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## **Mobile-banking and Entrepreneurship:**

### **Is there a link?**

- A case study on South Africa

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## **Abstract**

Entrepreneurship, which often manifests itself in the shape of microfirms or small and medium sized firms, is an important source of job creation and growth. These types of firms are often hindered by financial constraints and sometimes lack access to formal financial services. Mobile-financial services, such as mobile-banking, have been used as a tool for increasing access to finance and in aiding financial inclusion. This paper investigates the potential link between mobile-banking and entrepreneurship in South Africa. Since South Africa, a developing country with an upper-middle income status, has major problems with unemployment, this relationship is of interest to investigate.

A quantitative method is used. Data was collected through a survey during an eight-week period in the country. 110 responses were collected and the data extracted from those was used to make a probit analysis on a binary choice model with entrepreneurship as the dependent variable and mobile-banking along with other control variables as determinants. As a complement to this analysis, a few semi-structured interviews were conducted with relevant persons. The results indicate that there is a positive and significant link between entrepreneurship and mobile-banking in South Africa. This result is likely to be applicable to economies with similar financial characteristics.

**Keywords:** Entrepreneurship, Financial Inclusion, Mobile-Financial Services, Mobile-Banking, South Africa

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## 1. Introduction

Small and medium sized enterprises (SMEs) and micro-enterprises are important for job creation and account for a large proportion of employment, particularly in developing countries (e.g. Beck & Demirgüç-Kunt, 2006; Birch, 1981). One of the major issues for entrepreneurs is not being able to start or run a business due to financial constraints. Financial exclusion is one reason why individuals and firms struggle to develop and grow and could thus have a negative effect on job creation and inhibit productivity.

Currently, half of the world's adult population lack access to formal financial services and are financially excluded; most of them live in developing countries (Demirgüç-Kunt & Klapper, 2012, p 2). Both individuals and firms can be victims of financial exclusion, inhibiting possibilities of handling adverse economic shocks and reducing possibilities of investing in education or entrepreneurial endeavours. Having access to financial services is crucial in today's society, in order to, for example, smooth one's consumption path and handle economic shocks more easily. Financial inclusion is also very important for cash-strapped entrepreneurs, who, without access to financial services, may be forced to use their own insufficient means to try and start their business or are unable to start a business at all. Enhanced financial inclusion can reduce poverty, decrease income inequality and promote growth (e.g. King & Levine, 1993; Beck, Demirgüç-Kunt & Levine, 2004)

In response to the growing concerns of the effects of financial exclusion, recent development in technology, combined with an increasing penetration of mobile-phones and network access, has made it possible to reach previously unbanked or underbanked groups of society through mobile-financial services. This is sometimes referred to as the mobile-finance revolution. Mobile-financial services may be a tool not only in reducing financial exclusion, but also a business tool for entrepreneurs to use in their trade.

Research on mobile-financial services and financial inclusion implies a positive relationship (e.g. World Bank, 2014, p 64-67; Pénicaud & Katakam, 2013; Jack & Suri, 2011). This, combined with the entrepreneur's need for finance, indicates that there might be a link between those who create jobs (e.g. entrepreneurs), financial inclusion and mobile-financial services such as mobile-banking.

My question is: is there a link between entrepreneurship and mobile-banking? Or rather, does the usage of mobile-banking promote entrepreneurship? If the answer is yes, then mobile-banking could be an effective tool in creating jobs, reducing unemployment and poverty and decreasing inequality. To my knowledge, there have been no previous studies investigating the relationship between mobile-banking and entrepreneurship. By examining this link, this study sheds light on a field that has not yet been explored.

This is an empirical study, which has the main objective of investigating if the usage of mobile-financial services promotes entrepreneurship in South Africa. The data was collected through a one-page survey with 110 respondents, both entrepreneurs and non-entrepreneurs, from five regions in South Africa. Through a probit model, the study seeks to determine if mobile-financial services have an effect on entrepreneurship by controlling for various individual, geographical, financial and labour market variables. The country-specific data used in this report was collected in South Africa during June-July in 2014. Despite a limitation of fewer responses than preferred, the results are still relevant.

Results indicate a positive, significant relationship between the dependent variable and the main variable, suggesting that mobile-banking increases the probability of being an entrepreneur by 19%. Income and being an urban dweller also generate a positive, significant effect on entrepreneurship, whereas being a female or a student generates a significant negative effect on entrepreneurship. Bank account, loan, age, marital status, education and distance to ATM/grocery store do not render any significant results.

The paper is organized as followed: in chapter two theory and previous studies of entrepreneurship, financial inclusion and mobile-financial services are discussed. Chapter three presents a short overview and statistics of South Africa. Chapter four covers the method and data used in the study. Chapter five presents the model and explanatory variables. Chapter six contains the regression results and discussion around them. The final section, chapter seven, summarizes and concludes the study, as well as making recommendations for further studies.

## 2. Theory and previous studies

The following section seeks to present and attempt to define the concepts of entrepreneurship, financial inclusion and mobile-financial services, as well as explaining their importance; it also presents evidence from previous studies.

### 2.1 Entrepreneurship

When referring to the expression *entrepreneurship* in this report, we are talking about self-employment, i.e. owning or co-owning a firm. This includes having a firm with multiple employees and a one-man firm (no employees). Gartner refers to this process as “new venture creation” and defines it as “the organizing of new organization” (Gartner, 1985, p 697).

#### 2.1.1 Entrepreneurs and job creation

The general opinion is that entrepreneurship is important in creating job opportunities. A study on which of small, large and young firms in the US create jobs suggests that start-up firms contribute a lot to both gross and net job creation<sup>1</sup>. However, as young firms have an increased probability of failure, they also have higher rates of job destruction. It is further claimed that expanding firms, which includes new businesses, generate job creation whereas contracting firms, including exiting businesses, produce job destruction. (Haltiwanger, Jarmin & Miranda, 2010, p 3-19, p 30).

SMEs<sup>2</sup> and micro-enterprises<sup>3</sup> (less than 5 employees) are assumed to account for a large share of job creation. Birch (e.g. 1981) suggests that small firms are an essential source when it comes to generating jobs, but this evidence has been questioned by e.g. Neumark, Wall and Zhang (2008, p 14-14). Their research implies that small firms do create more jobs, but the difference is much smaller than indicated by Birch’s earlier work. This somewhat confirms the argument that small businesses play a big part in job creation.

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<sup>1</sup> Net job creation is defined as “the difference between gross job creation and gross job destruction” (Neumark, Wall, & Zhang, 2008, p 12).

<sup>2</sup> SMEs have about 5-99 employees (World Bank, 2014, p 105).

<sup>3</sup> Micro-enterprises have less than 5 employees (World Bank, 2014, p 105).



### 2.1.2 Determinants of entrepreneurship

In the literature various groups of determinants are presented as promoting or limiting entrepreneurship. Three major groups are; role of institutions, sociological factors and individual traits (Djankov et al, 2006, p348-351). Role of institutions includes for example financial, political and legal institutions. Lacking finance, incentives or judicial safety (e.g. property rights) will most likely reduce the probability of a person starting an entrepreneurial venture to zero. Sociological factors such as a network of family, friends, religious or ethnic groups etc. may have an effect on who becomes an entrepreneur. And individual or demographic factors such as age, gender, marital or labor market status may also be critical in who starts an entrepreneurial venture.

Entrepreneurs are often distinguished from non-entrepreneurs, with some believing that the entrepreneurs differ in psychological traits (e.g. risk-taking) and/or in background, experience or attitude (e.g. entrepreneurial parents, education and job satisfaction) (Gartner, 1985, p 699).

*Education* is argued to be an important factor for entrepreneurs. Formal education may not be necessary, since some of the greater entrepreneurs were school drop-outs (e.g. Henry Ford, Bill Gates and Steve Jobs). However, education provides a foundation, structure, increases problem-solving abilities and provides a social network for the person who dreams of being self-employed. Some areas of work, such as finance and engineering, might require a certain level of education (Hisrich, Peters & Shepard, 2010, p 38-39). Another individual characteristic that may affect the likelihood of being an entrepreneur is *age*. Theory and empirics indicate that entrepreneurial activity is most likely to be initiated between the early twenties and mid-forties. In general, men and women start their entrepreneurial businesses in their early to mid-30s, but some also start ventures after their children have left home (Hisrich, Peters & Shepard, 2010, p 40).

*Gender* is generally believed to be a determinant of entrepreneurship. Men usually have a higher probability of having their own business than women, especially in developing countries. Women often lack access to finance, have less education and have to stay at home with the children, all of which limit them in their choice of work. (World Bank,

2013). Being an *urban dweller* makes it more likely to be an entrepreneur, partly due to the fact that urban populations are often younger and more educated than rural dwellers. (Bird, & Sapp, 2004, p 8) They also have a closer link to potential customers, stakeholders and suppliers. Borjas (1986, p 5) claims that an entrepreneur who has staff face the risk that the employees shirk. Being married and hiring family members, such as your husband or wife, may reduce that risk. This could imply that being *married* increases the likelihood of being an entrepreneur.

One could argue that other factors such as psychological indicators (e.g. risk-taking and optimism) will affect who becomes an entrepreneur, but this is not discussed or controlled for in this thesis.

### **2.1.3 Entrepreneurs and finance**

Financial development is a vital determinant of entrepreneurship, innovation and growth. Firms in developed and developing countries differ in e.g. size, ownership, finance and regulatory constraints. This implies that access, determinants and what type of financial system works vary across economies. (Ayyagari, Demirgüç-Kunt & Maksimovic, 2012, p 4).

