasons for hesitation, should be discussed:

- Financial situation;
- Infrastructure (internet and electricity);
- Knowledge of employees; and
- Security;

Many options exist to overcome these reasons. Systems can be designed in ways to deal with power outages or loss of internet connection; the lack of knowledge can be addressed with training basic; simple systems can bring

benefits without investing too much; and free options exist. Addressing these potential risks prevents later hesitation or discussion.

8.5.4   Module 4: Change management

The third module educates the participants about change projects. As a digital transformation is seen as a process of change, it is important to inform SMEs on how to execute this the right way. In literature there are many models and methods, but the most important factors coming back in many methods (Hiatt, 2006; Kotter, 1995; Levasseur, 2001) are the importance of understanding of the change project for employees; the importance of actively guiding the change; and the fact that they need to keep in mind the long-term plan and should governing the changes. Furthermore, digital strategies should be explained in this part of the workshop. Simply said, the plan and argumentation for the change project. This is important as module four includes exercises for the participants to build a simple version a digital strategy for their own company. When explaining the term *digital strategy* be clear and keep it to the basics. Explain it as a plan for change, including the technologies needed; the goals they have; the challenges/risks they have; and that It describes the challenges/risks are taken into account (McKeown & Durkin, 2017).

8.5.5   Module 5: Digital strategy

The last module of the workshop should be about applying the given knowledge to the organization of the customers. The goal of this module is for all subjects to come up with their own digital strategy. In order to guide them towards a good digital strategy, it is important to help them analyze their business and help them to come up with ideas for their company. As analyzing a business can take a long time, it is structured in three short exercises. All of the sections make the participants analyze their business based on parts of their business model as described by Osterwalder & Pigneur (2010). Introduce the definitions, give an example of how the analysis might look for another business, and let them analyze it for their own company. After the analyzing phase, it is time to work towards their (basic version of) a digital strategy. Again, divided into two sections with related exercises.

Section one is about the value proposition of the business with the related business goals. An important part as the goals for a digital transformation must support the overall business goals. The value proposition of the company describes the services and products and how these are of value for their customers. It looks at why customers choose for the specific company instead of going to competitors. Let all participants write down their own value propositions with related business goals.

Section two is about the core- and supportive processes; and the different parties and data involved in those processes. These are important for the digital strategy, as IT- and digital options support/supplement the processes and communication between the different parties. Let the participants map their processes, and let them write down the partners and data involved.

Section three is about the customer segments, customer channels, and marketing strategies. The goal of this section is to make the subjects aware of what type of customer they focus on; how they reach out to these customers; and about current marketing strategies. The insights gained during this section helps thinking about new digital features, customer channels or business models, which could be included in their digital strategy.

In section four should all the subjects think about as many IT- and digital options that would benefit their company. In this part there are no real and they should **not** take into account any setbacks like financial situations. Let them use the knowledge gained during the first three modules, relate this to their own company and brainstorm for options.

In section five, after all subjects have analyzed their business and have written down many possibilities for their company, it is time to go into the more technical aspect of the workshop: creating a very basic digital strategy. Let them choose up to three ideas that they think are most feasible and let them create their own plan. What opportunities would they start with, and which of the opportunities are (maybe) possible in the future. Let them describe their ideas based on the following bullets:

-    The goal and reason for their IT- or digital innovation;

- The steps and technologies they need to take, buy or develop;
- The benefits of the investment;
- The risks/challenges the plan has and how they are going to deal with it;

During the exercises it is of high importance to offer support, as some of the participants might have difficulties with the exercises. After the exercises are done, let the subjects present their plan and give time for questions and feedback. If possible, give advice on how feasible it is and estimate costs and financial benefits in the long run. End the workshop by exchanging contacts, or arrange follow up meetings.

9 VALIDATION

This chapter will describe the validation of the roadmap, based on the Technical Action Research (TAR) method ad described by Wieringa (2014). He describes this method as follows:

> *Technical action research (TAR) is the use of an experimental artifact to help a client and to learn about its effects in practice.* (Wieringa, 2014)

He describes TAR studies as single-case studies, with a single implementation of the artifact. It differs from observational case-studies because the researcher is allowed to intervene. In comparison with other action research, TAR studies are artifact driven rather than problem driven. In addition, Wieringa (2014) suggests this type of study for the validation of artifacts. As time did not allow for a validation of both the artifacts, the workshop was chosen as priority. The framework, as elaborated in Chapter 8.5, is used in collaboration with Trinity Software Center to create and organize a workshop. Evaluating the workshop rather than the guidelines had two main benefits. First, the workshop is more tangible then some of the guidelines, making it easier to implement; and second, it provided the option to obtain feedback from multiple owners/managers of SMEs, as multiple people could participate in the workshop. The workshop is organized, executed and evaluated.

In order to evaluate the workshop, one of the four design science research (DSR) evaluation strategies by Venable, Pries-Heje and Baskerville (2016) is used. The *"Human Risk & Effectiveness strategy"* is chosen because most of the aspects of the workshop are aligned with the circumstance selection criteria as described in their report:

- If the major design risk is social or user oriented; and/or
- If it is relatively cheap to evaluate with real users in their real context; and/or
- If a critical goal of the evaluation is to rigorously establish that the utility/benefit will continue in real situations and over the long run.

The chosen strategy has as key purpose to provide evidence about the utility of the developed artefact. It is a systematic analysis that shows if the artifact solves the problem described in the research and to see if improvements are needed. Venable, Pries-Heje and Baskerville (2016) explain in their article different types of evaluation techniques for different types of artifacts. Because the workshop could be fully conducted in its real environment, including the IT-company and SMEs, the naturalistic evaluation techniques were used. This had as advantage that it embraced all of the complexities of human practices of both the supplier and the customers. The used naturalist evaluation techniques are surveys and observations.

9.1 MEASUREMENTS

In order to evaluate the workshop Venable, Pries-Heje and Baskerville (2016) suggest as first step to make the goals explicate and use these to work towards more tangible properties. The workshop described in the roadmap had multiple goals. It focused on getting the SMEs towards a next digital step, resulting in new potential customers (see Figure 7-2). The main goal of the evaluation is to see if the workshop is effective, and thus results in managers/owners of SMEs who are more likely to take their next digital step than before the workshop. To measure the difference the workshop makes the participants were asked to fill in a survey before and after the workshop, and permission was asked to use the observations during the workshop for research purposes. The following measurements were used to see if the goals of the workshop were achieved:

1. *The subject's knowledge concerning IT.* This measurement is chosen because it became clear during the problem investigation phase, that many owners/managers of small and medium enterprises hesitate to take their next step because they lack certain knowledge. The most important missing knowledge was about how the benefits of IT- and digital solutions can outweigh their costs, and the research endeavors to fill this gap.

2. *The perceived importance of IT/digital for the participants company.* This measurement was chosen to see if the workshop increased the participants perceived importance of IT for their company. As stated in the introduction of the report, play IT- and digital solutions an important role in

businesses. Importance of joining the digital revolution can be seen as driver for the participants to take the next step.

3. *The subject's eagerness to start using IT/digital in their company.* This measurement was chosen because it directly shows if the workshop makes the participants more eager to use IT- or digital options in their company, resulting in getting them closer to taking their next (or first) step.

4. *Points of hesitation and if these are corrected.* As an important part of the workshop is to help managers/owners overcome their hesitations, these are mapped for these particular participants. The measurement checks if these are corrected during the workshop.

The measurements are derived from findings of the interviews which showed many of the SMEs do not think the change is needed, and that the benefits don't outweigh the costs. the following assumption is made concerning the relation of the measurements with the goal and sub goal.

> *Increased knowledge concerning IT/Digital possibilities + increased perceived importance of IT/digital for the subject's business + increased eagerness to deploy IT within their company + corrected hesitations = more likely to take the next digital step = potentially new customers.*

The measurements are covered in the two surveys. The first three measurements are measured on a Likert scale (Ranging from 1 to 10) before and after the workshop. The reasons for hesitations are also included in the surveys. Before the workshop the question focused on mapping the reasons, and after the workshop the question is asked if these are treated. Furthermore, did the last survey look into improvements by asking for general remarks and an overall grade. During the whole workshop (including conversations before and after the workshop) observations were made about the attitude and position of the subjects. The findings are discussed with the trainer of Trinity Software Center.

Two months after the workshop, a follow up session with the participants is held, to ask if they had taken their next step concerning their digital transformation.

9.2 FINDINGS

During the execution of the workshop data is gathered about the quality of the program. In this sub-chapter two perspectives are given. First, the feedback from the subjects is elaborated, followed by the second perspective, from the IT-company point of view. In the last section the follow up sessions with the participants is described.

9.2.1 The subject's perspective

The first findings described, are obtained from the surveys. The first three questions of both the survey before- and after the workshop, were about how they rated (on a scale from 1 to 10) their perceived knowledge about IT; the importance of IT for their company; and the eagerness to start using more IT in their own business. A total of six subjects participated in the workshop. Figure 9-1 shows the results.
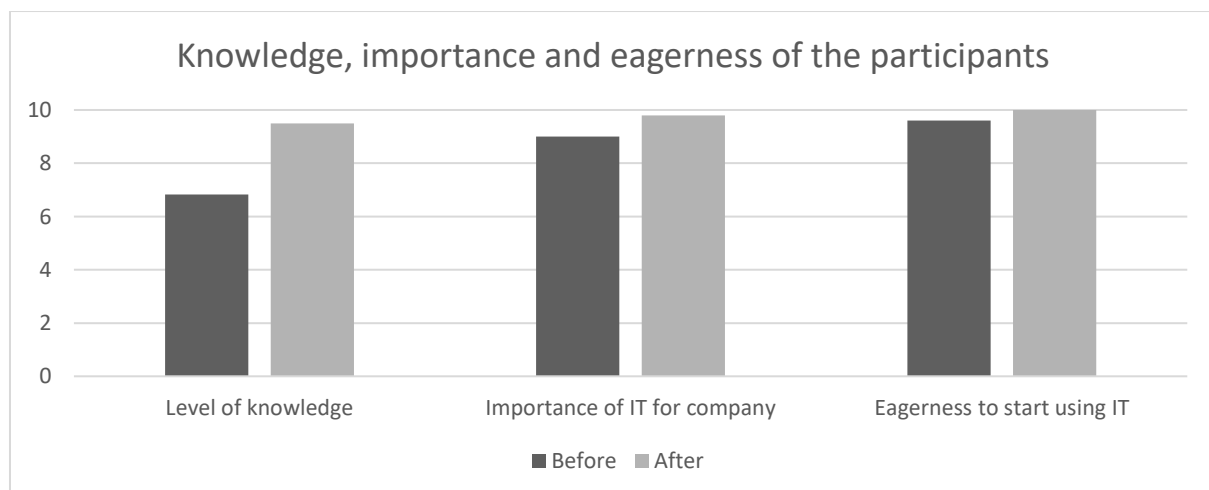

Figure 9-1. Results from the evaluation survey.

Three main things stand out in the figure above. First of all, all scores are rather high. Many of the subjects rated ten out of ten points on different questions, especially after the workshop. Although this seems rather unusual for Western scholars, it does cohere with some of the findings in the literature about communication and their perception on giving feedback (Meyer, 2014). People in Ghana see negative feedback as impolite, probably resulting in grades that are to some extend higher than when people in Western countries would have given the rating. As the results are not compared to results from other countries, this is not a problem. Even when taking the cultural aspect on giving feedback in account, it is assumed that the results are still good good/increase.

A second aspect standing out is the increase in perceived knowledge about IT. Although it is not asked specifically on what front the IT related knowledge is gained, the average rating has increased by 2.6 points on the Likert scale. 2.6 points is quiet high considering the four hours the workshop took. Besides the positive influence on the perceived knowledge of the subjects, the other two aspects were also rated higher after the workshop. Although both had a really high score before the workshop, the workshop did still increase the perceived importance by 0,83 points and the eagerness to start using IT by 0,4.

The increased perceived knowledge shows that the participants perceived that they learned from the explanations of the need to change; the different IT- and digital options; and/or how it relates to their company. In combination with the two other measurements, the increased importance and increased eagerness to start using IT, the hesitation towards digital transformation decreased (hesitation because they don't think IT is needed and the costs versus the benefits). Bringing them closer to their next digital step.

The second part of the surveys was about the reasons the subjects had for not using (more) IT. In the first survey, before the workshop, one questions was used to map their hesitations. After the workshop the participants were asked if their reasons were treated during the workshop, and if it the provided knowledge and insights helped them to invalidate those arguments. Figure 9-2 shows the answers of the subjects.

