The Internet Antenna of Silicon Savannah

How startups perceive the impact of internet services on the Nairobi business environment and enterprise development challenges

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Abstract

In recent years Nairobi, Kenya has experienced internet diffusion at a rapid pace. At the same time, there has been the formation of a local startup ecosystem shaped by a growing number of startups, innovation clusters and support services, making Nairobi the main innovation hub of East Africa. However, the growth and productivity of startups are constrained due to a number of development challenges in the Nairobi business environment. This thesis examines how internet services can strengthen the developmental impact of startups. It answers how startups perceive internet services to influence the business environment of Nairobi and offer solutions to enterprise development challenges. Adapted versions of the new venture creation model and the extended Technology Acceptance Model shape the basis for understanding the perceptions of the Nairobi business environment, internet services, online education programs, online marketing platforms and online venture capital websites. Numerous in-depth interviews with startups, innovation clusters and experts, a survey among startups, secondary data and several observations have led to the conclusion that internet services have had a radical effect on how startups market, communicate, network and do business in Nairobi. Internet services are strongly perceived to contribute to market access, whereas the impact on human capital and competitiveness is recognized to a lesser extent. While it is the most pressing development challenge, access to capital has not improved as a result of internet services. The findings can be considered an exploratory step in comprehending the developmental effects of entrepreneurship and internet diffusion in present-day Nairobi. The perspectives of startups presented in this study will have an enduring influence on the development of new internet services and the future of Silicon Savannah.

Keywords: startups, entrepreneurship, ICT4D, internet, Nairobi, Kenya, education, marketing, venture capital

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I hope you'll enjoy the read as much as I enjoyed the research.

Bart

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1. Introduction

1.1 Opening

'If you want to have any idea of the world that is coming,

the world that is ahead of us, look at Africa.'

- Achille Mbembe in Access to Africa, VPRO Backlight

In recent decades, there have been two developments in the world that form the foundation of this research. On the one hand, the invention and diffusion of the internet has transformed daily lives, particularly in the Global North. Smartphones, e-mails, social media, e-banking and online shopping have rapidly altered the way people communicate and inform themselves throughout the past twenty years. On the other hand, economic growth on a global level has been higher than ever before in the history of the world. Since the 1990s, the vast majority of economies in both the Global North as well as the Global South has doubled in size.

The concept of time-space compression by David Harvey can place these broad developments into perspective. In 1989, Harvey argued that the world became smaller as a result of a growing global economy and technological innovations. These were 'processes that so revolutionize the objective qualities of space and time that we are forced to alter, sometimes in quite radical ways, how we represent the world to ourselves', which Harvey referred to as time-space compression (Harvey, 1989: 240). Various information and communication technologies have made it possible to call, fax, e-mail and Skype anyone who is connected to the internet. The essence is that space has become less of an obstacle for global flows.

Although some argue that this reading of modernity is only applicable to the Global North, economic development and technological innovation are in fact global phenomena. Some of the highest increases in productivity have been measured in sub-Saharan Africa over the past years (McMillan et al., 2014). Also, in a short period of time the number of Africans that is now connected to the internet and owns a smartphone has radically increased. Kenya, which this research will focus on, has a mobile phone penetration rate of over 90 percent and almost two-thirds of all Kenyans have access to the internet (Communications Authority of Kenya, 2017). Due a variety of contextual factors that will be touched upon later, the capital of Kenya is currently establishing itself as the foremost innovation hub of East Africa. This process has

led to the creation of a unique and rapidly altering environment where technology has the potential to offer solutions to East Africa's most pressing development challenges.

In order to gain a better understanding of the relation between technological innovation and economic development, the scope of this research will narrow down to internet access and enterprise development in Nairobi.

1.2 Problem statement

High birth rates and migration have resulted in youth unemployment being one of the most pressing development issues in Kenya. The growing need for sufficient jobs is estimated to continue since the birth rate will further increase in the future (Omolo, 2012). The promotion of enterprise development is perceived as an important strategy for socioeconomic development by African governments (Nafukho and Muyia, 2010). However, as a result of various challenges that negatively affect growth and productivity, such as competition, access to capital and access to the market, 60 percent of micro and small enterprises in Nairobi fails within the first three months of operation (Bowen et al., 2009). Since enterprise failure prevents the creation of valuable employment opportunities and thus limits the internally driven development of the Kenyan economy, it is important to find out how enterprise development challenges can be tackled. The emergence of Silicon Valley and the growth of the global digital economy have led to the perception of internet access as a contributor to enterprise development. National governments and multinationals in the Global North and South expect investments in internet diffusion to have a positive impact on economic growth, youth employment, development of micro and small enterprises, female entrepreneurship and quality of education (Ministry of Information Communications and Technology, 2016). Literature indicates a positive impact of internet access and productivity and economic growth, but it remains unclear how internet services directly have an effect on the challenges that micro and small enterprises in Nairobi are confronted with (Minges, 2015). In order to increase the lifespan of micro and small enterprises and generate employment opportunities, it is important to understand whether and how internet services have the potential to tackle development challenges of enterprises in Kenya.

1.3 Purpose of the research

It is clear that the internet has created a new world of opportunities in a relatively short period of time. I argue that the impact of ICT on economic development has been understudied in relation to the impact it has had on the Global North over the past two decades and the impact it has today on numerous countries in the Global South. This exploratory research aims to contribute to a greater understanding of the impact of internet services on enterprise development. The research will emphasize on the perceptions of startups, a category of innovative and fast-growing micro and small enterprises, in Nairobi. The technology sector of Kenya is already among the largest on the continent. This sector has become an important source of innovation and employment opportunities in Nairobi and it is expected that the number of startups will continue to grow in the coming years (Hersman, 2012). The research will focus on the capital of Kenya and surroundings in particular, since this is where the majority of Kenyan startups is active and because Nairobi currently aims to establish itself as the innovation hub of Africa: Silicon Savannah. By understanding how internet services contribute to the development of different types of startups, the stakeholders in the Nairobi startup ecosystem can make better use of online opportunities. Therefore, the results can be of value to innovation clusters, universities, the Kenyan government and investors, who aim to foster enterprise development and innovation in the technology sector of Nairobi.

1.4 Relevance to development studies

As a result of the birth of the internet in the 1990s, a new field of research within development studies emerged. Information and communication technologies for international development, or ICT4D, entails the application of ICT for tackling development challenges in the Global South. The lowest incomes in developing countries are also confronted with most of the problems, which is why ICT4D aims to help these communities first (Heeks, 2008). However, there is literature available that merely emphasizes on the positive effects of ICT, whereas other sources carefully discuss how different applications have different effects on development. For this research, it is essential to link ICT4D to one of the various sectors in which technology can potentially make a difference. The contribution of micro and small enterprises to development is emphasized on extensively in development studies. Micro and small enterprises form the backbone of economic development in Kenya, since these categories are the largest sources of employment and income in the country (Micro and Small

Enterprises Authority, 2014). This research aims to link the application of ICT to enterprise development and explore an upcoming and innovative field of research. The world will digitalize further in the coming decades, which means that ICT4D will become a more established theme within development studies as well (Heeks, 2008). Therefore, it is necessary to understand how the use of ICT for enterprise development is changing the perception of development and how it contributes to solving the development challenges of these enterprises.

1.5 Research objective and research questions

As a result of this study, I will answer the following main research question:

How are internet services perceived by startups to influence the business environment of Nairobi and offer solutions to common enterprise development challenges?

The research will emphasize on the perceptions of startups that are active within Nairobi, the most common development challenges that entrepreneurs are confronted with and how internet services are able to tackle these challenges. The main research objective is to understand the different perceptions of startups on the business environment and internet services, which can be used to outline possible solutions for the most pressing enterprise development challenges in Nairobi. This way the research can conclude with policy recommendations for stakeholders in the Nairobi startup ecosystem on what additional forms of support are needed to foster enterprise development.

For the purpose of having a stronger grasp of the main research question, it is separated into the following six sub-questions:

1. How do startups and innovation clusters perceive the business environment of Nairobi?
2. How are internet services integrated in the business practices of startups?
3. How are online education platforms perceived by startups to impact human capital?
4. How do startups perceive online marketing platforms to influence access to the market?
5. According to startups, how do internet services have an effect on access to capital?
6. How do perceptions on the influence of internet services differ among startups?

1.6 Thesis structure

In the next section, the literature review will dive into the concepts behind the Nairobi technology sector. The theoretical framework will present two theories that will function as the foundation for data collection. Then, the regional thematic framework will discuss the context in which Nairobi startups operate. These three sections will further explain the concepts, theories and context behind the main research question and sub-questions. Hereafter, the research methodology will describe the data collection process in detail followed by the findings that have come out of the research period in Nairobi. These findings are structured around the six sub-questions mentioned above. Furthermore, the discussion will connect the findings and analysis to the literature review, theoretical framework and regional thematic framework. The thesis will conclude with answers to the main research question and sub-questions and a set of policy recommendations.

2. Literature review

This section provides an overview of the existing literature and concepts related to the technology sector, enterprise development and internet services.

2.1 The digital divide

The gap between those who are poor and those who are rich has increased throughout the last decades. These inequalities form the core of development studies, with many researchers attempting to explain this divide and how the inequalities can be reduced. With the introduction of the internet, a new dimension of inequality emerged: the digital divide. Mark Graham defines this term as the gap between those who have access to digital technologies and those who do not. Bridging the digital divide offers developing countries the opportunity to grow a knowledge economy and profit from the advantages that are linked to internet access, for example access to public services, higher quality of education, increased economy equality, political stability and economic growth (Graham, 2008). This perspective on the transformational effect of the internet entails elements of modernization theory and neoliberalist thought. However, due to the newness of the internet there is additional empirical research needed on how this link between development and internet varies across countries, sectors and communities (Graham, 2008). In other words, whether and how Graham's notion of the digital divide upholds within a startup ecosystem. Therefore, this research will elaborate on the notion of the digital divide and find out how internet services are perceived by entrepreneurs that are active in the technology sector.

2.2 Technology sector, startups and innovation clusters

The technology sector entails the companies, partners and institutions that are directly involved in or affected by the production, delivery and regulation of ICT products and services (The World Bank Group, 2002). These include technologically based products and services for both consumers as well as other businesses. Examples of established enterprises that are part of the global technology sector are online marketplace Alibaba and search engine Google. However, the vast majority of companies that shape the technology sector are small teams of developers and entrepreneurs with ideas based on the technology that is available. As these are part of the technology sector, they can be referred to as technology enterprises, but most young entrepreneurs prefer to call their own companies startups.

Interestingly enough, there is not one commonly accepted explanation of what the term 'startup' actually stands for. One definition emphasizes on the newness of the enterprise and another argues that being a startup simply requires a certain 'cool' factor (Robehmed, 2013). What most definitions have in common is that a startup offers an innovative and scalable product or service that is made through the use of new technology (Chamber of Commerce, 2018). With this as the foundation, the definition of a startup in this particular research will be refined using a set of variables: age, development phases, size, revenue, sectors, output, customers, formality and innovation cluster affiliation.

With regard to age, the vast majority of startups are in the first stage of business operation. However, it is still possible for a company to remain in this phase even after a couple of years of activity. On the one hand, age should not be an exclusive factor for identifying as a startup, but on the other hand, a limit should be set on what can be considered an innovative and new company or idea for the purpose of this study (Robehmed, 2013). Therefore, based on the available literature and input from innovation clusters in Nairobi, the maximum age to qualify as a startup will be set at three years.

Besides age, startup can also be categorized into four development phases that are based on the financing cycle of startups (Cohan, 2011). Every startup begins with the development of an idea and aims to turn it into a viable business, which is referred to as the idea phase. With an undeveloped idea it is nearly impossible to find venture capital firms that are willing to invest. When the startup enters the seed phase, it has developed the idea into a working prototype. However, it remains very risky to invest but it will be possible to find parties that want to take risk or help accelerate the startup. In the early-growth phase the startup will be able to attract its first significant venture capital investors, which can help grow the business. The late-growth stage is reached when the startup continues to attract venture capital, went through a period of rapid growth and is now an established company (Cohan, 2011).

Although it is evident that startup companies are generally micro and small enterprises, it is important to make a division of these terms based on their number of employees and their revenue. International organizations and governments have different definitions of what a micro, small, medium or large enterprise is. According to the National Council for Law Reporting, the Kenyan government has made the following division:

Entity	Number of employees	Revenue (in Kenyan shilling)
Micro	1 - 9 employees	Lower than 500.000
Small	10 - 49 employees	Between 500.000 and 5 million
Medium	50 - 99 employees	Between 5 and 800 million
Large	100+ employees	Higher than 800 million

Table 1 Division of micro, small, medium and large enterprises in Kenya

The startups that this study will focus on fall into the micro and small categories as defined in the table above. It will not focus on medium and large enterprises, because these are not considered to be part of the startup phase anymore and are less approachable for research. Since the number of employees is less sensitive to share than revenue, the startups that this research will focus on cannot have more than 50 employees, whereas the limit of 5 million Kenyan shillings in revenue will not be applied as a factor of analysis.

Another form of dividing startups into different categories are sectors. Based on conversations with innovation clusters and the organization of the Nairobi Innovation Week, startups can be categorized in one or more of the following sectors: agriculture, manufacturing and processing, cleantech and renewable energy, e-commerce and business services, education and employability, entertainment and lifestyle, fintech and health and life sciences (Nairobi Innovation Week, 2018).

Furthermore, the two most common types of output of startups can be divided into the following broad categories: products and services. Product startups are involved in the manufacturing process of a their own product, including but not limited to electronically based machinery, components and equipment, such as computers, mobile phones and transmitters. The services category involves startups that develop intangible goods, such as software, or are involved in the wholesale of (technology-based) products and services (OECD, 2003; Colombo et al., 2013).

There are various distinctions that can be made specifically with regard to the marketing strategies of startups, based on which party is selling and which party is buying, of which the most common forms are Business to Business (B2B), Business to Consumer (B2C) and Consumer to Consumer (C2C) (Odhiambo, 2013).

A final distinction can be made between formal and informal enterprises. The informal sector consists of startups that are not registered with or monitored by the government. Therefore,

these startups are not taxed nor included in the Gross Domestic Product. In Kenya, the informal sector is estimated to provide half of the employment and national output (Opiyo and K'Akumu, 2006).

Lastly, important to mention about startups is that the network in which they operate is particularly important for developing their idea into a marketable product or service. Startups often operate from within a cluster of other entrepreneurs, experts, investors and policymakers whose expertise can contribute to enterprise development. There are many innovation clusters that offer workspace and meeting rooms, but incubator or accelerator programs are also common within the technology sector. Business incubators and accelerators are companies that provide an environment for startups to develop their ideas into products or services. The incubation process emphasizes on the transfer of ideas, knowledge or research to the marketplace. Incubators often offer paid programs and services, such as training, technology transfer, marketing assistance, business advice, mentoring and information, that can improve the performance of startups (Meru and Struwig, 2011). The objective of these programs is to further develop the business model of the startup or make the startup ready for investments.

2.3 Enterprise development

Because there is few research available on the development of startups in particular, this section will examine enterprise development of micro and small enterprises. It will be used to position the new venture creation model in the theoretical framework.

Since the 1970s, micro and small enterprises are seen as engines for economic development by academia and policymakers (McPherson, 1996). They are widely regarded as strong contributors to job creation and economic stability (Morrison et al., 2003). Therefore, there are various promotion schemes in developing countries to support the growth of micro and small enterprises. The donating organizations, governments and NGOs are motivated by the belief that stimulating the development of enterprises can serve as an engine for development that also benefits the lower layers of developing countries (McPherson, 1996). This is because these micro and small enterprises provide a significant amount of new jobs in developing countries (Dobbs and Hamilton, 2007). These perceptions and promotion schemes illustrate the importance of enterprise development in the Global South.

Enterprise development consists of a set of interlinked factors that foster and limit the growth of the enterprise. Understanding these factors makes it possible to comprehend why the majority of micro and small enterprises fails at an early stage (Bowen et al., 2009). The most important factors that impact the development of micro and small enterprises are the ambitions, intentions and competencies of the entrepreneur. These include personal characteristics, educational level and business knowledge. Other factors that influence enterprise development include the internal organization of the enterprise, access to finance, market conditions, public sector regulation, the infrastructure and resources that are available to the entrepreneur and the external relations that configure the network of the entrepreneur (Morrison et al., 2003). Therefore, some of the enterprise development challenges that micro and small enterprises are confronted with include limited entrepreneurial skills, constraining government regulations, weak economic conditions and strong competition (Morrison et al., 2003). It is also important to make a distinction between enterprise development challenges that can be influenced and those that are purely external. Limited entrepreneurial skills, for example, can be tackled through education, whereas weak economic conditions are difficult to tackle from the position of an entrepreneur.

The growth of startups can be measured through various indicators, of which some are more practicable to measure than others. These indicators include market share, assets and measures of profits. The two indicators that are often easily available and uncontroversial are the number of employees and the value or number of products and services offered by the startup (Dobbs and Hamilton, 2007).

2.4 Internet services

Internet services are created using software tools and used through the internet on a regular basis by enterprises for the purpose of knowledge sharing, public administration, social services and business solutions (The World Bank Group, 2002). These include search engines, social media platforms, e-business services from the government, education programs, and payroll portals. The following paragraphs will further define the internet services examined in this study, whereas the extended Technology Acceptance Model in the theoretical framework will explain the motivations of startups to adopt or reject internet services.

Three sub-questions are devoted to reveal how internet services with links to common enterprise development challenges are used and perceived by startups. Based on the

academic literature and preliminary conversations with stakeholders in the Nairobi startup ecosystem, these internet services are online education programs, online marketing platforms and online venture capital websites. The three challenges that can be connected to these types of internet services are human capital, competition, access to market and access to capital.

Type of internet services	Enterprise development challenges
Online education	Human capital, competition
Online marketing	Access to market
Online venture capital	Access to capital

Table 2 Internet services linked to enterprise development challenges

From the perspective of academia and policymakers, entrepreneurship is widely perceived as a skill that can be taught. To increase human capital and compete with other entrepreneurs, online education programs have become an accessible option for startups since the introduction of the internet (Al-Atabi and DeBoer, 2014). Such programs can increase the skills that are needed to be a successful entrepreneur, such as presentation and management skills. Massive Open Online Courses, or MOOCs, are becoming more widespread over the internet and are often offered on the internet for free. This is merely one example of the various forms of education that are available to entrepreneurs to develop their startup (Al-Atabi and DeBoer, 2014).

Online marketing can best be defined as the promotion of products and services through the internet. Since the invention of the internet, startups have not only used their own website as a way of reaching out to the customer. Also, the rapid emergence of social media platforms has led to the increased involvement of enterprises on the internet (Constantinides and Fountain, 2008). It allows for a more personal and interactive connection to the customer, but also empowers the customers by having a better overview of different products and prices. Marketing through social media is important for startups because the budget that is available for advertising and reaching out to potential customers is often very limited in the earliest phases of enterprise development. The emergence of the internet and social media have altered marketing strategies and consumer behavior, which makes the application of online marketing an important factor for startups (Constantinides and Fountain, 2008).

Venture capital is a term that has become increasingly popular among startups. It is a source of non-bank financing that is particularly prevalent among startups and contributes to sales growth, profits, value of net assets and improvements in management of finance. Venture capitalist investors who believe in innovative business proposals take an ownership stake in the business and provide funds while sharing the risk with the entrepreneurs (Memba et al., 2012). This can lead to a profitable investment for the venture capitalist and gives the enterprise the opportunity to develop further. Crowdfunding is another form of accessing capital and differs from traditional investments in that it allows the public to decide what startups receive funding (Mollick, 2013). Through presenting the project and a capital goal on a crowdfunding platform, a large number of individuals puts together small amounts of funding that will contribute to the development of the concept or prototype. An example of a crowdfunding platform is Kickstarter, of which the top fifty of startups that received the most funding there are forty-five still in operation. In recent years, crowdfunding has emerged as an important source of capital for startups (Mollick, 2013).

2.5 Internet access and enterprise development

Although few research has been conducted on the impact of the internet on the development of startups, there are various sources available on the impact of internet services on enterprise development, and therefore economic development in general. The vast majority of existing academic literature on the impact of internet services on the development of micro and small enterprises is positive about the influence of the internet (Sekere, 2016; Kelly and Firestone, 2016; Mbogo, 2010; Maree et al., 2013). Overall, internet services on a global scale have contributed to productivity, expanded business opportunities and enhanced the quality of customer service (Kelly and Firestone, 2016). In the Global South, the mobile phone in particular has had a transformative impact on daily life and business practices. It has been shown that the use of mobile money transfer systems and mobile communication services can have a positive impact on efficiency, transaction costs, productivity and profitability of micro and small enterprises (Sekere, 2016).

However, there is also research available that argues that the impact of broadband internet on the productivity of enterprises is negligible, unless the internet services are tailored to the specific needs of the enterprise (Colombo et al., 2013). Therefore, researching the perceptions on internet services among a particular group of enterprises with similar needs, startups in

Nairobi, is the proper approach. The existing literature indicates that through the right use of the services and applications, internet services can contribute to the development of micro and small enterprises increase employment opportunities. In reference to the beginning of this literature review, providing internet access to and stimulating the development of micro and small enterprises makes it possible to not only bridge the digital divide, but also reduce the general wealth gap between the Global North and Global South.

3. Theoretical framework

The theoretical framework consists of two different theories: the new venture creation model and the extended Technology Acceptance Model (TAM2). The new venture creation model elaborates on the development of enterprises and the extended Technology Acceptance Model explains the adoption process of internet services. Together, these theories form the theoretical framework for researching how and why internet services are adopted by startups and what the relations are to enterprise development.

3.1 New venture creation model

In the relatively old but relevant article *A Conceptual Framework for Describing the Phenomenon of New Venture Creation* by William Gartner, new venture creation is explained as a multidimensional and complex phenomenon. The author argues that the description of new venture creation should be more comprehensive than it was at the time of writing, because enterprises do not form a homogenous group. This complexity is translated into the definition of new venture creation: an independent entity, profit center or joint venture that satisfies the following criteria:

- Founders with expertise on products, market or technology.
- Results are expected beyond the year in which investments are made.
- The venture is considered new by its competitors.
- The venture is regarded as a new source of supply by its customers (Gartner, 1985: 698).

These criteria show some similarities to the current definition of a startup. In addition to the newness of the venture and regarding it as a new source of supply, startups distinguish themselves through the innovativeness and scalability of their products and services.

The framework for new venture creation was developed since an elaborate analysis of entrepreneurship enabled researchers to compare and position their work within a broad field of research. As a result of Gartner's review of entrepreneurship literature, the following four dimensions were formed:

1. Individual(s): the personality of the entrepreneur, including psychological characteristics.
2. Environment: the context in which the entrepreneur grows its venture, for example the presence of innovation clusters.

3. Organization: characteristics of the firm, such as sector, presence of partners and strategic choices.
4. Process: the dynamic characteristics of the entrepreneur (Gartner, 1985: 698-701).

These four dimensions are shaped by a broad set of variables, which are listed in the figure below (Gartner, 1985: 702).

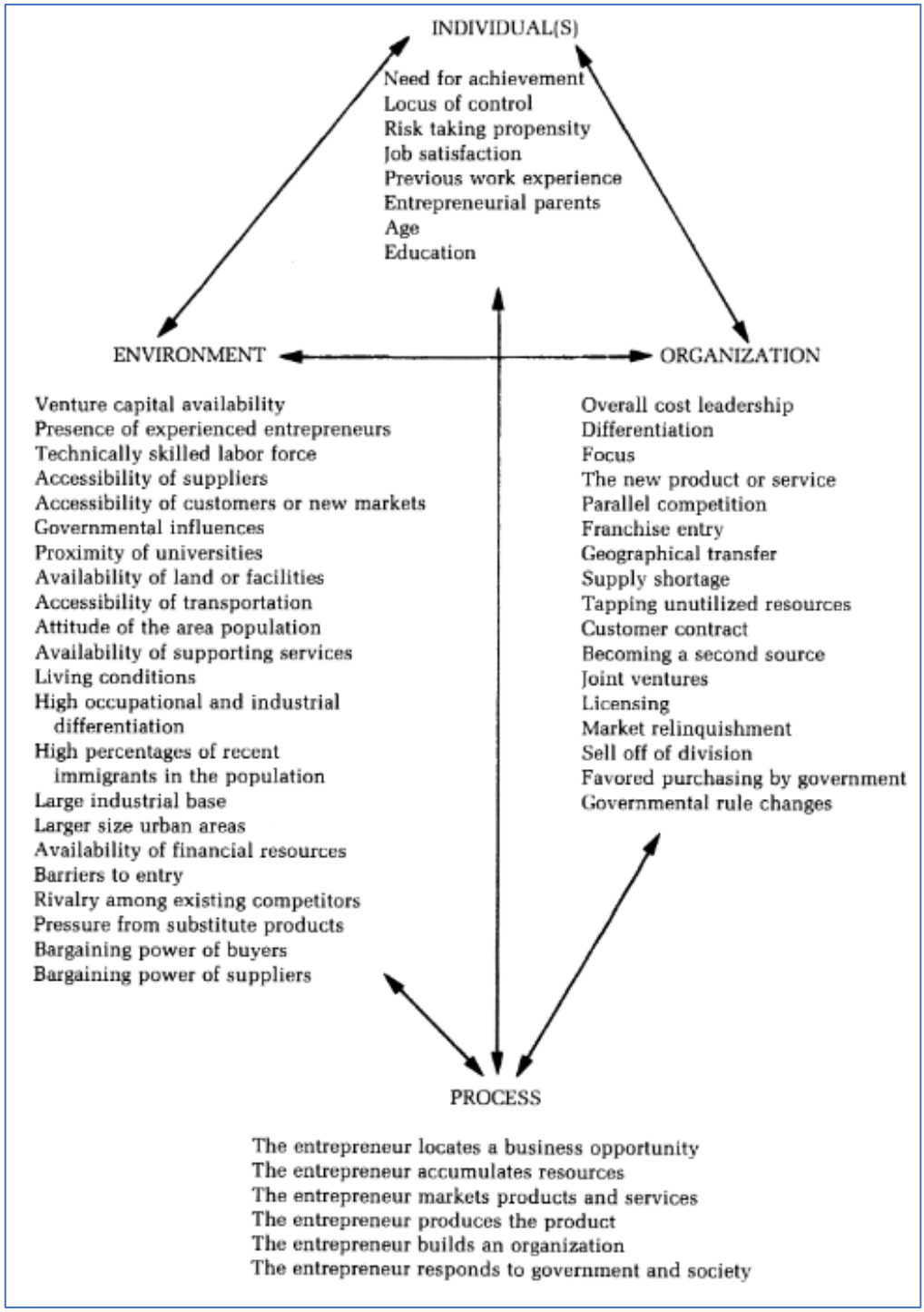


Figure 1 New venture creation model (Gartner, 1985)

Although this figure illustrates the multidimensionality of venture creation, Gartner does not argue that the list is complete. It merely functions as a step towards the recognition and appreciation of the complexity of entrepreneurship. This model was developed in 1985 and throughout the past decades enterprise development has changed as a result of a different environment. Also, it should be noted that this research focuses on startups, which operate in a different environment and organization as described in the Gartner model. Finally, the research samples that were used to develop this model originate from enterprises in the Global North. For these three reasons, the model will be used as a basis for what variables internet services can potentially have an effect on.