Having an *account at a formal financial institution* is an important factor for those who want to start their own venture. Financial exclusion decreases the probability of a person becoming an entrepreneur.

In developing countries micro and small firms are the dominating form of firms, and micro firms are the major job creators. (Ayyagari, Demirgüç-Kunt & Maksimovic, 2012). Common perceptions are that small and medium sized enterprises (SMEs) generate growth, but that market and institutional distortions limit their progress. Simply having an idea is not enough to build a business. A number of studies show that SMEs often have difficulties raising formal finance and are thereby financially constrained (Beck & Demirgüç-Kunt, 2006; Ayyagari, Demirgüç-Kunt & Maksimovic, 2012).

For any business to start, grow, and prosper, capital is required. Access to capital is something needed by most firms throughout their lifetime, not just during the start-up

process. The business life cycle, described in the book *Financial Management*, has five phases. These are start-up, growth, maturity, decline and closing. The book presents five sources of capital for starting up a firm. These are personal funds, borrowed funds from informal sources (friends/family), commercial bank loans, borrowed funds from start-up programs and lastly angel investors or venture capitalist funding. Many entrepreneurs use *personal funding* as a source of start-up capital. The advantage of this is that the owner can make decisions and reap the profits, whilst the limitation may be that there is an insufficient amount of money, which could potentially damage the possibilities of growth and future success. Many firms rely on *loans* from formal or informal sources. (Brooks, 2012, p 458-467)

Poor entrepreneurs have an especially difficult time to find collateral when there are financial market imperfections (e.g. transaction costs, information asymmetry). The problem is not the lack of enthusiasm or ideas, but lack of access to credit, at a reasonable cost. Inexperience and lack of “proof” or track-record is another limiting factor. Banks are as a majority, risk-averse, with the effect that they, in general, are reluctant to lend money to a new venture or company. This is especially true if the entrepreneur or founder cannot show historic results or provide collateral.

A study by Demirgüç-Kunt, Klapper and Panos on entrepreneurship in Bosnia and Herzegovina finds that households with more wealth have a higher probability of becoming self-employed. Having a bank account also increases this likelihood. Results from a study by Banerjee and Newman (1993) suggest that, without access to finance, potential entrepreneurs are “trapped” and may be forced to take a job rather than creating one themselves. Lacking access to formal financial services and having less money would thereby reduce the probability of self-employment.

Since it is argued that small and young firms are important in job creation, limitation of finance for these firms is thereby a threat to job creation and unemployment reduction.

## 2.2 Financial inclusion

The term *financial inclusion* refers to the proportion of people and companies that use financial services. These services (e.g. payments and savings accounts, insurance, credit, pensions etc.) are provided to them by the *financial system*. When the financial system (which includes financial institutions<sup>4</sup>, financial markets<sup>5</sup>, and financial infrastructure<sup>6</sup>) is not working properly, it will affect the institutions, firms and individuals in the country, and may also have effects outside the nation's borders (World Bank, 2014, p xvii). One negative consequence of a malfunctioning financial system is that some people and firms lack access to formal financial services and are financially excluded.

Financial inclusion plays a vital role in development by enabling economic growth and reducing income inequality. It allows poor people to smooth their consumption and insure themselves against economic shocks (disease, theft, etc.). Through financial access people are able to save and borrow, which in turn allows them to build their assets, to invest in education and entrepreneurial ventures, and thus to improve life quality. Financial inclusion is particularly likely to benefit underprivileged groups in society and is therefore likely to reduce inequality (World Bank, 2012, p 5). Financial exclusion could lead to a life in poverty, income inequality and slow economic growth (World Bank, 2014, p 15). It is therefore important to increase the number of financially included.

An enormous share of the world's population are financially excluded, also referred to as *unbanked*, meaning they do not use or have access to financial services (Pénicaud & Katakam, 2013, p 65). In fact the World Bank states that half the world's adult population<sup>7</sup> do not have an account at a formal financial institution<sup>8</sup> (World Bank, 2014, p 1). This means that more than 2.5 billion people do not have a bank account, savings account, bank loan etc. and have to rely on their own means to invest in an education or start their own business. Developing economies host a larger share of the unbanked

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<sup>4</sup> Financial institutions may include e.g. banks, insurance companies.

<sup>5</sup> Financial markets may include e.g. markets for stocks, bonds, currencies, raw material.

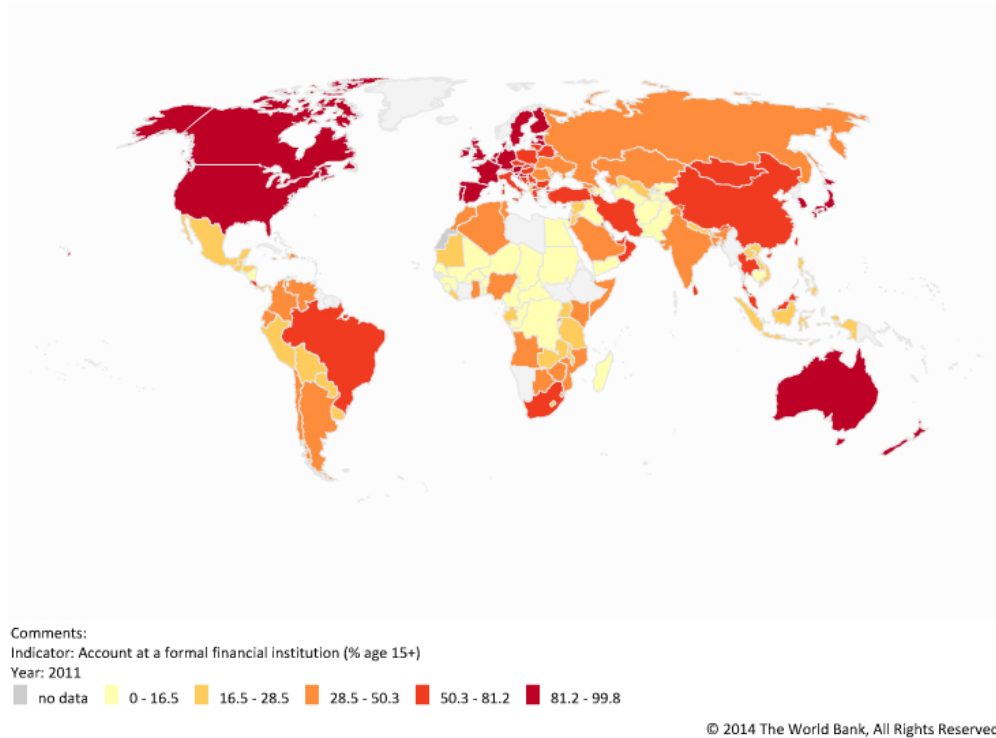
<sup>6</sup> Financial infrastructure may include e.g. payment systems and credit information systems.

<sup>7</sup> Adult population here is defined as people over 15 years of age.

<sup>8</sup> Formal financial institution is defined as a "commercial bank, insurance company, or any other financial institution that is regulated by the state" (GFDR, 2014, p xviii).

population. Figure 1 shows financial inclusion rates across the globe. Looking at the map, it is easy to see that a large part of the African population is financially excluded. Statistics from the World Bank indicate that only 24% of people in low-income areas and 28% in lower middle areas classify as financially included.

**Figure 1: Financial inclusion around the globe**



The figure displays financial inclusion around the globe. Developed economies (e.g. USA, Sweden, Australia) display a high rate of financial inclusion as seen by the intense red color. Developing countries in for example sub-Saharan Africa and parts of South America display a much lower rate of financial inclusion, as seen by a light yellow or orange color.

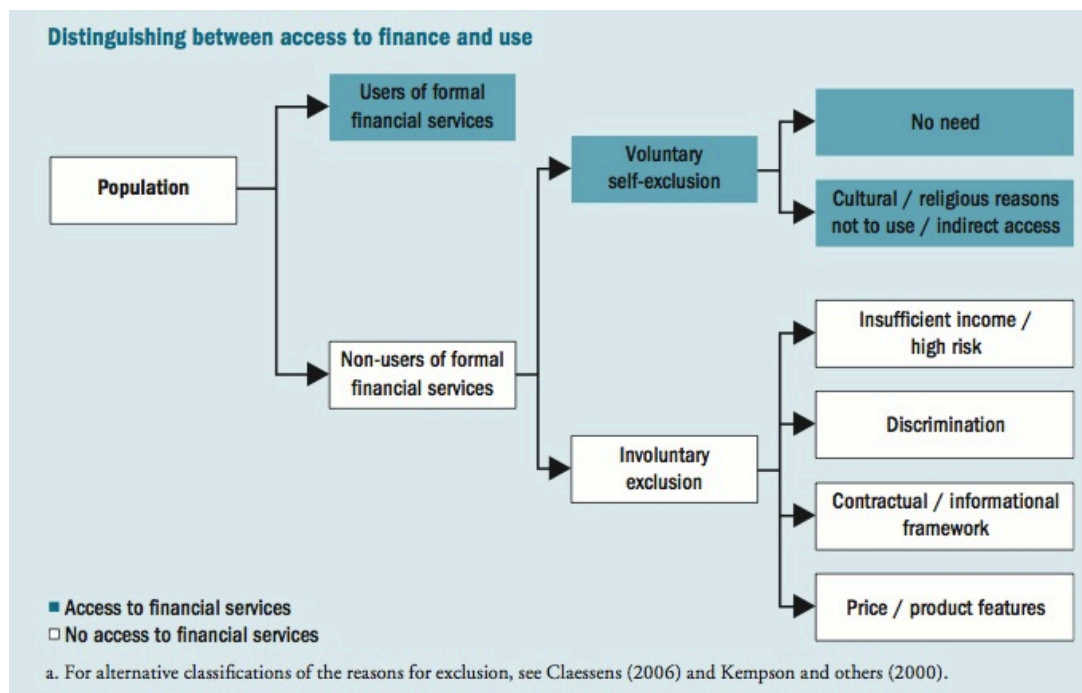
*Source: The World Bank Database, 2014*

Insufficient means may leave a family unable to protect themselves against an adverse shock, leaving them with the risk of having to take their children out of school and finding them a low-wage job. Financial development may therefore reduce the intergenerational income effect (Levine & Demirgüç-Kunt, 2009, p 8-39). Beck, Demirgüç-Kunt & Levine (2004) suggest that financial development in boosting the growth rate of the lowest quintile will reduce income inequality. In summary, financial inclusion matters for economic development and poverty reduction, while lack of access to finance can lead to poverty traps and inequality (World Bank, 2014, p 5-6).