Reasons of hesitation towards digital transformation
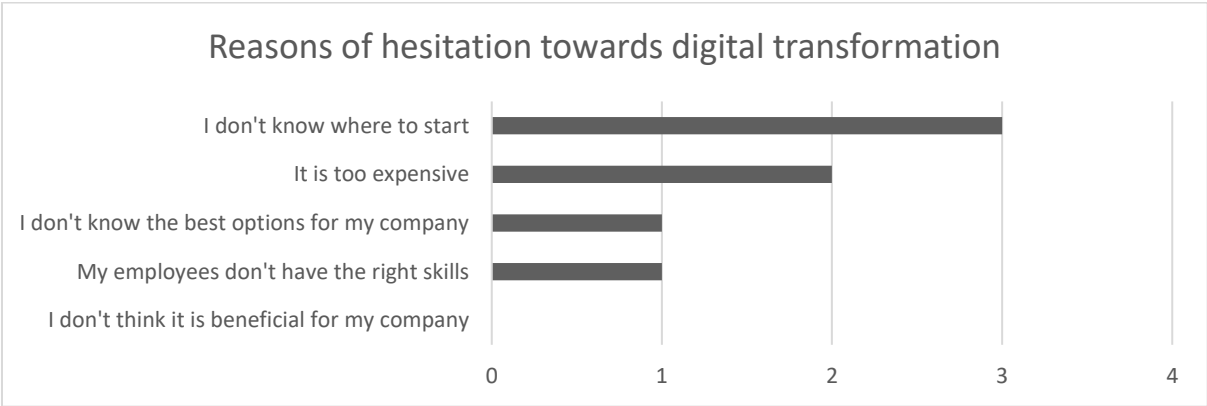
Figure 9-2. Main reasons of hesitations of the participants.

The most common answer given, was about the subjects not knowing where to start their digital transformation. The second argument was about the financials, followed by not knowing what options would fit their company. As the workshop covered all these topics, the results of the second question concerning this topic were positive. One of the subjects stated that she did not know where to start from earlier, but that this has been defeated. Another subject answered the questions with the fact that he now realizes that there are multiple possibilities fitting his business model. Furthermore, one of the subjects, who was concerned about the knowledge of his employees, now convinced that with the help of training, his employees could manage a simple to use system. A last subject stated that his doubts were reduced because IT might be more beneficial for his company then he thought before.

The quality of the overall workshop, from the subject's perception, is obtained via three question in the survey. The survey showed one topic that could have been explained better: the definition of a digital strategy. Two of the subjects indicated that this topic was a vaguely explained, and did not fully understand it yet. Although they stated this topic as difficult, all of the participants came up with a very basic version of a digital strategy as they participated in the exercises.

The modules 4 and 5 in the workshop framework are adjusted. The importance of explaining the term "digital strategy" based on a few simple terms and examples is clarified.

Second, the participants were asked about what they liked most. The following answers were given about what they liked most about the workshop:

- "Every point about IT/business was well explained to me, the interactivity, free lunch, real examples, networking, program well-structured and organized"
- "management systems was well explained and I needed help on that for my company"
- "The presentation and discussion of the companies part"
- "The information flow was on point and within the time I was expecting"
- "totally everything"
- "The lecture"

From the given answers most of them focus on the part explaining all the different options of IT in businesses and only one mentioned the discussion of their digital strategies. The interactivity of the workshop is also mentioned, and from an observational point of view this looked/felt rather natural. The general feedback that was asked in the survey, only retrieved three answers, all positive: "Up to standard", "Very successful" and a recommendation to all entrepreneurial meetups. Last, they were asked to rate the workshop as a whole. With four tens, a nine and a six, the average grade was a 9.1.

The high scores were discussed with Stephen Ofori, the Ghanaian co trainer. As a Ghanaian he interpreted the grades still as very good, and stated that these results are, also in Ghana rather high.

9.2.2 The IT-company / trainer perspective

The workshop is given in collaboration with the CEO of Trinity Software Center. During the workshop observation were made, which were discussed afterwards. The findings are divided into positive aspects (what went well), and negative aspects (what could be improved). Below is the discussion summarized.

The overall outline of the workshop was good. This includes the topics themselves and the time spend on each topic. The subjects seemed to keep their attention, and specifically liked all the examples. The small group, 6 guests, worked very well. Many reactions, questions and discussions arose during the workshop, and the whole program felt very personal with a continuous, natural flow. The last part of the workshop, where the subjects did the exercises and presented their ideas, went better than expected. Many of the subjects helped other subjects, and discussed how their plan could be improved. The break with lunch was much appreciated and during this break many of the subjects discussed topics that were addressed during the workshop so far.

During the workshop many examples were given of how the different opportunities were implemented in different companies. As it was noticeable that the participants liked this, it is extra emphasized in the framework.

One of the main improvements should be to talk more about security, although shortly mentioned during the workshop, the subjects really had the need to be more informed about this topic. This could be best addressed in during the workshop. The second substantive correction is about the use of the term digital strategy. The frameworks suggest to let all the subjects to come up with a digital strategy, but as "digital strategies" are rather comprehensive it might be hard to explain this to its full extend.

The security aspect of IT- and digital options is adjusted in the framework. It needs to be addressed as the participants seemed to value information about it. Furthermore, the term "digital strategy" should be kept to the basics as many of the participants asked a lot of questions about this topic. It is rewritten in the workshop.

9.2.3 Follow-up

All of the participants mapped different options for their company. About two months after the workshop a follow up session was held to see if they really took their next step. From the six participants only three were reachable. Two of the three told they had not "yet" taken their first step. The third participant stated that a website was developed for his company to improve his online presence. When asked about the supplier of the website, he stated that it was made by a friend he knew, and thus not by the company who also gave the training.

10 DISCUSSION

This chapter aims to discuss the quality and the accuracy of this research by determining its validity. Wohlin et al. (2012) describe four aspects of validity: the construct validity, the internal validity, the external validity and the reliability.

10.1 CONSTRUCT VALIDITY

The construct validity reflects to what extent the operational measures that are studied really represent the intentions of the research questions (Wohlin et al., 2012). The main research question as stated in the research method aimed to look for digital opportunities for sub-Saharan African SMEs and it explored options for local IT-companies to guide and steer these SMEs during their transformation process. The question does not only require to study the different digital and business aspects of the SMEs but extends itself with cultural aspects and change management. Looking back at the research as a whole, many different operational measures were studied in an exploratory way. The combination of the literature research and the interviews at both IT-companies and small and medium enterprises did provide a solid and broad exploration for the roadmap, of which the detailed specifics were not yet known at the start. The literature research focused on the digital transformation part and helped to create an overview of the cultural aspects in Ghana. Interviewing both IT-companies and SMEs gave two different perspectives on what holds back a lot of the SMEs to take the next step toward a more digital business. The observational study did provide extra context about the situation in Ghana. The combination of the different types of knowledge formed a good basis for the roadmap, and let toward the guidelines and the digital transformation workshop framework. The evaluation of the framework did provide evidence that the gathered results were correct.

10.2 INTERNAL VALIDITY

Wohlin (2012) describes that internal validity concerns situations where casual relations are examined. It is about whether the treatment is the cause of the outcome, or if other influences might have played a role. The research did only go through the first three phases of the design science method, missing the implementation- and the evaluation phase. It is therefore not possible to say if the treatment, in this report the roadmap, will reach the planned outcome, to help IT-companies guide digital transformations.

What could be said, concerns the validation of the workshop framework. The validation showed rather positive results. The workshop improved the chance for SMEs to take the next digital step, as the subjects' perceptions on digital transformations changed. The statement is based on the following assumption:

> *Increased knowledge concerning IT/Digital possibilities + less hesitations towards digital transformations + increased eagerness to deploy IT within their company = more likely to take the next digital step = potentially new customers.*

During a follow up session three participants were reached, of which one developed website. During the conversation he stated that this was a direct consequence of the workshop, as it showed him the importance of the online presence. To summarize, it is not possible to say that the whole roadmap will help IT-companies to guide digital transformations, but the validation proved promising results concerning the framework workshop, which is based on the same data.

10.3 CONTENT VALIDITY

The content validity reflects on the measurement instrument of the research, focusing on whether the instrument generated the right and representative data. It also monitors if all aspects of the construct are measured (Wieringa, 2014). One important choice that should be addressed concerning the content validity is the use of semi-structured interviews. The use of semi-structured interviews really helped gaining a positive atmosphere

during the interview, and provided a lot of context to the answers. This was especially important in Ghana, a high context culture country, where key messages are often not clearly expressed and where communication is more sophisticated and layered (Hofstede, 2019; Meyer, 2014). To secure that all of the themes were treated, an interview protocol, with related topics and questions, was used to guide the flow of the interview. The downside of how the technique is applied in this research, is that that it really focusses on qualitative data. As most of the interviewees' situations were very different, the qualitative data is very context dependent and messages are often implied or given "between-the-lines", which made it hard to analyze and to report. A threat to the scientific validity of the report might be that some of the implied messages, which are not or vaguely reported, are totally missed; or unconsciously (read: without traceability) taken into account when the roadmap was created. This could have as consequence that more factors might exits playing a role by the digital transformation of the SMEs in sub-Saharan Africa.

10.4 EXTERNAL VALIDITY

The external validity of the research regards the generalizability, meaning whether the same results will be yielded in different cases (Oates, 2006). For this thesis there are two main threats to this validity aspect. First, the generalizability of the validation of the workshop. The workshop is given only once, in collaboration with one IT-company. Time did not allow for another session. The workshop is created from the framework as described in the roadmap (before the evaluation-based adjustments). Although the framework describes all the facets of the workshop, the actual content of the workshop is given by the trainer at the moment of implementation. Other IT-companies using the same framework might interpret the framework differently, explain topics in other ways and different results might be achieved. To minimize the threat, the framework is described rather detailed. Also, other factors might play a role in a different outcome. For instance, the attendance might have more difficulty to grasp some of the topics, or the teaching skills of the trainer could be of another level. Despite the possible differences in content, attendances or trainers, the outline of the workshops should always be the same if the framework is followed correctly; including the findings resulting from the problem investigation phase.

A second threat to the external validity of the research is about the generalizability of results in countries in sub-Saharan Africa besides Ghana. The knowledge gained during the research comes from both the literature research as well as the empirical research in Ghana. During the literature search sub-Saharan Africa was taken as context. However, the later part of the problem investigation was executed only in Ghana. Besides Ghana, there were no other countries visited to investigate the problem. As the roadmap is designed based on the knowledge from both type of studies, it includes both aspects that account for the whole region and for some that came forward from the investigation in Ghana. This makes the roadmap not fully generalizable for the whole region. On the other hand, have the countries in this region a lot in common and is it expected that it will fit for other countries than Ghana.

10.5 RELIABILITY

The reliability of a research has to do with the repeatability, describing the consistency of the variables of the research (Wieringa, 2014). More easily, if another researcher would try to repeat the research, would (s)he get the same results? In order to get to a high reliability, it is important to create and follow a detailed description of the steps and procedures taken, without too much room for interpretation. For this research the method as described in Chapter 2 was followed, based on the Design Science Methodology by Wieringa (2014), a proven theory. However, on multiple parts of the research differences could appear. First, the semi structured interviews keep room for variety, as the 26 interviews for this research showed. If the research would be repeated, and other companies would be visited, it is unrealistic to expect that interviews would bring the exact same results. Despite the possible differences, it is plausible that more interviews would strengthen and supplement the findings as described in this report. In addition, the results from the problem investigation phase are used as input for the artifact. Different results would influence the created artifact, as maybe other aspects turn out to be more or less important when guiding the SMEs during their digital transformation.

10.6 OTHER REMARKS ON THE RESEARCH QUALITY

The validity threats as categorized by known literature, give a good view on the research, but are not comprehensive. Besides looking at the end product of the research, it is, especially as this is part of a masters, fair to analyze the process. Although short mentioned, the exact outcome of the artifact was not yet known during the planning phase of the thesis. Before the trip to Ghana the goal was to create a method for IT-companies to guide the transformation process of the African SMEs. As an increasing amount of data was gathered by the means of interviews this proved to be more difficult than expected. The main problem appeared to be the very first step; getting the SMEs to *start* their digital transformation. With this in mind, the focus of the artifact moved to the first stage of digital transformations, showing the SMEs that starting such a process would be beneficial. As the scope of the research included all kinds small and medium organizations in different branches, the choice was made to create a method for IT-companies that could help them reach a wide audience at once. This resulted in a workshop that IT-companies could give to multiple subjects at once, informing them about their options. The choice to make the participants of the workshop interact created the possibility to get to a general plan for all the individuals, with the argumentation of why the plan would work for their company. This method proved itself useful as at least one of the six subjects took a next digital step as result of the workshop. Although there was no time to evaluate the other guidelines, they can be traced back directly to at least the findings of the literature or the interviews.