Based on the literature on enterprise development in Kenya and practical experiences with startups in Nairobi, the new venture creation model can be altered and complemented with new variables. Due to the differences in time, type of enterprise and location, the variables in the model will be made specific for the context of startups in Nairobi. The changes apply mainly to the individual(s) and environment dimensions, since these have changed the most in comparison the Global North context of 1985. With regard to the individual, the need for achievement should be altered into the ambitions of the entrepreneur. Also, the intentions of the entrepreneur are important to take into account, since this relates to the abilities of the entrepreneur and how these are translated into opportunities (Morrison et al., 2003).

In relation to the dimension of environment, the availability of support services should be complemented with the important role of business incubators and coworking spaces in the development of startups. Furthermore, venture capital availability and availability of financial resources are indeed essential for enterprise development today, although it is also interesting to take into account alternative forms of capital such as crowdfunding in this manner. Finally, accessibility of education and training should be added to the environment dimension, since the model does not explicitly mention how this affects the process of venture creation.

The motivation for using this theory is to find out whether internet services are perceived to have an effect on the variables in this model. Therefore, for the purpose of this research, a distinction should be made between the variables that can and cannot potentially be affected by the access to internet services. Some variables such as age, previous work experience, market relinquishment and proximity of universities are more given facts instead of factors

that can be altered through internet access. Based on the existing literature on enterprise development and internet access, the variables that can potentially be affected by access to internet services are:

Individual(s)

- Education

Environment

- Venture capital availability
- Accessibility of education and training
- Venture capital availability
- Accessibility of suppliers
- Accessibility of customers or new markets
- Availability of supporting services
- Availability of financial resources
- Barriers to entry

Organization

- Differentiation
- Focus
- The new product or service
- Parallel competition

Process

- The entrepreneur locates a business opportunity
- The entrepreneur accumulates resources
- The entrepreneur markets products and services
- The entrepreneur produces the product
- The entrepreneur builds an organization
- The entrepreneur responds to government and society

The perception of internet services that are accessed by startups will be analyzed in relation to the abovementioned variables throughout the research, in order to find out what enterprise development challenges can or cannot be tackled through internet access.

3.2 Extended Technology Acceptance Model

The extended Technology Acceptance Model (TAM2) can help explain and predict user acceptance of information technology at work and will be used to explore and understand the adoption of internet services by startups in Nairobi. The model is well-established in social sciences and has strong connections to the Theory of Reasoned Action and the Theory of Planned Behavior (Venkatesh and Davis, 2000).

The original Technology Acceptance Model was developed by Davis in 1985 and states that an individual's behavioral intention regarding technology is determined by perceived usefulness and perceived ease of use. Perceived usefulness is the belief that the technology will enhance job performance and perceived ease of use entails the effort that is needed to adopt a technology. The arrows in the model indicate the relation between these constructs and how it then influences the intention to use and usage behavior. TAM2 was developed by Venkatesh and Davis in 2000 and incorporates social influence processes and cognitive instrumental processes that further explain the perceived usefulness and the intention to use a technology (Venkatesh and Davis, 2000). These theoretical constructs in the extended model are listed and defined below:

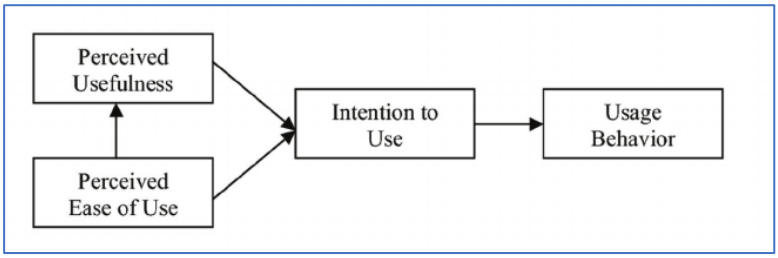


Figure 2 Technology Acceptance Model (Davis, 1985)

<u>Social influence processes</u>

- Subjective norm: the idea that society states whether or not to perform certain behaviour.
- Voluntariness and compliance with social influence: whether the choice to adopt is perceived to be voluntary.
- Image: the extent of status enhancement as a result of technological adoption in society.

<u>Cognitive instrumental processes</u>

- Job relevance: how relevant the technology is perceived by an individual in relation to the working environment.

- Output quality: how the technology performs in general.
- Result demonstrability: how tangible the results are of using the technology.

Another construct that applies to both social influence processes as well as cognitive instrumental processes is experience. The effect of subjective norms, in the form of mandatory usage of technologies, is found to erode over time. In addition to the original TAM, the figure below illustrates how the constructs are interlinked in TAM2.

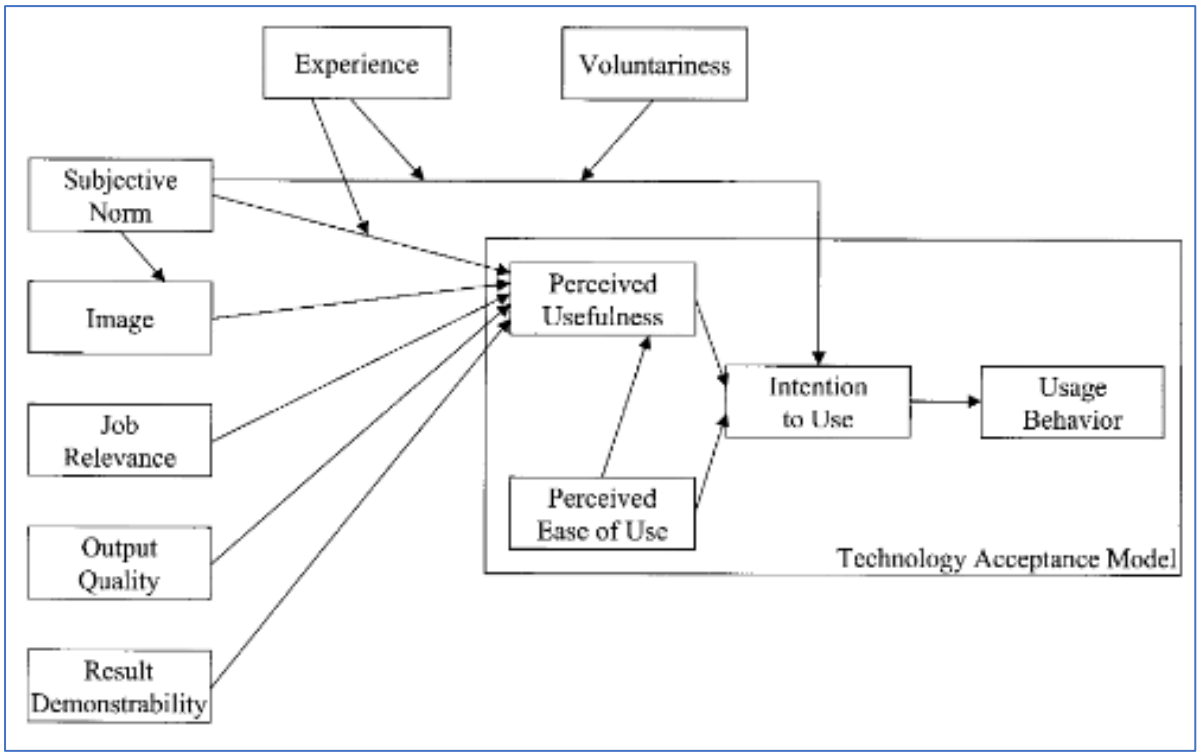


Figure 3 Extended Technology Acceptance Model (Venkatesh and Davis, 2000)

What is relevant about this model for the research is that it clearly outlines the various motivations for an entrepreneur to start using a certain internet service or technology. Especially result demonstrability, as in what effect the internet service has on the variables that relate to enterprise development, can be perceived as an important factor that determines whether a startup accepts or rejects a certain technology. But also output quality, image and job relevance should be taken into accounting when trying to find out why startups are or are not using certain internet services. Thus, it is possible to base questions for in-depth interviews and surveys on this model, although the criticism on TAM2 should be taken into account as well. Lunceford argues that technology adoption is too complex to be categorized into perceived usefulness and perceived ease of use (Lunceford, 2009). There are two groups of enterprises in particular that TAM2 does not emphasize on enough. First, those who cannot

access the technology due to financial constraints. It is possible that startups are unable to afford certain internet services due to the high costs of data or devices that are needed for access. The startup might decide not to make use of such services and devices or look for alternatives that are less expensive. This is in line with Graham's article on the digital divide, which focuses mainly on the financial constraints behind access to internet services. The second group consists of those who simply do not have the desire to adopt the technology. When researching the usefulness of particular internet services, it is also possible for startups to simply not be interested (Lunceford, 2009). Taking these aspects into account throughout the research will lead to an accurate image of how startups perceive internet services in relation to the development challenges they are confronted with.

4. Regional thematic framework

This section describes the framework in which startups operate. It provides further insight in the ambitions and societal challenges that exist on a regional, national and local level.

4.1 East Africa

Sub-Saharan Africa is on the rise. Especially East Africa has experienced strong economic growth and a fast-growing population in recent decades. However, the region has suffered severe droughts and famines since 2015, which has led to an increase in food prices (The World Bank Group, 2017). There is strong reliance on agricultural productivity in East Africa, which makes the region more vulnerable to the effects of climate change than other parts of the world (The World Bank Group, 2017). Even though these developments have led to a slowdown of economic growth, East Africa remains the fastest growing region on the continent. It is estimated that the region will continue to develop due to progress in public spending on infrastructure, agricultural productivity and higher consumption among households over the coming years (UN Economic Commission for Africa, 2017). The Gross Domestic Product of Kenya is expected to grow by 6 percent in 2018, whereas neighboring countries Ethiopia (8 percent) and Tanzania (7 percent) are growing at an even faster pace (The World Bank Group, 2017). Important to note is that economic growth can also lead to additional challenges. In line with the rest of the continent, East Africa is urbanizing at a rapid pace. The population in urban agglomerations has doubled since 1995 and is expected to double again over the next twenty years (UN Economic Commission for Africa, 2017). The challenges that will emerge as a result of urbanization will be discussed later in relation to urban development in Nairobi.

4.2 Kenya

Understanding the national context means that it is important to know in what direction Kenya is moving. In addition to economic growth and high birth rates, Kenya has experienced one of the strongest increases in internet diffusion and mobile phone adoption in Africa. Whereas mobile phones were rare in 2000, today more than 90 percent of the population has access to mobile phones and almost two-thirds of all Kenyans can access the internet (Communications Authority of Kenya, 2017). Whereas personal computers and fixed landlines are more common in the Global North, the vast majority of Kenyans uses a mobile phone to

access the internet (Maree et al., 2013). Furthermore, the money transfer system M-Pesa is widely used in Kenya. This system was launched by provider Safaricom in 2007 and makes it possible to transfer money with a mobile phone without requiring a bank account. It is used by consumers and businesses in both the formal as well as the informal sector for paying pills, transferring money to family and withdrawing cash (Mbogo, 2010).

The policies of the Kenyan government have played an important part in the diffusion of the internet, which are outlined in Kenya Vision 2030. This is the blueprint of Kenya's future and describes various strategies and ambitions that will contribute to transforming Kenya into a middle-income economy that provides high quality of life to all of its citizens. The document consists of three pillars: the economic vision and strategy, the social strategy and the political pillar (Kenya Vision 2030, 2007). In addition to the ambitious list of plans for 2030, there are several long-term flagship projects that aim to set the pace for Kenya's development. For the emerging technology sector, the flagship project is Konza Technopolis, which is a business park that is currently under construction outside of Nairobi (Kenya Vision 2030, 2007). It aims to function as the embodiment of the Kenyan technology sector, or Silicon Savannah, and should place Kenya on the map as the technology hub of East Africa (Ministry of Technology and Information, 2016). With regard to the government's ambitions on ICT, the Ministry of Technology and Information has published a masterplan for ICT that entails additional ambitions for Vision 2030. Through strategies on developing additional e-government services, improving access to ICT and fostering the growth of ICT businesses, the ministry aims for a stronger contribution of ICT to economic growth, jobs and foreign direct investments (Ministry of Technology and Information, 2016). Vision 2030 and the ICT masterplan illustrate the confidence of the national government in the role of the internet in transforming Kenya into a middle-income economy.

4.3 Nairobi

This section will touch upon urban development in Nairobi and briefly go into the emergence of startups and innovation clusters.

4.3.1 Urban development

The capital of Kenya has grown rapidly as a result of economic growth, high birth rates and migration from neighboring countries and rural areas. Therefore, Nairobi is confronted with

various urban development challenges that affect the livelihoods of its citizens and limit the development of the economy. The high unemployment rate, especially among young Kenyans, is the main challenge of today (Omolo, 2012). Also, the limited infrastructure has a negative impact on people's mobility and further economic development. One final urban development that is worth to mention is the growing inequality between poor and rich. Since the 1990s, economic growth has been mainly beneficial to those who were already part of the upper-class, but not to the population as a whole (UN Economic Commission for Africa, 2017).

4.3.2 Silicon Savannah

In order for something to grow, it is necessary to develop the right environment first. This is what made the emergence of Silicon Savannah possible. As mentioned before in relation to Konza Technopolis, the technology sector of Nairobi is commonly referred to as Silicon Savannah. In comparison to other African capitals, Silicon Savannah is the largest hub for innovation on the continent today (Hersman, 2012). Various factors can explain why this happened in Nairobi, such as location, climate, relative political stability and government policies. Also, the availability of capital in the city attracts startups that aim to grow. Finally, the international organizations, NGOs and global tech companies that are present in the city contribute to a wide network of information and opportunities for enterprise development (Hersman, 2012). Silicon Savannah adds to the general sense of optimism regarding economic development in Africa and is thought of as a cradle of innovation that has the ability to produce innately African solutions the development challenges of sub-Saharan Africa (Abdella, 2017).

There are two main actors in Silicon Savannah that shape the core of this sector: the startups and the innovation clusters. The following paragraphs will provide a general overview of these parties and how they develop in the Nairobi context.

Limited research has been conducted on the development of startups in the Global South. Also in Kenya, the vast majority of businesses is not registered in the Chamber of Commerce. There are studies available on the opportunities and challenges of enterprises, but these do not distinguish between formal and informal enterprises or between specific sectors (Bowen et al., 2009). Kenyan micro and small enterprises are confronted with various challenges that hinder their growth and productivity. According to a survey among enterprises in Nairobi, the most common challenges are competition among themselves and larger firms, lack of access

to credit, cheap imports, insecurity and debt collection. As a result of these challenges, it is estimated that 60 percent of all enterprises fails within the first three months (Bowen et al., 2009). Factors that can have a positive impact on the success of startups in Kenya are human capital and good infrastructure. Employees with relevant training or education, such as financial management, contribute the most to enterprise development. Also, adequate infrastructure, such as the access to roads, adequate power, water and sewerage contribute to a stronger business environment (Bowen et al., 2009). With regard to telecommunications, this means that inadequate access to digital infrastructure can be considered an obstruction to the growth of micro and small enterprises (Micro and Small Enterprises Authority, 2014).

To gain a clearer image of startups in Kenya, Ushahidi can be offered as a good example. Ushahidi is an active startup in Nairobi and the idea for the platform came to be as a result of post-election violence in Kenya in 2007 and 2008. The government banned live coverage and censored mainstream media, which created an environment of rumors and uncertainties. This information vacuum was filled by bloggers who collected information from protestors and witnesses. When the protests came to an end, a group of twenty developers used this idea of information sharing and created Ushahidi within a week (Okolloh, 2009). Users are able to report information on humanitarian crises and protests through their mobile phones or via the website. It uses accessible visualizations, such as maps and lists, to show what, when and where something happened. In those situations where information is of the most value, Ushahidi is used as an effective crowdsourcing tool (Okolloh, 2009). Besides national elections, other examples in which Ushahidi has been successfully applied are the earthquakes in Haiti and Chili, the civil war in Syria and forest fires in Russia.

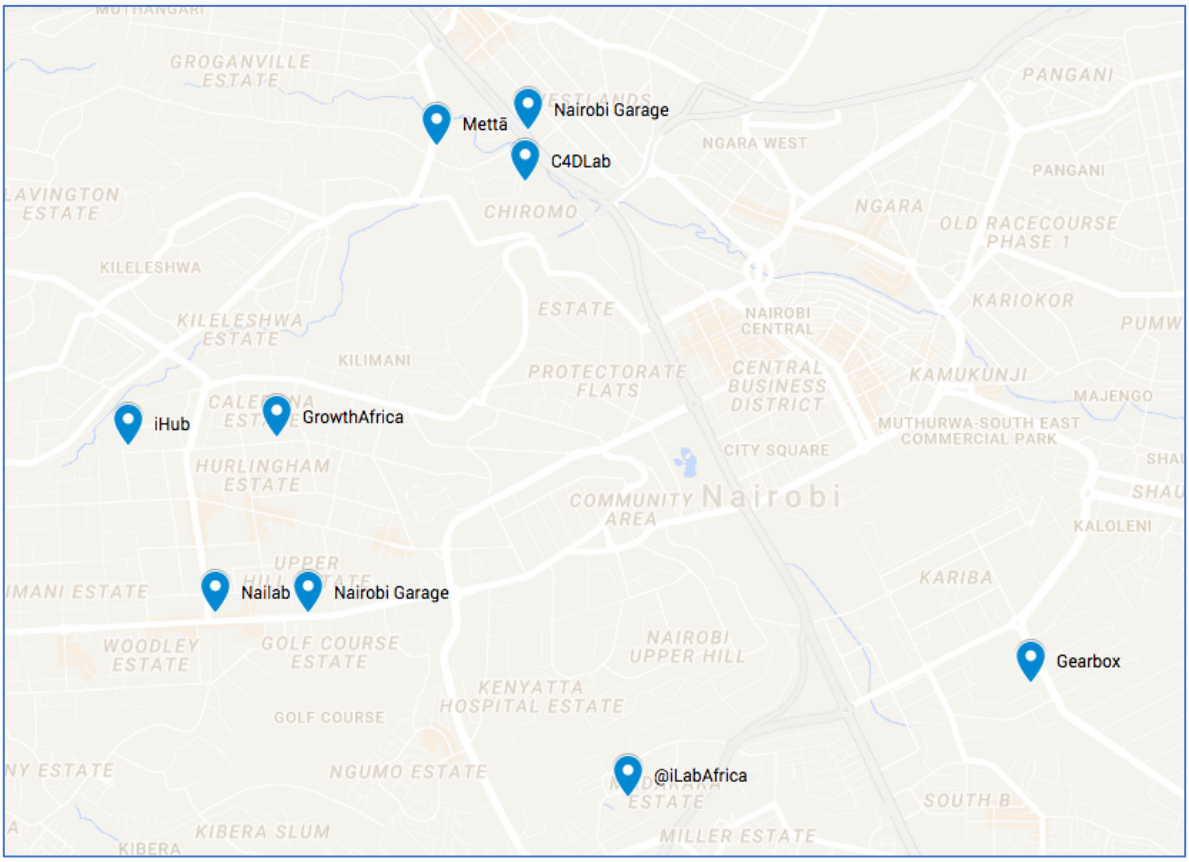
The second group of main actors in Silicon Savannah are innovation clusters, which play an important role for the development of startups such as Ushahidi. These workspaces and business incubators provide an environment for enterprises to work and develop ideas into products or services. Over the last ten years, there have been 117 business incubators that emerged in numerous African countries. Especially in the largest cities of South Africa, Nigeria, Ghana and Kenya there has been an increase in demand for incubation services from startups (Kelly and Firestone, 2016). In Kenya, the majority of innovation clusters is active within or around Nairobi. The four most notable innovation clusters are iHub, Nailab and @iLabAfrica

(Maree et al., 2013). An overview of innovation clusters and the services that they offer is provided in the table and figure below.

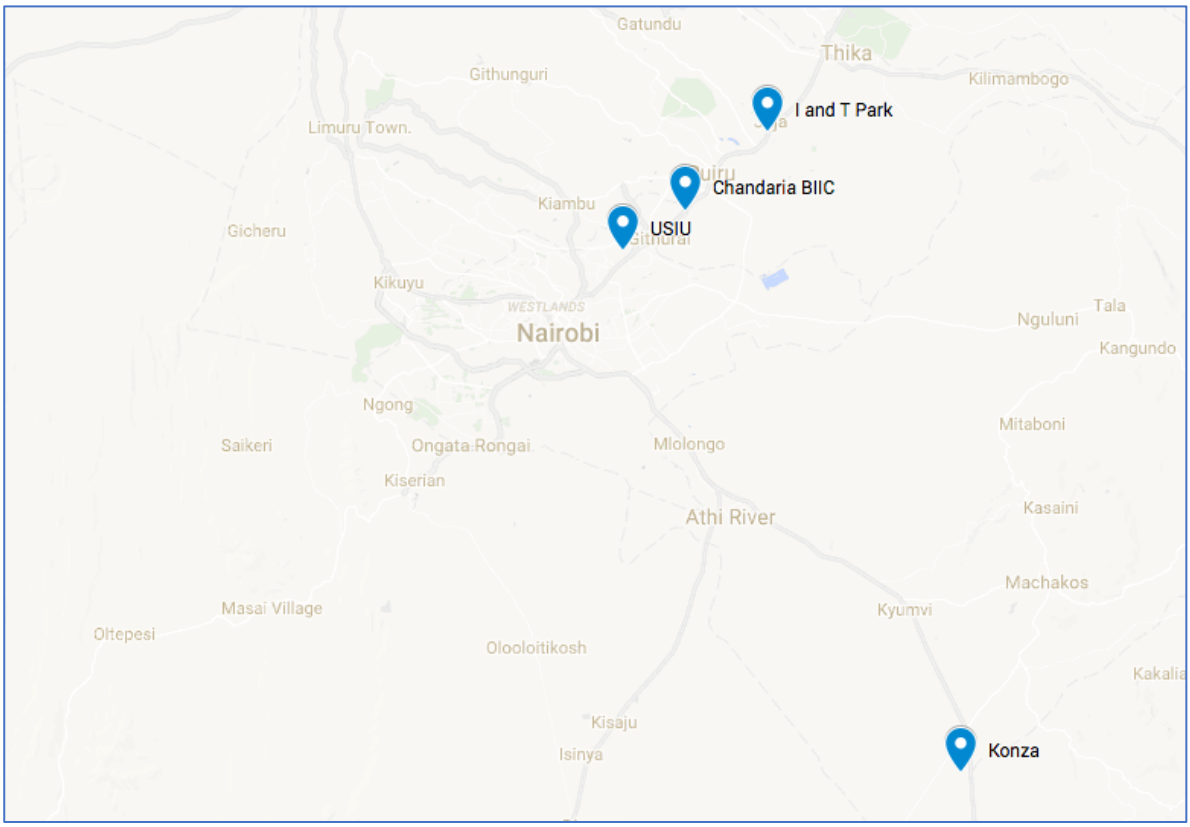
Innovation cluster		Services
iHub		- Three incubation programs: Entrepreneurship Journey, Innovation Journey and Investment Instruments - Workspace - Events
Nailab		- Two incubation programs: Core Incubation and Specialized Acceleration - Seed fund - Workspace
@iLabAfrica (Strathmore University)		- @iBizAfrica: incubation, mentoring and coaching - Academic programs and short courses - Software and web development services - Workspace
Nairobi Garage		- Workspace
C4DLab (University of Nairobi)		- Startup acceleration program for students - Research - Events, such as the Nairobi Innovation Week

Chandaria-BIIC (Kenyatta University)	Kenyatta University Chandaria Business Innovation and Incubation	- Incubation program for students - Workspace - Research
GrowthAfrica	growthafrica	- Acceleration program
Mettā	METTĀ	- Workspace - Events
Gearbox	Gearbox	- Workspace - Training - Tech support
United States International University - Africa	USIU AFRICA United States International University-Africa	- Incubation program
Nairobi Industrial and Technology Park	N/A	- Tech, marketing, management and financial support (*under construction*)
Konza Technopolis	KONZA Technopolis	- Workspace (*under construction*)

Table 3 Overview of innovation clusters



Map 1 Innovation clusters in Nairobi



Map 2 Innovation clusters around Nairobi

5. Research methodology

This section discusses how the literature review, theoretical framework and regional thematic framework are translated into the composition of the research.