### 2.2.1 Reasons for financial exclusion: Individuals and firms

Financial inclusion is not only associated with access to finance; a person may have access to formal financial services but choose not to use them (World Bank, 2014, p 2). There is a big difference between the use of and access to finance; see figure 2 below. There are users and non-users. It is possible to distinguish between the non-users who are voluntarily excluded due to lack of need, cultural reasons, indirect access<sup>9</sup> etc. Note that these people or enterprises have access to finance but choose not to use it. Others are involuntarily excluded, due to e.g. insufficient income, discriminatory features and price. These people and firms want access but have none (Demirgüç-Kunt, Beck & Honohan, 2008, p 29). A Global Financial Development Report (World Bank, 2014, p 18) indicates that by reducing market imperfections, such as transaction costs and information asymmetry, we could include people from the involuntary exclusion group.

**Figure 2: Access and usage of formal financial services**



The figure distinguishes between users and non-users of formal finance. Then the non-users are divided into groups of voluntary and involuntary exclusion.

Source: Demirgüç-Kunt, Beck & Honohan, 2008, p 29, Box 1.1

In the Global Financial Development Report, the most common reported reasons for not having a bank account were too little money and indirect use. Other common

<sup>9</sup> Another family member has an account that is shared

explanations were distance, lack of trust and documentation requirements. Gender, finance, labor market status, education and geography also play an important role in determining who the unbanked are. Women who are poor, young, unemployed, less educated and/or rural inhabitants are amongst the least likely to have an account. (Demirgüç-Kunt & Klapper, 2012, p 19-21). Other possible elements are, for example, inequality and financial knowledge.

### **2.3 Mobile finance**

In trying to deal with involuntary lack of access to financial services and credits for people who are poor and who are cash-strapped entrepreneurs, micro-credit programs have emerged throughout the world. These programs have had success in recent years, but there are shortcomings. One of the more prominent is the high interest rates (Kendall & Voorhies, 2014).

Andrianaivo & Kpodar (2011, p 20) find a positive relationship between mobile phone penetration and financial inclusion. Recalling earlier data, there are about 2.5 billion unbanked adults across the globe, and more than 1 billion of these have access to a mobile-phone (World Bank, 2014; Pénicaud & Katakam, 2013, p 4). Mobile signals cover the majority of the world's poor,; at the same time mobile-cellular penetration rates stand at 96% globally; 128% in developed countries; and 89% in developing countries according to a statistical report of the International Telecommunication Union (ITU) 2013<sup>10</sup>. In Africa there is a higher mobile phone penetration than fixed line penetration (Andrianaivo & Kpodar, 2011, p 3).

In recent years, there has been a technological development that has combined the extreme growth of mobile phone penetration with technological financial developments and the fact that so many people are unbanked – namely access to financial services via the mobile phone. Even though a high penetration rate of mobile phones is not a required condition for the development of mobile-financial services, it does play some part in getting people financial included. Without it, branchless banking services like

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<sup>10</sup> ITU is the United Nations specialized agency for information and communication technologies (ICTs)

mobile-financial services would have a hard time reaching the unbanked population (World Bank, 2014, p 9).

### 2.3.1 Mobile-financial services

The Groupe Speciale Mobile Associations (GSMA<sup>11</sup>) Mobile Money for the Unbanked Program (MMU) has defined *mobile-financial services* as “the use of a mobile phone to access financial services and execute financial transactions. This includes both transactional<sup>12</sup> and non-transactional services<sup>13</sup>[...]” (Pénicaud & Katakam, 2013, p 64). When referring to mobile financial services, the focus of this report primarily revolves around mobile money and mobile banking; it could however also include mobile insurance<sup>14</sup>, mobile credit and mobile savings<sup>15</sup>.

Mobile-financial-services is the overall classification of using a mobile phone to perform financial transactions and/or access financial services. It is a so-called *branchless banking service*<sup>16</sup>. This type of banking has had enormous growth over the past decade.

Mobile financial services can be divided into two groups: additive and transformational. For people who are already banked, these services are additive, i.e. in addition to services they already have. This is generally the case in developed countries. For individuals who are underbanked or unbanked, these services are transformational and will help them become financially included, which is more generally the case in developing countries.

There are two types of models of mobile financial services: the bank-based model (e.g. mobile-banking) and the nonbanked-based model (e.g. mobile money services). As the

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<sup>11</sup> GSMA is an association that represents the interests of mobile operators.

<sup>12</sup> Payment transaction, making a purchase from one person or company to another.

<sup>13</sup> E.g. viewing financial information on the mobile phone.

<sup>14</sup> “Mobile insurance uses the mobile phone to provide microinsurance services to the underserved” (Pénicaud & Katakam 2013, p 63)

<sup>15</sup> “Mobile credit and savings use the mobile phone to provide credit and/or savings services to the underserved” e.g. Musoni by MTN in Kenya or M-Schwari offered by Kenya’s Safaricom (Pénicaud & Katakam 2013, p 63)

<sup>16</sup> Branchless banking, “the delivery of financial services outside conventional bank branches, often using agents and relying on information and communication technologies to transmit transaction details – typically card-reading point-of-sale (POS) terminals or mobile phones”, (CGAP, 2010, p 1).



name suggests, in a bank-based model there is a direct link between the user and the financial institution. However Mobile Network Operators (MNOs)<sup>17</sup>, who act as retailers, handle the actual transactions outside the bank branch network. In nonbanked-based models there is no direct link between the customer and the bank. Instead, the retailer is given cash by the user who is then, in exchange, given a virtual account with an electronic record of money. The account is kept through the MNO or similar (Andrianaivo & Kpodar, 2011, p 38). Transactions can easily be made without physical interaction. This is time efficient and will for example reduce risks of transporting money.

Geography may be one of those obvious barriers since there is usually less availability of banks, ATMs or similar in rural areas than in urban areas. However mobile money and other technological innovations have decreased this problem. Price or affordability is one of the main reasons for financial exclusion. This is something that effectively can be confronted by new technological innovations that reduce, for example, transaction and administrative costs. One of the technological developments that have had the most success is mobile-financial services such as mobile money and mobile banking (World Bank, 2014, p 34).

### **2.3.2 Mobile banking**

Mobile banking, from an industry perspective, is still a rather young and not yet fully matured segment. The definition *mobile banking*, for that reason, is yet to be standardised with a universal interpretation. There are many different and diffuse explanations of the service. In one paper it is referred to as “the use of mobile phones to make financial transactions”, (Klein, & Mayer, 2011, p 2), which is a very broad description. In a report by the company Accenture, it is referred to as a service that is “jointly offered by banks and mobile communication carriers and performed through a mobile phone; it is an extension of traditional banking service channels on the mobile phone and is supported by the client’s bank account” (Chan & Jia, 2014, p 2). However, this report refers to mobile-banking in more narrow terms, like the one by Accenture. This provides a quite tight description and basically means that mobile banking is just a different channel of regular banking. This makes mobile banking a less optimal tool for

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<sup>17</sup> MNO is a cellular company that provides wireless communication services

increasing financial inclusion since it requires the user to already have an account at a formal institution. With this being said, mobile banking still has advantages over regular banking since it is available anytime and it is accessible wherever you have a connection, making it more convenient and time saving.. This would be equally ideal for a banked, rural user and a banked, urban user. Using the mobile-banking product over a mobile money service such as m-pesa also has the advantage of being able to earn interest on your money. The standard mobile-banking services work on all mobile-phones, not only smartphones, through a concept known as USSD or SMS-banking.

Recent innovations in mobile-banking include payment systems such as Snapscan<sup>18</sup>, from Standard Bank in South Africa. These types of mobile-banking services allow people and firms to complete transactions via an application on the mobile-phone, connected to the person's bank account, rather than with cash or card-machines. This does however require a smartphone. Other important features of mobile banking services are a simple and immediate way of keeping track of finances and managing them directly through your phone. This implies that one does not have to have an expensive computer, and reduces the need to visit a bank office or an ATM to view one's finances.

### **2.3.3 Mobile Money**

We have seen a growing number of mobile money and other branchless banking schemes around the globe, the majority of them in Africa with m-pesa as its frontrunner. (Mayer & Klein, 2011, p 2). The GSMA define *mobile money* as something that "... uses the mobile phone to transfer money and make payments to the underserved" (Pénicaud & Katakam, 2013, p 64). When the GSMA do their research they have a few criteria such as "customers must be able to use the service without having been previously banked" and "services that offer the mobile phone as just another channel to access a traditional banking product are not included", which means that mobile-banking via your bank would be excluded when using this description.