Another remark on the quality of the research is about the scope of the project. During the literature many different definitions and aspects of the problem were investigated, resulting in many topics about both sub-Saharan Africa and digital transformations. This resulted in an extensive overview, increasing over time. During the trip to Ghana also many aspects came forward, but compared to the literature research this became to some extend overwhelming. Many aspects play a role in the digital transformation of SMEs in sub-Saharan Africa, such as the government, education, infrastructure, and many different aspects of the culture. The semi-structured interviews, based on the interview protocol, kept too much room for variation, making it more difficult to analyze the results. Because of the overwhelming, interesting conversations this was noticed rather late. If a future possibility for a research like this might present itself, the interview protocol would be scoped clearer, with more quantitative, straight to the point questions.

11 CONCLUSION

The research conducted during the master's thesis described in this report started after a statement made by Diana van der Stelt about the struggle IT-companies have to market their products and services to small and medium enterprises, all in the context of sub-Saharan Africa. From the stated problem the following main research question derived:

> *"What are digital opportunities for sub-Saharan African SMEs and how can IT companies guide and steer a digital transformation process within these SMEs?"*

In order to gain a deeper understanding of the problems related to the MRQ, four sub-questions were formulated. The answers of the sub-questions are given throughout the whole report. In this chapter all of the answers of the sub-questions are summarized, and conclusions are made. Furthermore, the answer and conclusion of the main research questions is set out, followed by the scientific contributions and suggestions for further research.

11.1 ANSWERS TO THE SUB-QUESTIONS

In this sub-chapter the answers on the sub-questions are given. As a broader argumentation of the answers can be found throughout the report the related chapters will be given as well.

11.1.1 SQ-1: What are typical situational elements of sub-Saharan African SMEs?

The answers to the first sub-question are described in multiple chapters of this report. Chapter 3 shows the findings of the literature research about the African SMEs. It gives a short overview of the historical and political evolution of the region; describes different aspects of their current culture; and gives a description of the business environment SMEs operate in. The findings of the literature are divided based on two indicators: internal-verses external influences (from the perspective of the SMEs) and positive- verses negative influences.

Multiple internal negative factors were found during the literature research, of which the following were most relevant. First, the power distance is rather high in African countries, making it important to focus the people in charge when trying to initiate change. In general, the orientation of the SMEs is rather short term as they have other day-to-day priorities. The communication within the organizations is often of high context, meaning that the people tend to be indirect, especially concerning negative feedback. Furthermore, many of the companies lack financial resources and educated employees; and most of the managers do not see the need for investing in education for their employees. At last do many of the managers hesitate towards the use of technology.

On the other side are there some positive internal factors described in the literature. Many of the owners of small and medium businesses are rather paternalistic, meaning that they care about the employees in a personal way. When shifting the perspective to the employees, this results in many workers who are really committed to the companies. Furthermore, many of the SMEs value customer and partner relationships. These dynamics within the company make most of the companies adaptable to change if needed.

One of the most important external factors of the report is the infrastructure, which is of less quality compared to Western countries. Many of the organizations are influenced by the economy and easily effected by external factors like the weather. The educational system in these regions is of less quality resulting in less qualified employees. As many people in West Africa have few job options, many start their own business resulting in a highly competitive environment. Although many negative aspects occur, the region also offers opportunities. The internet coverage is increasing rapidly and most of the people use a smartphone nowadays. There is a rising middle class and the labor force is growing. The young population is eager to start using IT and many companies have no or very few legacy systems resulting in a lot of room for improvement.

Besides findings from the literature study, sub-question two is also investigated by the means of interviews and observations. A total of 19 different SMEs were visited and interviews were held. The full elaboration can be found in chapter 5. The interviews gave insights into six topics. First, the results showed that in general the companies used very little IT- or digital applications. 26% of the visited organizations used no IT at all. The other companies mostly used the office package, in a very simple way. Excel, word and/or mail were used, but in all

cases, this implied the basic functions with the goal to store and communicate data. The data was not used to be analyzed or generate any form of reports. During 15 interviews the interviewees stated they used their smartphone for business reasons, but when asked for more details it came down on using it for making calls, using chat applications or simple browsing tasks. Only 26 percent of the companies had a website. Second, the data showed that in 90 percent the interviewees stated that their employees had no to very little experience with IT. Noticeable was that 14 out of the 18 interviewees expected that their employees would learn the basics rather easily if they were trained. Furthermore, the results of the interviews showed that the main reason why the SMEs have not yet started to use (more) IT is because of the financial situation. Most of the managers would like to have a working system, but don't think the costs would outweigh the benefits. This is close related with the finding that about half of the interviewees thought that change is not really needed. At last, usability and costs came forward as most important criteria for software.

11.1.2 SQ-2: What is the current state of the art of digital transformation?

In order to answer sub-question two a literature study was done. The full literature study concerning digital transformation can be found in Chapter 4. The following definition of digital transformation is used during the research:

> *"a process that aims to improve an entity by triggering significant changes to its properties through combinations of information, computing, communication, and connectivity technologies"*

In order to answer sub-question two, the definition as a whole and the properties of the definition are explored. As the term dictates it is about a process of change by the means of information, computing, communication and connectivity technologies. In literature different perspectives exist on the differences between IT and digital, but most scholars agree that digital opportunities evolved from the use of IT. IT plays a supportive role while digital opportunities are used on strategic level and concern business models. The literature showed overlap between the IT- and digital opportunities, and suggest the need for a good IT/data infrastructure before benefits could be achieved. Two types of benefits are found. First, internal benefits, which include process efficiency operations by automating and empowering employees with knowledge and support. Second, external benefits, which include new ways of communication with customers and partners; improved customer journeys; and new features, products and business models. In order to guide the change process, the literature suggest the use of a digital strategy, simply explained as a long-term plan on how to create differential value out of digital (or IT based) products, processes and customer interactions. Besides putting attention to the IT- or digital implementations, it is important to keep in mind the IT capabilities within the company. The following IT-capabilities found in literature have a positive influence on the firm's performance: a strong and flexible base of the IT-infrastructure; good IT-management skills; strong human IT assets; and a strong relation between IT-managers and other employees. Last, as digital transformations are processes of change, three change methods are analyzed and showed some overlap. First, it is of high importance to create willingness and understanding of the change amongst employees. Second, the change process should be actively guided, and problems that occur should be redressed fast to prevent loss in motivation. It is important to share positive results and make goals tangible. Last, after the change has happened it should be governed, and new opportunities must be looked into.

11.1.3 SQ-3: What are contemporary digital transformation initiatives of African IT-companies

The third sub-questions are answered based in the findings of the interviews with IT-companies in Ghana. During the interviews, elaborated in chapter 5, questions were asked about initiatives for digital transformations targeting SMEs. The questions focused on two sides of the initiatives: on the one hand, the interactions with the customers (marketing, implementation and aftersales), and on the other the products (technologies, software and service). When looking at the interactions with customers the terms trust and brand awareness were brought up most. Owners and managers of small and medium enterprises will not do business with companies that are not trusted. Although this sounds obvious, it is important to keep in mind some differences between the African and the Western business environment as described in the literature study. In sub-Saharan African countries it is more likely to be scammed as the government has less control over individuals and corruption is still customary. In addition, five of the seven visited companies promoted their products/services mostly via their personal network. This method worked for them, especially in the starting phase of the company. As this marketing technique is used often, many of the interviewees related this with referrals and word-of-mouth marketing. The literature

study showed that West African cultures are rather collective ones. The results of the interviews confirmed this as almost 70 percent of all the interviewees brought up the importance of personal relations with the customers. At last, the results showed that when promoting a product, it is important to communicate a clear goal and keep the explanation simple. Having a unique selling point, understood by the customer helps to avoid confusion.

11.1.4 SQ-4: How can African IT-companies guide and steer digital transformations of sub-Saharan African SMEs?

In order to answer the last sub-question a roadmap is created. Chapter 7 elaborates on how the results of the literature- and the empirical study relate to the roadmap; and chapter 8 displays the roadmap itself. The created roadmap includes two types of artifacts: guidelines and a framework for IT-companies to create a workshop. Based on the findings the choice was made to let the IT-companies who use the roadmap focus on those SMEs who use IT in a very basic way, and deploy no to very little digital solutions. The research showed that most of the SMEs in sub-Saharan Africa find themselves in such a situation, and many opportunities to improve these companies exist. To that end, the roadmap concentrates on guiding SMEs towards their first steps in their digital transformation. The roadmap puts emphasis on creating a personal relation with the customers and creating a trustworthy environment. It states that the points of hesitation, that came forward during the research, should be addressed and that the level of knowledge of the subjects should be kept in mind. The designed framework is used in collaboration with the CEO of an IT-company in Ghana, and after evaluation turned out to be effective. The subjects' level of knowledge; their perceived importance of IT for their company; and the eagerness to start using IT all increased, resulting in SMEs who are more likely to start their digital transformation. Furthermore, a follow-up session with the participants of the workshops verified that at least one of the six subjects who attended the workshop actually made their first step.

11.2 ANSWER TO THE MAIN RESEARCH QUESTION

The main research question of the research consists of two parts. First, it looked at the digital opportunities for sub-Saharan African SMEs; and second, it looked into how local IT-companies could guide this process. The first part of the questions is answered by SQ1 and SQ2. To summarize, many beneficial digital options for SMEs exist. These could improve communication with partners and customers; improve the customer journey and expand the organizations with new features, products or business models. The literature suggests the need for a solid data/IT infrastructure before starting to look at these digital opportunities. During the course of the research it became clear that most SMEs in sub-Saharan Africa don't have this base. The fact that these companies have no to little legacy systems, can be used to their advantage. The solid base could be created fitting to the organizations current business model and goals; with a future proof architecture, ready for innovation. As the financial situation is founds as biggest reason for not having these systems yet, it is important to keep it low costs, and focused on the core process. Furthermore, the research showed that the internet coverage reaches most of the targeted area and that the majority of the people living there use a smartphone. If a good data infrastructure is created this opens room for multiple digital possibilities such as new communication channels and new digital features. The growing young population, eager to join the digital revolution, only strengthens this perspective. Furthermore, many cheap and free options exist to improve internal communication, such as, video chat services, planning services, and cloud storage services.

In order to help IT-companies guiding the transformation process of sub-Saharan African SMEs a roadmap is created, including guidelines and a frameworks for a digital transformation workshop. The guidelines inform IT-companies on four topics. First, the current situation of the SMEs, elaborating on the room for IT- and digital based improvements. Second, creating a sense of urgency, informing about how they can take away the hesitations many of the owners/managers of SMEs have. Third, the fitting technologies, explaining the different IT- and digital possibilities and how they fit in the context; and last, implementation and aftersales, providing insights in guiding the implementation and the aftersales phase. The empirical research showed the lack of IT- and digital solutions within SMEs, and showed multiple reasons why they haven't implemented them yet. In order to guide these SMEs towards their next (and often first) digital/IT implementation, a framework is created. The framework can be used by IT-companies to create a workshop for managers and owners of SMEs, to help them see how the different possibilities can benefit their company.

The workshop proved to increase the participants perceived level of knowledge about IT; the importance they attach to IT in their company; and their eagerness to start using IT. Furthermore, one of the six participants took their next digital step by implementing a website, as a direct result of the workshop.

11.3 SCIENTIFIC CONTRIBUTION AND RELEVANCE

During the course of the investigation digital transformation and the sub-Saharan African SMEs are investigated. There was no literature found combing the two matters. The relations explained between digital transformations and the context, are therefore new and contribute to the scientific landscape. As the study was rather exploratory, the findings can be used for further research. It showed different aspects influencing digital transformation of sub-Saharan African SMEs, giving a broad image of the situation. Furthermore, it shows that the region has room for improvements with the help of IT- and digital possibilities. As stated in the introduction of the report, are the investigated SMEs important for the development of these countries. Hopefully the report encourages other scholars in the field of computer science, to look into the African region.

11.4 FUTURE RESEARCH

In this sub-chapter multiple opportunities for future research are described. The first part of the thesis, the problem investigation phase, tried to link existing theories in the field of "digital transformation" to the context of the research: sub-Saharan African SMEs. As no literature was found combining these two aspects, this research aimed to identify and explore multiple facets of the situation.

One of these topics for future research, is the IT related knowledge of employees working in SMEs in sub-Saharan Africa. During the interview the managers/owners of the enterprises were asked about the knowledge of their employees, but no quantitative research was done to get a more detailed answer to the question. Results of such a research could be used to improve the created workshop framework or could help in the field of IT-training in African countries.

Just like the knowledge of employees, could the deployment of software within the SMEs be investigated more in-depth. Different aspects such as location, type of company and applicability could be mapped more detailed with a large-scale quantitative research all over sub-Saharan Africa, resulting in a better view on the targeted companies and their current situation.

Focusing on the later phases of the project, future research could address the artifact. First, the applicability of the guidelines in sub-Saharan African SMEs could be investigated, to see how these could be interwoven into the day-to-day operations of the local IT companies. In addition, the workshop framework could be investigated to see if the same results are gathered when used by different IT companies; different subjects participate; or in other countries than Ghana.