5.1 Operationalization

In order to reach out to startups in Nairobi, the innovation clusters were approached first. Since the vast majority of startups is affiliated with one or more innovation clusters, these organizations functioned as gatekeepers for further research and were able to share knowledge about the Nairobi startup ecosystem and explain how to get in touch with startups (Hennink et al., 2011). By contacting the innovation clusters, I was able to understand how to reach different types of startups. The University of Nairobi assisted me throughout this process via the innovation cluster C4DLab. After the connections with innovation clusters were made, it was possible to observe, conduct interviews among employees of innovation clusters and conduct interviews with startups. Most of the in-depth interviews were conducted in February and March, after which I used April and May to spread an online survey to as many startups as possible in.

As mentioned earlier, the main research question is divided into six sub-questions to have a stronger grasp of what this research aims to answer. These sub-questions are complemented with sub-sub-questions, so that it is clear what this research wants to find out in detail. The concepts of the technology sector, startups, innovation clusters and enterprise development which have been discussed in the literature review form the basis of these questions. The regional thematic framework then provides additional background on the concepts of the literature review on a regional, national and local level. The theoretical framework, that entails the new venture creation model and the extended Technology Acceptance Model, functions as an important foundation of this research and is strongly incorporated in the following sub-sub-questions. The new venture creation model is applied in relation to the perception of the business environment, the main development challenges of Nairobi and the integration of internet services. The extended Technology Acceptance Model is then translated into the sub-sub-questions on the motivations and perceptions of startups to make use of internet services that include online education programs, online marketing platforms and online venture capital websites.

1. **How do startups and innovation clusters perceive the business environment of Nairobi?**

   - What are the main development challenges of startups in Nairobi?
   - How has the business environment for startups developed in the past ten years?
   - What services do innovation clusters offer to startups?
   - How do startups perceive the support of innovation clusters?
   - Does the Kenyan government contribute to a better business environment?
   - How do startups and innovation clusters perceive their development in the future?
   - How do startups and innovation clusters perceive the future of Silicon Savannah?

Research methods: secondary data, in-depth interviews, survey

2. **How are internet services integrated in the business practices of startups?**

   - What devices do startups use to access the internet?
   - What networks do startups use to access the internet?
   - Do the startups have their own websites?
   - How do startups perceive ease of access to internet?
   - What internet services do startups use on a daily basis?
   - To what degree are services of innovation clusters offered to startups online?
   - How do startups perceive the online services of innovation clusters?
   - How do startups perceive the influence of internet access on enterprise development?
   - How do innovation clusters perceive the influence of internet access on enterprise development?

Research methods: observation, secondary data, in-depth interviews, survey

3. **How are online education platforms perceived by startups to impact human capital?**

   - What strategies do startups have to increase human capital?
   - To what extent are online education programs used by startups?
   - What types of online education programs are used by startups?
   - What are the main motivations for startups to make use of online education programs?
   - Do startups consider that online education programs have an effect on competing within the business environment of Nairobi?

Research methods: in-depth interviews, survey

4. **How do startups perceive online marketing platforms to influence access to the market?**

   - How do startups market their products and services?
   - What internet services can be used to access the market?
   - To what extent do startups use online marketing platforms to market their products and services?

- What motivations do startups have to make use of online marketing platforms?
- Do online marketing platforms influence access to the market according to startups?

Research methods: in-depth interviews, survey

5. According to startups, how do internet services have an effect on access to capital?

- How do startups attract venture capital?
- To what extent do startups attract venture capital?
- Where does venture capital for startups originate from?
- What internet services can be used to access capital?
- To what extent is the internet used by startups to access venture capital?
- Do startups think that internet access has improved access to capital?

Research methods: in-depth interviews, survey

6. How do perceptions on internet access differ among startups?

- Are there different perceptions on the internet services and enterprise development relation between…
    - younger and older startups?
    - development phases of startups?
    - startups in different sectors?
    - B2B startups and B2C startups?
    - startups that are affiliated with innovation clusters and those that are not?
    - product startups and service startups?

Research methods: in-depth interviews, survey

Based on the literature review, theoretical framework and regional thematic framework, these sub-questions and sub-sub-questions aim to answer the main research question: how startups in Nairobi perceive the impact of internet access on enterprise development challenges.

5.2 Research methods and techniques

The research will make use of mixed research methods. Observation and conducting in-depth interviews are described in the book *Qualitative Research Methods and Techniques* by Hennink, Hutter and Bailey. Conducting a survey is a quantitative research method that is explained in the article *Fundamentals of Survey Research Methodology* by Glasow.

5.2.1 Observation

An observation can be conducted to systematically spot behavior and talk. This qualitative research method is used to obtain a description of the people and settings that are relevant to the study. For example, it can be used to identify hidden norms and values in a community. For this research, the social setting of the innovation cluster will be researched via a 'walk through the spaces' technique. It entails asking one of the employees at the innovation cluster to describe what can be observed when walking through the social setting. This makes it possible to learn about the startups that are active within the innovation cluster from the perspective of the employee (Hennink et al., 2011). Observation at innovation clusters is also applied to find out how internet services are integrated in the daily business practices of startups, such as what devices and websites are made use of. In addition, attending several panel discussions and sessions of incubation and acceleration programs will shed further light on the current and future business environment of Nairobi. Finally, the Nairobi Innovation Week that took place in March and the Nairobi Tech Week that took place in April have been useful occasions to talk to a variety of stakeholders and gain a better understanding of the recent developments in the Nairobi startup ecosystem.

5.2.2 In-depth interviews

This research method involves an in-depth one-on-one conversation between an interviewer and an interviewee on specific topics related to the research. The main aim is to learn about the perception of the interviewee on these topics. Qualitative data is collected through a semi-structured interview guide that involves open questions and probes that contribute to answering the research questions. In-depth interviews have been conducted with fifteen startups at various locations around Nairobi, at both innovation clusters as well as independent workspaces. These startups have made it possible to identify motivations for certain behavior, identify beliefs and perceptions. Furthermore, six representatives of innovation clusters have been interviewed. These innovation clusters are iHub, Nailab, C4DLab, Chandaria Business Innovation and Incubation Centre, Gearbox and @iLabAfrica. The interviews mainly contributed to further identifying the social context (Hennink et al., 2011). In addition, five experts with a unique perspective on the Nairobi business environment have been interviewed. For background information on the beginning of the Nairobi startup ecosystem and the perspective of a startup that developed into an established entity within

Nairobi, I interviewed the Director of Community Engagement of Ushahidi Angela Oduor Lungati. From the Kenyan government perspective I had the pleasure of talking to former Cabinet Secretary for ICT Bitange Ndemo and Director of Business Development for Konza Technopolis David Mugandi. Ben White, the CEO of online venture capital platform VC4Africa, contributed to the research through an interview over Skype. Finally, I conducted an interview with Joyce Mbaya Ikiao and Rhoda King'ori of the Nairobi-based online education platform Zydii. The average duration of all in-depth interviews stands at 38 minutes. A total of 26 in-depth interviews have been used for answering the research questions.

5.2.3 Survey

The survey is used to collect information on general attitudes and behavior among a broader group of people. It can also be used to examine particular needs, demands and impacts among the population. For this research it has been developed to have an overview of the general perceptions among startups regarding the impact of internet access on enterprise development (Glasow, 2005). This will make it possible to distinguish between different subtypes of startups based on a variety of factors. The units of comparison used for this research are age of the startup, development phases, business sectors, B2B or B2C startups, innovation cluster affiliation and product or service startups. The online survey platform SurveyMonkey was used to develop and distribute the survey in April and May. The survey consists of 61 questions in total that were divided into categories based on the units of comparison and the sub-questions of the research. These categories are background information, internet use, enterprise development, online education, online marketing and online venture capital.

Besides the contacts at numerous innovation clusters, the survey was also shared via e-mail addresses that were accessed through the online public startup database Crunchbase. Furthermore, the organization of NIW.Startups of the Nairobi Innovation Week had an overview available of the 100 most promising Kenyan startups in 2018, which was used to reach out to the startups that fit the criteria for the research. Finally, several startups that participated shared the survey within their own networks, so that a sufficient number of startups was reached at the end of the research period. These various channels made it possible to receive a total of 88 respondents to the survey, of which one response was not considered to be usable since it was from a startup that filled in the survey twice. This brings

the total of unique respondents that fit the criteria of the research to 87. Based on the data provided by SurveyMonkey it took startups about 17 minutes to complete the survey.

5.2.4 Secondary data

In addition to the existing literature on internet access and enterprise development, the innovation clusters, the University of Nairobi and the Kenyan government have been consulted for data and other relevant sources. Several innovation clusters are or have been researching various topics related to startups and enterprise development. This data can be seen as complementary to the quantitative analysis component of this research and will lead to a stronger grasp of the Nairobi business environment from the point of view of its main stakeholders.

5.3 Sampling strategy

The sampling approach for this research is a combination of purposive sampling, snowball sampling, expert sampling and random sampling. For the in-depth interviews with startups and innovation clusters, purposive sampling has been applied at first. Purposive sampling is a non-probability sampling technique that is used in qualitative research and allows the researcher to select research units within the population (Etikan et al., 2016). It is important that a large variety of startups and innovation clusters is interviewed, so that the results offer a complete perspective on the perception of startups in Nairobi. This means that the interviews needed to involve younger and older startups, male and female entrepreneurs and different kinds of enterprises, sizes and outputs. By selecting and visiting multiple innovation clusters in Nairobi, it was possible to reach an adequate variety of startups. Furthermore, the Nairobi Innovation Week and the Nairobi Tech Week were used as opportunities to reach out to startups that are not affiliated with innovation clusters. This type of purposive sampling is called maximum variation sampling (Etikan et al., 2016). In addition, snowball sampling is applied as a way to make use of the personal networks of startups and innovation clusters. Snowball sampling involves asking participants to recommend other startups or innovation clusters to participate in the interview. Since networking is an essential feature of the Nairobi startup ecosystem, snowball sampling is a good way to generate a large variation of startups and innovation clusters that will be suitable for the research. The first contacts at the University of Nairobi and sending e-mails to innovation clusters proved to be good starting points for this approach.

In relation to the expert in-depth interviews, expert sampling is used as a sampling strategy. These interviews were needed to generate a better understanding of the Nairobi startup ecosystem and how the Kenyan government, online education programs, venture capital websites and established startups participate in the business environment. Another regular topic in these interviews was the perception of these stakeholders with regard to the future development of the Nairobi business environment, especially in relation to Vision 2030 and Konza Technopolis (Etikan et al., 2016).

For the survey, it was important that a large and varied sample of startups was reached. To prevent bias, the online survey was shared with multiple innovation clusters, distributed through several online startup databases and the startups were selected randomly. Random sampling means that all participants are given equal chances of being included in the research. Because it was difficult to estimate the number of startups that were not affiliated with innovation clusters, active in the informal sector and absent on websites, databases or platforms, the sample cannot be considered purely random. Due to the early stage of development of the Nairobi startup ecosystem and the exploratory nature of this research, random sampling has been the ultimate objective but not feasible in practice. However, efforts have been made to reach all types of startups in Nairobi that fit the criteria as described in the literature review and were suitable to participate in the research. No exclusion was made on the basis of formality, output or affiliation.

5.4 Positionality of the researcher

The positionality of the researcher influences what is observed and how an interviewee responds throughout the research. Therefore, it is important to be aware of the characteristics that may influence data collection. As a white male it can be expected that the people you encounter will make various assumptions about you. This can have an impact on data collection, since positionality influences what and how much information the participant is willing to share with the researcher. Thinking about how to introduce yourself, how to dress and in what setting the interview takes place are good ways to take positionality into account. Throughout the research period it was my objective to act and dress similar to the entrepreneurs, so that the power relations between researcher and participant were as equal as possible (Hennink et al., 2011). My work experience at a startup platform in the Netherlands

proved to be useful, since this has increased my understanding of the social setting in which startups operate.

5.5 Ethical review

Before the start of data collection, a number of ethical issues have been taken into account. For the credibility of the findings and the trust between researcher and participant, the ethical review provided a brief code of conduct for me as a researcher. It describes the process of participant recruitment and how participants would be informed of their rights when partaking in an interview or survey. Furthermore, the ethical review touches upon the potential risk to participants, confidentiality regarding the collected data and potential conflict of interests. The complete ethical review, as it has been written in January, can be found in the annex section of this thesis.

5.6 Limitations and risks of the research

One of the limitations that was expected to negatively impact the quality of data collection in February was the degree of access to innovation clusters and startups. Even though it was difficult to get in touch with and visit some of the innovation clusters, the most significant organizations turned out to be very open and welcoming. Furthermore, efforts were made to collect data from a strong variety of startups in Nairobi, but the visibility of certain startups made this more difficult. The startups that are not affiliated with innovation clusters, not registered as a formal business and in the idea phase of development turned out to be harder to find. Therefore, the results from the in-depth interviews and survey cannot be considered applicable to the Nairobi startup ecosystem as a whole without first placing these in the context of the literature review, theoretical framework and regional thematic framework. It also turned out to be important to compare the results from the in-depth interviews with the results of the survey and vice versa. This is because there have been several instances where a finding from one research method turned out to be inapplicable as a result of the other research method.

Furthermore, there was less of a language barrier during the interviews than first expected. In a few cases the interviewees did not speak in a loud enough manner or Swahili slang was used, which sometimes led to valuable information being lost in the transcript. In addition, some of the responses of startups may have been altered due to issues of trust or the

positionality of the researcher. Especially questions on the formal registration of the startup and the opinion on their affiliated innovation clusters were occasionally followed by discomfort or making sure the interview is anonymous. With regard to the positionality of the researcher, it occurred that startups gave inadequate answers in the section on online venture capital. This is because some expected that the researcher had funding available or was able to forward them to investors in the Netherlands. Finally, the number of survey respondents made it difficult to pursue some of the comparisons that I was hoping to make. For example, the relation between business sectors and perception of online education programs was hard to look into, since most sectors only consisted of around ten survey respondents.

6. Findings and analysis

This part of the thesis will discuss the findings from the in-depth interviews, online survey, observations and secondary data. The large sets of data that were collected throughout the fieldwork in Nairobi consist of coded interview transcripts and responses to survey questions. The upcoming chapters aim to capture the general perceptions of startups in response to the sub-questions that were presented earlier in the introduction. The findings are structured around the first five sub-questions on the Nairobi business environment, use of internet services, online education programs, online marketing platforms and online venture capital websites. The sixth sub-question on how perceptions differ among startups will not be touched upon in an isolated segment, but is integrated into the five mentioned sections instead. This is because the varying perceptions of startups are strongly connected to the discussions around Silicon Savannah and the integration of internet services.

The findings will be accompanied by a variety of quotes from the in-depth interviews and several figures from the online survey. The quantitative data analysis consists of graphs that were designed based on the responses of the SurveyMonkey software and a variety of comparisons in the IBM SPSS software in order to provide an elaborate answer on the final sub-question.

6.1 Silicon Savannah

6.1.1 Startups and development challenges in Nairobi

'*I generally say, if you can make it in Nairobi, you can make it anywhere.*'

- Founder of startup AB3D Africa

This was the response of a startup when asked about the ease of doing business in the Kenyan capital. The quote entails both the difficulties that Nairobi startups are confronted with as well as the opportunities that are available. When describing the Nairobi business environment, some of the most common keywords that were mentioned by startups were '*tough*', '*thriving*', '*hostile*' and '*great*'. Although there are a great number of challenges that startups are confronted with from the start, it became clear throughout the interviews that Kenyans tend to have a more optimistic perspective on entrepreneurship in Nairobi:

'*Problems and challenges just give you a bigger white paper to innovate around.*'

- Head of Communications and Marketing at innovation cluster Nailab

This chapter will discuss the development of the Nairobi business environment, common enterprise development challenges of startups, the contribution of innovation clusters and the Kenyan government to the development of startups and the future of Silicon Savannah.

First, the interviews that were conducted with startups led to a clearer perspective on the profile of a typical Nairobi startup. The majority of startups in Nairobi consists of young, educated men who have recently graduated from university. A division can be made based on the various sectors that startups in Nairobi are active in. As a result of the online survey, the graph below offers an overview of the most active sectors in the city. E-commerce and business services and fintech are the sectors with the highest numbers of startups. This can be considered representative for the startup ecosystem of Nairobi since several interviewees have pointed out the dominance of these sectors. An example of an e-commerce and business services startup is Shop Jiji, which functions as an online marketplace that links African fashion brands to the Kenyan market. The fintech sector consists of startups with innovative solutions for the financial industry, such as Grassroots Bima, which aims to provide inclusive insurance to Kenyan grassroot communities. The 'other' category consists mainly of startups that focus on information technology and advertising services.

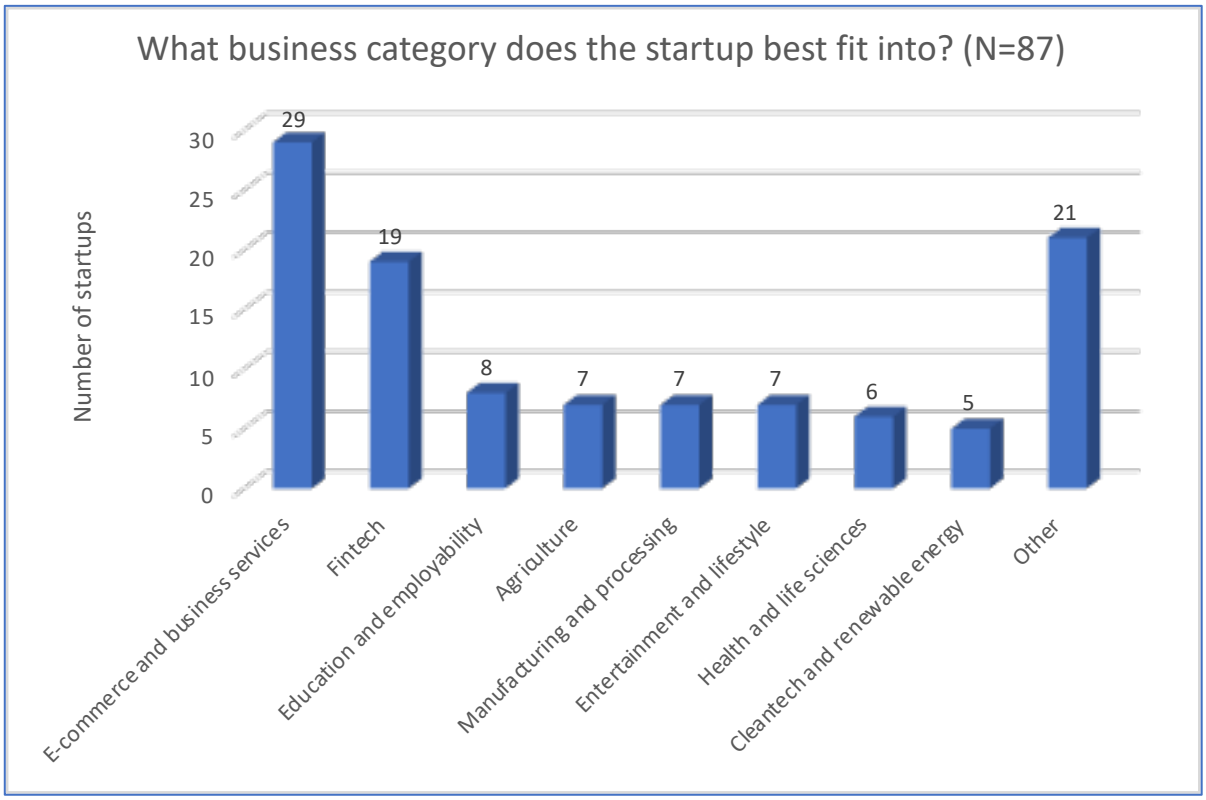


Figure 4 Business categories of startups in Nairobi

In line with the vibrant e-commerce and business services and fintech sectors, the vast majority of startups offers a service to its customers. Some startups have developed a concrete product, such as wireless headphones or a tracking device, but setting up a service startup in the form of an app or a website is far more popular in Nairobi. Service startups are predominantly active in the e-commerce and business services, fintech and education sector, whereas product startups, needless to say, predominantly shape the manufacturing and processing category. The graph below shows that 58 percent of startups focus on offering only a service, an estimated 11 percent have a product for sale and the other startups offer both a product as well as a service to their customers. According to the innovation cluster Gearbox, which focuses on the development of hardware startups in the industrial area of Nairobi, the number of product startups is rapidly growing at the moment. Although there is no existing academic research available, Gearbox and several product startups have argued that the manufacturing and processing sector in Nairobi tends to contribute more to the number of available jobs in comparison to startups that have developed an app or a website, thus having a stronger social and economic impact.

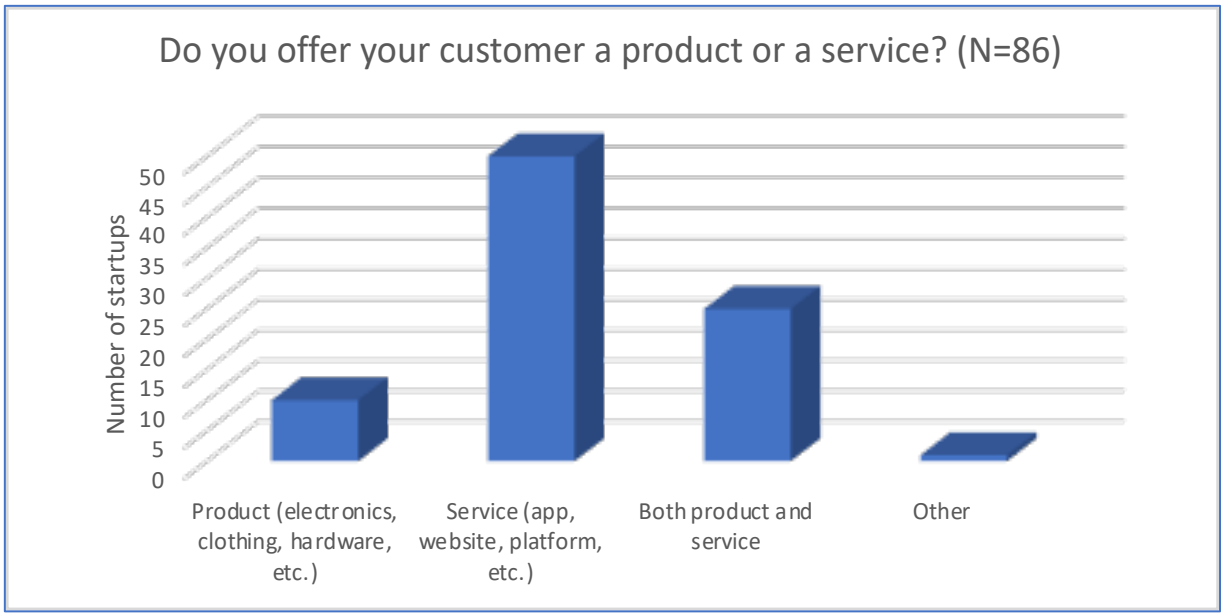


Figure 5 Product and service startups

Besides categorizing the various types of startups in Nairobi, the survey was used to gain insight in three other fields: drivers, perceptions and development challenges. First, when entrepreneurs were asked about their most important drivers for setting up a startup, it became clear that generating social impact is strongly agreed upon. However, it is important to point out that the other drivers tend to score high as well. With regard to social impact, many startup ideas are based around solving the most pressing development challenges on the African continent, such as access to electricity and clean drinking water. It is generally assumed that a link can be made between startups that aim to solve development challenges and their success, as can be derived from the following quote of a startup:

'*If you clearly look at the startup culture, you see most of the startups that succeed are startups that aim at solving the social challenges that we have*.'

- Founder of startup Moot

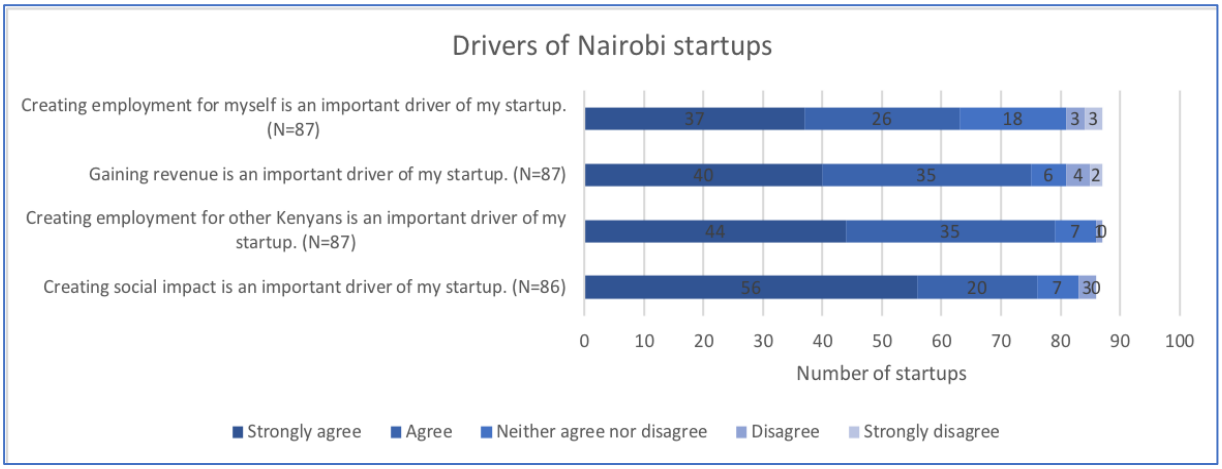


Figure 6 Drivers of Nairobi startups

Startups were also asked to give a grade from a scale of 1 to 10 about how they perceive the ease of doing business in Nairobi. The average grade was just below sufficient: a 5,69 (N=84). In addition, it turns out that this grade is even lower among startups that are in the seed phase of development. Based on this and the low success rate of micro and small enterprises in Nairobi, as discussed in the introduction, it can be stated that it is not easy to start a company in Nairobi. However, startups remark that there is no better alternative market available in the region or perhaps even on the continent. When startups were asked a similar question about their own development, the grades where significantly higher. The analysis also indicated that the startups in the later phases of development gave higher grades for their own development than startups in the earlier phases, which indicates that startups are confronted more with challenges in the earlier phases of development.