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<sup>18</sup> By scanning a QR-code with the Snapscan app, the buyer enters the amount for the service or good and then confirms the payment via a PIN-code. The money is then transferred from the buyers account to the seller. The seller then receives a confirmation of payment, and the buyer gets a receipt, both on their phones .

The most successful mobile money scheme by far is the m-pesa, which is a mobile payment and money transfer service for its registered users who have an electronic account where they can deposit cash which becomes converted to electronic-float (e-float)<sup>19</sup>. The user can withdraw money and transfer this e-float to other users. You may be able to pay cab-fares or bills via your m-pesa account (Andrianaivo & Kpodar, 2011 p 39). Important to understand is that m-pesa is not a bank, it does not give loans and it does not pay interest on deposits. (Jack & Suri, 2011, p 4-5). M-pesa does not create money, it simply converts cash to electronic money or vice versa. It then stores and transacts money. However the net balances in m-pesa have to be deposited in regulated banks for safe-keeping (Mayer & Klein, 2011, p 9-15)

## **2.4 The link between mobile-banking and entrepreneurship**

Relieving SMEs of financial constraints could aid productivity growth and possibly job creation, something that is needed not least in the developing world. Some research indicates that products for savings and insurance may foster investment in microenterprises. (World Bank, 2014, p 105-115).

Efficient financial systems that improve the flow of payments (receivables and payables) have a positive impact on capital turnover and thereby increase the possibility for a corporation to increase growth. The technology and service innovations behind the rapid development of mobile payment solutions clearly support SME growth.

Although there is restricted empirical proof today, there are clear indications that people who have access to mobile-financial services are more likely to be entrepreneurs than those who do not have this access. Mobile-financial services, such as mobile-banking, reduce transaction costs, shorten time of cash inflow, give the user a financial overview to track costs and income and remove the inconvenience of cash. This is very important for an entrepreneur who may lack a computer or bank connection to get this type of assistance. Keeping money in an account rather than in cash is safer and earns interest. With new services emerging, such as Snapscan, the entrepreneur will not have

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<sup>19</sup> E-float or e-money is a commodity measured in the same units as money, it can be transferred via SMS technology from one m-pesa account to another or sold back to Safaricom for money. It is often used to pay for goods and services such as electricity bills. (Jack, & Suri, 2011, p 5-7).

to rely on expensive technology such as a card-machine, and the customer can instead pay directly through her/his phone. This may increase transparency, reduce transaction costs for both parties and remove the inconvenience and risks of carrying cash. Also, with track-records, banks can follow the firm's economic records over time, and they might become more inclined to give business loans.

### **3. South Africa**

This chapter covers a short history and provides important information about South Africa, the country in which the field study was done. A map of South Africa can be found in appendix 2, figure A2.

#### **3.1 Brief history**

Since the disembarking of the Dutch East India Company in Cape Town in 1652, South Africa has experienced a long period of conflicts and discrimination. From the arrival of Dutch traders in the 17th century, through the overthrow by the British Empire in the early 19th century, to the 1948 election with the Nationalist Party initiating the apartheid government schemes. For many, 1994, with the first free elections and the African National Congress (ANC) coming out as winners with Mandela as their president, marks the start of a new democratic South Africa. Finally, apartheid was truly abolished, at least in practice (Nationalencyclopedia, 2014). This year of 2014 marks the 20 year celebration of freedom, yet people still describe the post-apartheid South Africa as two countries in one; one developed country with living standards comparable to the richest nations of the world, and one developing nation with some of the world's worst living standards.

**Table 1: Facts and figures of South Africa**

Topic	South Africa
<b>Population</b>	52.98 million (2013)
<b>Area</b>	1,214,470 sq km (25 <sup>th</sup> )
<b>Capitals</b>	Pretoria (administrative) Bloemfontein (judicial) Cape Town (legislative)
<b>Largest city</b>	Johannesburg
<b>Official languages*</b>	11 official languages (Afrikaans, English and nine Bantu-languages)
<b>Ethnic groups*</b>	Black African (79.2%), White (8.9%), Colored (8.9%), Indian/Asian (2.5%), Other (0.5%) (2011)
<b>People living with HIV/AIDS*</b>	6.1 million (2012) (1 <sup>st</sup> )
<b>Government</b>	Republic
<b>President</b>	Jacob Zuma (2009-present)
<b>GDP</b>	\$350.6 billion (2013)
<b>GDP growth</b>	1.9% (2013)
<b>GDP per capita (US\$)</b>	6.618 \$ (2013)
<b>Inflation</b>	5.7% (2013)
<b>Income-level</b>	Upper-middle
<b>Gini-coefficient</b>	63.1 (2009)
<b>People living on less than \$1.25/day</b>	6.9 million (2009)
<b>People living on less than \$5/day</b>	31.3 millions (2009)
<b>Account at a formal financial institution (age 15+)</b>	53.64% (2011)
<b>Unemployment</b>	25% (2012)
<b>Long-term unemployment<sup>20</sup></b>	32.4% (2012)

This table presents relevant facts and figures about South Africa. Primary focus on economic figures.

*Source: Data from the World Bank and CIA World Factbook (marked with \*)*

<sup>20</sup> Long-term unemployment is classified by the World Bank as "the number of people with continuous periods of unemployment extending for a year or longer, expressed as a percentage of the total unemployed"

### 3.2 South Africa today

South Africa is experiencing problems with poverty, income inequality and unemployment, as seen from the figures in table 1. In 2009 there were 31.3 million living on less than \$5 a day, 6.9 million of whom were living on less than \$1.25 a day. The Gini-index<sup>21</sup> is 63.1 (2009), one of the highest in the world. The annual GDP growth declined from 3.5% in 2011 to 2.5% in 2012 and to 1.9% in 2013. The unemployment level has seen an upward trend in recent years and reached 25% in 2012. There is persistently high long-term unemployment at a staggering 32.4% (World DataBank, Sept, 2014).

In an Economic Report on South Africa, 2013, it is concluded that an increase in access to financial services for both individuals and small firms could help to reduce poverty and inequality and at the same time stimulate job creation. South Africa's problem with a high unemployment rate could, according to the report, be aided by financial inclusion, supporting the argument of this thesis. Now, South Africa, compared to other African countries, has a higher share of adults with a bank account, but these statistics tell us nothing about the financial inequality in the country. There are large gaps between the richest and poorest quintiles and more than 12 million adults lack a bank account (World Bank, 2013).

According to The Banking Association of South Africa, SMEs make up about 90% of formalized business, employ about 60% of the labor force and provide an economic output of about 34% of GDP. However, they face many obstacles in South Africa. Some of the most prominent being crime and corruption, finance and access to credit as well as access to markets (The Banking Association of South Africa, 2014).

South Africa has a good financial infrastructure and mobile-phone penetration as well as technology. This provides a good climate for adoption of mobile-banking. The question that follows is – will mobile-banking be a key piece in the answer to South Africa's problem of unemployment?

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<sup>21</sup> GINI-index, is a measurement of income inequality. It is measured on the Lorentz curve where the income distribution amongst residents in a country is calculated by plotting percentage total income against number of receivers, starting with the poorest individual. A score of 0 represents perfect equality, and a score of 100 perfect inequality. (Source; World Bank)

## **4. Field study: Method and Data**

This sections presents field methodology and descriptive data as well as the complications and limitations associated with the study.

### **4.1 Field methodology**

The objective of this thesis is to try to determine if there might be a relationship between mobile-banking and entrepreneurship in South Africa. In the attempt to determine this, a quantitative research method is used. Data was collected through a one-page, multiple choice survey in three cities in South Africa. In the appendix there is a copy of the survey used in the field study. The questions in the survey can be divided into four themes; individual, geographical, financial and labour market characteristics of the respondent. To gain deeper knowledge on the subject, the field methodology also consisted of interviews with key people. However, the focus lies on the quantitative data collected.

To my knowledge, there have been no previous studies within the field of mobile-financial services and entrepreneurship. This study therefore contributes to shedding light on a relationship previously overlooked in research.

#### **4.1.1. Survey**

The survey was primarily inspired by two previous studies, one on financial inclusion and another on entrepreneurship. The first is a study by Honohan and King on the cause and effect of financial access. This report studies what effect individual, geographical and national traits have on the usage of financial services in sub-Saharan Africa (Cull, Demirgüç-Kunt & Morduch, 2013, Ch 3, p 46-82). The second is the work by Demirgüç-Kunt, Klapper and Panos on entrepreneurial finance in the Western Balkans, which focuses on the role of access to formal and informal finance for people who are self-employed (Cull, Demirgüç-Kunt & Morduch, 2013, Ch 8, p 211-260).

The outline of the survey is as follows; question one inquires if the respondent has a mobile-phone. Respondents who lacked a mobile-phone were excluded from the study. Lacking a phone would make usage of mobile banking or mobile money services virtually impossible. Questions two to five concern individual traits such as age, gender,

education and marital status. The geographical characteristics of the respondent are investigated in questions six to seven. Questions eight to ten deal with the financial characteristics of the respondent. Questions eleven to thirteen deal with the labour market traits, and it is here that I separate the entrepreneurs from the non-entrepreneurs. The final question, question fourteen, returns to the person's financial characteristics. It asks about the respondents' income, and can be seen as an uncomfortable question which might result in fall-outs in responses. Therefore that question was placed as the final question to increase response frequency. In general it is very difficult to get people to state their exact income. Having a scale or index makes people a little more comfortable about responding to this already uncomfortable question, so instead of having an "open-question" that respondents filled in themselves, "tick-boxes" were used. These were then converted to an index-scale of one to seven, one being the lowest.