REFERENCES

Abor, J., & Quartey, P. (2010). Issues in SME Development in Ghana and South Africa. *Finance and Economics*, *39*(39), 11. https://doi.org/ISSN 1450-2887

Acquaah, M. (2011). Business Strategy and Competetive Advantage in Family Business in Ghana: The Role of Social Networking Relationships. *Journal of Development Entrepreneurship*, *16*(1), 103–126. https://doi.org/10.1142/S1084946711001744

Adam, L., & Wood, F. (1999). An investigation of the impact of information and communication technologies in sub-Saharan Africa, *25*(1999), 307–318.

Annan, K. (2015). Are Elections Giving Democracy a Bad Name? Retrieved January 7, 2019, from https://www.linkedin.com/pulse/elections-giving-democracy-bad-name-kofi-annan/

Beegle, K., Christiaensen, L., Dabalen, A., & Gaddis, I. (2016). *Poverty in a Rising Africa*. Washinton DC.

Beek, D. van. (2010). *De intelligente organisatie*. Tutein Nolthenius.

Bharadwaj, A., El Sawy, O. A., Pavlou, P. A., & Venkatraman, N. (2013). Digital Business Strategy: Toward a Next Generation of Insights. *MIS Quarterly*, *37*(2), 471–482.

Bharadwaj, A. S. (2000). A Resource-Based Perspective on Information Technology Capability and Firm Performance: An Emperical Investigation. *Management Information Systems Research Center, University of Minnesota*, *24*(1), 169–196.

Bughin, J., Chironga, M., Ermias, T., & Jacobson, P. (2016). Lions on the Move II: Realizing the Potential of Africa's Economies.

Charland, A., & Leroux Brian. (2011). Mobile Application Development: Web vs. Native. *Communication of the ACM*, *54*(5), 49–53. https://doi.org/10.1145/1941487

Chen, Y., Wang, Y., Nevo, S., Jin, J., Wang, L., & Chow, W. S. (2014). IT capability and organizational performance: The roles of business process agility and environmental factors. *European Journal of Information Systems*, *23*(3), 326–342. https://doi.org/10.1057/ejis.2013.4

Cohan, P. (2013). How Netflix Reinvented Itself. Retrieved January 21, 2019, from https://www.forbes.com/sites/petercohan/2013/04/23/how-netflix-reinvented-itself/#3d0e04182886

Dale Stoel, M., & Muhanna, W. A. (2009). IT capabilities and firm performance: A contingency analysis of the role of industry and IT capability type. *Information and Management*, *46*(3), 181–189. https://doi.org/10.1016/j.im.2008.10.002

Dörner, K., & Edelmand, D. (2015). What "digital" really means. Retrieved January 14, 2019, from https://www.mckinsey.com/industries/high-tech/our-insights/what-digital-really-means

Ebert, C., & Duarte, C. H. C. (2018). Digital Transformation. *IEEE Software*, *35*(4), 16–21. https://doi.org/10.1109/MS.2018.2801537

Evans, D. S., Hagiu, A., & Schmalensee, R. (2006). *Invisible Engines: How Software Platforms Drive Innovation and Transform Industries*. Cambridge: MIT Press books.

Hampshire, K., Porter, G., Asiedu, S., Mariwah, S., Abane, A., Robson, E., … Milner, J. (2015). Informal m-health: How are young people using mobile phones to bridge healthcare gaps in Sub-Saharan Africa? *Social Science & Medicine*, *142*, 90–99. https://doi.org/10.1016/j.socscimed.2015.07.033

Hess, U., Richter, K., & Stoppa, A. (2002). Weather Risk Management for Agriculture and Agri-Business in Developing Countries. *Climate Risk and the Weather Market, Financial Risk Management with Weather Hedges*.

Hiatt, J. M. (2006). *ADKAR: A Model for Change in Business, Government, and Our Community* (1e ed.). Loveland: Prosci Learning Center Publications.

Hofstede, G. (2011). Dimensionalizing cultures: The Hofstede model in context. *Online Readings in Psychology and Culture*, *2*(1), 1–26. https://doi.org/10.9707/2307-0919.1014

Hofstede, G. (2019). Country Culture Comparison. Retrieved January 10, 2019, from https://www.hofstede-insights.com/country-comparison/

Honig, B., & Acquaah, M. (2016). Sustainable management and managing sustainability: The continued challenges of the African continent Introduction to the special issue: Sustainable development in Africa through management theory and research. *Canadian Journal of Administrative Sciences*, *33*(3). https://doi.org/10.1002/cjas.1400

IMF. (2018). World Economic Outlook. Retrieved January 10, 2019, from https://www.imf.org/external/pubs/ft/weo/2018/01/weodata/index.aspx

Jameson, G. O. M. (2008). *A Short History of Africa*.

Kane, G. C., Palmer, D., Phillips, A. N., Kiron, D., & Buckley, N. (2017). Achieving Digital Maturity. *MIT Sloan Management Review and Deloitte University Press*, (59180), 1–29. Retrieved from https://search.proquest.com/docview/1950392650?accountid=10755

Kotter, J. P. (1995). Leading Change: Why Transformation Efforts Fail. *Harvard Business Review*.

Kyem, P. A. K., & LeMaire, P. K. (2006). Transforming Recent Gains in the Digital Divide into Digital Opportunities: Africa and the Boom in Mobile Phone Subscription. *The Electronic Journal of Information Systems in Developing Countries*, *28*(1), 1–16. https://doi.org/10.1002/j.1681-4835.2006.tb00189.x

Laudon, K. C., & Laudon, J. P. (2014). *Management Information Systems: Managing the Digital Firm*. Pearson Education Limited.

Lem, M., van Tulder, R., & Geleynse, K. (2013). *Doing business in Africa, a Strategic Guide for Entrepreneurs* (2e ed.). Berenschot International BV.

Levasseur, R. E. (2001). People Skills: Change Management Tools-Lewin's Change Model. *INTERFACES*, *31*(4), 71–73.

Lin, J. (2008). *World Bank Updates Poverty Estimates for the Developing World*.

Matt, C., Hess, T., & Benlian, A. (2015). Digital Transformation Strategies. *Business and Information Systems Engineering*, *57*(5), 339–343. https://doi.org/10.1007/s12599-015-0401-5

McDonald, M. P. (2012). Digital Strategy Does Not Equal IT Strategy. *Harvard Business Review*, 1–4.

McKeown, N., & Durkin, M. (2017). *The Seven Principles of Digital Business Strategy*. Business Expert Press.

Meyer, E. (2014). *The Culture Map* (1st ed.). New York: Ingram Publisher Service US.

Mithas, S., Ramasubbu, N., & Sambamurthy, V. (2011). How Information Management Capability Influences Firm Performance. *MIS Quarterly*, *35*(1), 237–256. https://doi.org/10.2307/23043496

Morgen, R., & Page, K. (2008). Managing business transformation to deliver strategic agility. *SC: Briefings in Entrepreneural Finance*, *7*(5–6), 133–214.

Ncube, M., Lufumpa, C. L., & Kayizzi-Mugerwa, S. (2011). The Middle of the Pyramid: Dynamics of the Middle Class in Africa. *AfDB Chief Economist Complex*. Retrieved from www.afdb.org

Netflix. (2019). About Netflix. Retrieved January 21, 2019, from https://media.netflix.com/en/about-netflix

Nolan, R. L. (1973). Managing the computer resource: a stage hypothesis. *Communications of the ACM*, *16*(7), 399–405.

Oates, B. J. (2006). *Researching Information Systems and Computing*. London: UK: SAGE Publications.

OED. (2018). transformation, n. In *Oxford University Press*. Retrieved from https://en.oxforddictionaries.com/definition/transformation

Olawale, F., & Garwe, D. (2010). Obstacles to the growth of new SMEs in South Africa: A principal component analysis approach. *African Journal of Business Management*, *4*(5), 729–738. https://doi.org/10.1177/2050640613502897

Osterwalder, A., & Pigneur, Y. (2010). *Business model generation: a handbook for visionaries, game changers, and challengers*. John Wiley & Sons.

Peoples, H. C., Duda, P., & Marlowe, F. W. (2016). Hunter-Gatherers and the Origins of Religion. *Human Nature*, 261–282. https://doi.org/10.1007/s12110-016-9260-0

Porter, G. (2012). Mobile Phones, Livelihoods and the Poor in Sub-Saharan Africa: Review and Prospect. *Geography Compass*, 241–259. https://doi.org/10.1111/j.1749-8198.2012.00484.x

Porter, G., Hampshire, K., Abane, A., Munthali, A., Robson, E., Bango, A., … Milner, J. (2015). Intergenerational relations and the power of the cell phone: Perspectives on young people's phone usage in sub-Saharan Africa. *Geoforum*, *64*, 37–46. https://doi.org/10.1016/j.geoforum.2015.06.002

Recker, J. (2015). Evidence-Based Business Process Management: Using Digital Opportunities to Drive Organizational Innovation, (May). https://doi.org/10.1007/978-3-319-14430-6

Rijenen, C. (2018). *The OMC Approach*. Utrecht University.

Safrudin, N., Rosemann, M., Recker, J. C., & Genrich, M. (2014). A typology of business transformations. *The 360° Business Transformation Journal*, *2014*(10), 24–41. Retrieved from http://eprints.qut.edu.au/73857/

Sanou, B. (2017). *ICT Facts and Figures 20167*. Retrieved from https://www.itu.int/en/ITU-D/Statistics/Documents/facts/ICTFactsFigures2017.pdf

Smalley, M. (2018). The difference between digital transformation and IT transformation. Retrieved February 12, 2019, from http://blog.goodelearning.com/subject-areas/it4it/the-difference-between-digital-transformation-it-transformation/

Smit, Y., & Watkins, J. A. (2012). A literature review of small and medium enterprises (SME) risk management practices in South Africa. *African Journal of Business Management*, *6*(21), 6324–6330. https://doi.org/10.5897/AJBM11.2709

Snijders, J., & Bast, J.-C. (2012). *Ondernemen met informatie* (8th ed.). Noordhoff Uitgevers.

SOS Children's Villages. (2018). On the poorest continent, the plight of children is dramatic. Retrieved December 19, 2018, from https://www.sos-usa.org/about-us/where-we-work/africa/poverty-in-africa

Stair, R. M., & Reynolds, G. W. (2012). *Fundamentals of Information Systems*. Cengage Learning.

Tarute, A., Nikou, S., & Gatautis, R. (2017). Mobile application driven consumer engagement. *Telematics and Informatics*, *34*(4), 145–156. https://doi.org/10.1016/j.tele.2017.01.006

UN. (2017). World Population Prospects: The 2017 Revision, Online Demographic Profiles. Retrieved December 19, 2018, from https://population.un.org/wpp/Graphs/DemographicProfiles/

Venable, J., Pries-Heje, J., & Baskerville, R. ; (2016). FEDS: a Framework for Evaluation in Design Science Research. *European Journal of Information Systems*, *25*, 77–89. https://doi.org/10.1057/ejis.2014.36

Vial, G. (2019). Understanding digital transformation: A review and a research agenda. *Journal of Strategic Information Systems*, 0–1. https://doi.org/10.1016/j.jsis.2019.01.003

Wanasika, I., Howell, J. P., Littrell, R., & Dorfman, P. (2011). Managerial Leadership and Culture in Sub-Saharan Africa. *Journal of World Business*, *46*(2), 234–241. https://doi.org/10.1016/j.jwb.2010.11.004

Ward, J., & Peppard, J. (2002). *Success Factors in Strategic Information Systems. Strategic Planning for Information System* (3rd ed.). West Sussex, UK: John Wiley & Sons.

Westerman, G., Bonnet, D., & McAfee, A. (2014). *Leading Digital, turning technology into business transformatoin*. Harvard Business Review Press.

Wieringa, R. J. (2014). *Design Science Methodology*. Enschede: University of Twente.

Wohlin, C., & Aurum, A. (2015). Towards a decision-making structure for selecting a research design in empirical software engineering. *Empirical Software Engineering*, *20*(6). https://doi.org/10.1007/s10664-014-9319-7

Wohlin, C., Runeson, P., Höst, M., Ohlsson, M. C., Regnell, B., & Wesslén, A. (2012). *Experimentation in Software Engineering*. New York. Retrieved from https://books.google.nl/books?hl=nl&lr=&id=QPVsM1_U8nkC&oi=fnd&pg=PR5&dq=wohlin+experimentation+in+software+engineering&ots=GOA0shnRAv&sig=Z7KQJh1jWg73g3482P5yw9ZlUtk&redir_esc=y#v=onepage&q=wohlin experimentation in software engineering&f=false

Wu, J., Ping, L., Ge, X., Wang, Y., & Fu, J. (2010). Cloud Storage as the Infrastructure of Cloud Computing. https://doi.org/10.1109/ICICCI.2010.119

APPENDIX A: INTERVIEW PROTOCOL SMEs (CUSTOMERS)

Introduction

My name is Micha van den Akker, currently working on my master's in business informatics at the Utrecht University in the Netherlands. I'm conducing a research about digital transformations in small and medium enterprises in the West African region. During this research I'm looking into different aspects relating to this topic. The most important aspects are about different digital and IT solutions, culture, change management and stumble blocks. During this interview I would like to learn about your experiences in your company. The interview will be semi-structured, which means that I'll ask questions based on some themes. There is not one line of questioning but rather it is a natural conversation. Possible information about your company itself will not be shared outside of people working with me on the project. People who might hear/read the non-anonymous information include supervisors from the Utrecht University and employees of Maxim Nyansa a Ghanaian based non-profit organization which collaborate on the project. If knowledge from the interviews will be used for publication the data will be made anonymous. The data will only be used for scientific reasons.