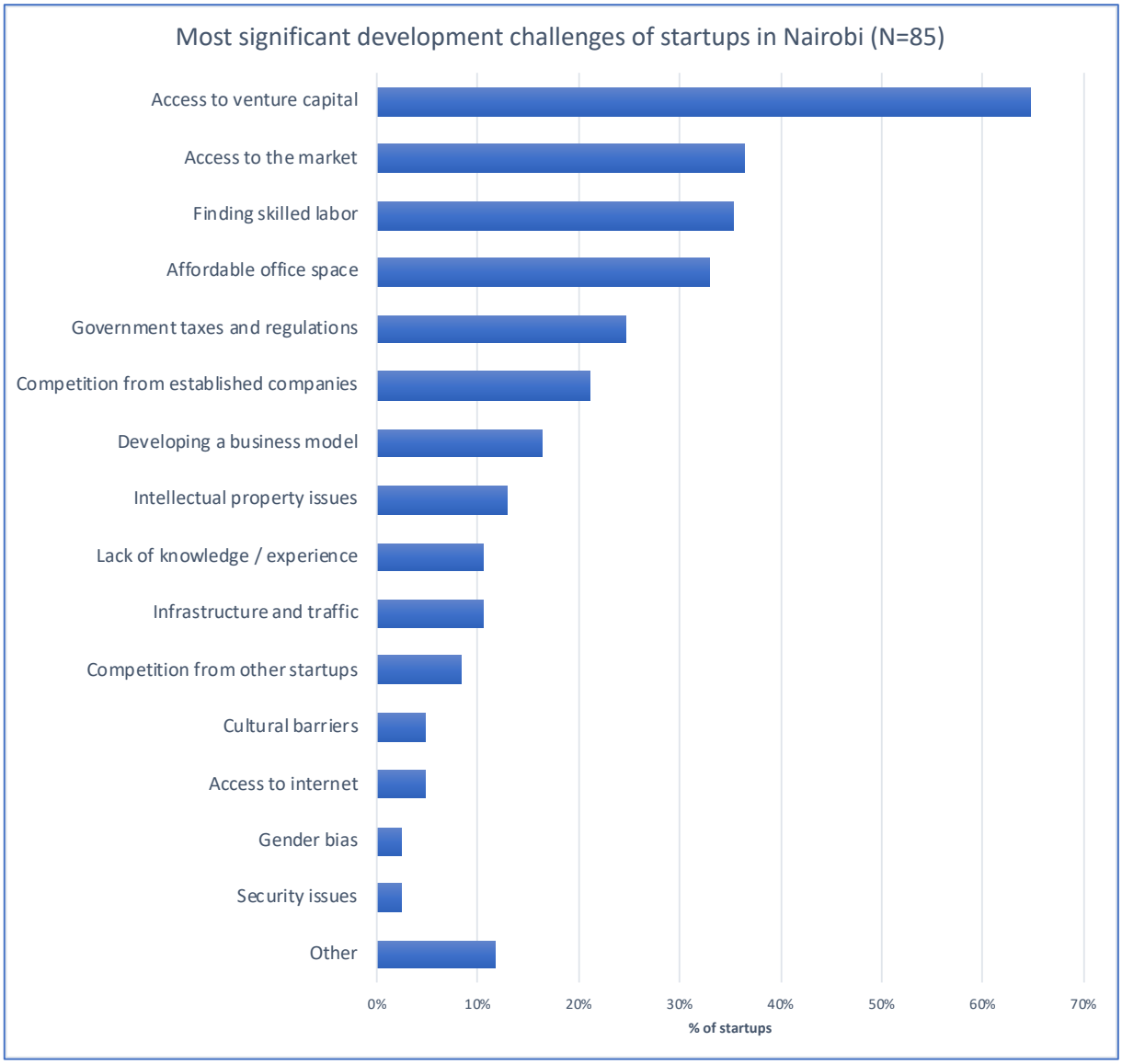


Figure 7 Most significant development challenges of startups in Nairobi

In addition to investigating the main drivers and perceptions of the business environment, a list with the enterprise development challenges that were mentioned on a regular basis in the interviews was drafted. Then, through the survey it was possible to find out what challenges startups are confronted with the most. Startups were asked what three development challenges they perceive to be most pressing, and as a result the graph above provides an overview of the most significant development challenges in Nairobi.

It indicates that the number one challenge, by far, is access to venture capital with an estimated 65 percent of startups placing this challenge in the top three. When discussing this in the interviews, one interviewee remarks:

'*Funding was the main problem. These are the same guys that need to survive. They need to put food on the table, still have to work on the innovation, so along the way we have a number of them dropping out because they need to survive.*'

- Researcher at innovation cluster C4DLab

Because of the lack of access to capital, startups have very low budgets available to invest in the startup, for example to build a prototype, develop a website or application and grow the number of employees. Enough money needs to be available for basic needs such as housing, food and in some cases education. The challenges that are followed by access to venture capital are access to the market, finding skilled labor and affordable office space.

Access to the market and competition from established companies are mainly issues for startups in the idea phase of development. Credibility and trust on the market are necessary in order to connect with customers and promote the product or service. About this challenge, one startup comments:

'*In a startup world I mean like nobody still knows you, you haven't obtained the credence that is needed so you have to do like ten times more than an established entity would have to do.*'

- Founder of startup Sauti

The subsequent challenge, finding skilled labor, is an issue because the vast majority of unemployed people neither has a university degree nor the right set of skills that is required for the vacancies of a startup. Through the data analysis it became clear that this in particular is a challenge for startups in the seed phase. Although online education programs were named

as a potential solution to this problem, the Kenyan education system is observed as the main actor that can bring about significant change for the unemployed.

Affordable office space is a growing problem, since Nairobi is becoming increasingly popular to live and work. The demand for housing and office space is growing at a faster pace than the number of apartments, co-working spaces and offices being built. Startups in the early-growth phase of development tend to select this development challenge more often in their top three than others. Perhaps this can be explained by the fact that these startups are expanding in size and therefore need to increase their workspace.

Some of the other challenges that scored high on this survey question were government taxes and regulations, competition from established companies, developing a business model and intellectual property issues.

Startups tend to agree that the business environment of Nairobi has improved over the last ten years (N=84). The three factors that have contributed most to the ease of doing business are the support of innovation clusters, government involvement and internet access. Numerous innovation clusters have come up in recent years and have offered startups an environment to develop ideas into viable business models. The government has provided additional information for startups online and has made registration for new businesses easier. The internet has allowed Nairobi to catch up with the rest of the world through information and knowledge shared online, which has led to increased awareness and the need to keep up with what is happening outside of Kenya. How startups perceive the support of the Kenyan government and innovation clusters will be touched upon in the following paragraphs. The perceived impact of internet access will be elaborated on in the next chapter.

Innovation clusters form an important role in the development of startups, since an estimated 79 percent of startups is affiliated with one or more innovation clusters in Nairobi (N=86). These entail both co-working spaces as well as incubator and accelerator programs. When dealing with numerous innovation clusters today, it is difficult to imagine that one decade ago there were no innovation clusters active in Nairobi. This changed in 2010, when the iHub was opened at the Bishop Magua Centre on Ngong Road. Not only was it the first incubation hub of the city; it was the first on the continent. The iHub rapidly drew international attention and placed Nairobi on the map as Africa's innovation capital. After years of incubation services, events and several successful spin-offs, the iHub had to relocate to the Senteu Plaza in order

to provide enough space to its community. With 250 active members the iHub currently remains one of the most vibrant innovation clusters in the city and continues to work towards its objective of supporting the development of startups.

Besides the workspace, mentorship, internet access and trainings that innovation clusters such as the iHub offer to startups, the value of these organizations mainly comes from the network that is established. For example, the C4DLab at the University of Nairobi is responsible for the Nairobi Innovation Week that is organized each year. According to one of the researchers at the C4DLab, the startups that are affiliated with the innovation cluster are helped through this event, because it is an opportunity for them to grow their network:

'*So all of the startups that come through C4DLab always go to the Innovation Week so that they can network themselves and pitch the ideas to investors, banks, financial institution.*'

But in most cases the network of innovation clusters is not accessible to startups for free. Some innovation clusters ask for a monthly fee to become part of the community whereas others ask to own a small percentage of the startup in return for their support. The iHub, for example, offers a monthly membership for 7.000 Kenyan shillings (56 euros) and Chandaria-BIIC requires the startup to give ten percent ownership in return for support. Still startups tend to have a positive perception towards the support of innovation clusters. It is relatively cheap for startups to join an innovation cluster instead of having to arrange workspace and internet access individually. Working in an environment with other startups also makes it possible to organize events such as pitching competitions or panel discussions and share ideas, knowledge and skills among fellow entrepreneurs. However, some of the startups criticize the innovation cluster because they do not have a clear focus on supporting a particular type of startups. Another critique is the quality of the incubator and accelerator program that is offered. This mainly targets the experience and knowledge of the mentors that work for the innovation cluster. In general, when asked about the contribution of innovation cluster services to the business environment of Nairobi, startups graded them with a 6,29 (N=84). Interesting to note is that the startups affiliated with Chandaria-BIIC and @iLabAfrica, which are both based at university campuses in Nairobi, score relatively higher than the other innovation clusters. Also, product startups tend to have a more positive perception on the services of innovation clusters than service startups.

The Kenyan government has endeavored to strengthen the Nairobi business environment through policies and projects over the last ten years. Under the supervision of Bitange Ndemo, the Cabinet Secretary for ICT from 2005 to 2013, the Kenyan government constructed several undersea cables for stronger internet access, subsidized the establishment of innovation clusters, developed an online platform where businesses can register and lowered taxes on consumer technology for Kenyan students. Reflecting on these developments, Bitange Ndemo points out that the Kenyan government was among the few in the region that was actively thinking of ways to strengthen its business environment: '*We took a lot of risk, which gave us the impetus to move on.*' This desire for change was fueled by the general belief of the cabinet that internet has the ability to stimulate the economic development of Kenya. Under the new president Uhuru Kenyatta, the plans for innovation and entrepreneurship are pushed through in a slower, more careful manner. The main question that the government wants to see answered is how digital transformation can contribute to achieving Kenya's economic objectives.

Startups tend to be more skeptical of the support of the Kenyan government. Most are content with the increasing acceptance of startups and the efforts that are currently being made. A recent example is the presence of the government at the Nairobi Innovation Week in March. The startup fair on the University of Nairobi campus was filled with stands of ministries and government agencies that were there to support and interact with startups. One of the startup founders that attended the event pointed out:

'*They try to demystify and break the barriers between most Kenyans and themselves. That way you will feel comfortable approaching the government.*'

In addition, the event was visited by a strong delegation of government officials, among others Amina Mohamed, the Cabinet Secretary of Education, and Joe Mucheru, the Cabinet Secretary of ICT. Also, various startups mention that eCitizen, the online services platform of the government, offers a business registration portal that has made it significantly easy to register:

'*We applied online for the permit, we paid online from the eCitizen portal* […] *and it was just nice to have everything said to me without me going to the offices*.'

- Founder of startup Botlab

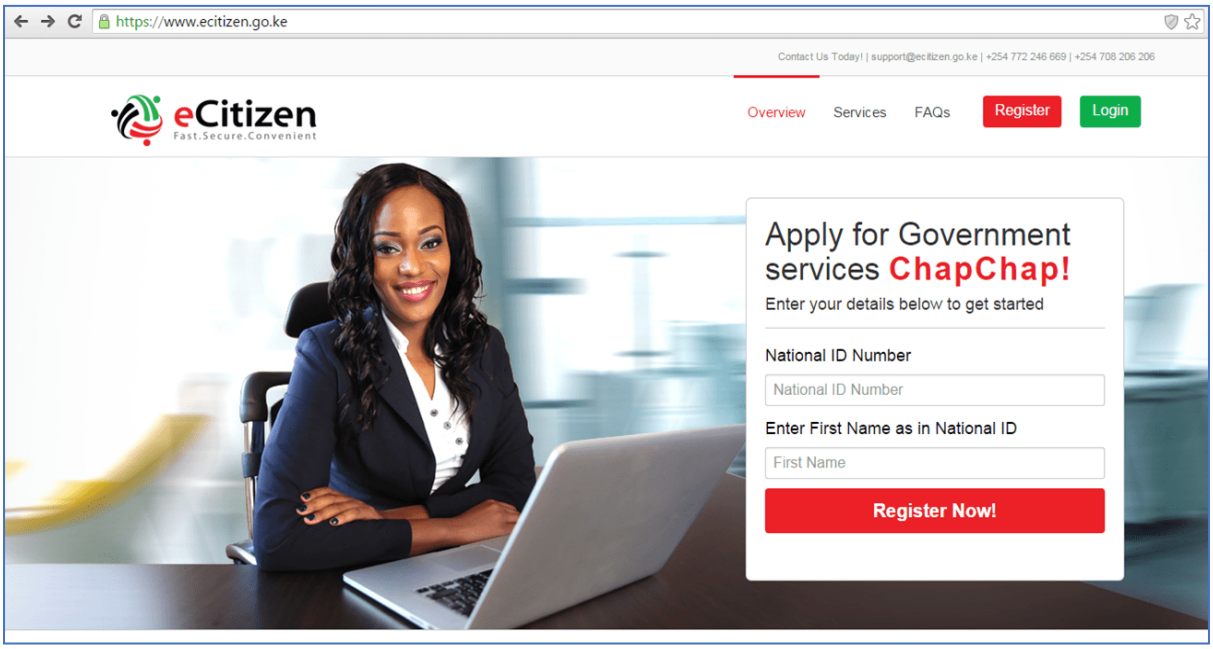


Figure 8 Example of eCitizen platform

However, the majority of startups argues that the recent efforts by the Kenyan government are not sufficient for a stronger business environment. It remains difficult for startups to comply with government policies, because some innovations of startups are ahead of current regulations. Furthermore, the taxes on micro and small enterprises are getting higher every year. Avoiding taxes is a motivation for some startups not to register through the eCitizen portal. These startups are commonly referred to as informal enterprises. About 18 percent of the survey respondents indicate that their startup is part of the informal sector (N=85). Some founders of startups experienced cultural difficulties when communicating with government agencies. Others struggled with the paperwork when applying for one of the youth grant that the government offers to young entrepreneurs.

The consensus is that the Kenyan government needs to do a lot more if it wants to keep up with developments within the startup ecosystem instead of being several steps behind the trend. When startups were asked to grade the contribution of the Kenyan government to the ease of doing business in Nairobi, the average was a poor 4,54 (N=82). As can be seen in the table below, this grade is significantly lower than the other grades given by startups in the survey. What can also be noted is that the standard deviation is higher compared to the others, which indicates that these grades are more spread out and thus general opinions of startups are less consistent.

Survey question	N	Average	Standard deviation (σ)
How would you grade the development of your startup up to this point?	84	7,0357	1,94
How would you grade the ease of doing business in Nairobi?	84	5,6905	2,11
How would you grade the services of your innovation cluster(s) in the sense that they have contributed to ease of doing business in Nairobi?	82	6,2927	2,21
How would you grade the efforts and services of the Kenyan government to startups in the sense that they have contributed to ease of doing business in Nairobi?	82	4,5366	2,27

Table 4 Enterprise development and ease of doing business grades

Furthermore, when analyzing the grades that were given by startups on a deeper level, it became clear that there exist two noteworthy correlations. The first is between the grade for the development of the startup and the perceived ease of doing business in Nairobi. With a moderate positive correlation of 0,46 it can be stated that startups with a positive perception of their own development tend to be more positive about the ease of doing business in Nairobi. With a moderate positive correlation of 0,32, the other instance is weaker but nevertheless worth to mention. It indicates that startups with a more positive perception of the contribution of innovation cluster services to the Nairobi business environment are more positive about the contribution of the Kenyan government as well.

	Startup development	Ease of doing business	Services innovation cluster	Services Kenyan government
Startup development	r = 1			
Ease of doing business	r = 0,4642 σ = 0,000	r = 1		
Services innovation cluster	r = -0,1260 σ = 0,259	r = -0,1175 σ = 0,293	r = 1	
Services Kenyan government	r = 0,1705 σ = 0,126	r = 0,1763 σ = 0,113	r = 0,3168 σ = 0,004	r = 1

Table 5 Correlation enterprise development and ease of doing business grades

The perception of startups with regard to the future of Silicon Savannah is encouraging. Although only a small number of startups will develop into a successful and sustainable

enterprise, the vast majority is optimistic about their own development in the future. The matter of startups having high trust in themselves and strong criticism on outsiders was regularly touched upon in the interviews with innovation clusters and experts.

When discussing the future of the Nairobi business environment, it is significant to have a look at the developments over the last decade. Ushahidi, one of the first startups of Nairobi, stood at the core of these developments. In an interview with Ushahidi's Director of Community Engagement, it was explained that the creation of another startup called BRCK, which provides internet to remote locations in Africa, and the iHub, the first innovation cluster of Africa, came out of Ushahidi. The following quote clearly illustrates how the recent developments in the Nairobi business environment originate from the needs of startups in particular and Kenyans in general:

'*To be honest, we did not have that environment for ourselves. We were always those people who would scratch our own edges. With a physical space, start a lab. We have crappy internet, start a company that makes internet*.'

The upcoming plans of innovation clusters and the Kenyan government follow the same pattern as the expansion of Ushahidi. First, as a result of the Nairobi Innovation Week in March, several innovation clusters have come together to form the Kenyan Association of Startups and SME Enablers, which aims to expand collaboration between innovation clusters on services for startups in the near future. Second, many of the innovation clusters mentioned that there will be efforts made to reach out to a wider audience of startups in Kenya using the internet. For example, through an online incubation program and livestreams of events at the innovation cluster. This will be elaborated on in the next section on internet services. Third, the Kenyan government is working on several innovative projects that will contribute to the ease of doing business in Kenya. For instance, the Cabinet Secretary for Education announced that her ministry will develop digital learning courses for startups at the Nairobi Innovation Week. Also, former Cabinet Secretary for ICT Bitange Ndemo is currently the head of a government taskforce that targets to find out how technologies such as blockchain and artificial intelligence can be used to strengthen the business environment and offer additional government services online.

Finally, the Kenyan government is currently constructing the Konza Technopolis 70 kilometers to the southeast of Nairobi. As described earlier in relation to the Vision 2030, this will be the main hub for innovation and technology in the country. In an interview with the Director of Business Development for Konza Technopolis, it became clear that this project tends to focus more on attracting foreign direct investments and multinationals to Kenya rather than supporting the development of startups. Several innovation clusters are involved in the project by giving advice and sharing ideas for the development of facilities and services specifically for startups, but most of the outsiders are skeptical when it comes to Konza. One innovation cluster remarked: '*We normally don't do very well with implementation in such cases.* […] *It can be full, but we may not get a lot of space for startups… Unless there is money involved.*' Startups and innovation clusters agree that the Kenyan government needs to think more critically about how the Konza Technopolis project is going to contribute to the development of startups rather than solely developing into an investment hub for multinationals.

Figure 9 Model of Konza Technopolis

6.1.2 Integration of internet services

'*People have access to knowledge and information, so it helps change mindsets* […]. *I think that is one of the main things that has really opened up Nairobi.*'

- Project champion at online education program Zydii

Besides the impact of innovation cluster services and government policies, startups perceive internet access to be the strongest disruptor in the Nairobi business environment. This section will discuss how internet services are integrated in and perceived by startups in Nairobi.

As mentioned before, the construction of the undersea cables in the late 2000s was the starting point for a digital Kenya. In the following years an increasing number of network providers competed on the Kenyan market. Although the majority of startups connects to the internet through the Wi-Fi points of innovation clusters that they are affiliated with, many also have a subscription with network providers such as Safaricom, Telkom, Zuku, Airtel and Liquid Telecom for data on their smartphone. According to startups, the speed of internet has increased and the cost of internet has decreased as a result of the competitiveness among network providers on the Kenyan market. Still some startups continue to struggle with the high costs of a reliable internet connection. For example, university students in Nairobi are able to browse the internet at the university library or the innovation cluster on campus, but there is often no Wi-Fi network available at the dorms. This strongly influences how these young student-entrepreneurs make use of the internet on a daily basis:

'*For me it is a problem at night, because at night I am not at school. Here it is free, so when I am at home I limit my usage to just basic browsing.*'

- Founder of startup Vorane Studios

Figure 10 Example of Airtel advertisement

With regard to the speed of internet in Kenya, the average connection speed of 13.7 megabits per second is up to par with most networks in Europe and is significantly higher than the 10.7 average in the United States (Kuo, 2017). Within Nairobi, most providers offer excellent coverage. Safaricom is the network provider with the highest speed and the widest coverage country-wide, but it is also perceived

by startups as the most expensive option. The streetscape is filled with advertisements for their newest 4G+ network, which is the first and therefore fastest of its kind in Africa. With the increasing demand for cheap and fast internet services, it is difficult to find a street without advertisements from one of the major network providers in Nairobi. The main rule when subscribing for a network provider is the cheaper the network, the slower and less reliable the internet connection will be.

Another issue in relation to internet access in Nairobi is that startups often complain about a loss of connection as a result of power outages. These occur regularly in Nairobi, which has been a reason for various innovation clusters to invest in a backup generator, so that startups can always continue their work. Finally, when moving out of the city, startups that aim to expand their market or reach out to customers in rural communities are often confronted with bad coverage and a slow internet connection. It makes them dependent on a slow public Wi-Fi network, which makes it difficult to organize a videoconference, download e-mails or even browse the internet.

The following graph provides further insight in the perceptions of startups regarding how the costs of internet and the speed of the connection limit access to internet. It indicates that the speed of the internet connection is currently more of an obstacle to startups than costs.

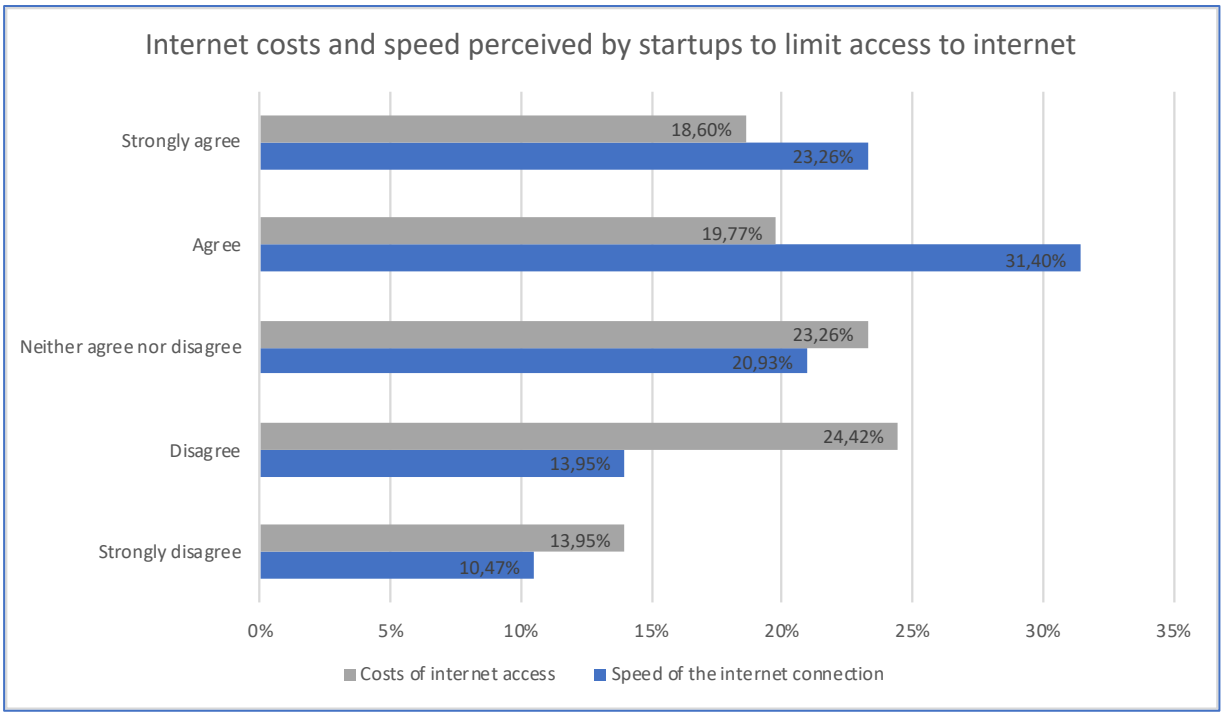


Figure 11 Internet costs and speed perceived by startups to limit access to internet

Startups tend to agree that internet speed is a factor that limits access to internet, whereas they are more divided on the topic of costs. This can be explained by startups often being affiliated with innovation clusters that offer complementary internet access to their community. Interesting to note is that especially early-growth and late-growth startups consider costs of internet and to an even larger extent speed of internet to be limiting factors.

Whereas the literature indicates that the smartphone plays a major role in the development of micro and small enterprises in sub-Saharan Africa, most startups hold value to a variety of devices at work. The majority makes use of a laptop or personal computer to browse the internet, send e-mails, do administrative tasks, work on documents and prepare presentations. The smartphone is mainly used for phone calls and other business-related forms of communication, for example through WhatsApp and SMS. However, for many service startups the phone holds a more important position in reaching out to the customer. 74 percent of startups (N=85) suppose that their target customer can easily be accessed through the internet, which means that the target customer is predominantly present online.