Some of the data collected was used for analysis purposes rather than in the regression model. For example questions about the respondent's living area are used to ensure that not all respondents originate from the same area, so that there are less "regional-effects" affecting the results. Also, follow-up questions on the provider of mobile-banking, meaning of loan and how to finance business were not believed to have an actual effect on the dependent variable entrepreneurs, but were seen as important for the discussion of the results later in this report.

#### **4.1.2 Interviews**

To gain deeper knowledge of the subject and a perspective on how things work in South Africa, I was able to complement the field study with interviews with entrepreneurs and professionals in the bank and mobile phone industry. Using the unstandardized and unstructured approach instead of the standardized and structured approach enabled me to ask more open questions, choose topic and order more freely, with room left for the respondent's personal opinions and thoughts. It could be argued that this type of approach is better suited for an explorative research for qualitative studies, but I found it suitable since the field is relatively new and unexplored (Lundahl & Skärvad, 1999, p 115-117).



I met with a female entrepreneur from Futuresharp, a male entrepreneur from World Wide Worx, the senior manager of mobile banking at Nedbank, the chief commercial officer of international business and the head of m-commerce and banking in South Africa at Vodacom.

#### **4.2 Uptake area and distribution**

The material was gathered from three cities in South Africa, but includes people from five provinces in the country. The surveys were distributed in Cape Town (Western Cape), Port Elisabeth and Grahamstown (Eastern Cape) and Johannesburg (Gauteng province). The respondents in the study came from Western Cape, Eastern Cape, Gauteng province, Kwa-Zulu Natal and Free State.

To get in contact with entrepreneurs I received help from my in field supervisor Richard Fearon. I also visited a few places where entrepreneurs are very prominent such as marketplaces and a festival.

#### **4.3 Descriptive data**

The people who participated in the study are both entrepreneurs and non-entrepreneurs and also users and non-users of mobile-banking. All of the respondents had a mobile-phone. A total of 130 people answered the survey; 20 were excluded due to the fact that some questionnaires were not properly filled out. The question most people skipped was the last one asking about average income per month, which was anticipated. This resulted in the usage of 110 surveys.

In tables A2, A3 and A4 in appendix 2 there is a summary of the demographical characteristics of the population in the survey. Table A2 presents a summary table for all respondents, table A3 covers only the entrepreneurs and table A4 is a summary of the characteristics of the non-entrepreneurs. From the table one can see that out of the 110 people that responded, 38 were entrepreneurs and the remaining 72 were non-entrepreneurs.

#### **4.4 Complications and limitations**

Theory and practice are two widely different concepts, which I realized quite quickly during my time in South Africa. I initially experimented with an alternative, longer survey that was very thoroughly constructed to control for a large amount of potential determinants. Unfortunately this survey was too ambitious and it proved difficult to gather responses. Another problem was that the English was a bit too complicated for some of the locals who had a different first language, and despite the fact that I had the survey translated into the two most common languages, Zulu and Xhosa, there were still problems with respondents not comprehending questions. One of the biggest challenges was getting responses from people from “the-bottom-of-the-pyramid” in rural areas and townships. This was due to location and safety reasons, as some of the areas where these people live are remote and are considered unsafe. Another reason was the resistance of some individuals to answering a survey about matters relating to finances from a stranger they do not trust.

Realizing that the initial survey would not generate as many responses as necessary, I consulted with my supervisor and decided to use a shorter version in the form of a one page, very basic survey. It was constructed so that the few responses already collected from the first survey could be used as well. I made the English “fool-proof”, asking very clear and basic questions to decrease the risk of misinterpretation, and removed many of the sensitive questions regarding money and finances to decrease the risk of people skipping questions. This was done when I was in South Africa, and resulted in time-loss and fallout in the gathering of responses. It also resulted in less describing data per respondent since the survey had to be reduced. There is always the possibility of omitted variables bias (variables of importance may have been left out). Despite this, the data can still be used to shed light on this new topic and potential relationship.

There is a risk that the respondents misinterpreted the questions and/or answered untruthfully, resulting in measurement errors. However, the new, shorter and simplified version was constructed to minimize these risks and resulted in 110 responses, hopefully without many measurement errors.

## 5. Model

This chapter presents model specifications and explanatory variables along with predictions. The main objective of this study is to answer the question: does mobile-banking promote entrepreneurship in South Africa? The original question revolved around mobile-financial services as the potential link, but since the respondents using mobile-financial services all used mobile-banking in particular and none used other services such as m-pesa the question became more specified. I investigate the potential link between mobile-banking and entrepreneurship, with a binary-choice model.

### 5.1 Model specification

Binary-choice models are used when the dependent variable only has two possible outcomes. There are some different types of these types of binary choice models. In its most basic form the model is a linear probability model, where the probability ( $p$ ) of an incident occurring is supposed to be linear in the function. The defects of this model are that there will be problems with the disturbance term and that the probability of this model can become greater than one and less than zero. To deal with the second issue there are two other types of binary-choice models commonly used, logit and probit. Here, the probit model is used. The probit model assumes that the probability ( $p_i$ ) of an incident is determined by a function  $F(Z)$ .

$$p_i = F(Z_i) \quad (1)$$

$F(Z)$  is the cumulative standardized normal distribution<sup>22</sup>, and  $f(Z)$  its derivative, the standardized normal distribution (Dougherty, 2011, p 345-365.)

$$f(Z) = \frac{1}{\sqrt{2\pi}} e^{-\frac{1}{2}Z^2} \quad (2)$$

The dependent variable (ENTR) measures if the person is an entrepreneur. If the dependent variable equals 1 the person is an entrepreneur, if it equals 0 the person is not. The probability of a person becoming an entrepreneur is determined by the following specified function:

$$p_i = p_i (\text{ENTR} = 1) = F(Z_i) = \frac{1}{\sqrt{2\pi}} e^{-\frac{1}{2}Z^2} \quad (3)$$

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<sup>22</sup> Standardized normal distribution has zero mean and unit variance (Dougherty, 2011, p 365).

Where Z is a linear function that looks as follows:

$$Z_i = \alpha + \beta_1 \text{mob\_bank}_i + \sum_{j=2}^{11} \beta_j X_j + \varepsilon_i \quad (4)$$

Mob\_bank represents the main variable, mobile-banking, a binary variable that will be explained more thoroughly below. The beta-coefficients ( $\beta_1$ -  $\beta_{11}$ ) represent the direction and effect each of these determinants have on Z. There is a difference between the coefficient effect and the marginal effect. The marginal effect tells us the direction and magnitude of the effect that the explanatory variables have on the dependent variable, entrepreneurship. The marginal effect is computed as in equation 5, by multiplying the beta-values with equation 2. (Dougherty, 2011, p 365-367).

$$\frac{\partial p}{\partial X_i} = \frac{dp}{dZ} \frac{\partial Z}{\partial X_i} = f(Z)\beta_i \quad (5)$$

To establish if the effect of an explanatory variable is applicable, we need to control if it is statistically significant. This is done when the regression is completed by looking at the p-values.

## 5.2 Determinants

In the survey, questions were separated into four different groups of characteristics, namely individual, geographical, labour market and financial characteristics. This following section describes the determinants used in the regression model and their possible effect on entrepreneurship. A summary table of the explanatory variables, their interpretation and my predictions can be found in table A5 in appendix 3.

### 5.2.1 Main variable: Mobile-banking

Mobile-banking is a binary variable, which measures if the person uses mobile banking (1) or not (0). This thesis revolves primarily around mobile-financial services, but none of the respondents in the study used mobile money services such as m-pesa; all used mobile banking applications via their bank. It seemed most appropriate to call the variable mobile-banking in the regression model. Since this variable has the “lead-role” it is included in all regressions. From the theoretical discussion, I expect mobile-banking to be an important tool (reducing transaction costs, good overview of finances etc) for entrepreneurs. My predictions are therefore that this variable will have a positive effect on the dependent variable entrepreneur.

### **5.2.2 Bank account**

Bank account is a binary variable that measures if the respondent has a bank account (1) or not (0). Since it is argued that financial inclusion is important for financially-constrained entrepreneurs, I believe that having a bank account will have a positive effect and increase the probabilities of a person being an entrepreneur.

### **5.2.3 Average monthly income**

Average monthly income measures the respondent's income through an interval scale of income in South African Rand (ZAR). There are seven different groups represented by an interval of income, with one representing the lowest income group. Higher income is believed to have a positive effect on people being entrepreneurs, which is why I believe that a higher score on the income-scale will be linked with a positive effect on the dependent variable. It would have been preferable to use the respondents' exact income, but as mentioned this might have resulted in absence of answers to that very question.

### **5.2.4 Loan**

Loan is a binary variable that measures if the respondent has a loan (1) or not (0). Access to finance is crucial for any entrepreneur, and many ask for financial support for their business in the form of a formal loan, informal loan (e.g. from family or friends), micro-institution and so on. Therefore I predict that the variable loan will have a positive effect on the variable entrepreneur.

### **5.2.5 Age**

Age measures the respondent's age in years. Income and experience are often gained with age, which suggests that the explanatory variable age will have a positive effect on the likelihood of being an entrepreneur.

### **5.2.6 Gender**

Gender is a binary variable that measures if the respondent is female (1) or male (0). Theory on gender and finance, and also on gender and entrepreneurship, implies a negative relationship. This, combined with the fact that South Africa has problems with inequality, makes it probable that the variable gender will have a negative effect on the dependant variable. In other words, being a woman will decrease the probability of a person being an entrepreneur.