The interview will take at least 20 minutes, but depending on the flow of the conversation it might take longer. During the interview we will go over the following topics:

- Interviewee and company;
- Current IT infrastructure;
- IT capabilities;
- Openness for IT;
- Experiences with IT.

Themes and *possible* questions

1. **Interviewee and company**

   What is your age, gender, function in the company?

   What company do you work for and where is it located?

   What does the company do? (value proposition)

   What are the core-processes within the company?

   What customers segments does the company focus on?

   What is the business model of the company? (costs vs revenue)

2. **IT infrastructure**

   What Information technologies are deployed within the company? (If yes, how/why?)

   Do you have (stable) internet connections?

   Does the company make use of digital opportunities? (If yes, how/why?)

3. **IT capabilities**

   What are your experiences on the IT capabilities of employees within the company?

      Do they use technologies like phones, computers, tablets? (If yes, how/why?)

      Do they get used easily to possible new IT implementations?

   Are employees comfortable using IT for business purpose?

   Are employees open and enthusiast for IT training? And what training would they like?

4. **Openness for IT**

   Would you and other employees be open for digital and IT improvements?

   What are the biggest stumbling blocks concerning IT/digital improvements?

   What do you think are the biggest risks for investing in new technologies?

        Do you think some of them are specific in the Ghanaian culture?

   What would be the biggest benefit for IT?

   What kind of IT would be most beneficial for your company/ in Ghana?

5. **Experiences with IT projects**

   Do you have any experiences with IT projects? (If yes, what/how/why?)

   What went well during these projects?

   What would you have seen better?

   How would you find software companies?

   What kind of payment structure would you like most?

Closure

I want to thank you for your time and for providing me with the information needed for this research project. After I have completed my thesis, I will share the results.

APPENDIX B: INTERVIEW PROTOCOL IT-COMPANIES (SUPPLIERS)

Introduction

My name is Micha van den Akker, currently working on my Master thesis project in Business Informatics at the Utrecht University in the Netherlands. I'm conducing a research about digital transformations in small and medium enterprises in the West African region. During this research I'm looking into different aspects concerning this topic. The most important aspects are about different digital and IT solutions, culture, change management and stumble blocks. During this interview I would like to learn about your experiences in this field. The interview will be semi-structured, which means that I'll ask questions based on some themes. There is not one line of questioning but rather it is a natural conversation. Possible information about your company itself will not be shared outside of people working with me on the project. People who might hear/read the not-anonymous information include supervisors from the Utrecht University and employees of Maxim Nyansa a Ghanaian based non-profit organization which collaborate on the project. If knowledge from the interviews will be used for publication the data will be made anonymous. The data will only be used for scientific reasons.

The interview will take at least 20 minutes, but depending on the flow of the conversation it might take longer. During the interview we will go over the following topics:

- Interviewee and company;
- Current IT infrastructure;
- IT capabilities;
- Fitting technologies in Ghana;
- Best practices; and
- Fail factors.

Themes and _possible_ questions

1. **Interviewee and company**

   What is your age, gender, function in the company?

   What company do you work for and where is it located?

   What does the company do? (value proposition)

   What are the core-processes within the company?

   What customers segments does the company focus on?

   What is the business model of the company? (costs vs revenue)

2. **IT infrastructure**

   What Information technologies are deployed within the company? (If yes, how/why?)

   Do you have (stable) internet connections?

   Does the company make use of digital opportunities? (If yes, how/why?)

3. **IT capabilities**

   What are your experiences on the IT capabilities of employees within the company?

   > Do they use technologies like phones, computers, tablets? (If yes, how/why?)

   > Do they get used easily to possible new IT implementations?

   What IT-skills do employees mis mostly and what skill do you think is most important?

Are employees open and enthusiast for IT training? And what training would they like?

4. **Technology and Ghana**

What kind of applications fit in the Ghanaian context?

What kind of applications work good in Ghana?

What factors influence applications in a bad way?

5. **Best practices / fail factors**

What are best practices when trying to reach customers / sell the products?

What are fail factors in relation to communication with customers?

Why would those customers react these ways?

What are changes you encountered during your work experience?

What do you think is changing coming years?

Closure

I want to thank you for your time and for providing me with the information needed for this research project. After I have completed my thesis, I will share the results.

APPENDIX C: ELABORATION OF THE INTERVIEWS AT THE IT-COMPANIES

Trinity Software Center

After the introduction of the research the 26 years old CEO of the company started to talk about the struggles the company encountered since they started to work. They create software mostly for small and medium enterprises, but they struggled to market their products. As example he gave their school management software, called Skuuni. Skuuni is a web-based all-round school management system. It handles students, employees, administration, grading and communication with parents. Although the quality of their application is fine and most of the schools do not yet use any form of management software, they still struggle to market it. In order to find customers, they did try different tactics. They started with, how they called it, the Thursday-marketing-days. This involved walking around in busy places, sharing flyers and talking to the people on the street. Although they spread their name and created a small network, it did not really deliver results. For Skuuni they went to schools all over Kumasi and talked to the IT-teachers and/or headmasters. When the schools had time, they also showed a demo of how the software works. Most of the people from the school were enthusiast about Skuuni but decided not to use it. Follow ups did not work. Most of the reasons they gave were about the costs, the fact that they also needed an internet connection (which costs data/money) or that they did not need it because the current way of working was just fine. They are now thinking about hiring a marketing expert.

When asked about the knowledge of the employees within the company he concluded that it was just fine as it is now. When IT graduates come from the university in Ghana, they mostly have theoretical experience. They learn some programming, but it is not much. The skills they mostly miss, in the CEO's perspective, was about programming and the focus on mobile applications. Also, they teach the old ways of software development. After college he did a traineeship and learned about Scrum, which in his opinions is important these days. In order to get the right skills, students have the choice to ether do self-study, an internship or a traineeship.

At last the question was asked about what kind of software would work for small and medium enterprise in Ghana, with the focus on Kumasi, the market he knows best. His answer was very clear. First of all, it needs to be usable for the customer segment you focus on. The end-users of the product must feel comfortable, and avoid too much change if possible. Furthermore, the costs are very important. Even if the application is very valuable, people in Ghana always focus on costs. Besides usability and costs, he also stated that applications should work from the beginning, they don't have to cover too much fancy functionalities, and adjustments can be made in a later phase. The first time the customers use the software it should not crash or show errors. People who are unexperienced with IT tend to turn against software quickly when this happens. Concerning business cases, he experienced that most Ghanaian people like to pay all at once. They don't like to be stuck to some kind of membership. As an example, he told about mobile data, which is almost always bought by pre-paid money.

Cervus

The interview with mister Kwabena, the CEO and founder of Cervus, took place in Kumasi. The interviews started with his personal career rather than only his work for Cervus. In his first years after founding Cervus he found out that is was way harder to run a company than he expected. The main problem he encountered was the fact that his company was not yet known; and he had little prove about how the quality of his applications. When he finally had some customers, they stopped paying after the first period and he spend most of his time visiting and contacting the companies to follow up on his money. During his first few years he learned a lot. His best choice, so he told, was creating a function which shut off the system automatically if the license was not paid. As regards on how to market the software, the most important factor is one's network. Always contact the targeted companies in a personal way and meet the person in charge of the IT system during the first visit. It is also important to have the right attitude when visiting potential customers. It is for instance important to align the way you dress to the audience you are facing. In Ghana there is a big difference between visiting a company in Accra, where they only take you seriously when you wear a suit, and outside of Accra, where people are way more comfortable when you dress more casually. As another example, he stated that it is easier to sell software in

Accra when you drive to the company with a big expensive car. In the more rural areas, this big car could turn against the sales.

When asked about what criteria he thinks applications should achieve in order to be successful amongst small and medium enterprises in Ghana, he stated three main criteria. First of all, it needs to be very simple to use, as many managers and owners do not have much experience with IT yet. Secondly, the application must have a clear goal and its value must be notable for the segment it is built for. He stated that they don't see the benefits without specific explanation. As last software needs to be cheap. Even if it would pay itself back in a year, the price cannot be too high because it will scare most of the potential customers. If the marketing process worked and the application is sold and used, it is of high importance to stay closely related to the company. At least during the phase where all employees still need to get used to the system. Mr. Kwabena told that he always helps the manager in leading the change. He experienced that many Ghanaian people hesitate when they have to use a computer, they are often too proud to ask for much help. He also experienced that this is way less when talking about mobile phones because most businesspeople in Ghana use one.

Viamo

During the visit the CEO/co-founder, the software product manager and a back-end developer were interviewed during a group-discussion. The conversation started about the starting phase of the company. In the beginning they tried to focus on small companies in their personal surroundings, but these companies were no valuable customers. The main reasons they gave was that these companies all need a lot of support and attention, which resulted in high costs. During this time, they got a job for a (big) media company, for which they did promotion via SMS. This worked rather well for a lot of citizen they tried to reach, but there were also a lot who were not able to read and did not receive the information. They did a test with voice call software and this turned out to work way better, especially in the rural areas. In the following years they expanded their platform. Nowadays they use three main communication methods: SMS, voice-calls and USSD. The later of these three options was made possible in collaboration with Vodaphone, one of the biggest network providers in Ghana, who also funded their program. USSDs are on demand messages a network provider can send after the customer calls the right USSD-code, a number between asterisk and often supplemented with a hashtag and code. (e.g. *[number]*#[number]). They compared their USSD service with a Wikipedia accessible without internet or a computer.

Their business model can be seen as a communication service. Their platform helps organizations who want to share or gather information over large areas. The enterprises, for instance health organizations, banks or governmental organizations pay for the communication. There service is always free for the end user.

When asked about software (development) criteria that would stimulate sales and use of software products they started immediately about problem solving. Software sells best when the people really see the use of it. Furthermore, if focusing on the whole of Ghana, software for the mobile phone fits better as many people don't have experiences with computers and still not everybody knows how to read or write. On top of that, a big part of the Africans use native languages. For example, Ghana, has over 20 languages. As last they concluded that whatever software or technology you introduce, you should always offer support and training. They gave two good examples of both usability and support. The first example is about WhatsApp. Even in areas where people don't know how to write or read, the application is used. These people only use the voice-message function. The second example is about Uber. The application is widely used in the two main cities in Ghana, but not all of its functionalities are used. The map, showing the location and route for the driver is most of the time ignored. Most of the uber request are just accepted followed by a call to gather the location. Uber tries to help uber drivers by giving (free) classes to potential drivers. The main curriculum of these lessons is about reading maps and professional attitude. They even organize follow-up classes with uber drivers who score low rating.

Software should furthermore have a low entrée barrier, which is closely related to a good user-centric design. Try to stick to known cultural pictures and traditions. Ghanaian people are conservative, and often stay for a long time with the same brand. If they try something new, it must work perfectly, or they will lose interests quick.

ViTech

The interview with the founder of ViTech, a startup tech company, took place on the terrace of a coffeeshop and started with personal introduction about my research and his starting career. During the interview he told he founded a company. Currently marketing their first application. He stated proudly that they worked Agile, which he learned when he followed an additional course in software development after he finished his masters. He noticed that the other four members of his company did not know the method, just as many of his other friends from college. Furthermore, he told that he experienced difficulty when starting the company because most of the employees had little background with coding (although they all did a computer science master) and they all lacked teamworking skills.

He stated that the Ghanaian customers are hard to reach because they don't like, and don't see the need for (digital) change. Besides, he argued that there are many different types of customers within Ghana with different levels of knowledge. As example he gave knowledge about IT, and in particular mobile phones. Many people in Accra know how to use the mobile phone and use multiple applications, but outside of the bigger cities the amount of knowledge about IT drops quickly. He told that many Ghanaians in the north (he took his family as example) don't know how to use a phone at all. With this reason it is always the case to make applications as easy to use as possible. For instance, using the right pictures and animations or providing customized support for different users.

In the application they are building, called ViniPay, they tried to adhere to these aspects as much as possible. Their application helps in connecting business (shops, restaurants, etc.), customers and deliverers. The application uses location to suggest customers about products and food in their neighborhood; includes a payment system; and helps with the logistics. In order to reach different segments they are creating their own payment platform including different payment techniques such as: banks, wallets and mobile money. When asked about their marketing strategy he started about promoting the application via their personal networks including friends and (extended) family. He explained that he believed in the applications business case, because of the low entrée barrier for businesses. As many of these business lack experience (because they simply never really used digital possibilities) it is important to help them with the implementation and offer a lot of support.