First of all, the website stands at the core of the startup's online presence: over 85 percent of startups have a website (N=85). The device that is predominantly used to access customers is the smartphone. Besides a website, an application that can be downloaded in the Google Play Store or the App Store for smartphones is often developed by service startups in order to provide the service to the customer. Another channel to reach out to the customer is USSD technology, which is short for Unstructured Supplementary Service Data. This can be accessed on any phone with access to a network, even without an internet connection, by typing in a certain code in the dial menu, such as *639#. This code brings you

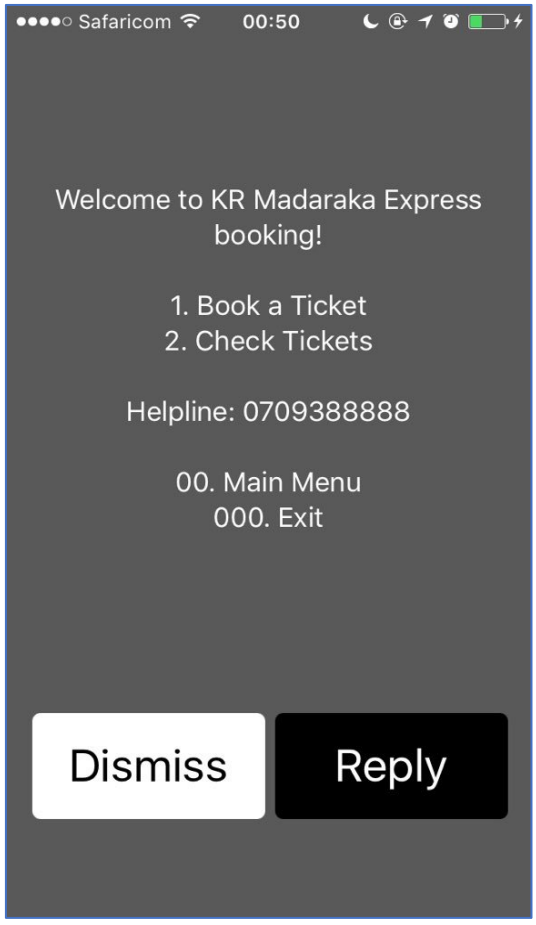


Figure 12 Example of USSD

to the menu above and allows you to buy a ticket for the next train heading to Mombasa. Although USSD is a relatively old technology that is barely made use of in any Western country, it continues to gain popularity in sub-Saharan Africa. This technology has proven to be especially useful in rural areas with low internet coverage and for those who own a basic mobile phone instead of a smartphone. An example of how USSD is applied by a Kenyan startup is Sauti, which uses this technology, and SMS, to provide trade and market information to Kenyans living in rural communities near the border.

Some of the keywords that were used by startups to describe the importance of internet access for the development of their enterprise were '*everything*', '*essential*', and '*key*'. During one of the interviews, a startup with its own office space pointed out what happens when all of a sudden there is no access to internet:

'*We use internet by a provider called Zuku* […] *and on Monday they give a check for the internet to this place and since it was the holiday the check had not been processed. So on Tuesday when we were coming into work in the morning the internet had not been paid for. Now, the whole place was at a complete standstill. No one was working.* […] *Business has completely stalled.*'

- Founder of startup GIG

Throughout the interviews and the survey, it became clear that there could not be a vibrant startup ecosystem without internet access. It gives startups visibility, makes it possible to work from anywhere at any time, allows the establishment of global connections and provides them with endless flows of information.

Especially among innovation clusters there was a consensus of the internet as a form of empowerment:

'*The startups don't have a lot, but just with the power of internet they have managed to do a lot more than what their competition is doing.* […] *It has given them a place where they can leverage themselves.*'

- Community manager at innovation cluster iHub

Furthermore, innovation clusters emphasized on the internet as a source of information and as an enabler of thinking on a global level. By being exposed to what is happening around the world, startups aim to keep up with the pace of international competitors and design business

models that are not only suitable for the Kenyan market, but for the rest of the world as well. For instance, since one of its founders lives and works from Canada and other members of the team frequently have to travel to other African countries, the startup Sauti explained that it was only able to develop its platform through the use of internet services:

'*So the thing is, like, we do teleconferencing and telecommuting so all those require internet. Like one of us is in the DRC right now but we still work together* […]. *And then like one of us was in the Nairobi Innovation Week, one of us was in Arusha, but we still need to work*.'

Over 60 percent of startups in Nairobi states that internet access is extremely important for allowing them to compete on the global market (N=83). The following figure provides a better perspective of the markets that startups from Nairobi are active in (N=84). Although it indicates that the vast majority is currently only active within Kenya, many startups have explained in the interviews that they have the ambition to expand to other African countries as well as other continents as soon as the capacity to scale has been reached.

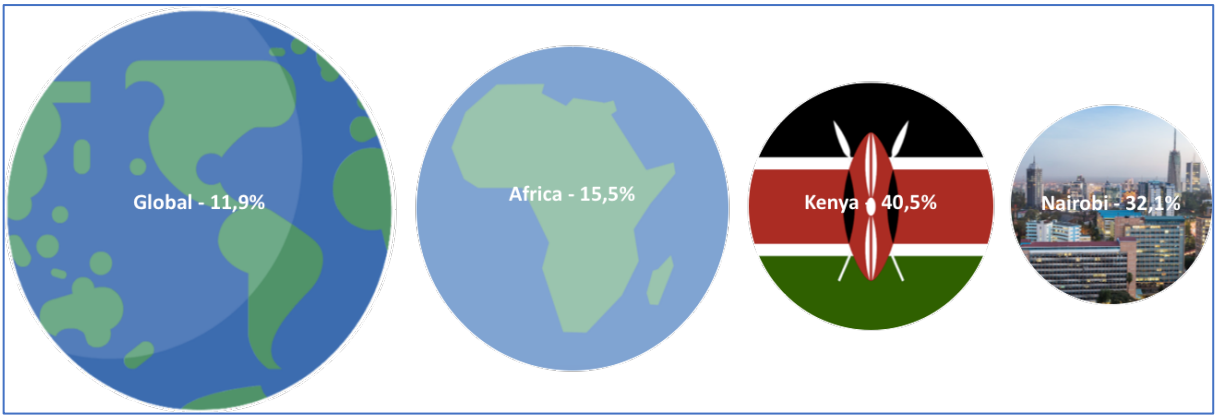


Figure 13 Market focus of Nairobi startups

Although innovation clusters strongly value internet services and provide complementary access to affiliated startups, most of the services that innovation clusters offer tend to be in person instead of accessible online. What can currently be found on the websites and social media channels of innovation clusters is information about incubation or acceleration programs, a portal to register as a member of the innovation cluster, a calendar with upcoming events and a variety of blogs and articles about topics related to entrepreneurship in Nairobi. In a few cases, there is also an overview available of the research activities of the innovation cluster in the form of reports and articles.

A couple of innovation clusters are currently experimenting with additional services for startups online. iHub has the Traction Camp acceleration program, which can be accessed by a select group of startups in East Africa. Although the six-month program consists of online lessons and assignments, the group is also required to come together for a one-week boot camp in Nairobi. Another example is Gearbox, which has begun to publish instructional videos for basic manufacturing tasks on YouTube. This makes it easier for startups to design and develop their own prototypes. Most of the other innovation clusters are still in the process of developing additional online services to startups, such as online mentorship for startups outside of Nairobi or livestreaming training sessions. The main motivation behind these efforts is to have a wider reach to startups in the region. It is considered to be the next phase of offering innovation cluster services to both entrepreneurs based in the Central Business District of Nairobi as well as a startup operating in a small town near the Tanzanian border.

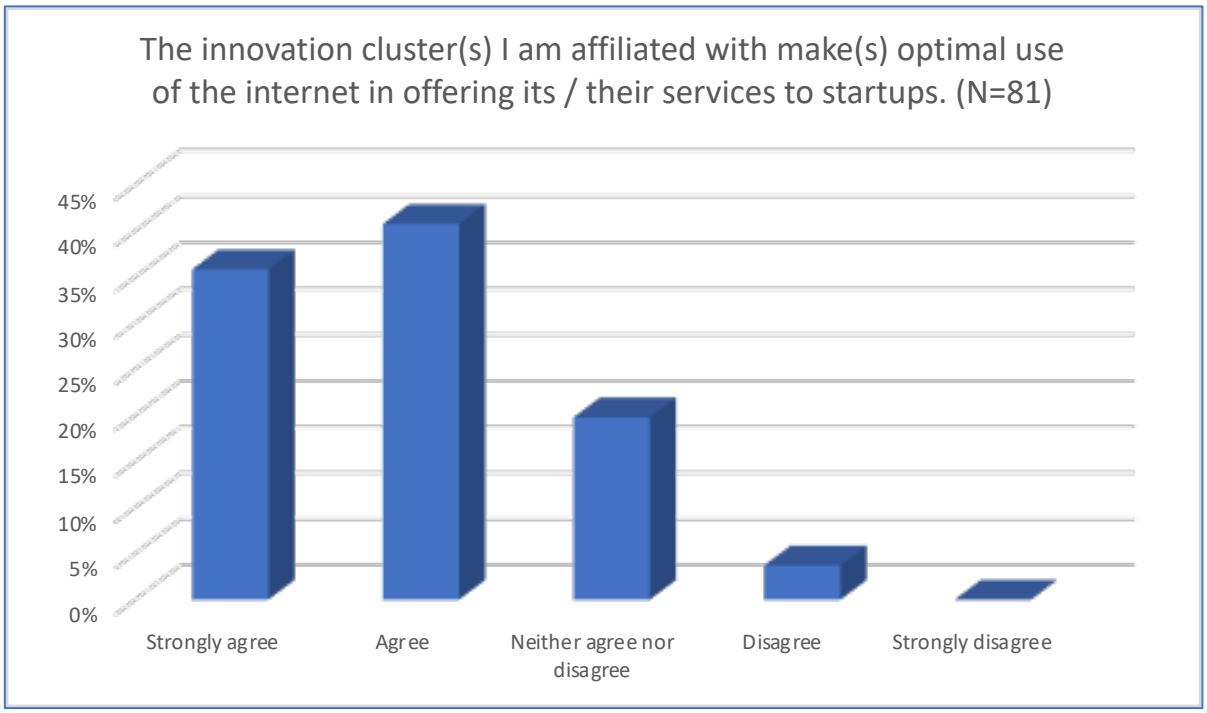


Figure 14 Online services and innovation clusters

Startups pointed out in the survey that they are content with the degree of online services offered by innovation clusters. The graph above illustrates that startups tend to agree that innovation clusters make good use of the internet in their services. The majority agrees that the innovation clusters they are affiliated with are currently making optimal use of the internet when offering their services to startups. However, startups suggested in another survey question that innovation clusters should make more of their services accessible

through the internet (N=80). This demonstrates the pressing need for additional online services that support the further development of startups.

Besides the perception of online services offered by innovation clusters, it is also interesting to briefly touch upon similar efforts of the Kenyan government. The online services of the Kenyan government predominantly consist of the eCitizen platform and several upcoming projects, such as online education programs and the taskforce for blockchain and artificial intelligence. When startups were asked about how they perceive the online services of the Kenyan government, the responses were more divided. In comparison to the innovation clusters, more startups disagreed with the statement that the Kenyan government was making optimal use of the internet in offering its services to startups. In addition, the percentage of startups that argued for more online services to become accessible through the internet was significantly higher for the Kenyan government than it was for innovation clusters (N=84).

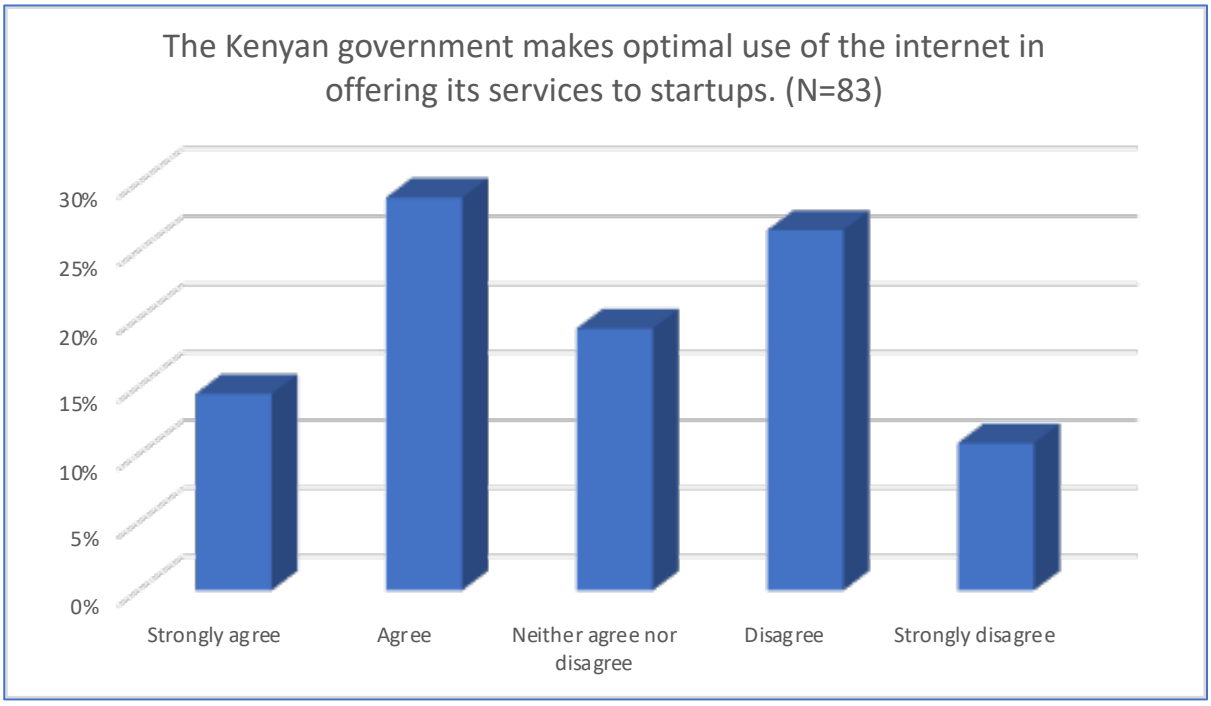


Figure 15 Online services and the Kenyan government

6.2 The Internet Antenna

6.2.1 Perceptions of online education

'*You should never stop learning. The day you stop learning you might as well be dead, especially in today's world where everything is infinite.*'

- Founder of startup AB3D Africa

Human capital within a startup can be increased in two distinct ways: by attaining skilled labor and through learning. This chapter will focus on how startups learn, what online education programs are made use of and how these services are perceived to impact the development of startups. Throughout the interviews, it became clear that startups strongly value education and training programs. However, most of the entrepreneurs do not have a particular strategy in place for increasing knowledge amongst themselves or their colleagues. This is because education is not perceived as a priority in relation to the regular work of running a startup. Learning from experience and engaging with other entrepreneurs are already seen as forms of education as well. In addition, entrepreneurs in Nairobi take the opportunity to attend events and conferences, read books and articles, listen to podcasts, watch YouTube tutorials and participate in webinars.

Startups frequently participate in incubation and acceleration programs offered by innovation clusters in Nairobi. These programs require a lot of time from startups, but are useful to learn about the theoretical background of entrepreneurship. Such programs have been criticized by startups for not offering sufficient practical examples or being hands-on enough: '*You got inspiration, but you don't get the problem fixed*'. Through observation at the Pangea Fund acceleration program at @iLabAfrica, it became clear that startups perceived the program to be effective, but the main point of improvement was that the program needed to be significantly more condensed. Because of the amount of sessions and assignments, startups were not able to spend sufficient time on the development of their startup.

Furthermore, the internet is also perceived as an important and free source of education by startups. Search engines such as Google are widely used to find basic information on a variety of topics. Startups also make use of several online education programs, such as Coursera, Udemy, Udacity and edX. Nairobi startups are mainly interested in their massive open online

courses on business development, online marketing, psychology, leadership, sales, data analysis and coding. There are also some large technology companies who have developed their own online education programs, such as Microsoft and Facebook. Another example is Google, which developed the Digital Garage platform for entrepreneurs to design a learning plan, learn digital skills and obtain a certificate upon completion.

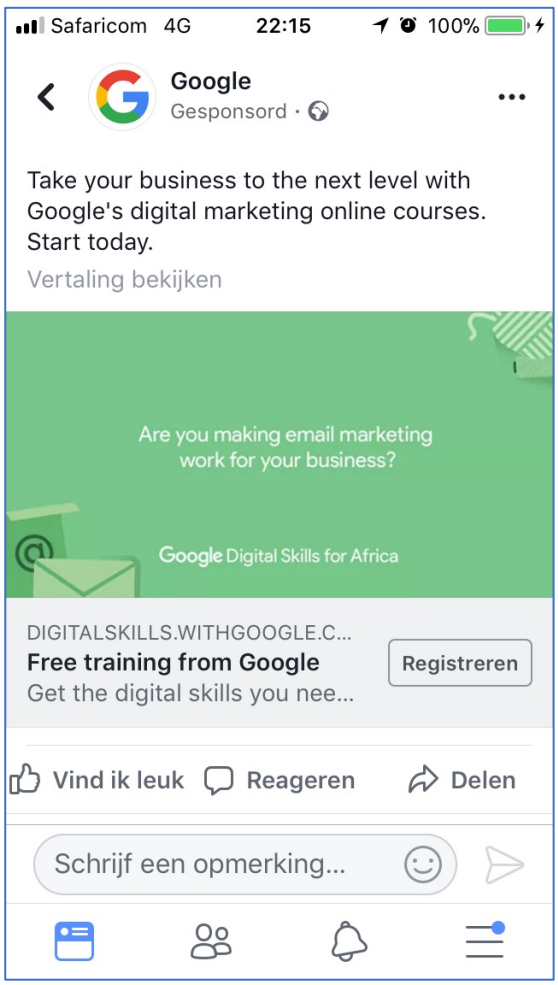


Figure 16 Google's online education program

In addition, there are numerous YouTube tutorials available from motivational speakers and established entrepreneurs on the challenges of entrepreneurship, how to develop a successful pitch and other topics that can be directly applied within a startup. There are also various internet forums for entrepreneurs to make use of on a global scale. For instance, the startup Vorane Studios mentioned that it uses such forums to interact with other entrepreneurs, ask questions about coding and stay updated on recent technological developments. Such platforms have made it significantly easier to find quick answers to the most common questions of startups.

As mentioned earlier, startups strongly value education opportunities, but few of them actually make regular use of online education programs. The following graph shows the number of startups per online education program. Around 26 percent of startups in Nairobi have made use of the platforms Coursera and Udemy for the development of their enterprise.

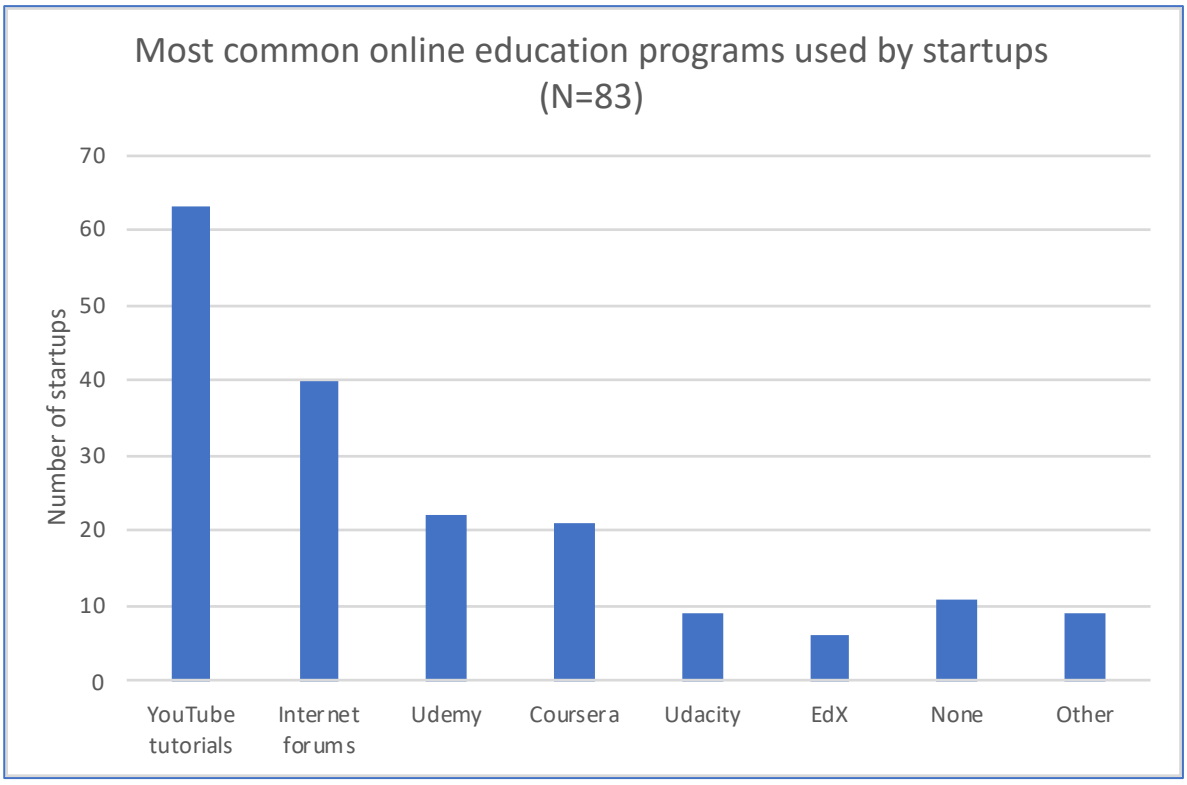


Figure 17 Most common online education programs used by startups

The number of startups that have watched YouTube tutorials and visited internet forums for business purposes is significantly higher. Some of the programs that were mentioned in the 'other' category were LinkedIn Learning and the Google Digital Garage platform that was touched upon earlier. When startups were asked how often they made use of online education programs, the most common answers were once and several times per week (N=84). Interesting to note is that startups in the idea phase are more frequent users of online education programs than startups in the later phases of development.

One of the motivations of Nairobi startups to make use of online education programs is that it is easier and quicker for them to follow a course on the internet instead of going to a classroom with a teacher. It gives the startup flexibility, since the course or information can be accessed at any time. Through the survey it became clear, however, that there is only a slight general preference for online education over face-to-face education (N=76). The analysis shows that startups unaffiliated with innovations clusters have a higher preference for increasing human capital through online education programs than startups affiliated with innovation clusters. Another motivation for online education is that it is essential for startups to stay up-to-date on recent developments. The technology sector is developing at such a

rapid pace that most information is only available online and not yet part of the textbooks and curricula of Kenyan universities:

'*The thing is that most of the tools and technologies we are using, some of them are published like two years ago. So even in books we are not going to find them. It is too young. There is no books.*'

- Founder of startup Vorane Studios

Finally, online education programs give startups leverage. For example, when a startup decides to outsource certain parts of the business, it wants to know at least a little bit about what is being outsourced instead of having full trust in the contractor. One startup mentioned that it required leverage in order to outsource the development of a website:

'*So we host our platform on Amazon Webservices. That is being done by the developers, but I was able to do a dummies course on Udemy, right. So when the developer tells me things, I can actually push back so it actually makes sense.*'

- Founder of startup Rate my Service

Startups also touched upon various reasons not to make use of online education programs. First, startups tend to focus on their core business instead of following an online course on data analysis due to time constraints. It is seen as complementary, which is why a great number of startups decides to skip the education and work on the company instead. Watching a tutorial on YouTube or browsing an internet forum is less time-consuming, which can explain why these are significantly more popular among Nairobi startups. If the course would be more concise and time-efficient, startups explained that their motivation to participate would be higher. Furthermore, the online education courses tend to consume high amounts of internet data, for example because of instruction videos and advanced graphics. For the startups with limited access to internet, the costs of data can be seen as a barrier to online education. Also, some of the platforms charge a fee for the education programs or the certificate of completion. It also occurs that only the first lesson is offered for free, after which the platform asks for a fee before continuing to the next lesson.

What stood out in the interviews was that startups were disappointed about the lessons being primarily designed for the Western market. This is because Coursera, Udemy and edX originate from the United States and do not offer courses specified for a particular region. Startups need courses that take into account the development challenges in the Kenyan

context. The demographics around income, tribes and consumer needs are radically different in comparison to the Western market. One startup pointed out that it would already be useful to provide Kenyan case studies throughout the courses, for instance by discussing the local supermarket Naivas instead of using the American company Walmart as an example. When startups were asked if online education programs need to be better tailored to the context of the African market, the vast majority argued for additional local content (N=82). There is one online education platform in Nairobi, Zydii, that offers courses designed by and for Africa. However, there are only a small number of courses relevant for entrepreneurs thus most startups in Nairobi are not familiar with this platform.

The online education programs are perceived to have a positive impact on the development of startups, but there are several aspects that can be improved in order to make these programs more suitable (N=82). It has an effect on competition with larger established companies and other startups in Nairobi. Startups that put effort in education and training tend to be more innovative and agile, since it keeps them up-to-date on what is new and makes them continuously develop a stronger business model. With regard to established companies, startups perceive them to put less effort in staying competitive as they are in a comfortable position to determine the status quo. Although this affects their ability to innovate, established companies have the budget for professional trainers and courses to strengthen a variety of skills among employees. Startups have much more limited budgets for professional education, which is why their path to increased leverage is information found on the internet, preferably for free. Startups tend to agree that human capital determines which startups outweigh the competition with other startups in Nairobi.

Knowledge gives the startup an edge in a competitive business environment, which is reflected in the following graph that shows to what extent online education programs have made competition easier. Interesting to note is that online education tends to have a more positive influence on the competitiveness of a startup with other startups in comparison to the leverage it creates within the Nairobi business environment as a whole.