### **5.2.7 Marital status**

Marriage is a binary variable that measures if the person is married (1) or not (0). I am not certain of the direction of the effect. Marriage can lead to people preferring to have a job rather than being self-employed, since it might generate a safer, but potentially smaller, income. However one could also argue that having support from home may contribute to a potential positive effect on self-employment.

### **5.2.8 Education**

Education measures the respondent's years in school. Longer education is for example thought to increase productivity and sometimes intelligence. It can also contribute to broadening a strong social network. Therefore I believe that longer education will increase the probability of a person being an entrepreneur.

### **5.2.9 Urban**

The control variable urban measures if the respondent is an urban (1) or rural (0) dweller. In empirical studies, being an urban resident increases the probability of being banked, and with a higher education and network of customers and investors. Therefore I believe that being an urban resident will increase the probability of a person being an entrepreneur.

### **5.2.10 Distance to ATM/grocery store**

This variable measures the distance in minutes it takes for the respondent to get to an ATM or grocery store from where they live. In previous studies on financial inclusion, distance to ATM or grocery store is a proxy for proximity to access to finance. It is believed that further distance is related to less probability of being banked. I believe that this variable could have either no effect or a negative effect. With mobile-banking reducing the need of physical proximity, it may prove that distance to ATM/grocery store is not relevant for being banked or being an entrepreneur.

### **5.2.11 Student**

Student measures if the person is a student (1) or not (0). Being a student takes both time and money, which is why I believe that currently being a student has a negative impact on a person being an entrepreneur. However, after the student has graduated, the probability of becoming an entrepreneur may increase, but this is not measured in this report.

### 5.3 Complete model

The complete model, including all control variables is presented below.

$$\begin{aligned} Z_i = & \alpha + \beta_1 \text{mob\_bank}_i + \beta_2 \text{bank}_i + \beta_3 \text{income}_i + \beta_4 \text{loan}_i + \beta_5 \text{age}_i + \\ & \beta_6 \text{gender}_i + \beta_7 \text{married}_i + \beta_8 \text{education}_i + \beta_9 \text{urban}_i + \beta_{10} \text{distance}_i \\ & + \beta_{11} \text{student}_i + \varepsilon_i \end{aligned} \quad (6)$$

### 5.4 Hypothesis

My hypothesis is that access to mobile-banking will have a positive effect on the probability of a person being an entrepreneur when having controlled for different characteristics specified in this model. If this is the case then mobile-banking and mobile-financial services could be an effective tool for increasing productivity by creating jobs and reducing unemployment.

## 6. Regression results and discussion

This section presents the econometric results from the regressions as well as a discussion and tests regarding multicollinearity and heteroscedasticity. There are five regressions shown in the results table, and mobile-banking is included in all, since it is the main variable of interest. I have organized it so that in regression one mobile-banking is the only included variable in the regression. In regression two the variables bank, income and loan are added so that all financial characteristics are accounted for. Regression three includes the main variable, financial variables and individual features such as age, gender, marital status and education. The fourth regression includes the variables mentioned as well as geographical determinants such as urban and distance. The final regression, five, represents the full model and includes all variables presented in the previous chapter.

### 6.1 Multicollinearity and Heteroscedasticity tests

It is important to control and/or remove any factors that could affect the validity of results. Problems that may occur are multicollinearity and heteroscedasticity.

### **6.1.1 Multicollinearity**

Multicollinearity occurs when there is high correlation between the explanatory variables. To check for signs of multicollinearity I have used a correlations matrix with all the explanatory variables planned for use in the regression; this is presented in table A7 in appendix 4. The highest score of the explanatory variables is 0.53, which implies that they are not showing signs of multicollinearity and will therefore be used in the binary choice regression (Dougherty, 2011, p 165-176).

### **6.1.2 Heteroscedasticity**

It is necessary to confirm that the disturbance term in each observation is drawn from the same probability distribution, with the same variance. This is known as homoscedasticity. If there is evidence of heteroscedasticity, the standard errors of the coefficients will be incorrect and the F-test and t-tests will also be incorrect. To detect heteroscedasticity different tests can be applied. Here the Whites test is used and the test results can be found in table A8 in appendix 4. The Chi-square p-value is circa 39%, which is strictly larger than 5%. Therefore I cannot reject the null hypothesis that there is homoscedasticity present, and that there is no heteroscedasticity in the sample. Hence the standard errors, F-values and t-values can be used for inference (Dougherty, 2011, p 280-297).

## **6.2 Regressions**

The results from the regressions can be found in table 3 on the following page. The full model (number 5 in table 3), specified in equation 6, has a McFadden R<sup>2</sup> value of 0.24. The McFadden R<sup>2</sup> value represents the models “goodness-of-fit” and indicates that 24% of the relationship is explained by the model. In the following sections results of determinants are presented and discussed; the primary discussion revolves around the full model.



**Table 3: Regression results**

Dependent variable: ENTR (1/0)

Method: Binary Probit

Included observations: 110

	(1)	(2)	(3)	(4)	(5)
<b>Variable</b>					
MOB_BANK	0.206** (0.024)	0.165* (0.091)	0.151 (0.135)	0.148 (0.144)	0.190* (0.066)
BANK		0.179 (0.407)	0.220 (0.335)	0.160 (0.493)	0.185 (0.421)
INCOME		0.081*** (0.001)	0.068** (0.018)	0.059** (0.046)	0.059** (0.047)
LOAN		-0.170 (0.141)	-0.195 (0.116)	-0.164 (0.187)	-0.150 (0.215)
AGE			0.004 (0.401)	0.004 (0.360)	0.001 (0.836)
GENDER			-0.221** (0.028)	-0.193* (0.056)	-0.210** (0.039)
EDUCATION			0.019 (0.299)	0.014 (0.437)	0.014 (0.422)
MARRIED			0.086 (0.490)	0.152 (0.248)	0.130 (0.317)
URBAN				0.275* (0.098)	0.271* (0.099)
DISTANCE				0.003 (0.629)	0.003 (0.568)
STUDENT					-0.280* (0.072)
C	-0.272*** (0.000)	-0,668*** (0.002)	-0,925*** (0.004)	-1,085*** (0.003)	-0,965*** (0.007)
McFadden R-sq	0.037	0.133	0.193	0.215	0.240

The table displays results of a probit regression, it shows the marginal effects the variables have on the dependent variable. The p-value of the variable is presented in the parenthesis. The asterix defines if the results are statistically significant

\* = statistically significant at 10%    \*\* = statistically significant at 5%    \*\*\* = statistically significant at 1%

### 6.2.1 Mobile-banking

Mobile-banking shows a positive and significant result. In regression one and two the variable is significant, while in regressions three and four it is not significant. It is the final regression, number five, that is of most importance since it represents the full model. In this regression mobile-bank is significant at the 10% level. Having access to mobile banking is estimated to increase the probability of a person being an entrepreneur by 19%. This confirms previous predictions and my hypothesis that mobile-banking in fact does promote entrepreneurship.

### **6.2.2 Income**

Income has a positive effect and is statistically significant throughout the regressions. Rising one level on the income scale increases the probability of a person being an entrepreneur by about 6%. This confirms the theory and predictions that income and access to finance affect self-employment. It should be mentioned though that the scale used to measure income is not constant in the sense that the “jumps” between each income figure is not the exact same as the one before. This could generate some measurement errors, meaning that the interpretation of the coefficient should be regarded with some caution.

### **6.2.3 Gender**

Gender shows a strongly negative, significant effect on entrepreneurship. This confirms suspicions that gender has an effect on self-employment. Results indicate that being female reduces the probability of being an entrepreneur by 21%. The role of finance could also work through the variable gender, since it is more difficult for women not only to attain funding for business but also to get mere access to an account. This would then further increase the negative effect gender could have on entrepreneurship.

### **6.2.4 Urban**

Urban shows a positive effect on the dependent variable and is statistically significant. Interpretation of the coefficient indicates that being an urban dweller increases the likelihood of being an entrepreneur by 27%. This result confirms my prediction that urban has a positive effect on entrepreneurship, but I was not expecting the variable to have such a large effect. This high result could be due to the fact that the sample was small, and that there were few rural dwellers included. However, I do believe that living in an urban area has quite an effect on entrepreneurship. Not only does living in a city increase your potential clients, it also broadens your whole social network.

### **6.2.5 Student**

The variable student is significant and has a strongly negative effect on the dependant variable. Being a student decreases the probability of a person being an entrepreneur by 28%. This was expected, as being a full-time or part-time student is both time-consuming and is a time-period when one acquires knowledge for future employment or self-employment.

### **6.2.6 Statistically insignificant results**

The marginal effect of having a bank account raises the probability of being an entrepreneur by 18.5%. The results are not statistically significant in any of the regressions, and therefore it cannot be confirmed that access to formal financial services promotes entrepreneurship. That the results are not statistically significant could be due to the fact that very few of the respondents, only 10%, in this field study lacked a bank account.

Another financial variable that proved not to be significant is loan. The marginal effect of having a loan decreases the probability of becoming an entrepreneur by 15%, but since these results are not statistically significant, the results cannot be confirmed. The reason as to why loan has no significant effect on the dependant variable is likely to be related to the fact that most of the entrepreneurs here financed their business by their own means.