BlueSpace

During the visit to BlueSpace Mr. Ofori was interviewed. The office of BlueSpace is located near the airport of Accra, in the business center of the country. The interview started off with a general introduction of BleuSpace. The core customers of the company are banks and governmental institutes, for instance the National Information Technology Agency (NITA), the Ghanaian ministry of finance and some of the biggest banks in Ghana. They help these organizations by implementing IT solutions, mostly based on the value of data. They approach all their projects/customers in the same way. Analyzing their current data infrastructure and improving it (security, structure, accessibility and storage); adding value to their core processes by data-based decision; and helping them innovate with what they call "value added services". He told that most of the governmental organizations and banks are currently in their digital transformation process, and that BlueSpace is rather successful nowadays. In his opinion, did most of the big organizations, both governmental and private, wait too long before they changed towards the digital way of working. He told that he noticed this during his first software project, an application for university students to see their schedule and grades. They had to go with a bottom-up data approach as the university did nothing to supply the data in a digital form. All the information for the application was gathered by the community of students. The main reason that the application got attention was because many of the students at the universities liked the application and noticed the benefits.

After talking about the application and universities the question was asked about why and what kind of software's work in Ghana, and what not. Software criteria that many Ghanaians, and SMEs, see as a disadvantage are a bad usability and data intensiveness. Usability because many of the people have little experience with applications and data because of the related costs. Even if they have experience with software, it is mostly for pleasure and with the use of mobile phones (e.g. Facebook). During his time as a volunteer at the Ghana Innovation Hub he got a lot of experience with start-ups and noticed the low amount of IT knowledge of beginning

entrepreneurs. Many of these people didn't even know about the existence of cloud storage solutions like Google, Drive or Dropbox. In contrast to their knowledge of IT, most of those young, starting entrepreneurs were eager to learn all about it. The problem Ghanaians have with internet, he continued, was not only the costs, but also the poor connectivity. In Ghana there are many applications to handle online and mobile money. He explained that banks were very late to transform digitally and that many start-ups tried to create applications around money transferring. Two of those applications are Expresspay and Slidepay. Expresspay has a very simple and usable interface while Slidepay went for a fancy and good-looking interface. Expresspay has more users because of the preferred simple user interface. He also noticed that many of the people in his network thought that the fancy interface costed more data resulting in more costs.

When asked on how to market products as an IT-company, he came with two ingredients that worked for him. First of all is it most easy to start on personal bases, people who know you can be trusted. Secondly, if people don't know you yet it is important to win their trust. He kept a personal portfolio with all of his projects and has always taken all opportunities to get certificates besides his university degree. Last, he also noticed that it may help to sell your service and products by unique selling points, Ghanaian people tend to trust companies more when they are specialized. Following on the certificates he found that a following a bachelor or master's in computer science is often not seen as "enough". People graduating from these studies lack experience. He knew that many people payed IT-professionals to help them with their practical assignments. Furthermore, the colloquium of the universities is obsolete. He countered the bad school system by doing a lot of additional projects, which also helped him network. Students who follow studies other than in the category of computer science have generally way more backlog in IT. Even the most basic applications of IT are not used in these studies. For instance, in Ghana students still have to hand in assignments physically and with no- to little exercises computers are needed. In order to counter these problems, it is always wise as a software company to help educate people to use your applications in the right way.

AppsNmobile

During the interview at AppsNmobile the 39-year-old marketing/sales manager was interviewed. The company operates in the financial sector. The interview started off with a description of the financial sector in Ghana as this differs a lot from the western market, and my knowledge lacked on this area. The main reason for this, so he explained, was that the Ghanaian companies were late (and still far behind) with the use of ICT within their organizations. Banks for instance, were late with integrating online banking and many other companies tried to fill the gap. The whole financial market in Ghana consists of many companies all trying to get a piece of the market-share. All these companies are banks, online wallets, mobile money providers or money transactions providers. AppsNmobile was described as the last sort, trying to help transferring money between the different wallets and accounts. The interviewee explained that the company created a platform compatible with all the big credit/money providers, from mobile money and bank accounts to most of the big wallet-applications. Their main business is to keep this platform up to date and to help businesses by implementing their payment systems. An easy example he gave was for web-shops. AppsNmobile provides and implements APIs for websites in order to help them make transactions with customers. The benefit from their platform is that end customers always can choose witch payment system to use. All the different types of payment go to the same bank account as addressed by the organization. Furthermore, AppsNmobile provides a clear overview online of all the transactions. The whole system can be compared to an extended version of IDEAL, a payment provider in the Netherlands. The marketing manager told, that although the financial market is growing fast in Ghana, it is hard to sell of the many competitors. Many companies offer likewise services and it even occurs that money flows via multiple platforms.

When asked about the next theme of the semi-structured interview, the IT capabilities of the employees, he told that they have a lot of knowledge in their company. Because there are so many different parties which their platform communicates with, different types of programming skills were needed. Most of their employees have a specialty and focus on one function of the platform. As it is hard to find good employees, they often hire graduates after their national service (one year of obligated work to repay the government for supporting education). After they are done with this year and the employees work-attitude was known to be good they decided to hire them or not. The interviewee told that this has as result that most of the employees were fresh from college and

often lack experience working for an IT company. Most of the knowledge is learned on the job. Furthermore, he noticed that it is hard to find employees with the right attitude, many of their employees hesitate when they have questions and act rather reserved.

In order to create a platform which would be attractive in Ghana they focused on usability. For their own customers they also try to unburden them by guiding or doing the implementation of their API. Their platform has the benefit of including all of the important payment methods in Ghana at once. This has as benefit for the end-user that (s)he can use the preferred payment method. As a marketing/sales manager he often went to potential customers, explained the service and showed them how the platform worked by transferring 1 pesewa (1/100th of a Ghanaian cedi | 1/6th of a euro cent) to a test account. Furthermore, all sales were handled via personal, and face to face meetings. None of their customers bought their product purely via mobile or online communication. The process of selling the products is always a lot of work, many of the people he talked to, told him that they needed to talk to others like managers, IT specialist or other departments. He experienced that most of the time many different people from the same company asked the same questions. He stated that patience was needed and that you have to stay nice, even if the same questions is asked for the fifth time.

> "You have to keep answering and communicating, you never know how valuable a company can be in the long run" (Prince, marketing manager AppsNMobile, 16-05-2019)

In order to try to make the process as efficient as possible he always tried to meet with the people in charge and their consultants (often from their IT department) at the same time.

At the beginning of the company most customers were found via two ways: Personal networks/referrals and with random visits to possible customers. The one that worked based was via the personal network, but he also had some successes via visits to random companies. These marketing methods enlarged the, as he called it, "sphere of influence". By promoting via these ways this sphere grows slowly. Nowadays, since the company has a solid number of customers, most of the new customers find them via referrals. They find AppsNmobile because customers talk about- and recommend them. This word-of-mouth marketing has a positive relation to the companies sphere of influence. It builds trust and helps their brand name grow. As last he stated that marketing via social media (mostly Facebook) also works. Many of the CEO's in their region (Accra) use this platform.

Hubtel

During the visit at Hubtel the CEO was interviewed. As he was also one of the co-founders of the company, he has a good view on the evolution of the enterprise. The first idea of the business came in 2003. He had a lot of experience of what struggles and opportunities IT-companies in Ghana have, and how the market responds. The first part of the interview was about the company's origin, the market they operate in and their current core business with the related business model. The idea of a company started in 2003, when two roommates (the two co-founders) discussed about the use of SMS for businesses to communicate with customers. Two years after the first discussion they noticed that still no company used this technology and they started their company SMSGH. Their main goal was to support business with communication via SMS and the mobile phone. They created an application which helped businesses communicate to customers via SMS. In 2007 they got one of the main banks of Ghana as a customer because they wanted to communicate information about payments to their customers. During this time, they moved their application to an online environment. Their service was noticed by other companies and the fact that they worked with a bank gave the company a trustworthy name. in 2008 they grew into a company with 25 employees and got a revenue of over the million Ghana Cedi's for the first time (about 200.000 euro). As they grew, they kept focused on how to add functionalities to their platform, especially around an upcoming technique: mobile money. In 2010 they made it possible, in collaboration with banks and telecom providers to transfer mobile pre-paid money. As this was a great success, they started focusing on the possibilities this could bring and transferring money got their main business by 2014. As Alex Bram (15-05-2019) stated during the interview: "Back than I knew: mobile payment must be business"

In 2017 they decided that their name did not cover their services anymore and they changed it to Hubtel. Currently the company has just over a hundred employees, and they focus on the e-commerce business. The

transactions between business with each other and their customers was in 2018 over 5 billion Ghana Cedi's (almost a billion euros).

They are nowadays still active with communication for businesses via SMS, but many functionalities were added to their platform. They provide an all-inclusive e-commerce platform including web-shops for businesses, an own web-shop (where businesses can add their products), a money transaction system and a financial/human resource management system. Furthermore, they provide a service to provide logistics by connecting the shops with people who do the delivery (A Uber-like system as he called it). The company could be compared to an extended version of Bol.com (a Dutch company).

As the company grew fast and many new employees were hired, he has a good view on the knowledge level of people in Ghana. The main struggle the enterprise encountered was getting talented people. He said that there are a lot of them, but that these people are very wanted by a lot of the big companies in Ghana. Many of the people with experience move to a consultancy job, as these are well payed and seen as high-status jobs. The problem they encountered was not only in the IT segment, but did also occur for people in sales, managing, marketing and finance. As the IT sector is new for a lot of people, marketeers often struggle with the change to the IT technical parts. He stated that they tried to hire people from other branches, with no IT background, but that this does not always work. An estimated 50 percent of these people can make the change successful and are really beneficial for the company. Hubtel offers all their employees education via online courses. They keep track of success of their employees on the basis of KPI's. As Hubtel is seen as a successful and trustworthy company they lose a lot of employees who get offers from other companies who consciously scout their employees.

In order to reach the market as best as they can, Hubtel always tried to keep their idea simple. In the past they tried adding a lot of functionalities, but they experienced that this makes it hard for customers (especially SMEs) to see the benefits. The strategy they use nowadays is to keep the functionalities simple and for a clear segment. Some of their functionalities (e.g. the HRM system) are offered as extra modules. They always start with the basics of the web-shops and payment systems as this is relatable by most of the managers/owners of the SMEs. He experienced that many companies upgraded their system with the extra modules in a later phase.

At Hubtel they use marketing techniques as TV and radio. This helps getting the name of the company out there, and builds a trustworthy brand. As this associated with high investments, they only just started doing this. At the earlier phases of the company they only did face-to-face marketing. Via personal networks and (trade) conferences. As their product worked very well for a lot of companies, they quickly created a "clean brand". One that managers talk about, see as a good partner and as trustworthy. During all their visits to (potential) customers they always leave materials like flyers and business cards.

APPENDIX D: ELABORATION OF THE INTERVIEWS AT THE SMES

Preliminary high schools

Interview 1: Nana Quainoo Memorial School

The Nana Quainoo Memorial School is based in Kumasi. It is a private school with about 200 students and 25 teachers. As the interview was planned during the Easter vacation no kids were around. The interviewee was one of the three IT-teachers who also did the administration. The school was in possession of 12 computers, all installed in the computer hub to be used by students. The teacher explained that all classes existed of about 10 children, so all students could use a computer during the lessons. The lessons were all about how to use a computer (starting the computer; and using the keyboard and mouse to navigate) and how to use Microsoft Office's Word and Excel. In order to manage the administration of the school the IT teacher used his own laptop with his own written simple applications and excel sheets, in order to keep track of reports of the students, the payroll of employees and to keep track of payed school fees. Furthermore, he used e-mail to contact some of the parents. No other teachers really used computers for school management practices. It was hard to upgrade or extend the IT infrastructure solely because of the financial recourses needed. Last, he told that he believed that all the teachers at the school are capable of learning to use new applications if the opportunity would arise.

Interview 2: The African Child School Kumasi Richard

The African Child School is based in in Kumasi, the second biggest city of Ghana. With about a thousand students and 35 teachers it is the biggest private school visited. The assistant headmaster, a 29-year-old male, was interviewed. The school is in possession of around 30 computers of which 25 were used for teaching the students. The students get IT lessons and even make exams on the computer. The remainder of the 30 computers are used for administration. The school uses an all-round school management system to keep track of all the students with their related details, the payed fees, the exam results, and the payroll of teachers. The system is connected via an internal network and does not need internet. The school is very happy with the management system and the way it was introduced six years ago. The company who sold the software also took care of the internal network and trained the required employees. The fact that the company took care of the whole implementation was the most important factor why they were chosen. They sold a system used by more schools in Ghana and other customers recommended them when they were contacted by the African Child School. Even now, after six years of purchase, they have monthly visits by the IT-company for support, updates and improvements.