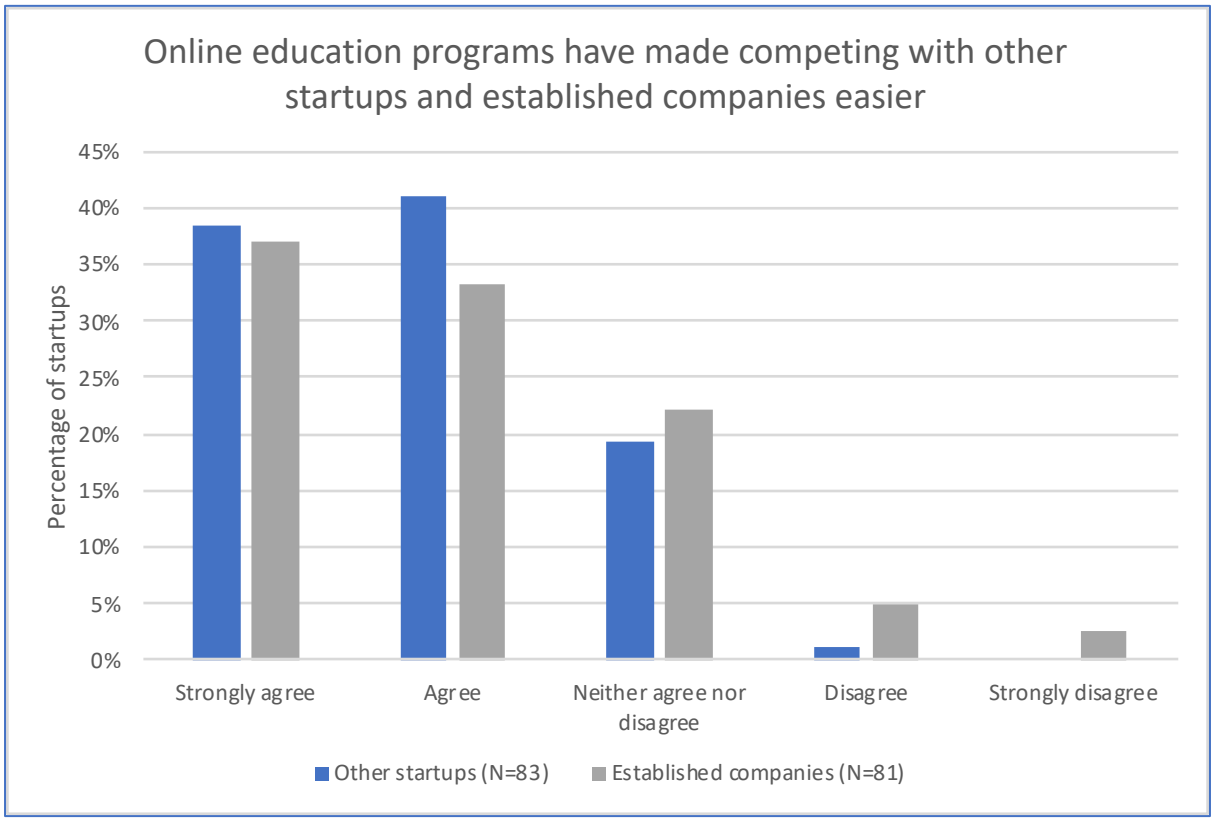


Figure 18 Impact of online education on competition

At last, it can be questioned to what extent the knowledge from online education programs is applied in practice by startups. The impact of education programs should be observed in relation to the personality traits of the entrepreneur. Depending on how the entrepreneur decides to apply the lessons learnt, the startup will notice to what extent it has an impact on enterprise development. The courses with information that can be applied directly into daily business, such as a model to structure a pitch or a change of habit in the workforce, are perceived to be most useful by startups. Also, programs that teach technical skills, such as coding, are seen as more effective since these are universally applicable in an entrepreneurial context. In conclusion, online education programs are perceived to contribute to the development of Nairobi startups, in particular in relation to competition with other startups and established companies. However, online education programs need to provide more courses that are applicable to the context of the African market, more time-efficient, less heavy on data consumption and more easily applicable within business practices of the startup.

6.2.2 Perceptions of online marketing

After a startup has developed its product or service, the next priority is to reach out to the customer. With the increasing role that the internet plays in the daily lives of people in Nairobi, the most recent generation of enterprises is more present online than ever before. Whereas newspapers, radio and television remain important marketing channels for established companies, the internet and social media have become essential means for the strategies of startups in Nairobi. This chapter will discuss how startups aim to reach the customer, what internet services are used for marketing and to what extent these channels are perceived to impact the development of the startup.

When startups were asked about their marketing channels, a combination of personal and online marketing forms were touched upon. For personal marketing, the most common methods of startups were approaching the customer in person, handing out brochures, doing pitches and workshops, attending conferences and word-of-mouth marketing. The online marketing channels entail the website of the startup, social media platforms, which the vast majority of startups makes use of several times per week (N=82), and online advertising. The survey indicates that startups do not have a clear preference for either personal or online marketing strategies, thus these are of even importance to this group of entrepreneurs (N=72). One of the differences that can be observed among startups is that product startups have a stronger preference for personal marketing strategies than service startups. The marketing strategies of startups are largely designed on the basis of who the target customer is. For example, startups that target customers in grassroot communities with limited internet access have pointed out that it is more efficient to visit these communities and hand out brochures rather than spending most of the budget on online advertising. Also, B2B startups, who aim to sell their product or service to other companies, tend to lean towards a more personal strategy, since a higher degree of trust is required between these two parties. This was explained throughout the interviews by multiple B2B startups and an innovation cluster:

'*Social media should not be your only market strategy. You will find that a startup with a B2B product and their market strategy will be social media, that would not make sense because if it is a B2B product you are actually going to have to interface with the company*.'

- Head of Communications and Marketing at innovation cluster Nailab

On the other hand, B2C startups, who target common consumers, argue that social media channels are good methods to spread the message behind the product or service. Furthermore, the startup also takes into account that the marketing strategy is not only suitable for potential customers, but can also attract new partners and investors. Using different channels for different purposes is explained by one of the interviewed startups in the following quote:

'*So one of the things in our model, acquisition strategy is to majorly use our website to get partners and investors, then social media to involve customers*.'

- Founder of startup Moot

Of all the possible online marketing channels available to startups, the website is the most important one. It functions as the backbone of marketing, or as one entrepreneur put it: '*The most important is the website, because if you don't have a website there is no need for you to market yourself on a social media platform.*' The following graph illustrates the online marketing platforms that are made use of the most by startups in Nairobi.

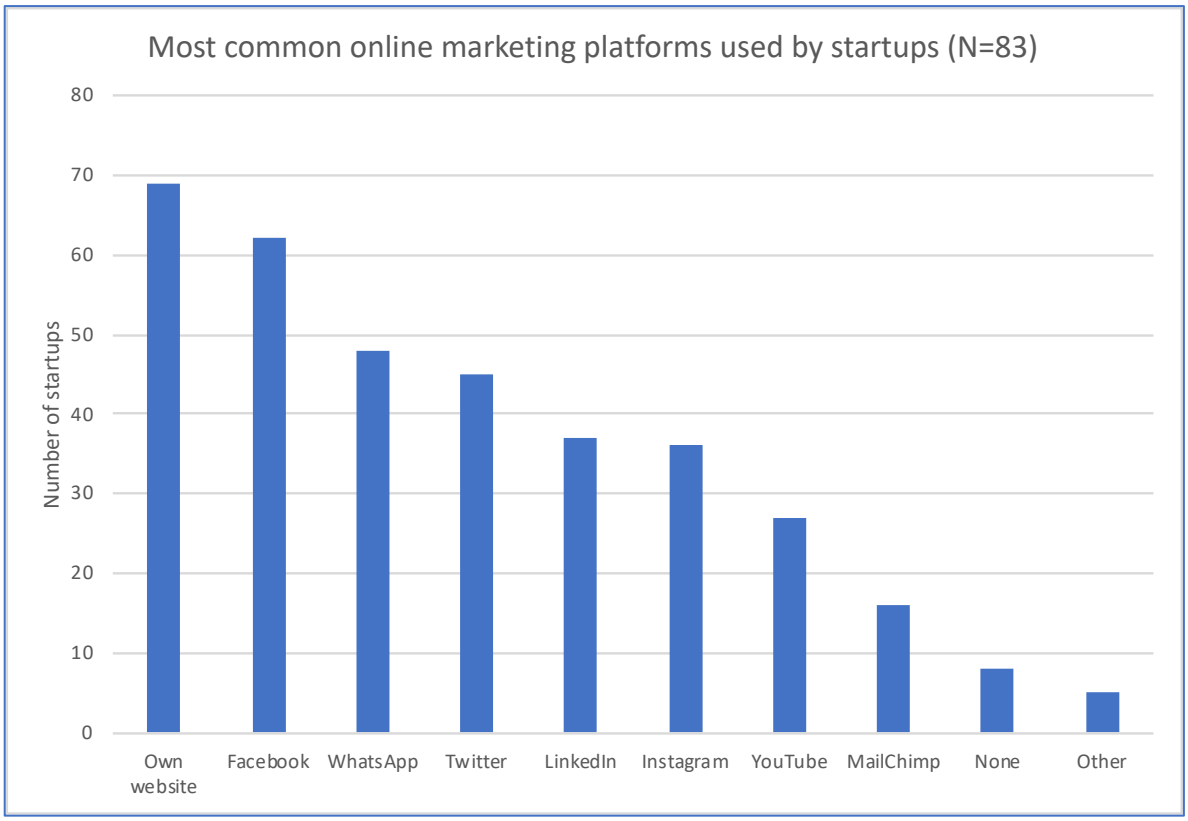


Figure 19 Most common online marketing platforms used by startups

The graph indicates that 83 percent of the startups have a website that is also being used for marketing purposes. This is done by directly offering the product or service for sale on the

website, for example in the form of a web shop, or through publishing content such as blogs or promotional videos on the website. Doing this on a regular basis is perceived to bring customers back to the website. Ushahidi, one of the first startups in Nairobi, explained that writing daily blogs on the website was essential for the early success of the platform. By posting blogs on the website and various social media outlets, it led to country-wide awareness of their services. The most used platforms that follow are Facebook, WhatsApp and Twitter. On Facebook it is possible to set up a personal page without having to pay a sum of money. The startups who are active on Facebook argue that it enables them to gain awareness, allows a personal connection with the customer and helps build towards higher credibility. For example, the founder of startup Pace pointed out that the ability to interact with customers through Facebook Messenger and the reviews that customers leave behind on their page are most valuable to them:

'*If you check our Facebook, we did not write a single review by ourselves. It is all from people who came to our website and bought our product and come to our Facebook page to review. It is like 13 reviews, five stars all the time.*'

The mobile chat service WhatsApp plays an important connective role similar to Facebook Messenger. By simply providing potential customers with a phone number that they can reach out to for any inquiries makes the service significantly more personal. The platform has noticed its value for micro and small enterprises and recently rolled out the platform WhatsApp Business, which allows startups to set up a business profile, automatic messaging, insight in statistics and quick responses. Finally, the social media platform Twitter is predominantly used to promote the product or service and share updates about developments within the startup, but it tends to be less popular among startups than Facebook.

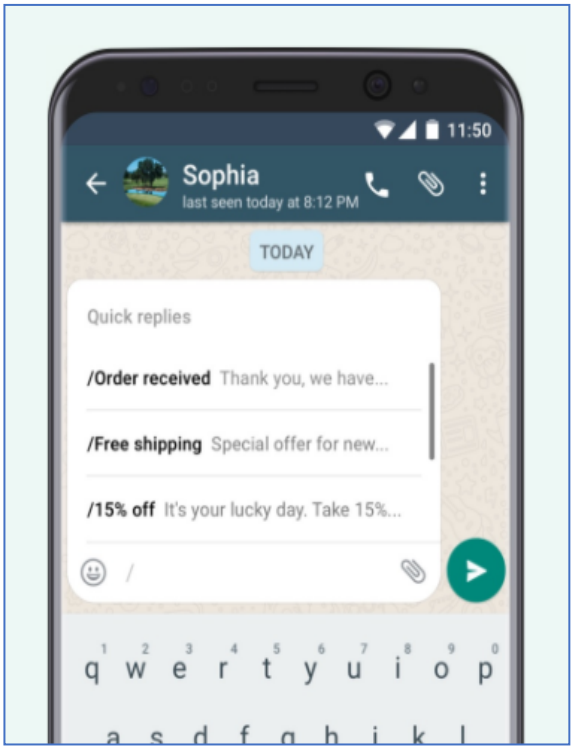


Figure 20 Example of WhatsApp Business

Besides the activities of startups on their own websites and social media platforms, a small portion of startups has invested in online advertising. For example, through Facebook Ads or Google Adsense, startups are able to promote their product or service and reach out to new customers that fit the profile. If the startup aims to reach out to Kenyan students from 15 to 25 years old, the algorithms of these technology companies are able to assist. However, not a lot of startups are making use of online ads on a regular basis mainly due to the costs. Startups in the early-growth and late-growth phases of development make more frequent use of online advertising, which might be explained by the fact that these startups have more budget available for marketing purposes than idea and seed phase startups. Another reason against online advertising is that it sometimes does not lead to enough conversion for the startup. For instance, a startup explained that it had developed an app and paid 10.000 Kenyan shillings (around 85 euros) for an online ad to promote the app, but the number of people that actually downloaded it was far below expectations.

There are several more motivations for startups to make use of online marketing platforms. The first is that online marketing is more cost-effective in comparison to personal and traditional marketing strategies. Creating a website is getting cheaper and can be designed without having to hire a web developer. Because of the business model based on advertisements, the social media platforms that have been mentioned are free to use. Startups are only expected to pay when they want to publish an advertisement on the network. Since the budgets for young companies are low, online marketing is a cheap and effective alternative to newspaper, radio and television commercials. Interesting to note is that startups consider this to be the next step as soon as their budgets increase, which confirms the continuous value of traditional marketing methods. Another motivation of online marketing for startups is the reach beyond the Kenyan border:

'*However, why we do social media is that we want to be known globally, so if we are talking to investors in Europe, they would definitely check our online presence*.'

- Founder of startup Grassroots Bima

Thus, through a diverse online presence, startups in Kenya are more likely to be noticed by potential partners and investors from other countries. The survey indicates that startups believe internet access enables them to compete on a global rather than a national level (N=83). Finally, startups with customers in rural communities without access to the internet

still consider online presence to be valuable, because it can complement word-of-mouth marketing. One entrepreneur explained that people who encounter the website or Facebook page online are likely to tell their friends and family who have limited internet access as long as the product or service is applicable to and useful to their backgrounds. One of the motivations against making use of online marketing, that was also mentioned in relation to online advertising, is the uncertainty behind conversion. Startups were discontent about the lack of information provided on visitors of the website and social media platforms. For example, the owner of the startup Sauti explained that it had posted several promotional videos on its social media platforms and that the number of viewers turned out to be above expectations. However, the startup was unable to discover how many of these viewers visited the website and began to make use of the service of Sauti. With regard to online advertising as well, not enough information is available about the potential customers that see the ad in their timeline and how this group responds to it. A possible solution is asking customers to fill in a feedback form with questions on the market strategy and how the startup became familiar to them.

In general, the perception of startups with regard to the impact of online marketing platforms on enterprise development is largely positive. In the earliest stages of a startup, the personal network is of higher value than reaching out to the customer through online marketing strategies. Further developed startups tend to rely more on online marketing. In the situation where the startup has limited money to spend, the best option is to make use of online marketing platforms. Startups that make use of online marketing platforms predominantly confirm that it has helped them increase the number of customers and contributed to market access (N=82). There is a general consensus that online marketing will become increasingly important as the use of internet expands among the Kenyan population. The importance of internet services will mature within the field of marketing strategies. The personal approach will remain important for startups, especially in the earlier stages. Startups fear that the personal connection will deteriorate as soon as the number of customers increases, but entrepreneurs emphasize on the opportunities of online marketing platforms for upholding the relationship with customers. Therefore, startups hope that these platforms will develop solutions that enable them to both increase the number of customers as well as provide them with personal service.

Finally, the need for additional data on visitors of the website and social media platforms was elaborated on in the interviews. From the perspective of startups it is valuable to learn more about the profile of such visitors and find out through what channels they found out about the startup. Online marketing strategies and advertising can be improved based on the input of these potential customers. This necessity has led to a dependency of startups on technology companies that are able to provide such data, such as Google, Facebook and other online marketing platforms. In conclusion, startups perceive online marketing platforms to have a positive impact on enterprise development since it offers them a new range of opportunities to get in contact with potential customers. Besides the benefits of costs and personal relationships, startups argue that the insight in data on visitors of their websites and pages should be expanded in order to further strengthen the marketing strategy. It is clear that online marketing is still in its infancy and it will be interesting to find out to what extent advertising based on personal data and algorithms are able to coexist with privacy regulations in the future.

6.2.3 Perceptions of online venture capital

'*Investment is like dating someone. It needs to have a very good one-on-one feel to it.*'
- Founder of startup GIG

The most common development challenge of startups in Nairobi is access to capital (N=85). Capital is perceived to be essential for making the leap from startup to established enterprise and without access to capital it is more difficult for startups to scale. This chapter will discuss how startups attempt to gain access to funds, what internet services can be used to find venture capital opportunities and to what extent startups perceive these services to have an effect on the development of their enterprise.

Before discussing the various channels for accessing venture capital, it is interesting to mention that 78 percent of startups in Nairobi are currently open to venture capital investments. Especially older startups and those that are in the later development phases tend to be more open to venture capital investments than others. This can be observed in the following cross tabulation on how startups have responded to the survey questions on development phases and openness to venture capital. The data analysis indicates that startups in the idea and seed phases of development are less open to venture capital investments than startups in the early-growth and late-growth phases.

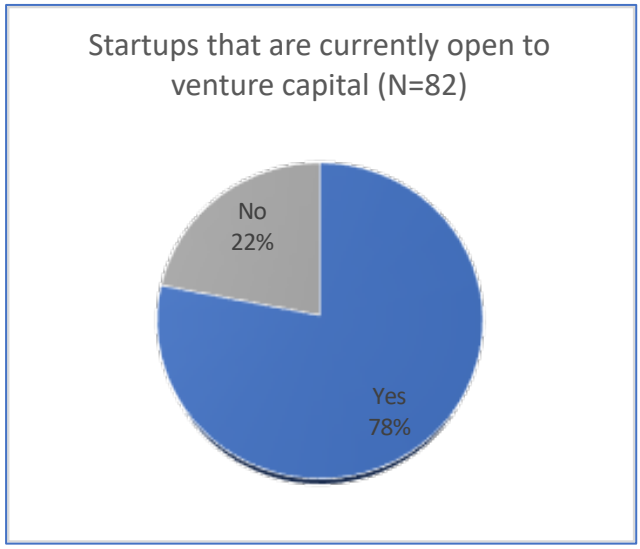


Figure 21 Startups open to venture capital

		Open to venture capital			
		Yes	**No**	**No response**	**Total**
Development phases	**Idea phase**	4	5	1	10
	Seed phase	25	4		29
	Early-growth phase	28	8	4	40
	Late-growth phase	5	1		6
	Other	2			2
	Total	64	18	5	87

Table 6 Crosstab development phases and open to venture capital

The 22 percent of startups not open to venture capital have named various reasons for not seeking investments. First, some startups want to have their idea, business model or prototype further developed before reaching out to investors. These are mainly startups in the early phases of development that want to increase their leverage or gain experience before expanding. Another share simply prefers to grow the enterprise organically based on the belief that the demand for the product or service will enable the startups to scale. Although these startups understand that their expansion will be significantly slower, it allows them to retain full ownership of the enterprise. Because there are no external investments that can be relied on, many of these entrepreneurs are required to work part-time in addition to their regular work for the startup, which is commonly referred to as bootstrapping. A portion of the income from this job is put aside for the startup and the rest is needed for rent, food and other basic needs.

Then, there are various channels available to startups for accessing capital. The easiest and most common option is borrowing money from friends and family. Although these are often not high amounts of money, the trust between the entrepreneur and personal networks tends to be much higher than any other investment channel. Besides investments through personal networks, sources of venture capital for Kenyan startups are dispersed from local to international investors and across various sectors. Most of the opportunities originate from outside of Kenya, whereas a relatively small number of investors are originally from Kenya. Examples of foreign governments, banks, NGOs, universities that are investing in Kenyan startups and mentioned in the interviews are the Australian embassy, the British bank Barclays, UNICEF and the London School of Economics. With regard to local funding opportunities, for example, startups mentioned that they were able to apply for the Youth Enterprise Development Fund of the Kenyan government and the Start it Fund of KCB Bank. The main difference between international and local investors is that the ones from out of Africa have more money to invest in startups.

Startups become familiar with opportunities for venture capital through personal referrals, accelerator programs, innovation clusters, competitions, events and the internet. Accelerator programs focus on making startups investor-ready and set to deal with investors, but in some instances they are also able to offer investments to participating startups or getting them in contact with investors in their network. Innovation clusters have different priorities, but are

also able to provide similar services. The innovation cluster Nailab, for example, offers the Seed Fund of up to 2.5 million Kenyan shillings (around 21.000 euros) available to technology startups in Eastern Africa and connects startups to other stakeholders that can assist them further. Since innovation clusters are personally involved in the development of these startups, the recommendations and mentorship are often perceived as valuable and reliable by startups. Another surprisingly popular path to capital is competitions in the form of pitches and television shows. For example, KCB Lion's Den is the Kenyan version of the American television show Shark Tank and lets Kenyan startups pitch their product or service to a group of five investors. The most successful presentations will receive funding and mentorship to strengthen and scale the startup further. In relation to this television show and other competitions, an innovation cluster came up with the term 'compreneur' for startups that are spending more of their time on preparing and participating in competitions instead of working on their business. Finally, startups attend events such as the Nairobi Innovation Week to pitch or present their concept and connect with potential investors, which sometimes can lead to meetings, partnerships and investments.

Figure 22 Example of Lion's Den

Another channel for venture capital opportunities that began to emerge in recent years is the internet. Investors have started using the internet as a tool to reach out to startups, whereas startups are accessing venture capital platforms with overviews of available opportunities and websites of Kenyan and international investors. Although most of the opportunities are scattered over a great number of websites, the platforms VC4Africa, F6S and AngelList are trying to consolidate these opportunities. VC4Africa, for example, is an organization based in Amsterdam that has developed an online network for African ventures and global investors. Startups are able to create their own company profile, let investors and mentors know what type of investment they are looking for and browse through the programs and funding opportunities that are available in their localities. F6S and AngelList offer services similar to

VC4Africa, but are not as popular among Kenyan startups. In addition, the international organizations, NGOs, government agencies, banks and universities that were mentioned earlier in relation to investments use the internet to make startups aware of the funding opportunities that they have to offer, but it is difficult for startups to stay updated on each and every website. The following graph shows that the platforms with consolidated venture capital opportunities are significantly more popular than the other websites. VC4Africa is made use of by nearly half of the startups that participated in the survey, followed by F6S and AngelList.

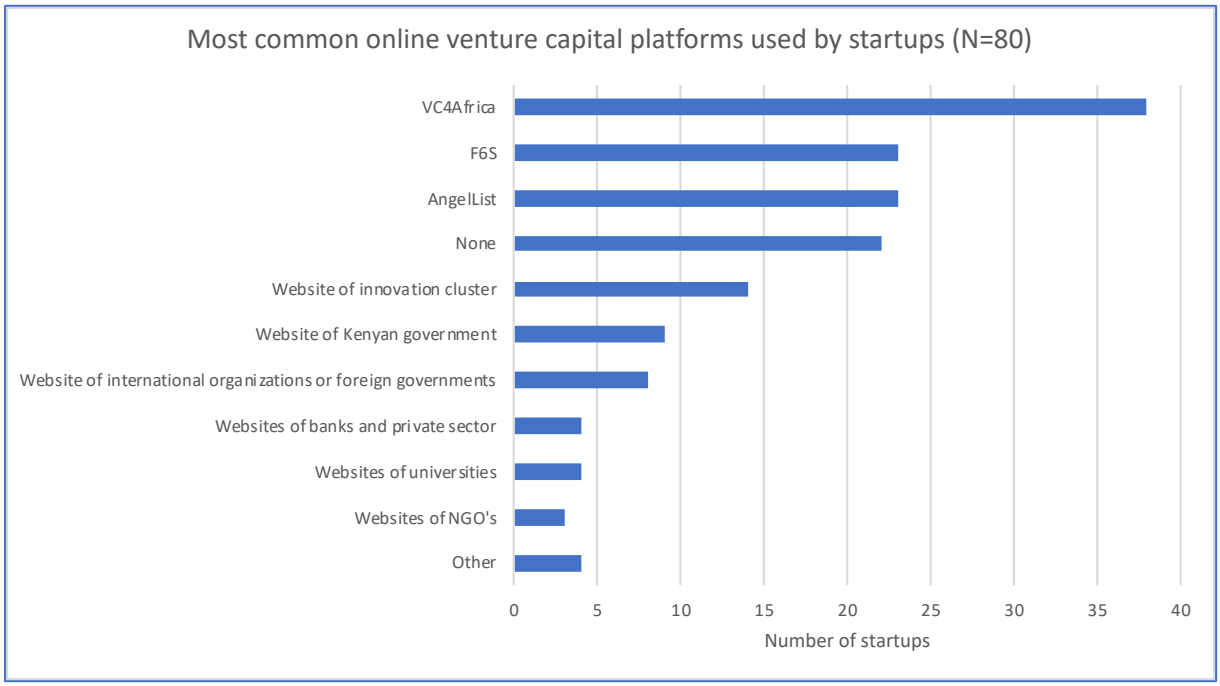


Figure 23 Most common online venture capital websites used by startups

The graph also shows that 28 percent of startups does not make use of any internet services to access venture capital opportunities. Startups were also asked about the use of crowdfunding platforms, which enables the startup to present its product or service, lets individual donors 'invest' in the startup and it has led to the successful kickstart of several startups in the West. However, startups indicated that such platforms are rarely made use of in the Nairobi startup ecosystem since the number of Kenyans with available funding is much lower in this context. With regard to the use of venture capital platforms, the survey revealed that most of the startups active on platforms like VC4Africa visit these about once or a couple of times per month.