Three of the individual determinants (age, education and marital status) are not statistically significant. The marginal effect of age, becoming one year older, implies an increase in the probability of being an entrepreneur by 0.1%. Age is not statistically significant in any of the regressions and therefore the effect on the dependent variable cannot be confirmed. Theory and empirics imply that most entrepreneurs start their businesses between early their twenties and mid-forties, which could be the reason as to why becoming one year older, after a certain age, lacks effect on entrepreneurship. An increase in education by one year suggests an increase in the probability of becoming an entrepreneur by 1.4%, but since the coefficient is not statistically significant, the effect cannot be confirmed. This could be partly due to the fact that South Africans in general have completed what they refer to as “Matric”, equal to upper-secondary school. Theory and empirics provide evidence of school drop-outs who have successful entrepreneurial firms, implying that more years in school may not be a determinant of entrepreneurship. It is to be noted that relevant working experience or the field of business was not inquired about, as some fields of business do not require a higher level of education. This could have told us more about whether schooling would have an impact on entrepreneurship.

The variable married indicates a positive effect on entrepreneurship. Being married increases the probability of being an entrepreneur by 13%, but the results cannot be confirmed since the coefficient is not statistically significant. It is not completely surprising that this control variable is not significant. I was originally unsure about how and if marriage would have an effect on entrepreneurship, so this result confirms that being married does not have an effect on entrepreneurship.

The final variable that proved not to be significant was distance to ATM/grocery store. The marginal effect suggests that increase in this distance by one minute increases the probability of being an entrepreneur by 0.3%. This result is not statistically significant and cannot be confirmed. It is in line with predictions and, thanks to access to mobile-financial services, could imply that distance to bank branch or other has become insignificant.

### **6.3 Results from interviews and observations**

The most important findings from interviews, in combination with my own personal observations, are that (1) Mobile-banking is more than just a transaction tool (2) Business loans are very difficult to get in South Africa (3) m-pesa is hardly used at all in South Africa.

#### **6.3.1 Mobile-banking is more than a transaction tool**

Initially I believed mobile-banking would only have an effect on the financial part of the entrepreneurial venture, but during my stay I came to the conclusion that mobile-banking does more than decreasing actual transaction costs. It enables the user to keep a good overview of finances, something crucial for any business, and it reduces and potentially removes the need to make business deals with cash or a card-machine. This is encouraging for both the owner of the business and its customers. It provides a track record of an individual or firm for the bank, which makes it easier to prove credit-worthiness, reducing risk for the bank and perhaps resulting in more loans to new or established entrepreneurs.

#### **6.3.2 Business loans in South Africa**

During my endeavours it became evident that getting a business loan from a bank was difficult, which was confirmed both through personal contact with the respondents of

my survey and from interviews. Tables A9 and A10 in appendix 5 present further evidence from follow-up questions about loans and financing of entrepreneurial ventures for the entrepreneurs collected through the survey. They show that the majority of entrepreneurs in the study finance their business through their own means, very few through loans. Of the few entrepreneurs that do finance their business through a loan, only three had loans from a formal financial provider.

During my interviews, I asked all of them questions about formal business loans, which confirmed that South African banks are very restrictive in giving out loans to entrepreneurs. This fact seemed true despite social status and whether or not the applicant for the loan was wealthy and established, or poor and unestablished. Most believed that a personal loan, for a house or similar, was much more easy to get than a business loan.

### **6.3.3 M-pesa in South Africa**

When we hear mobile-banking or mobile-finance, most of us think “Africa, Kenya, m-pesa”. M-pesa has had an enormous impact in countries such as Kenya, Tanzania, and Rwanda. My initial thought was that the service would have a wider user base since m-pesa is such a success in other African economies. I find it very interesting that m-pesa had such few South African users, for example not one of the survey respondents used m-pesa.

Since the launch in 2010 m-pesa has only reached 1 million users in South Africa, and measures taken to try to increase these figures have not shown much success (Techcentral, August 2014). The people I spoke with from Vodacom were obviously very optimistic that m-pesa would have success now that it is re-launching in 2014 in South Africa, but many of my other interview subjects disagreed. There have been other mobile money schemes in South Africa, such as WIZZIT, but mobile-banking still seems to dominate the field of mobile-financial services in the country. Perhaps m-pesa is best adopted in an environment with lower bank penetration and lower financial inclusion, where there are few alternatives, but is less successful in an economy where bank penetration is much higher and fewer people are unbanked, such as in South Africa.

From interviews and information gathering during my time in South Africa, it has become evident, despite the statistics on financial-inclusion – that most people have a bank account, even those with hardly any income at all.

It is clear that mobile-banking is a service that is more used in developed countries, whereas mobile money services would be more demanded in places where there is a low percentage of financial inclusion. If you are already banked, why would you get a mobile money account when you could use your own bank's mobile-banking app?

Perhaps in developed countries a mobile money service such as m-pesa is rather a complement than a substitute to regular banking

## **7. Conclusion and summary**

This empirical study evaluates the relationship between mobile-banking and entrepreneurship in South Africa. Results from the probit regressions indicate that mobile-banking promotes entrepreneurship. This in turn suggests that mobile banking will have a positive effect on job creation, and thereby in decreasing unemployment. A decrease in unemployment could help to reduce income inequality and poverty.

The results reveal that mobile-banking increases the probability of being an entrepreneur by 19%. Climbing one level on the income scale increases the probability of a person being an entrepreneur by about 6%. Being an urban dweller also generates a positive, significant effect and increases the probability of being an entrepreneur by 27%. Being a female reduces the probability of being an entrepreneur by 21%. Being a student decreases the probability by 28%. The six remaining variables: bank account, loan, age, marital status, education and distance to ATM/grocery store, do not render any significant results. Additional findings imply that mobile-banking is the leading form of mobile-financial service used in South Africa. Secondly, mobile-banking is a tool not only for decreasing transaction costs, but also for monitoring finances, providing a track-record etc. Third, support from both interviews and surveys results indicate that South African banks are very restrictive in giving out business loans, thus creating a difficult environment for cash-strapped entrepreneurs.

A recommendation for policy makers is to attempt to make mobile-financial services available to all, further increasing financial inclusion. They should try and create a regulatory and financial environment that improves and increases the usage of mobile-financial services, and there should be continuous investments made for development of these services. Another recommendation is to try and produce incentives for banks to give out more business loans. This would create more opportunities for financially restricted entrepreneurs to open and/or expand their businesses, hence possibly creating even more jobs and further increasing productivity.

This study is based on a sample from three major areas in South Africa, making it a country-specific study. The results are of particular interest and importance for South Africa. The persistent high unemployment rate in the country is a big problem and may be one of the reasons for poverty and inequality. Indications that mobile-banking may promote entrepreneurship and job creation are positive. Despite the fact that this is a country-specific study, my opinion is that the results could be applicable to economies similar to that of South Africa, a developing country with a high bank penetration.

It is important to keep in mind that a quantitative analysis, such as this field study, has limitations and should be carefully interpreted. I believe mobile-financial services have, and will continue to have, an important role to play as a tool for prosperous entrepreneurs. Due to the fact that there a limited number of observations is used, the strength of the relationship might be over or underrated. There may also be variables, such as specific personality traits of an entrepreneur or other, which were not included in this model, but should have been taken into account.

For future analysis I recommend a more extensive study with a larger sample size, and perhaps in different types of economies. This would help to increase knowledge about the role that mobile-banking and mobile-financial services have to play for entrepreneurs. It would also be interesting to investigate why m-pesa has not succeeded in South Africa, and what type of financial and regulatory climate is most appropriate for the service.

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# Appendix

## Appendix 1

### Figure A1: Survey on usage of mobile-banking

1. Do you have a mobile phone? Yes  No
2. Gender: Female  Male
3. Age: \_\_\_\_\_ years
4. Marital status: Married  Not married
5. Education, how many years did you spend in school? \_\_\_\_\_ years
6. Where do you live? \_\_\_\_\_
  - a. Rural  Urban
7. Distance to grocery store\ATM from residence? \_\_\_\_\_ min
8. Do you have a bank account? Yes  No
9. Do you have a loan? Yes  No 
  - a. If yes, what was the purpose of it?  
Business  House  Education  Other  \_\_\_\_\_
  - b. If yes: was the loan Informal (family, friends)  Formal  Microloan
10. Do you use mobile-banking\mobile-financial services? Yes  No 
  - a. If yes, what type of provider? My bank  M-pesa  Other  \_\_\_\_\_
11. Are you employed? Yes  No
12. Are you a student? Yes  No
13. Do you have your own business/firm? Yes  No 
  - a. If yes, how do you finance it?  
Formal loan  Informal loan (family/friends)  Micro loan  Own means
14. What is your personal average monthly income in ZAR? (before paying off loans, electricity etc)

0-1600	1601-3000	3001-6000	6001-12.000	12.000-20.000	20.0001-30.000	30.0001+
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

The figure is an illustration of the survey used in the field study

## Appendix 2

Figure A2: Map of South Africa



The figure is a map of South Africa

Source: CIA World Factbook, 2014

## Table A2: Demography, all respondents

**Table A.2.1**

### Individual characteristics

	Nr	%		
<u>Gender</u>				
Men	46	41.8%		
Women	64	58.2%		
<u>Marital status</u>				
Married	32	29.1%		
Not married	78	70.9%		
	<b>Mean</b>	<b>Std.Dev</b>	<b>Median</b>	
Age	35.13	13.55	30	
Education	13.21	2.89	12	

**Table A.2.2**

### Geographical characteristics

	Nr	%		
Urban	85	77.3%		
Rural	25	22.7%		
<u>Region</u>				
West Cape	12	10.9%		
East Cape	14	12.7%		
Gauteng	77	70.0%		
Kwa-Zulu Natal	6	5.5%		
Freestate	1	0.9%		
	<b>Mean</b>	<b>Std.Dev</b>	<b>Median</b>	
Distance	10.67	11.22	5	

**Table A.2.3**

### Financial characteristics

	Nr	%		
Bank Account	100	90.9%		
Unbanked	10	9.1%		
Mob-Bank	62	56.4%		
Loan	29	26.4%		
<u>Income group</u>				
1	21	19.1%		
2	25	22.7%		
3	13	11.8%		
4	11	10.0%		
5	14	12.7%		
6	11	9.1%		
7	16	14.5%		
	<b>Mean</b>	<b>Std.Dev</b>	<b>Median</b>	
Income group	3.6	2.09	3	

**Table A.2.4**

### Labor Market characteristics

	Nr	%
Total employment	81	73.6%
Entrepreneurs	38	34.5%
Non-entrepreneurs	72	65.5%
Employed (excl entrepreneurs)	43	39.1%
Unemployed	29	26.4%
Student	22	20.0%

The tables in A2 display demographical statistics of the all of the respondents in the study. A.2.1 presents the individual characteristics, A.2.2 the geographical characteristics, A.2.3 the financial characteristics and table A.2.4 the labor market characteristics of the respondents in the study.

**Table A3: Demography, entrepreneurs**

**Table A.3.1**

**Individual characteristics**

	Nr	%		
<u>Gender</u>				
Men	20	52.6%		
Women	18	47.4%		
<u>Marital status</u>				
Married	17	44.7%		
Not married	21	55.3%		
	<b>Mean</b>	<b>Std.Dev</b>	<b>Median</b>	
Age	40.63	13.52	35.5	
Education	13.84	3.34	12	

**Table A.3.2**

**Geographical characteristics**

	Nr	%		
Urban	34	89.5%		
Rural	4	10.5%		
<u>Region</u>				
West Cape	6	15.8%		
East Cape	5	13.2%		
Gauteng	24	63.2%		
Kwa-Zulu Natal	2	5.3%		
Freestate	1	2.6%		
	<b>Mean</b>	<b>Std.Dev</b>	<b>Median</b>	
Distance	8.55	9.23	5	

**Table A.3.3**

**Financial characteristics**

	Nr	%		
Bank Account	33	86.8%		
Unbanked	5	13.2%		
Mob-Bank	25	65.8%		
Loan	10	26.3%		
<u>Income group</u>				
1	3	7.9%		
2	5	13.2%		
3	4	10.5%		
4	3	7.9%		
5	8	21.1%		
6	8	21.1%		
7	7	18.4%		
	<b>Mean</b>	<b>Std.Dev</b>	<b>Median</b>	
Income group	4.6	1.92	5	

**Table A.3.4**

**Labor Market characteristics**

	Nr	%
Student	3	7.9%

The tables in A3 display demographical statistics of the entrepreneurs in the study. A.3.1 presents the individual characteristics, A.3.2 the geographical characteristics, A.3.3 the financial characteristics and table A.3.4 the labor market characteristics of the entrepreneurs.



**Table A4: Demography, non-entrepreneurs****Table A.4.1**

<b>Individual characteristics</b>			
	<b>Nr</b>	<b>%</b>	
<u>Gender</u>			
Men	26	36.1%	
Women	46	63.9%	
<u>Marital status</u>			
Married	15	20.83%	
Not married	57	79.17%	
	<b>Mean</b>	<b>Std.Dev</b>	<b>Median</b>
Age	32.22	12.64	28
Education	12.88	2.55	12

**Table A.4.2**

<b>Geographical characteristics</b>			
	<b>Nr</b>	<b>%</b>	
Urban	51	70.8%	
Rural	21	29.2%	
<u>Region</u>			
West Cape	6	8.33%	
East Cape	9	12.50%	
Gauteng	53	73.61%	
Kwa-Zulu Natal	4	5.56%	
Freestate	0	0.00%	
	<b>Mean</b>	<b>Std.Dev</b>	<b>Median</b>
Distance	11.79	11.98	8

**Table A.4.3**

<b>Financial characteristics</b>			
	<b>Nr</b>	<b>%</b>	
Bank Account	67	93.06%	
Unbanked	5	6.94%	
Mob-Bank	37	51.39%	
Loan	19	26.39%	
<u>Income group</u>			
1	18	25.0%	
2	20	27.8%	
3	9	12.5%	
4	8	11.1%	
5	6	8.3%	
6	2	2.8%	
7	9	12.5%	
	<b>Mean</b>	<b>Std.Dev</b>	<b>Median</b>
Income group	3.1	1.99	2

**Table A.4.4**

<b>Labor Market characteristics</b>		
	<b>Nr</b>	<b>%</b>
Employed	43	59.72%
Unemployed	29	40.28
Student	19	26.4%

The tables in A4 display demographical statistics of the non-entrepreneurs in the study. A.4.1 presents the individual characteristics, A.4.2 the geographical characteristics, A.4.3 the financial characteristics and table A.4.4 the labor market characteristics of the non-entrepreneurs.

## Appendix 3

**Table A5: Interpretations and predictions of explanatory variables in model**

Variable	Short	Interpretation	Predicted effect on ENTR
<b>Mobile-banking</b>	MOB_BANK	1= uses mobile-banking 0= does not	Positive effect
<b>Bank account</b>	BANK	1= has a bank account 0= does not	Positive effect
<b>Average income per month</b>	INC	Scale of 1-7, 1 being the st (see table A6 in appendix 3 for further explanation)	Positive effect
<b>Loan</b>	LOAN	1= has a loan 0= does not	Positive effect
<b>Age</b>	AGE	Age, in years, of respondent	Positive effect
<b>Gender</b>	GENDER	1 = female 0 = male	Negative effect
<b>Married</b>	MARRIED	1 = married 0 = not married	Uncertain
<b>Education</b>	EDU	Years of education	Positive effect
<b>Urban</b>	URBAN	1 = urban resident 0 = rural resident	Positive effect
<b>Distance to ATM/grocery store</b>	DISTANCE	Distance in minutes to ATM or grocery store from residence of respondent	None or negative effect
<b>Student</b>	STUDENT	1 = student 0 = not student	Negative effect

The table displays the descriptions of explanatory variables used in this study as well as predictions of the effect they will have on the dependent variable entrepreneur

**Table A6: Explanation of the income scale**

Income groups	Average monthly income in ZAR	Average monthly income in USD	Average daily income in USD
<b>INC1</b>	0-1600 ZAR/month	0-145 \$/month	0-5\$/day
<b>INC2</b>	1601-3000 ZAR/month	145- 265 \$/month	5-9\$/day
<b>INC3</b>	3001-6000 ZAR/month	265 – 530 \$/month	9-18\$/day
<b>INC4</b>	6001-12.000 ZAR/month	530 – 1.060 \$/month	18-35\$/day
<b>INC5</b>	12.001-20.000 ZAR/month	1.060-1.780 \$/month	35-60 \$/day
<b>INC6</b>	20.001-30.000 ZAR/month	1.780-2.660 \$/month	60-89 \$/day
<b>INC7</b>	30.001+ ZAR/month	2.660+ \$/month	89+ \$/day

The table displays the income-scale and presents different income groups used in this study. Conversion ZAR to USD based on Bloomborgs exchange-rate of 11.2595 USD/ZAR (October 1, 2014, 7.00 pm)

## Appendix 4

**Table A7: Correlations matrix**

Covariance analysis: Ordinary  
 Sample: 1 110  
 Included observations: 110

Correlation	AGE	BANK	DISTANCE	EDU	GENDER	INC	MARRIED	LOAN	MOB_BANK	STUDENT	URBAN
AGE	1.000										
BANK	0.187	1.000									
DISTANCE	-0.154	-0.319	1.000								
EDU	0.071	0.165	-0.047	1.000							
GENDER	-0.015	0.181	-0.146	0.125	1.000						
INC	0.489	0.257	-0.315	0.218	0.111	1.000					
MARRIED	0.526	0.133	-0.063	0.162	-0.066	0.380	1.000				
LOAN	0.079	0.046	0.003	0.085	0.005	0.341	0.253	1.000			
MOB_BANK	0.082	0.168	-0.258	0.115	-0.040	0.173	0.160	0.110	1.000		
STUDENT	-0.451	-3.51E-17	0.009	0.011	-0.040	-0.252	-0.270	-0.041	0.165	1.000	
URBAN	-0.017	0.281	-0.488	0.152	0.024	0.207	-0.178	-0.119	0.179	0.054	1.000

This table represents a correlations-matrix over the explanatory variables. A score above 0.8 is often used as an indicator of multicollinearity. Highest score here is 0.526, hence no indications of multicollinearity

**Table A8. Whites test for heteroscedasticity**

### Heteroscedacity Test: White

F-statistic	1.080	Prob. F (69,40)	0.402
Obs*R-squared	71.582	Prob. Chi-Square (69)	0.392
Scaled explained SS	42.624	Prob. Chi-Square (69)	0.994

The table shows results from the heteroscedasticity test. The probability values are well above 5% and therefore the null hypothesis of homoscedasticity is not rejected. The regression does not show signs of heteroscedasticity

## Appendix 5

**Table A9: How the entrepreneurs finance their business**

<b>How do you finance your business?</b>	
<b>Own means</b>	30
<b>Formal loan</b>	3
<b>Informal</b>	4
<b>Microloan</b>	1

The table display results from the survey on the follow-up question for entrepreneurs on how they finance their business

**Table A10: The purpose and source of a loan**

<b>Purpose of loan</b>		<b>Source of loan</b>	
<b>House</b>	11	<b>Formal</b>	20
<b>Business</b>	8	<b>Informal</b>	8
<b>Education</b>	5	<b>Micro</b>	1
<b>Other</b>	5		

The table display results from the survey on the follow-up question for loan-takers describing the purpose of and the source of the loan