Interview 3: Unisco Model School

The Unico Model School in Kumasi has about 400 student and 26 teachers. They don't use IT for management practices and only have four computers for teaching the students. They have one IT teacher, but most of the IT lessons are given without the use of a computer. The reason why they don't have more computers is because of the school's financial recourses. There are other priorities to invest in. If they could have a school management system, they would use it for administrational tasks like keeping track of the school fees; the details of their students; the details of the teachers; the grades; and of the timetable. The skills to give computer lessons are present amongst the teachers as the curriculum only includes basic skills like starting/shutting down the computer, navigating with mouse and keyboard, and opening applications.

Interview 4: Sunshine State School

The Sunshine State School located in Kumasi educates about 285 students. It has 16 teachers of which only one teaches the ICT classes. The interview was held with the headmaster, who also teaches different subjects when needed. The school has a total of 10 computers which are only used for education. The headmaster told that there is no need for IT concerning administrational tasks. The books they use right now work fine, and no information is missing. The headmaster told that there is no need for IT as he had the full trust of the owner of the school. If the school were to get new computers, the teachers would be skilled enough to operate them. Some short trainings would provide enough knowledge for most of the teachers to learn the student.

Interview 5: Brightanic International School

Information about the Brightanic Int. School in Kumasi was gathered through an interview with the headmaster, a 31-year-old lady. The school has about 90 children educated by 7 teachers. The school has one computer which is only used for education. When asked what the children learned the headmaster told us the very basic skills. Beginning with starting up and shutting down of the computer, and she lets them play on paint. When they teach ICT multiple children are behind the computer at the same time. The other teachers of the Britanic school do not know anything of computers and should first be trained before they could give lessons or use IT for administration. The headmaster tried to use the computer for administration once, but as it did cost her too much time, and manually working with books worked fine, she didn't see the need to keep doing it.

Interview 6: Golden Gate school

During the visit at the golden gate school the headmaster was interviewed. The headmaster, 62 years old, is also the owner of the school. The school was founded in 1996 and has currently about 160 students. There are in total 23 employees working of which 19 are teachers. There are 4 computers owned by the school which are used for administration as well as for education. The school has a management system which is called Skuuni. This is web based all-round management system taking care of all aspects of school administration. The main motivation for using Skuuni was the fact that the headmaster was enthusiast about ICT. He worked for some years in the US and noticed how the world was going digital. By using a cloud management system he hoped to teach children and parents a little bit about the options of IT. The system included a parent portal, showing grades and attendance. Via Maxim Nyansa they are in the process of buying another 30 computers for their computer lab.

Interview 7: SSNIT Presbyterian Model School

During the visit to the SSNIT Presbyterian Model School one of the mathematics teachers was interviewed. The headmaster did not have any time and the ICT teacher was not around. The mathematics teacher was chosen because reference and his knowledge of the IT use within the school. The school has about 700 students educated by 40 employees. Furthermore, there are two employees who did the administration. The school has 40 computers for education and one computer for the administration. The school uses computers to keep track of fees, employees and grades. Furthermore, Microsoft Word is used to write letters which could then be printed and shared with the parents. The grading of the students is done by all teachers. For this process they use a customized application installed on the computers in the lab. This application keeps track of all the grades and takes care of the reports for the students. The IT lessons given in the lab are about the basics of computers, and Microsoft Word and Excel. The mathematics teacher told that most of the teachers were capable to use computers and that they are excited to work with them. He told that only little training was needed for the use of the grading system. Only some of the older teachers had difficulties with using the computers. The teachers who knew how to use it helped the other teachers with the input of the grades. The interviewee saw this as a security risks as they all shared their passwords without hesitation. The computers are connected via an internal network and he told that they don't see need for an online system. This system works fine; reports can be printed, and the administrative data can be found on the computer when needed. Their main reason to use the computers for keeping track of the grades is because of the archive. They've had encountered multiple situations where graduates needed their grades, which could not be found anymore because of lost books.

Prince Emanuel clinic

Two interviews were held within the Prince Emmanuel Clinic, an herbal hospital with two locations. The first interview was with the son of the owner of the hospital. He is a university student of 22 years old, but closely involved in the practices of the hospital. Mostly in Accra but sometimes also in Kumasi. He explained a few differences between the Kumasi and the Accra location. As the Kumasi clinic was founded first most of the employees are closely related and part of the extended family (including biological family, close friends and the personal network). Most of these people are not graduated at a university and started working after high school. On the other hand, the Accra location is further away from their personal network and founded after they booked success at the Kumasi location. While setting up this second establishment they decided to only hire graduated non-

personal related people. The Kumasi clinic exists of 15 employees and the Accra location has 10 people working there. In order to manage the financial part of the administration the company started to use a computer with administrational software. About one year ago the Kumasi location started the transition to an all-round management system. This decision was made after the son of the owner kept pushing his parents to do so. His reasons were clear, IT would increase efficiency for the clinic. He said that he noted that a lot of goods got missing (sold by employees for their own benefit) and searching for patient data took too much time (they used big books where they noted al their patient data). In order to get the right system, the son asked a lot of IT-companies to create a proposal. He choose the best plan based on costs versus quality. After agreeing on the proposal, the processes of the hospital were mapped, and the first version of the application was made. The IT-company, in this case Trinity Software Center, also arranged the computers and the internal network. After the first version was installed many improvements were made based on feedback. The son told us that he was very happy about the way it all went down and that the employees of the trinity software Center (the supplier) were very passionate. The process he described was an agile way of working. During the implementation phase of the system many trainings were given to all employees. Although the parents were skeptical at first, they got to realize they made the right choice. Investing in such a system was profitable in long term. Less items get lost/stolen as the process is mapped and the activities of employees can be tracked more easily.

During the interview with the manager of the Kumasi location additional information came forward. Although the system worked fine and it improved insights into their inventory and financial data, he encountered a problem. The last steps of the process were not executed in the application, resulting in a difference of inventory goods in the pharmacy and the system. Because only the last step was not executed, the system made it visible who didn't do his part. Although the problem was raised by the owner, they did not do anything about it because the relationship with the individual was to important.

Kumasi Hive

The interview at Kumasi Hive was with the 20-year-old manager and founder. They describe themselves as an innovation hub. Their core business is guiding start-ups. Some of these are part of the Kumasi Hive community and some of them are independent. Besides supporting in developing ideas, they also rent out offices and rooms for training. They started in 2016 and helped over 50 projects grow to healthy organizations. Internally, they use basic planning system to keep of the availability of the rooms. Furthermore, they use their mobile phones for communication with each other. After the general introduction to Kumasi Hive the interview went towards skills and knowledge of the people coming there. As they provide training for start-ups, they notice a lot of what type of IT- and business skills people are missing. The main skills IT graduates are missing are practical. College does only provide the theoretical knowledge. They lack in providing high quality practical education. Furthermore, they do not provide much education about how to create a good business plan related to a good business model. When asked about the capabilities of current SMEs she encountered, she told that most of their employees need basic IT- and business training. Most of the SME owners use no to little IT solutions and do not even have experience with Microsoft Office. Furthermore, they do not keep track of most of information/data provided by their day-to-day activities. Think of for instance inventory or cashflow. When creating applications for such companies, she addressed usability and price as most influent criteria. A good application for this market segment should be cheap or free; should be usable offline and online (and be able to synchronize); should offer support to the main business process; and should be easy to use. In order to market such a project in Ghana it is best to promote it via one's personal network and face-to-face communication (preferable small groups). The products should be explained clearly and their benefits should be addressed. Furthermore, she noted that social media can also work, but mostly in the capital city (Accra) or when reaching out to young people/students.

Cerit

The interview at the company CERIT, was held with the 30-year-old CEO and founder of the company. The company gives training and consults about data applicability and data management for research. When asked about the main drivers for starting the company he told about the skills many people, amongst which a lot of students lack. One of the major factors when managing and using data are computers, and most people don't know how to use these correctly or to their full benefit. His customers have difficulty with analyzing and using their data.

Besides using IT for data management, he also tried to explain to many of his trainees about the use of IT and internet for marketing purposes. He uses internet media like Facebook and "WhatsApp target groups" (WhatsApp groups with a certain commonality, e.g. student associations) in order to share information about his business. Those application work best to reach his customer segment, which are aged mostly between 16 and 30. The reason that these channels work is because of the use of smartphones. Besides these channels, Cerit also uses posters, but these have shown very little results until now. At the end of the interview he did tell that although a lot of people still struggle with IT now, he notices that the amount of skilled and interested people in IT is increasing.

BleuSparkTechnology

The interview at BleuSparkTechnology was held with the 26-year-old lady responsible for the administration. The company sells systems to clean and recycle water. The cleaned water is not drinkable, but can be used for tasks like cleaning cars. The interviewee just graduated from her Bachelor of Administration, where she also learned how to use administration software. When she joined the company, about half a year prior to the interview, they only used a simple Microsoft Excel sheet for administrative purposes. Because the company is still very small, they did not see need to change towards an expensive software application. She said that her computer skills are good enough to use other software's, and that she would be open for it if her boss would want one. She explicitly stated that the choice for new software would not be her choice, but the choice of the CEO.

Big Foot Safari Lodge

During the trip to the Volta Region in Ghana, a visit was made at the Big Foot Safari Lodge. The 35-years-old manager was interviewed. The Big Foot Safari Lodge is located in Wli, nearby one the highest waterfalls of West Africa. The interview started with a description of the Lodge, which was founded in 2011. There are six people working in the lodge and they can have 22 guests if all rooms and tents are booked. The manager told that the business was going rather well, as most of the tourist touring trough Ghana pass by Wli. When asked about the use of IT for the business, he stated that they use e-mail, their mobile phones and the website for communication. Two of all the employees (the owner and he himself) use their private mobile phone for answering general questions and bookings via e-mail. As the city was located near the border of Togo their internet connection from Ghanaian internet providers is rather bad and mostly of the time not reachable. They use Togonese internet providers, as these are a little better in their area. All internet is provided using a hotspot on their phone. For better download speed he would often download mail around midnight, as this worked somewhat better then by day. Overall, he called the reception "*somehow oke*". Besides IT for communication he told about the Excel sheet they use for administrative purposes. They use the spreadsheet environment to keep track of their budgets, including income, outcome, expenses and revenue. As last he used the internet for news and current exchange rates.

The following question was about the IT skills of the other employees and the general population of Wli. He stated that although a lot of people were interested and eager to learn, the skills were still very low. They simply don't have experience with computers and if they had opportunities within their circles of friends and family, they only learned the very basics as navigating, typing, Microsoft Word and/or browsing. Mobile phones are more attend compared to computers, and these are used for applications such as: WhatsApp, Facebook, YouTube, Music applications and news applications. Furthermore, he stated that schools in this region don't have computers. He told about how sometimes he used the laptop from the lodge, to educate some of the older students from a school nearby. As general knowledge and experience is lacking with most of the people in that region, he stated that training is a must for all implementations.

An overall management system for the lodge would be very "nice" he stated, but it is not really needed. The current way of working is doable, and the workload is not too high. If he would look for a good company to create or deliver such a system, he would use google; or he would go to HoHoe, one of the bigger cities in the area, and search for signs and billboards. When a company would be found that seemed good, he would go in and talk to them to see what they have to offer. Preferable he would look for a big company of which he knew other people had good experiences with.

Kpedze Senior High

The interview with ICT teacher Yussif Ousman found place in Kpedze, east Ghana. As one of the three ICT teachers of Kpedze Senior High. he had a good view on the use of IT within the school. He is an ex-trainee of Maxim Nyansa and in the last two years he was looking into options to improve administrative task based on IT. Besides, he also tried to get more computers to the school's ICT lab. After an extensive tour through the school and over its campus, the interview was held. The school teaches about a thousand students aged between 13 to 20 years, and was founded in 1962.

The ICT colloquium contains subjects in hardware and software, and focusses on the basics of IT as prior knowledge is often missing. The lessons given are based on the general outlines given by the government. These are converted to the lessons given by the teachers, which are worked out in a detailed lesson-notebook. The elaboration of the lessons cost a lot of time, but are necessary because the government uses these to check the school during audits. The school has one computer lab with 23 computers. The lab does not have a projector or interactive board.

The management of the school is in possession of one laptop, on which Microsoft Excel used. Most of the data is written down manually in books. The teachers who use Mail, WhatsApp or other technologies for their business practices use their own smartphones. Yussif estimated that about 90% of the teachers have a smartphone. For the students it is not allowed to use a smartphone on campus. All teachers at the school have at least a bachelor's degree, and would be able to use computers if they got the right training. The main problem with getting a good working system was the government. As they are a governmental school, they receive no money at all for new computers or other IT-goods. During the interview he told that he tried to reach out to some of the responsible institutions, but that he gets rejected every time. The school does not provide any form of internet access to teachers, employees and students.