Startups are motivated to use websites with venture capital opportunities for a number of reasons. First, it is increasingly important to have an online presence in the case that investors

want to reach out for arranging a meeting and discuss possibilities. There is a certain fear of missing out among startups if they do not have a profile on VC4Africa or are not aware of the newest available funding rounds. Also, startups tend to agree that the internet offers a good overview of venture capital opportunities (N=81). However, this overview is far from complete, especially when it comes to the visibility of Kenyan investment opportunities. At this point only 15 percent of startups have been able to attract investments as a direct result of using such internet services (N=82). Analysis shows that service startups and startups in the early-growth and late-growth phases are more likely to attract venture capital through internet services than other startups. When startups were asked if they would prefer reaching out to venture capitalists through personal networks or internet services, the vast majority chose personal networks (N=71). When looking at differences among startups, the data shows that B2B startups have a stronger preference for personal networks than B2C startups. Also, the startups in the seed phase tend to be more negative towards online venture capital even though this group was most open to venture capital in comparison to the other groups. Thus, internet services are seen as the undesirable alternative to relying on people within the personal network of the startup, such as innovation clusters, mentors and referrals. This brings us to the first and main motivation against making use of internet services for access to capital: trust.

The general trust between investors on the one hand and startups on the other hand is low. Not only are startups skeptic about investors, also investors tend to distrust startups. When discussing this issue with one of the startups in an interview, the entrepreneur explained:

'*Our fear is that if we get into board with someone else, he probably has a different vision of where he wants to go. By having a person that is providing the funding, we are limited to take the direction for the standards that they have*.'

Venture capital investors are seen as a threat to the company, because of the risk that they might want to change too much about the startup. It also occurs that the startup or investor has communicational difficulties with the other side, which makes the path to mutual understanding more challenging. Between startups and international investors, this manifests itself in the cultural differences between predominantly Western investors and Kenyan startups. Startups argue that the investment models are biased towards Western entrepreneurs, which makes it more difficult for them to gain access to capital. In an interview,

one startup led by a Kenyan entrepreneur showed the following picture that was being shared through social media channels of startups. It shows a group of white people posing for a photo along with the text: '*"African" startups funded by investors*'. Because startups led by Western entrepreneurs have a better understanding of what these investors expect and want to hear, they have better odds at receiving funding from them. However, international investors are perceived to be more familiar with startups on a global scale and present the terms and conditions in more detail. Misunderstandings are more common between startups and local investors. In such cases the terms and conditions were not discussed in sufficient detail, a binding contract is missing or the partnership ends in an unexpected manner. And this does not only happen when investors are found online, but also through the personal networks of startups, such as the following experience of an interviewed entrepreneur:

Figure 24 Criticism on investors

'*So last in July there was a person we knew who was a relative to my co-founder. He had committed 50.000 USD in instalment, but after the first instalment, which was just 5.000, he did not put the subsequent instalment and he kind of messed us up in terms of our plan.*'

In a different example a startup emphasized on the lack of communication with the investor when the startup did not receive funding for several months after which the investor argued the startup did not make enough progress. Although it can be stated that both the startup as well as the investor is obligated to uphold the terms in the contract, it is difficult from the perspective of an outsider to judge on these situations. As shown in the graph below, the survey indicates that startups are divided on the statement that venture capitalists can be considered trustworthy. Therefore, if general trust in investors is already low among startups and there is a strong preference for personal networks relative to internet services, the trust

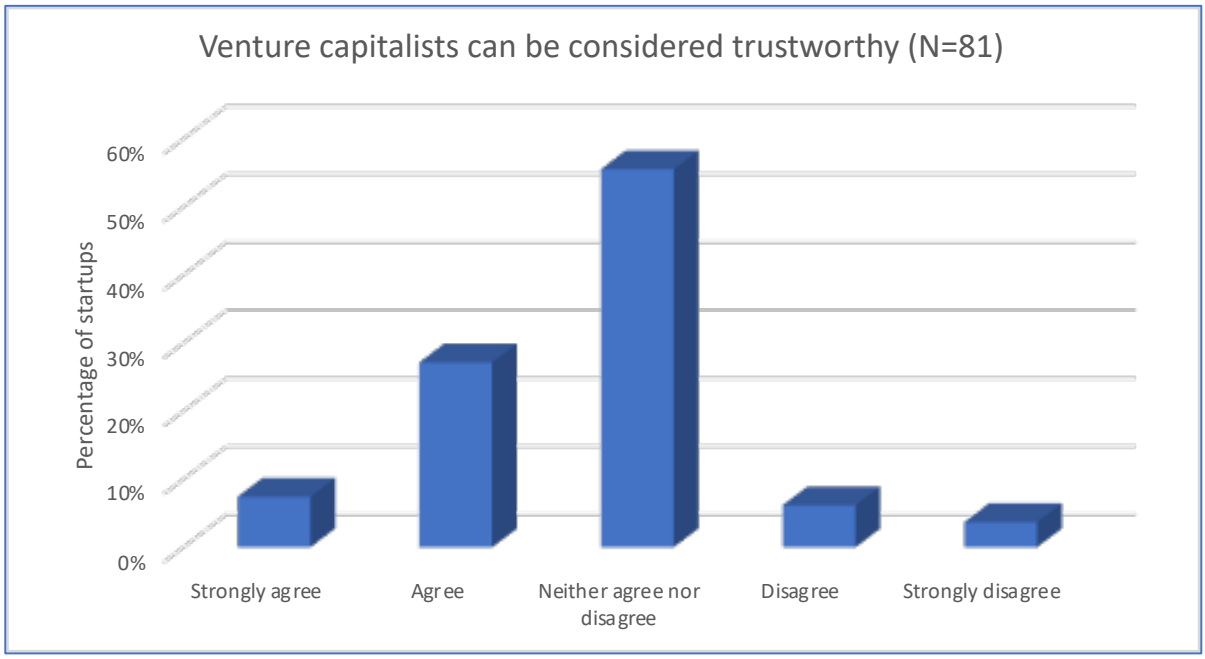


Figure 25 Trustworthiness of investors

in online venture capital opportunities is supposedly even lower. It is an impersonal effort to foster mutual understanding between the startup community on the one hand and investors on the other. After conversations and interviews with both sides, the returning distrust and difficulties in communication give the sense that these two parties are from different planets.

Another reason for startups not to make use of online venture capital platforms is the amount of time and work that is needed in order to receive an investment. This ranges from documents on the business model and financial overviews to meetings with and presentations for potential investors. Startups often do not realize the importance of risk assessment by investors and simply look for fast funding, which is impossible in most cases. Finally, startups are sometimes confronted with certain requirements that prevent them from applying. For example, some funds are only open to female entrepreneurs, solutions for social impact or startups within a particular business sector. All things considered, most of these reasons are not connected to the fact that the venture capital opportunities are offered online, but are generally related to the struggles behind access to capital overall.

With regard to the general perceptions of startups, the survey shows a division on the statement that online venture capital platforms have contributed to access to capital for startups. The majority neither agrees nor disagrees with the statement, as can be seen in the graph below. A similar response was given when startups were asked if they believed online venture capital platforms had contributed to their development. Therefore, the impact of

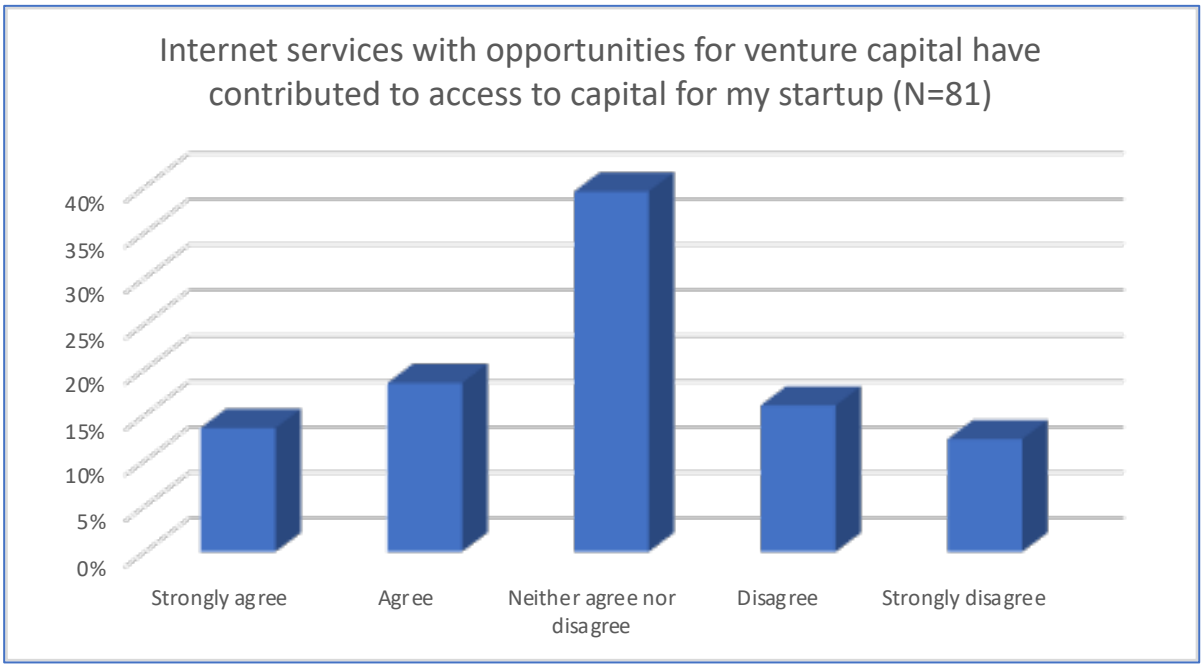


Figure 26 Impact of internet services on access to capital

internet on access to capital can be considered negligible. The most common example of internet services contributing to access to capital is the connections it creates between Nairobi startups and international investors. Startups have given examples of arranging videoconferences and personal meetings with investors as a result of contact through online venture capital websites. The startup Grassroots Bima, for example, explained how it participated in several online pitches for funding rounds of British and Swiss venture capital investors:

'*So we pitched via Skype and told them about our product. If we had no internet we were not able to do that, because you can't be there physically, so it helps us to reach*.'

In order to improve access to capital, startups have shared various recommendations that can further improve the use of internet in providing venture capital opportunities. First, startups have pointed out in the survey that online information needs to be more consolidated and transparent (N=81). Especially local investors remain not visible enough to the Kenyan startup community. Therefore, the platforms should continue their efforts in consolidating opportunities, so that startups will not have to spend most of their time looking for what is available. Also, startups argue that there is currently too much misrepresentation on the internet. In order to find out which investors can be considered trustworthy, startups have proposed complete transparency from the part of the investor when providing information online and the deployment of personal intermediaries from innovation clusters or platforms

that can function as the impartial referee between startup and investor. One other solution that was frequently mentioned is putting a rating system in place where startups are able to review and rate their experiences with an investor or organization. Similar to the review systems used by organizations such as Uber and Airbnb, startups looking for funding will be able to find an overview of reliable investors. From the perspective of the investor, it can also be useful to review the behavior of startups throughout the process.

Furthermore, the trust and understanding between startups and investors needs to improve through solutions that will lead to more personal connections:

'*I would say it will be even much better if they could sort of use the platform to create a direct channel to the investors. More personal. Maybe have the conversation on a personal level. Also understand what they are looking for.*'

- Founder of Moot

The interviewees suggested that venture capital is a sensitive issue to them, hence distrust remains an aspect intertwined with African entrepreneurship when attempting to partner up with unfamiliar investors. When difficulties arise it has become the standard to blame the other side, simply on the basis of not understanding the opposite perspective. Besides the nescience of startups, this is an important issue among local investors, who are unaccustomed to the different approaches and organizations of startups, and international investors, who often lack a deeper understanding of Kenyan cultural customs and the Nairobi business environment. In conclusion, due to the issues of venture capital availability and trust, it can be stated that online venture capital websites are currently not contributing to the development of startups. These internet services are able to improve various aspects that can be of help to startups in Nairobi, but this will not fully resolve the issue of low capital accessibility in sub-Saharan Africa.

7. Discussion

After placing the findings and analysis into the context of this research, the collected information is able to provide comprehensive answers to the research questions. The following paragraphs will connect the findings to the literature review, theoretical framework and regional thematic framework. Elaborating on this connection further clarifies how the results complement the existing research on enterprise development, adoption of new technologies and ICT4D.

7.1 Startup development

Startups have elaborated on how they perceive the Nairobi business environment and what their most pressing development challenges are. The survey made it possible to draft an overview of these challenges among startups and understand how different types of startups are confronted with different types of challenges. Access to capital, access to the market, competition from established companies and the other development challenges discussed in the findings can be linked to the four dimensions of Gartner's new venture creation model: individual(s), environment, organization and process. Based on the four dimensions in this model and the regional thematic background on the Nairobi startup ecosystem, a list of variables that can be influenced by internet services was developed and directly applied in the interview guides. For example, the variable of venture capital availability in the environment dimension led to questions on how internet services were used in relation to this variable. As a result, more can be said about how the variables in the model are influenced by internet services in the Nairobi business environment.

First, the personality of the entrepreneur has been touched upon frequently in relation to educational background and increasing human capital (Gartner, 1985). The findings indicate that internet services have made education programs more accessible to startups. Although startups understand the importance of education, it is generally seen as complementary and not a priority. It is more important for startups to work on the business model, develop a prototype, reach out to customers, discover venture capital opportunities and establish a professional network of clients and mentors. However, this conflicts with the explanations of innovation clusters and several experts that human capital is key for the position of an entrepreneur within the business environment. The knowledge set that is required entails

entrepreneurial, technical, presentation and social skills. Those who develop a certain tunnel vision around the main entrepreneurial tasks and discard the importance of (online) education are more likely to join the majority of startups that fails within the first three months of operation. Besides internet forums and YouTube tutorials, the internet has more to offer within the field of online education and startups are more likely to make use of such programs when these are developed in line with their context and preferences. Therefore, the variable of education in the new venture creation model should emphasize more on how the entrepreneur applies its educational background in an entrepreneurial context rather than what this background consists of.

Most of the development challenges in Nairobi can be related to the environment dimension, that entails the context in which the entrepreneur grows its venture (Gartner, 1985). Internet as a whole is observed as the great connector and an '*artifact in social inclusion and economic development*' as stated by one of the startups. As a result of increased competition among network providers and efforts of the Kenyan government, internet has become more accessible over the last decade. Hereafter, internet diffusion has impacted the other 'access to' variables within the environment dimension as well. For example, the internet has enabled the development of various online education programs and other information flows. Also, new online marketing platforms, digital forms of communication with customers and platforms with venture capital opportunities have changed the behavior of young entrepreneurs. Although the main contribution of internet to the business environment is improved access, other effects remain limited. The content that is offered through online education is often weakly relatable to the specific needs of Kenyan startups. Another example is that online venture capital websites have increased the visibility of investment opportunities, but have not tackled other issues such as the distrust between startups and investors. Therefore, when access to internet will decrease as an obstacle of enterprise development in the future, the challenge will be to what extent internet services are shaped to the particular necessities and habits within the local entrepreneurial context. It is possible that contextualized internet services will also have a more positive impact on enterprise development.

Third, internet services have altered some of the core characteristics of firms and established a new, innovative type of enterprise: the startup (Gartner, 1985). All of the startups that were

interviewed and participated in the survey are highly dependent on their connection to the internet. Internet is perceived as a lifeline; without internet access the startup as a type of enterprise would not exist. The characteristics of the firm, such as focus and the type of product or service, have been strongly influenced by the diffusion of internet in Kenya. For example, this can be observed by the high number of startups that offers its services through a mobile application or a website. Furthermore, the driving force of this category of enterprises, to generate social impact through the use of technologies and the number of startups that aims to tackle social challenges, indicate the emergence of a generation of entrepreneurs who aim to contribute to inclusive development in their own way. The ambition is to become a viable alternative to the historic dependence on foreign NGOs, governments and companies. The internet as a lifeline and a tool of empowerment is also illustrated by the strong influence of government rule on the past and future development of the Nairobi startup ecosystem as a whole. This is because government efforts were directly followed by the diffusion of internet and the emergence of innovation clusters. Political will stands at the core of numerous developments related to internet access and ease of doing business. Thus, the support of the Kenyan government through enterprise regulations, taxes and the Konza Technopolis project will also indicate the dedication to the Nairobi startup ecosystem over the coming years.

Finally, it can be stated that the internet has an influence on dynamic characteristics, since it widely broadens the mindset of entrepreneurs (Gartner, 1985). In relation to the entrepreneurial process it was frequently mentioned that startups believe they are more in touch with developments in their field on a global level, which ultimately has an effect on their behavior as well. This ranges from responding to new developments from government and society to locating business opportunities in new markets. For example, a startup that works in the field of 3D printing technology is continuously on the lookout for new technological developments as these will influence what the startup will offer its customers in the future. Startups and innovation clusters are more receptive to global developments in the field of entrepreneurship and technology than ever before. It will be interesting to find out whether these processes will lead to the development of unique startup ecosystems that strongly take into account the local context or if technological developments will result in the establishment

of one homogenous startup ecosystem with its members spread out over the globe yet connected through internet services.

At the start of the research, the new venture creation model was already altered on the basis of startup development in the current business environment of Nairobi and it will be further supplemented as a result of the findings. The emergence of internet services makes it valuable to further investigate the link between educational background and entrepreneurial skills and to what extent internet services are applicable in the local entrepreneurial context. With regard to the organization dimension, it can be argued that the Nairobi startup ecosystem is a direct effect of internet diffusion and political will. The new venture creation model should also emphasize more on internet access as a tool for startups to partake in the global economy and whether this will establish additional barriers for startups in sub-Saharan Africa. Finally, it should be noted that the impact of internet services on the development of startups is merely an attempt to explain the complexity behind enterprise development. This again confirms Gartner's interpretation of entrepreneurship as a multidimensional and complex phenomenon, which becomes even more complicated when adding the rapid, continuous developments in the age of internet.

7.2 Adoption of internet services

The findings elaborate on the internet services that are made use of by startups as well as why some are adopted widespread whereas others are less commonly accepted (Venkatesh and Davis, 2000). The extended Technology Acceptance Model helps explain and predict user acceptance of information technology at work and is used in this research for understanding the adoption of internet services by startups in Nairobi. The factors of result demonstrability, output quality, image, job relevance, financial constraints and personal interest can be linked to the various features of internet services. The following paragraphs will discuss how, to what extent and why online education programs, online marketing platforms and online venture capital websites have been adopted or rejected by startups in Nairobi.

Online education programs are only made use of on a regular basis by a moderate segment of startups in Nairobi. It is difficult to determine how the lessons can be applied by startups in practice. This lack of result demonstrability is the main reason for startups to not perceive online education as a priority and instead make use of quick online searches and YouTube tutorials. Moreover, startups are generally content with the performance of the technology,

although specific content designed for Kenyan entrepreneurs and the African market would further strengthen output quality. Lastly, startups have touched upon financial and time constraints for making using of online education platforms, which has also limited the adoption of these internet services. A significant segment has indicated low interest in online education programs, even though education is perceived to have a strong influence on enterprise development. The adoption of online education programs is higher among startups in the idea phase, thus it is useful to learn more about the topics of interest of startups in the latter development phases.

Online marketing platforms are adopted more broadly by startups than any other type of internet service. Product reviews on the Facebook page and statistics on the number of visitors have a direct effect on the perception of result demonstrability and output quality. Broader sets of data on visitors of the websites or social media profiles are seen as valuable additions by startups. Online advertising shows different results, since there are instances where it does not lead to conversion and thus has a negative effect on output quality. However, this tends to be more common among startups in the earlier development phases and shows the importance of developing an effective long-term marketing strategy in the idea phase. Furthermore, startups have elaborated on the importance of building up an online presence, which indicates the significance of image in relation to online marketing. Finally, job relevance turns out to differ among startups. B2B startups and startups working in grassroots communities have a strong preference of personal marketing methods over internet services, whereas B2C startups tend to value their online presence to a greater extent. This explains why B2B startups perceive online marketing platforms to contribute less to enterprise development. The question is whether it is possible to develop internet services that will be better suitable for enterprises with low interest in online marketing platforms.

Websites with venture capital opportunities strongly lack result demonstrability, because only a small percentage of startups has been able to attract capital through the internet. Presence on venture capital platforms, such as VC4Africa, is similarly but less important for the visibility and status of startups in comparison to online marketing platforms. Although service startups and startups in the later development phases have been slightly more successful in the use of online venture capital websites, the low percentage of startups that has been able to receive funding through internet services makes it difficult to draft realistic recommendations for

what startups can change in order to have a better chance at gaining access to capital. Ultimately, the issues of trust, time and personal interest tend to decrease the adoption of venture capital websites. This has no influence on the availability of capital, requires startups to bootstrap or search for alternative funding opportunities and in numerous cases prevents the startup from scaling up to the next phase of development.

In conclusion, the extended Technology Acceptance Model makes it possible to explain the motivations behind the adoption of internet services. Taking into account the factors in the model makes it possible to come closer to solutions that will contribute to the wider adoption of internet services. It should be noted that in an entrepreneurial context, the cognitive instrumental processes, including financial constraints, tend to weigh more than the social influence processes. The findings entail a variety of recommendations on how the three categories of internet services need to be altered from the perspective of startups. However, it should be noted that this research is of exploratory origin and additional research is required for more accurate recommendations on how these internet services need to be altered in detail.

7.3 The Nairobi digital divide

The literature review opened with Graham's concept of the digital divide, which is the gap between those who have access to digital technologies and those who do not (Graham, 2008). I argue that this notion upholds in the context of the Nairobi startup ecosystem. Although internet services have empowered startups in Nairobi, it should be noted that the diffusion of internet and the emergence of startup communities occurred much later in sub-Saharan Africa than in the West. Therefore, some of the experts and innovation clusters expect Nairobi to always be one step behind. Startup ecosystems in Western countries are further developed in terms of funding opportunities, legislation and support networks. Furthermore, internet services for startups are predominantly designed in the West and will therefore first be adopted by Western startups as well.

Some experts pointed out that Western startups will use this as an advantage that will only further widen the gap between integration of internet services in the West as opposed to sub-Saharan Africa. It is possible that it will be more challenging for startups from sub-Saharan Africa to compete with startups from other parts of the world. In an earlier segment on the impact of internet services on enterprise development, some academics argued that there

can only be impact through the right application of internet services (Colombo et al., 2013). The impact of internet services on the development of startups could be different in the scenario where internet services are innately African: developed by and for Africans. However, additional academic research is needed to understand the differences in internet use and application of internet services between Western and African startups. It will also be interesting to learn to what extent African startups are making use of African internet services and find out how the impact of these internet services is perceived in comparison to internet services from the West.

7.4 Reflection

This segment will briefly elaborate on the execution of this research and several potential topics for future studies that were or were not yet mentioned in the discussion. To start, the research questions turned out to be more comprehensive than anticipated. I decided to explore online education, online marketing and online venture capital altogether, even though one of these three topics would have been sufficient. Focusing on one topic even might even have led to additional findings. However, by investigating multiple topics that have not been researched in this context before, the findings are of value to a broader range of stakeholders.

In the scenario where I dug deeper in one subject, I would have looked into the following topics. With regard to online education, there is a need to understand what the education system of Kenya, from elementary school to public university, can change in order to better prepare the next generation of entrepreneurs. In relation to online marketing, the need of startups to gather personal information on their customers and the consequent dependence of startups on large technology companies, such as Google and Facebook, should be investigated. For online venture capital, it is important to understand how technology can contribute to mutual trust between Nairobi startups and investors from Kenya and abroad.

Finally, I would like to point out the need for research on the difficulties of African startups trying to enter non-African markets. With a growing number of technology companies active on a global scale, why is it that there is no flagship originating from Africa and, more importantly, what can be done to alter this?

8. Conclusion and policy recommendations

All the previous chapters of this thesis have led to a good understanding of how internet services are perceived by startups to influence the business environment of Nairobi and offer solutions to common enterprise development challenges. This final chapter will answer the main research question and sub-questions, touch upon some of the limitations and conclude with policy recommendations for stakeholders in the Nairobi startup ecosystem.

The first five sub-questions, which also entail the sixth sub-question on how perceptions differ among startups, form the basis for answering the main research question. First, the business environment of Nairobi has rapidly changed over the last decade and startups recognize numerous improvements as well as a number of pressing development challenges, such as access to capital, access to the market and finding skilled labor. Nairobi offers the most established startup ecosystem in the region, especially due to the support of innovation clusters. However, the business environment is far from complete and, rather than spectate, startups want to participate in the future ambitions of innovation clusters and the Kenyan government. Second, internet services form a core role in the business practices of startups. Faster and cheaper internet connections can be linked directly to the growing number of startups, because the internet functions as an enabler in terms of communication, information and market access. The online services provided by innovation clusters and the Kenyan government are generally perceived to be helpful, but startups and experts observe these as merely the first experiments within a broad new range of opportunities.

Third, online education platforms have a moderate impact on strengthening human capital. The majority of startups points out the importance of education and the internet has made information flows more accessible to entrepreneurs. However, the content of online education needs to be applicable to African entrepreneurs and have a better fit with the demanding schedules, financial constraints and business practices of startups. Fourth, online marketing platforms strongly influence access to the market. The global reach, cost-effectiveness and enhanced visibility make personal websites, Facebook pages, WhatsApp Business and other marketing channels of importance to startups in the early phases of enterprise development in particular. Improving insight in conversion, information on potential customers and advanced tools for personal communication can further strengthen the position of online marketing platforms for an even broader range of startups. Finally, the

impact of online venture capital websites on access to capital is negligible. Websites such as VC4Africa and F6S have improved the visibility of venture capital opportunities and enable contact with international investors. However, access to capital remains limited due to low availability of capital, numerous requirements for funding opportunities and the low level of trust between startups and investors.

Therefore, the answer to the main research question is that over a time span of ten years the internet has had a transformative impact. Not only has it radically altered how enterprises communicate, market, network and conduct business in Nairobi, it has also contributed to the establishment of numerous innovative and technology-based enterprises called startups. Up to this point, online marketing platforms have strongly improved access to the market, online education programs have contributed to human capital and strengthened the competitiveness of startups to a certain extent, and online venture capital websites have not been able to tackle the most pressing development challenge of access to capital.

It should be noted that internet diffusion is a recent phenomenon and it is difficult to predict what technological developments will take place in the next ten years. It is certain that internet services will continue to have a transformative effect on the Nairobi business environment and enterprise development, but what effect this will have on the conclusions of this thesis cannot be foreseen. Another limitation of this research is how the results are only applicable to the context of the Nairobi startup ecosystem. Some aspects are relatable to other Kenyan cities and countries in sub-Saharan Africa, whereas most of the findings will only be applicable to Nairobi. In order to foster internally driven development, it is highly valuable to learn more about internet diffusion and the emergence of startup ecosystems in sub-Saharan Africa.

The following policy recommendations for innovation clusters, the Ministry of ICT, universities and online venture capital websites are predominantly based on the findings and analysis and the discussion chapters:

Innovation clusters	- Explore how the internet can be better integrated in services for startups, with a particular focus on online education - Reflect on the applicability and the distinctive value of incubator and accelerator programs that are offered

	- Experiment with personal intermediaries between startup and investor and invest in funding schemes for startups
Ministry of ICT	- Involve more startups in the development of new online services and the Konza Technopolis project - Improve transparency for business taxes, regulations and upcoming projects
Universities	- Explore how technological and entrepreneurial skills can be better integrated in all course curricula - Develop Massive Open Online Courses (MOOCs) similar to the example of Western universities, but designed for the local context - Provide complementary access to internet everywhere on campus as well as in student dorms
Online venture capital websites	- Experiment with a rating scheme that allows startups and investors to reflect on the process and provide feedback - Tackle bias of investors towards non-African entrepreneurs and take note of how cultural differences influence the startup-investor relationship

Table 7 Policy recommendations

Finally, I would like to conclude this thesis with two notes that I believe are of vital importance to the development of the Nairobi startup ecosystem and the field of development studies as a whole. First, the endless optimism of numerous startups that have taken the time to participate in this research. When asked about the future of entrepreneurship in Nairobi, the founder of LoyaSoft simply replied: '*Very optimistic, because, well, I'm in it, so we have to make it in a way that works for us.*'. The second note is the strong determination of Nairobi startups to develop a story of success independent from any non-African influences. With numerous brilliant and innovative ideas coming out the Nairobi startup ecosystem, the founder of AB3D Africa pointed out: '*We just need to be better at selling ourselves as Africa*.'

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Appendices

Appendix A: List of interviewees

In-depth interviews with startups (15)

Name	Sector	Product or service	Phase
1. Botlab	Education	Service	Early-growth
2. MyRide	E-commerce	Service	Early-growth
3. BigDrop	Web development	Service	Early-growth
4. Pace	E-commerce	Product	Early-growth
5. Grassroots Bima	Fintech	Service	Seed
6. Sauti	E-commerce	Service	Early-growth
7. AB3D Africa	Manufacturing Cleantech Education	Both product and service	Early-growth
8. Moot	E-commerce	Both product and service	Idea
9. LoyaSoft	E-commerce	Service	Seed
10. HRExpert	E-commerce	Service	Seed
11. Vorane Studios	Web development	Both product and service	Idea
12. Shop Jiji	E-commerce	Both product and service	Seed
13. Rate My Service	E-commerce	Service	Seed
14. GIG	Entertainment	Service	Seed
15. MedBit	Health	Service	Early-growth

In-depth interviews with innovation clusters (6)

Name	Origin	Number of affiliated startups
1. iHub	Private	250
2. @iLabAfrica	University	30
3. Nailab	Private	146
4. C4DLab	University	20
5. Chandaria-BIIC	University	117

6. Gearbox	Private	N/A

In-depth interviews with experts (5)

Name	Position
1. Ben White	CEO at VC4Africa
2. David Mugambi	Director of Business Development at Konza Technopolis
3. Bitange Ndemo	Former Cabinet Secretary at Ministry for Information, Communications and Technology
4. Angela Oduor Lungati	Director of Community Engagement at Ushahidi
5. Joyce Mbaya Ikiao and Rhoda King'ori	Founder and Project Champion at Zydii

Appendix B: Interview guide startups

Utrecht University

University of Nairobi

Introduction and Consent

Hello, my name is Bart van der Meer and I am hoping to use thirty to forty minutes of your time to conduct an in-depth interview for my study program International Development Studies at Utrecht University in the Netherlands in affiliation with the University of Nairobi. The purpose of this research is to gain understanding of how startups in Nairobi perceive the impact of internet access on enterprise development. The questions in this interview will relate to your experience as an entrepreneur and your perception with regard to online services and applications that are used within your enterprise. All of your answers will only be used for this research project, and will not be shared with anyone else. Your name will not be used and your answers will be kept confidential. Participating in this interview is voluntary and you may decide not to answer any questions if you do not feel comfortable. For the purpose of having a complete overview of the matters discussed in this interview, I want to record this interview using my smartphone. Are you willing to give consent to participating in this interview and the recording of this interview?

Background information

Name of enterprise	
Affiliation with innovation cluster	
Age of enterprise	
Number of employees	
Informal or formal enterprise	

I. Opening questions

1. Can you briefly tell me a little bit about you and your startup?
   Probe: Education, contribution to development, founded how, type of product or service, what makes it innovative / unique, growth

2. What is your working environment like?
   Probe: Affiliation with innovation cluster, office, incubation services, contribution of network to startup, colleagues

II. Enterprise development

3. What is the business environment of Nairobi like?
   Probe: Changes in past years, example of a positive or negative development, why is Silicon Savannah emerging now
4. What kind of factors are currently limiting the growth of your startup?
   Probe: Similarity to most common challenges of micro and small enterprise development, experiences of other startups in network, what will be a challenge in the future, possible solutions
5. What do you think needs to be improved about the business environment of Nairobi?
   Probe: Perception of startups in general, role of innovation clusters, role of the government, possible solutions

III. Internet access

6. What does internet access mean for your startup?
   Probe: Access how, type of devices, most essential online services and applications, own website, example of daily use
7. Are there any factors that currently limit access to internet?
   Probe: Costs of devices, costs of internet, skills, network restrictions, possible solutions

IV. Online education and training

8. Does your startup make use of any education or training programs or other information sources that contribute to the knowledge and skills within the startup?
   Probe: Example of programs, online or offline, offered by innovation cluster, other startups
9. For are your most important motivations to (not) make use of online education and training programs?
   Probe: Perceived benefit to startup, importance of knowledge and skills for startup, most important skill for successful startup, attracting employees online
10. Competition is often perceived to limit the growth of startups in Nairobi. Do you believe that online education and training programs has an effect on competing with other startups or not?
    Probe: Example of own experience, who are competitors, effect on enterprise development, alternative ways to increase human capital

V. E-commerce

11. How does the internet help with marketing the products or services of your startup?
    Probe: How customers reached startup or vice versa, own website, personal contacts, e-commerce platforms, suppliers and customers, other startups
12. For what reasons do you (not) make use of e-commerce platforms programs?
    Probe: Perceived benefit to startup, importance for marketization, how to access the market in the future
13. Have e-commerce platforms affected access to the market for your startup or not?
    Probe: In what way, example of own experience, effect on enterprise development, alternative ways to access the market

VI. Venture capital

14. How does your startup attract venture capital?
    Probe: How does process work, network of innovation cluster, personal contacts, private funds, government, to what degree online, other startups
15. How and for what reasons do you (not) make use of the internet to attract venture capital?
    Probe: Websites, perceived benefit to startup, importance for growth, risks of venture capital, crowdfunding
16. Do you think internet access has influenced access to capital for your startup or not?
    Probe: In what way, example of own experience, awareness of opportunities, effect on enterprise development, availability of venture capital

VII. Closing questions

17. How do you think your startup will develop in the next five years?
    Probe: Expected growth, increase employees or revenue, future of Kenya's technology sector
18. Is there anything you would like to add or do you have any questions for me?

Appendix C: Interview guide innovation clusters

Utrecht University

University of Nairobi

Introduction and Consent

Hello, my name is Bart van der Meer and I am hoping to use twenty minutes of your time to conduct an interview for my study program International Development Studies at Utrecht University in the Netherlands in affiliation with the University of Nairobi. The purpose of this research is to gain understanding of how startups in Nairobi perceive the impact of internet access on enterprise development. The questions in this interview will relate to the business environment of Nairobi and the perspective of your innovation cluster on internet access and enterprise development. All of your answers will only be used for this research project, and will not be shared with anyone else. Your name will not be used and your answers will be kept confidential. Participating in this interview is voluntary and you may decide not to answer any questions if you do not feel comfortable. For the purpose of having a complete overview of the matters discussed in this interview, I want to record this interview using my smartphone. Are you willing to give consent to participating in this interview and the recording of this interview?

Background information

Name of innovation cluster	
Number of affiliated startups	

I. Opening question

1. Can you tell me a little bit about this innovation cluster?
   Probe: Founded how and when, development throughout years, main activities of team, incubation services, research, donors or partners, cooperation or competition with other innovation clusters, what makes it unique
2. How would you describe the types startups that are affiliated with the innovation cluster?
   Probe: Definition startup, categorization of startups, success rate of startups in Nairobi

II. Main questions

3. How do you perceive the business environment of Nairobi?
   Probe: Changes in past years, what makes it attractive, relation to private sector, existing research of innovation cluster, what needs improvement, role of the government
4. What are the main development challenges that startups are confronted with?
   Probe: Reasons for failure, practical examples, existing research of innovation cluster, possible solutions
5. How does the innovation cluster provide an answer to the main development challenges of startups?
   Probe: Competition, access to market, access to capital, particular challenges within innovation cluster, limitations of solutions, unanswered challenges
6. To what degree are services of the innovation cluster offered online?
   Probe: Use of internet in communication, education and training, e-commerce opportunities, venture capital
7. What does internet access mean for the development of startups in Nairobi?
   Probe: Cluster provides access to internet or not, existing research on internet and enterprise development, aiming to expand role of internet in future
8. How do startups contribute to the economic development of Kenya?
   Probe: Emergence of Silicon Savannah, (youth) employment, revenue, innovation

III. Closing questions

9. How do you think the innovation cluster will develop in the next five years?
   Probe: Expected growth, employment and revenue, integration of online services, future of Kenya's technology sector
10. Is there anything you would like to add or do you have any questions for me?

Appendix D: Survey startups

Welcome!

Dear startup,

This survey is part of my master research at Utrecht University in affiliation with the University of Nairobi. Its purpose is to gain understanding of how startups in Nairobi perceive the business environment of Nairobi and the impact of internet services on enterprise development. The questions will relate to your experience as an entrepreneur and your perception with regard to internet services that are used within your startup.

Before you start, it is important that:

- You are part of a startup that is **based in Nairobi**
- The startup is **founded within the past three years**
- A startup can only **participate once** in the survey

The survey will start with some background information about your startup. Hereafter, there will be questions on how you use the internet in your startup and how you perceive the business environment of Nairobi. In addition, there will be questions about three development challenges that startups are confronted with: human capital, access to the market and access to capital. It will take about **10 to 15 minutes** to complete the survey.

All of your answers will only be used for this research and will not be shared with anyone else. Your name will not be used and your answers will be kept confidential. Participating in this questionnaire is voluntary and you may decide not to answer any questions if you do not feel comfortable. By clicking on 'Next' you are giving consent to participating in this research.

Thank you for making this research possible!

Kind regards,
Bart van der Meer

I. Background information

1. What is the name of your startup? _____

2. How old is the startup?

- ☐ Less than 3 months
- ☐ 3 months to less than 6 months
- ☐ 6 months to less than 1 year
- ☐ 1 year to less than 2 years
- ☐ 2 years to less than 3 years

3. Which innovation clusters (co-working space(s) or business incubator(s)) is the startup affiliated with? Multiple answers are possible.

- ☐ iHub
- ☐ Nairobi Garage
- ☐ C4DLab
- ☐ Nailab
- ☐ @iLabAfrica
- ☐ Gearbox
- ☐ GrowthAfrica
- ☐ Mettā
- ☐ Chandaria-BIIC
- ☐ None
- ☐ Other (please specify)

4. What phase of development is the startup currently in?

- ☐ Idea phase

- Seed phase
- Early-growth phase
- Late-growth phase
- Other (please specify)

5. How many people are currently employed by the startup? _____

6. Is the startup mainly founded and driven by student-entrepreneurs (who are currently enrolled in a university)?
- Yes
- No

7. Is your startup registered with the Kenyan government? (e.g. formalized)
- Yes
- No

8. What business category does the startup best fit into? Multiple answers are possible.
- Agriculture
- Manufacturing and processing
- Cleantech and renewable energy
- E-commerce and business services
- Education and employability
- Entertainment and lifestyle
- Fintech
- Health and life sciences
- Other (please specify)

9. What market locations does the startup currently target? (please name the cities, counties, countries, regions you are active in) _____

10. Is the customer that you target a consumer (B2C) or a business (B2B)?
- Business to Consumer (B2C)
- Business to Business (B2B)
- B2C and B2B
- Other (please specify)

11. Do you offer your customer a product or a service?
- Product (electronics, clothing, hardware, etc.)
- Service (app, website, platform, etc.)
- Both product and service
- Other (please specify)

12. Gaining revenue is an important driver of my startup.
- Strongly agree
- Agree
- Neither agree nor disagree
- Disagree
- Strongly disagree

13. Creating social impact is an important driver of my startup.
- Strongly agree
- Agree
- Neither agree nor disagree
- Disagree
- Strongly disagree

14. Creating employment for other Kenyans is an important driver of my startup.
- Strongly agree
- Agree
- Neither agree nor disagree
- Disagree
- Strongly disagree

15. Creating employment for myself is an important driver of my startup.
- Strongly agree
- Agree
- Neither agree nor disagree
- Disagree
- Strongly disagree

II. Internet use

16. Does your startup have its own website?
- Yes
- No

17. What devices do you use to access the internet for your startup? Multiple answers are possible.
- Smartphone
- Tablet
- Laptop
- Personal computer
- Other (please specify)

18. Costs of internet access is a factor that limits access to internet for my startup.
- Strongly agree
- Agree
- Neither agree nor disagree
- Disagree
- Strongly disagree

19. Speed of the internet connection is a factor that limits access to internet for my startup.
- Strongly agree
- Agree
- Neither agree nor disagree
- Disagree
- Strongly disagree

20. The target customer of the startup can easily be accessed through the internet.
- Strongly agree
- Agree
- Neither agree nor disagree
- Disagree
- Strongly disagree

21. Internet access has become more affordable in the past five years.
- Strongly agree
- Agree
- Neither agree nor disagree
- Disagree
- Strongly disagree

22. Internet connections have become faster in the past five years.
- Strongly agree
- Agree
- Neither agree nor disagree
- Disagree
- Strongly disagree

23. How important has internet access been for the development of your startup?
- Extremely important
- Very important
- Somewhat important
- Not so important
- Not at all important

24. How important has internet access been for the scalability of your startup?

- Extremely important
- Very important
- Somewhat important
- Not so important
- Not at all important

25. How important has internet access been for making it possible to compete on the global market?
- Extremely important
- Very important
- Somewhat important
- Not so important
- Not at all important

III. Enterprise development

26. How would you grade the development of your startup up to this point?
1 2 3 4 5 6 7 8 9 10

27. How would you grade the ease of doing business in Nairobi?
1 2 3 4 5 6 7 8 9 10

28. How would you grade the services of your innovation cluster(s) in the sense that they have contributed to ease of doing business in Nairobi.
1 2 3 4 5 6 7 8 9 10

29. How would you grade the efforts and services of the Kenyan government to startups in the sense that they have contributed to ease of doing business in Nairobi.
1 2 3 4 5 6 7 8 9 10

30. The business environment of Nairobi has improved over the last ten years.
- Strongly agree
- Agree
- Neither agree nor disagree
- Disagree
- Strongly disagree

31. What are the three most significant development challenges that your startup is currently confronted with?
- Cultural barriers
- Access to venture capital
- Gender bias
- Finding skilled labor
- Affordable office space
- Developing a business model
- Intellectual property issues
- Government taxes and regulations
- Access to the market
- Security issues
- Infrastructure and traffic
- Competition from established companies
- Competition from other startups
- Access to internet
- Lack of knowledge / experience
- Other (please specify)

32. The innovation cluster(s) I am affiliated with make(s) optimal use of the internet in offering its / their services to startups.
- Strongly agree
- Agree
- Neither agree nor disagree
- Disagree
- Strongly disagree

33. The innovation cluster(s) I am affiliated with need(s) to make more of its / their services to startups

accessible online.
- Strongly agree
- Agree
- Neither agree nor disagree
- Disagree
- Strongly disagree

34. The Kenyan government makes optimal use of the internet in offering its services to startups.
- Strongly agree
- Agree
- Neither agree nor disagree
- Disagree
- Strongly disagree

35. The Kenyan government needs to make more of its services to startups accessible online.
- Strongly agree
- Agree
- Neither agree nor disagree
- Disagree
- Strongly disagree

36. How do you perceive the future of the Nairobi business environment?
- Very positive
- Positive
- Neutral
- Negative
- Very negative

37. How do you perceive the future development of your startup?
- Very positive
- Positive
- Neutral
- Negative
- Very negative

IV. Online education

38. With regard to online education programs, what internet services has the startup made use of to increase human capital? Multiple answers are possible.
- Coursera
- Udemy
- Zydii
- EdX
- Udacity
- YouTube tutorials
- Internet forums
- None
- Other (please specify)

39. How regularly does the startup make use of online education programs?
- More than once a week
- About once a week
- About once a month
- About once a year
- Less than once a year
- Never

40. Do you have preference for face-to-face education programs or online education programs for increasing human capital within the startup?
Face-to-face education programs --- Online education programs

41. Online education programs need to be more tailored to the context of the African market.
- Strongly agree

- Agree
- Neither agree nor disagree
- Disagree
- Strongly disagree

42. Online education programs have made competing with other startups easier.
- Strongly agree
- Agree
- Neither agree nor disagree
- Disagree
- Strongly disagree

43. Online education programs have made competing with established companies easier.
- Strongly agree
- Agree
- Neither agree nor disagree
- Disagree
- Strongly disagree

44. Online education programs have contributed to the development of my startup.
- Strongly agree
- Agree
- Neither agree nor disagree
- Disagree
- Strongly disagree

V. Online marketing

45. Which internet services has the startup made use of for marketing its product or service? Multiple answers are possible.
- Own website
- Facebook
- LinkedIn
- Instagram
- WhatsApp
- Twitter
- MailChimp
- YouTube
- None
- Other (please specify)

46. How regularly does the startup make use of internet services to market the product or service?
- More than once a week
- About once a week
- About once a month
- About once a years
- Less than once a year
- Never

47. Do you prefer personal marketing strategies or online marketing strategies for reaching out to your customers?
Personal marketing strategies --- Onine marketing strategies

48. How often have you made use of online advertising for your startup?
- Always
- Usually
- Sometimes
- Rarely
- Never

49. Use of online marketing platforms has led to an increase of the number of customers of my startup.
- Strongly agree
- Agree

- Neither agree nor disagree
- Disagree
- Strongly disagree

50. Online marketing platforms have contributed to access to the market for my startup.
- Strongly agree
- Agree
- Neither agree nor disagree
- Disagree
- Strongly disagree

51. Online marketing platforms have contributed to the development of my startup.
- Strongly agree
- Agree
- Neither agree nor disagree
- Disagree
- Strongly disagree

VI. Venture capital

52. The startup is currently open to venture capital.
- Yes
- No

53. With regard to accessing venture capital opportunities online, what internet services has the startup made use of? Multiple answers are possible.
- VC4Africa
- F6S
- AngelList
- Website of innovation cluster
- Website of Kenyan government
- Website of international organizations or foreign governments
- Websites of NGOs
- Websites of banks and private sector
- Websites of universities
- None
- Other (please specify)

54. Has the startup been able to attract venture capital using internet services?
- Yes
- No

55. How regularly does the startup make use of internet services to find venture capital opportunities?
- More than once a week
- About once a week
- About once a month
- About once a year
- Less than one a year
- Never

56. Do you prefer reaching out to venture capitalists through personal networks or through internet services when looking for venture capital?
Personal networks --- Internet services

57. Overall, venture capitalists can be considered trustworthy.
- Strongly agree
- Agree
- Neither agree nor disagree
- Disagree
- Strongly disagree

58. The internet offers a good overview of what venture capital opportunities are available to startups.
- Strongly agree

- Agree
- Neither agree nor disagree
- Disagree
- Strongly disagree

59. Online information about venture capital needs to become more transparent and accessible.
- Strongly agree
- Agree
- Neither agree nor disagree
- Disagree
- Strongly disagree

60. Internet services with opportunities for venture capital have contributed to access to capital for my startup.
- Strongly agree
- Agree
- Neither agree nor disagree
- Disagree
- Strongly disagree

61. Internet services with opportunities for venture capital have contributed to the development of my startup.
- Strongly agree
- Agree
- Neither agree nor disagree
- Disagree
- Strongly disagree

Thank you!

You have reached the end of this questionnaire! Thank you for participating!

For any questions regarding the research, feel free to send me an e-mail at:
b.j.vandermeer@students.uu.nl

Please press 'Done' below to submit the survey!

If you wish to receive the outcomes of this research (around August 2018),

you can fill in your e-mail address below:

Kind regards,
Bart van der Meer

Appendix E: Ethical review

This section will discuss the ethical issues that will be taken into account throughout the research.

Participant recruitment

In development studies, ethical research involves the respectful treatment of the local community's culture, knowledge and traditions. As an outsider, it is particularly important to pay attention to the characteristics and behaviours in the local community in the first weeks. With regard to the research, innovation clusters in Nairobi can be regarded as local communities on their own. Consulting and involving these local communities in the research is the first step towards participant recruitment. These partnerships will function as the gateway to startups that can participate in the research. When approaching startups, I will be respectful, flexible and transparent. Furthermore, the results of the research will be shared with innovation clusters and interested startups as a token of gratitude and a return of knowledge. These actions will contribute to the relationship with participants (Scheyvens et al., 2003).

Informed consent

Anyone participating in the research will be openly informed of their rights. Written consent forms will be prepared for all participants of the in-depth interviews. For the survey, a section will be devoted to the rights of participants, such as the voluntariness and confidentiality of the survey. Important to note is that it is not the format of the consent, but the quality of it that matters. Making participants aware of their rights may be beneficial to the relationship with the researcher and the quality of the collected data (Scheyvens et al., 2003).

Potential risk to participants

Confidentiality entails that any information that may lead to the identification of the participant will be left out of the research (Scheyvens et al., 2003). Throughout the interviews and survey, it may occur that entrepreneurs share certain details that can be harmful to themselves or to the enterprise. In order to make participants feel secure about the research, names of entrepreneurs will be left out. Furthermore, participants will be informed that their participation in the research is completely voluntary and that they are allowed to withdraw at any time. For other interviews where anonymity cannot be guaranteed, as it is in the case of

the organization behind innovation clusters, the participants will be asked if the names of the innovation clusters may be mentioned in the research at the start of the interview.

Sharing of findings

Due to the vulnerability of participants, notes, transcripts of interviews and complete surveys will not be shared with anyone but myself. The sharing of raw primary data can have a negative impact on the relationship with participants. However, the research findings can be of important value to innovation clusters and startups. Therefore, I will offer the innovation clusters to present what I have learned throughout the research in the last weeks in Kenya (Scheyvens et al., 2003). This will be a broad summary of the research findings and not include any individual contributions. Also, I will share the final product with any cluster, enterprise or academic that is interested and contributed to this research as a return of knowledge. This will only be possible when the thesis is completed and handed in.

Conflict of interest

As a researcher, I will maintain relationships with my supervisors, the innovation clusters and the startups. A conflict of interest will occur if these trust relationships lead to wrong judgements on objectivity, ethics or loyalty (Scheyvens et al., 2003). For example, it can be assumed that innovation clusters want to hear that certain internet services are beneficial to the development of startups. Or that startups that develop an internet service use the research to promote their own product. Recognizing such behaviour is important for protecting the quality of the data and the direction of the research will be adjusted based on such conflicts.

Appendix F: Time planning data collection

Week 1 (1 - 4 February)	1 February: Flight Amsterdam - Nairobi *Settling and exploring Nairobi*
Week 2 (5 - 11 February)	First meeting with Romanus Opiyo Visit innovation clusters 9 February: Update supervisor
Week 3 (12 - 18 February)	Meetings with innovation clusters
Week 4 (19 - 25 February)	Review of research questions and theoretical framework 23 February: Update supervisor
Week 5 (26 February - 4 March)	Review of research methodology Prepare, conduct and process in-depth interviews
Week 6 (5 - 11 March)	Prepare, conduct and process in-depth interviews 5 - 9 March: Nairobi Innovation Week 9 March: Update supervisor
Week 7 (12 - 18 March)	Prepare, conduct and process in-depth interviews
Week 8 (19 - 25 March)	Prepare, conduct and process in-depth interviews
Week 9 (26 March - 1 April)	Prepare, conduct and process in-depth interviews 27 March: Presentation for University of Nairobi
Week 10 (2 - 8 April)	Additional interviews Draft survey 5 April: Update supervisor and submit interim report *Break: Diani Beach and Mombasa (6 - 12 April)*
Week 11 (9 - 15 April)	*Break: Diani Beach and Mombasa (6 - 12 April)* Prepare survey
Week 12 (16 - 22 April)	Conduct and process survey 19 - 21 April: Nairobi Tech Week 20 April: Update supervisor
Week 13 (23 - 29 April)	Conduct and process survey 27 April: Update supervisor
Week 14 (30 April - 6 May)	*Break: Ethiopia (30 April - 14 May)*

Week 15 (7 - 13 May)	*Break: Ethiopia (30 April - 14 May)*
Week 16 (14 - 20 May)	Conduct and process survey Additional research 18 May: Update supervisor
Week 17 (21 - 27 May)	Conduct and process survey Additional research
Week 18 (28 May - 1 June)	Additional research 30 May: Presentation for University of Nairobi 31 May: Update supervisor 1 June: Flight Nairobi - Amsterdam

Appendix G: Photos

C4DLab

Chandaria-BIIC

Gearbox

iHub

@iLabAfrica

Nailab

Nairobi Innovation Week Opening Ceremony

Nairobi Tech Week Keynote Speaker Event