When asked about what kind of system the school would need, he began talking about an overall school management system. The system should include all student details, grades and attendance; and should it be able to keep track of the financial situation and data concerning HRM. The main benefit would be the efficiency it would provide. As they are a big school it is hard to find the right data when needed, if it is found at all. As a risk he spoke about the power outages and the bad internet connection in the region. Both of these are often not reliable. Furthermore, should the project have a good security plan, as he expected that many of the teachers would be careless with for instance their passwords.

If he would look for a good company to provide the system, he would start in his personal network. As a former IT student and trainee at Maxim Nyansa, he knows a lot of people in the branch. The experiences of other customers and people he knows is his most important criteria when choosing a company.

Business Entrepreneur Bonny Nti Mensah

The interview with Bonny Nti Mensah was set up during the Kingsday Reception (celebrating the birthday of the Dutch King Willem Alexander) at the Dutch Embassy in Accra. Mr. Mensah is a Dutch Ghanaian who just moved back to Ghana after spending thirteen years in the Netherlands. He grew up in Ghana until he moved to the Netherlands when he was sixteen years old. During our interview he was back in Ghana for just over seven months, with as goal to start a business in IT. His roots in Ghana in combination with his years living- and studying Informatics at the VU in the Netherlands make him a valuable source for the current (IT related) situation in Ghana. The interview was held at his house in Wineba, located in south-west Ghana. He described himself as an entrepreneur looking to set up a business. He had two main ideas which he was investigating in the last 6 months. The first idea was about university management systems using G suite's (google) environment as base. Think of functions like mail, online storage, calendar and the intranet. Furthermore, he looked into the entertainment branch, as he believed that there were many opportunities for Ghana. He talked about a combination of interactive games, a movie theater, a swimming pool and/or a club.

Concerning his IT related business ideas, he was mostly into helping the universities in Ghana to use the cloud. His ideas were about improving communication between management, teachers, students and different

departments. This would support the learning of students by adding practical experience with IT, while making many processes more efficient. During his investigating at universities he noticed that most of the people in Ghana were rather practical minded. When they talked about a possible system, they wanted it to "just work". He therefore decided that his plans should start with the basics. He stated: "you need to learn how to crawl before you start how to walk or run.". Furthermore, he noticed that many people in Ghana do not yet see what an IT or cloud-based solution can bring.

When asked about his communication with possible customers he came with four clear points. First, he stated that it is of high importance to meet face-to-face. In Ghana people do not actively read and react on e-mail. Especially when you try to sell something or if you need information. He advised to "just" go to people you want to talk to, and speak to them directly. If this is not possible, try calling before mailing. His second finding is about follow-ups. As people are busy with their day-to-day operations, they don't often spend much time to react on (for them) unimportant business. In Ghana it is more usual to call again after a week of not hearing something. Although this can seem rude in countries like the Netherlands, this is seen as a normal way of business in Ghana. They tend to see you as "more serious" if you put more attention into the relation. His last two points were about how to share your information. A website with your information is needed, but should always be supplemented with brochures and or flyers. The potential customer should be able to find information in both ways, so (s)he can choose the way he pleases.

Timber companies

As three of the five visited companies wanted to stay anonymous, the choice was made to describe the findings of all timber companies without their company- and employees names.

Interview 1

During the visit of the first timber company the operational manager was interviewed. He told about the work their company does; which includes cutting down the trees appointed by their contract with the forestry, the logistics to their factory, milling the logs into planks and selling it to customers. The company he said, has almost 100 employees. He described their company as the middleman between the forestry, the forest itself and the customers for planks. The company uses IT, but in a very simplistic way. All activities are logged manually. This includes information about the trees that are cut down, the planks they are milled in, and the sales to customers. After this was all logged manually, the books went to the IT-department, which had one computer. Here the information transferred to a Microsoft Excel sheet every morning, only to mail it to their manager in Accra. He told that the IT managers the only one was who knows how to use the computer. Other employees were not interested and had other tasks. When asked about possible benefits of having an overall management system, the operational manager told us that it would be good as an archive. Whenever he needed information he always struggled to find it.

Interview 2

During the second visit to the second timber company the CEO, the operational manager and the accounted were interviewed. The first conversation was with the CEO. The company has about 70 employees and was founded in 2003. Just as all the timber companies they had contract with the forestry. They pay them for a contract and in return they can cut down the appointed trees. After they have been cut down, manually logged, and transported to the processing yard they were milled into planks. After the milling, they ended up with three categories of products. The 1th grade, including planks of much used and common sizes; the 2nd grade, planks that could not be formed into the right sizes but still have a high quality; and the 3d grade, with includes leftovers. They sell their products on the international market as well as to locals. After the CEO talked about the company and showed me around, he sent me to his son and one of his employees. They were the operational manager and the accounted and had all the knowledge of ICT which was present within the company. The CEO himself felt not comfortable to talk about IT.

Within the company IT is used for two purposes: to keep track of the activities related to human recourse man-agement and the accounting part. Both of the activities were managed with the use of Microsoft Excel and Word. When talking about how they used the software they showed me some of their Excel sheets, which were simply a substitution for their notebooks. Besides filing in the operational and HRM data they did not use more functions of excel. They didn't use the data to analyze it in any way to see trends or made forecasts.

The company has plans to invest in an inventory software, in order to keep track of the production but these plans were postponed because of other day-to-day problems and lack of financial recourses. When asked on how he (the operational officer) would address such a project, he answered that he would look for the right program himself. He stated that he would not use an IT-company, as he could find some software online and shape it without the help IT-professionals. He admitted that this would probably result in a less high-quality program, but that the financial costs did not outweigh the benefits.

If they were to implement an overall management system, they would use it for HRM, accounting and inventory. The biggest benefit of such a system was that he could then manage his operations based on live data which would be easy to find. If an overall system would be used many of his employees would need to have in-depth training. A lot of them did not have any education at all and do not even know the very basics. An application should be designed in such a way that it saves changes automatically because of the light-offs (power outages). A cloud base solution would be very "cool" but not realistic. It would only increase monthly costs because of the data, and he did not see more benefits then an offline system.

Interview 3

During the third visit the acting CEO was interviewed. He got the company under his command since 2007. They have a contract for one compartment in the forest of the Western Region. Just like the other companies they cut down the trees and make logs of it. The company is still very small and has around the 30 employees. It is located at half an hour of the closest village. They only operate in the local markets. They don't use systems and keep track of everything in a manual way. Most of his employees were locals who had no to little chance to find an-other job, and were not education. He thought that a system would be very useful to create a good overview of the activities and in- and outcomes of goods and finance. He thinks most of the employees would hesitate to use such a system at first but will accept it when they get used to it. Before this would work well, they would need a "good amount" of training. They lack the basic IT skills. Most of the employees do have a smartphone, but only use it for pleasure (e.g. WhatsApp and Facebook). In the region of the company there is no internet connection, so an online system would work.

Interview 4

During the fourth timber company visited, the 55 years old operational manager was interviewed. The company was founded in 2001 and produced over 150 M^2 of planks per day, with about 80 employees. Although he was the operational manager for over 15 years, he did not really know how the computer within the company was used. There was one computer used for administrative tasks, but the accountant was not present. To the best of his knowledge the system was used to keep track of the incoming logs, the produced planks and the sales. Also, the other employees who were asked did not know what the computer is used for. Most of the employees had no to little experience with using a computer. As the operational manager he stated that he did not need com-puters to do his job. Everything was managed manually and face-to-face.

Interview 5

The last timber company visited during the research deployed IT companywide. The company had about 150 employees and did not fit the definition of a small or medium enterprise. As the gathered knowledge could still be of benefit for the research, the choice was made to there when the opportunity arose.

The interview was held with the database-manager of the company. Besides the use of IT also the management practices looked way more organized. The company's core activities were, just as the other timber companies, about cutting trees, logistics, milling and sales. One of the main differences was that their main focus was on international markets. As the database manager, the interviewee had a good view on all the data used and logged

by the IT systems. He stated that from A to B 90% of the activities were logged in the system. Not only the inventory, HRM and accounting processes were supported by software but also the communication with the forestry; maintenance concerning their tools, cars and equipment; and management practices were backed by IT. He gave the example of the maintenance of the trucks. When one of them broke down, the employee involved has to create a job card in their system, with the description and request for repair. Only when the manager accepts the request the employee is allowed to go on with the needed proceedings. After the truck is fixed the job card in the system will be resolved and stored in the archive. Another example he gave is that the attendance of the employees is registered by a clock-in system based on fingerprints. The most important reason for the use of IT within the company is to obtain and keep certificates needed on the international markets.

He did not have a clear answer on the question of why their company was so far ahead of other timber companies. The main reason he could think of was the fact that they operated internationally for a long time, longer than most of the other companies. This did not only show them how more developed companies across the border worked, but also gave them a financial lead back in the day.

Furthermore, he stated that most of the IT knowledge was located in the office, where most of the data was imported into the system. Many of their employees working in the field only had basic skills about how to use software and came to the office when they needed to report something. The company does not make use of the mobile phone or tablets to use the system when working in the forest. One of the underlying reasons for this was that there are many areas where there is no internet connection. He did not think that training the field workers to use an application would be a problem if the system would extend. The employees working in the office are mostly educated and were given extra support on how to use computers when they entered.

When an application is going to be created for all timber companies it is of high importance to offer support, training and arguments on why and how to use the system. He experienced, during a software implementation in his last job, that the IT-company developed and implemented the system right, but that the process lacked after-sales support. This resulted in a system that was not fully used and many skeptical employees. The interview ended with an interesting discussion on how to improve the overall timber industry. Especially about an overall system which could be used by the forestry and all the timber companies. We agreed that such a system, used by all parties involved would make the overall processes more efficient.

Survey *before* the workshop: "Digital Transformation SMEs"

The workshop is based on the results of a master's thesis research. To see if the workshop is effective some questions will be asked in the form of a survey. The answers you give are totally anonymous and give insights in how you think about certain topics. The results will be used to further improve the workshop. There are no wrong answers!

(1). On a scale of 1 to 10, how would you rate your current level of knowledge about digital opportunities for businesses? *1 is low, knowing not much about IT. 10 is high, knowing a lot about IT.*

low	1	2	3	4	5	6	7	8	9	10	high
	□	□	□	□	□	□	□	□	□	□	

(2). On a scale of 1 to 10, how important are IT- and/or digital possibilities for your company? *1 is not important, the company could survive easy without it. 10 is very important, we need it now.*

Not	1	2	3	4	5	6	7	8	9	10	very
	□	□	□	□	□	□	□	□	□	□	

(3). On a scale of 1 to 10, how eager are you to start using IT or digital opportunities in your own company? *1 is low, you are not planning on using IT or digital opportunities. 10 is high, you are starting as soon as possible.*

low	1	2	3	4	5	6	7	8	9	10	high
	□	□	□	□	□	□	□	□	□	□	

(4). What are your main reasons for not using (more) digital options? Multiple ticks/answers are allowed!

- □ I don't know where to start
- □ It is too expensive
- □ My employees don't have the right skills
- □ I don't think it is beneficial for my company
- □ I don't know what options are best for my company
- □ Other 1 : ………
- □ Other 2 : ………

(5). What are you expecting- and do you want to learn during the workshop?

………
………
………
………

(6). What do you think are the three most important benefits of IT?

1 |……

2 |……

3 |……

Survey *after* the workshop: "Digital Transformation SMEs"

The workshop is based on the results of a master's thesis research. To see if the workshop is effective some questions will be asked in the form of a survey. The answers you give are totally anonymous but give insights in how the workshop might have changed some of the aspects in the survey. The results will be used to further improve the workshop. There are no wrong answers!

(7). On a scale of 1 to 10, how would you rate your current level of knowledge about digital opportunities for businesses? *1 is low, knowing not much about IT. 10 is high, knowing a lot about IT.*

low	1	2	3	4	5	6	7	8	9	10	high
	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	

(8). On a scale of 1 to 10, how important are IT- and/or digital possibilities for your company? *1 is not important, the company could survive easy without it. 10 is very important, we need it now.*

not	1	2	3	4	5	6	7	8	9	10	very
	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	

(9). On a scale of 1 to 10, how eager are you to start using IT or digital opportunities in your own company? *1 is low, you are not planning on using IT or digital opportunities. 10 is high, you are starting as soon as possible.*

low	1	2	3	4	5	6	7	8	9	10	high
	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	

(10). Are your reasons for not using IT covered and taken away? Which ones are? and which ones are not?

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(11). Do you have an IT/digital plan for your company? If yes, which opportunities are you going to take?

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(12). What topics did you miss or could be explained better in the workshop?

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(13). What did you like about the workshop?

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……

(14). How would you rate the workshop? *1 is very bad. 10 is very good.*

bad	1	2	3	4	5	6	7	8	9	10	good
	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	

(15). General feedback on the workshop / other remarks: