

*The financial development of a  
double-edged sword?*

A case study examining the development of financial  
inclusion and FinTech services in Kenya



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May 26, 2021

# Abstract

Since the mid-2000s, the financial sector in Kenya has experienced an unprecedented surge in financial inclusion amongst the population. Often attributed to financial technologies, commonly known as FinTech, the financial sector in Kenya has seen a boom-like expansion of providers seeking to establish themselves on the market. Leading to further services being provided, a rift between scholars has appeared where promises of deepened financial inclusion has been paralleled with warnings of potential financial hazards amongst users.

By analyzing the services provided by M-Shwari in Kenya, this thesis established that FinTech development indeed facilitates deepened financial inclusion in theory. Through the use of exploratory quantitative analysis and descriptive statistics, a further examination of the patterns and indicators established in the theoretical framework were conducted by looking at the financial behavior of individuals using M-Shwari. The analysis found that patterns of deepened financial inclusion indeed could be detected, but that a definite correlation could not be established. However, this thesis concludes that M-Shwari users are more likely to become further financially included than excluded.

*Key words:* FinTech, Financial Inclusion, M-Shwari, savings, credit

Word count: 9.952

# Acknowledgements

First, I would like to thank my supervisor, Gustav Agneman, for his valuable input and guidance.

Second, I would like to thank everyone involved in the BIDS programme for these three years.

Third, I would like to thank my friends for always laughing, crying, dancing, stressing, revising, and brunching with me. And for all your support.  
You are the best.

Lastly, I would like to extend my deepest gratitude to my family. Thank you for always encouraging me and for cheering me on.  
The only thing bigger than your support is my gratefulness for it.

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# List of abbreviations

FinTech = Financial Technologies

MFS = Mobile Financial Services

MFI = Microfinance Institution

GDP = Gross Domestic Product

Ksh = Kenyan Shilling (National currency of Kenya)

ROSCAs = Rotating Savings and Credit Associations

SMEs = Small- and Medium Enterprises

ANOVA = Analysis of Variance

SPSS = Statistical Package for Social Sciences

ASCAs = Accumulation Savings and Credit Association

NGOs = Non-governmental organizations

CBOs = Community-based organizations

P2P lending = Peer-to-Peer lending

# 1 Introduction

In the last decade and a half, the financial sector in Kenya has witnessed a remarkable change through a surge in financial inclusion amongst the population. This surge can be traced back to the development and diffusion of digital financial services within the country, which has led Kenya to be proclaimed a hub of technological innovation from which unique financial infrastructures have emerged. FinTech, short for financial technology, is as the name entails a technological application which operates in the financial realm. Often seen as an innovation, it helps the consumers to managing their finances and banking needs using technology, often mobile phones (Sy et al. 2019; Bateman, Duvendack & Loubere 2019). The ability to transfer money and track finances using mobile phones has allowed people to handle their finances in a safe and structured manner both in and outside of the formal banking system. The market of FinTech providers has expanded considerably in recent years, with an increase in actors seeking to participate in, and benefit from, the FinTech miracle (Collins 2020). This has generated in an expansion of services being offered as an aid to further financial inclusion. Now, FinTech providers offer banking services to people who traditionally have been excluded from the formal financial sector, and thus besides access, offers advances services. Arguably, this entails an increase in services providing financial access, but the jury is still out on whether it leads to deepened financial inclusion or not.

This development has today made FinTech a highly contested subject with many opposing views. In contemporary research there is a distinguishable division between researchers, where one side argues that all development is good development, while the other side argues that the contemporary FinTech development is merely seeking to take advantage of poor people in a highly unregulated setting (Fick & Mohammed 2018). However, most of this research is, to a large extent, focused on the long-term, macro-level impacts of the development and puts little emphasis on the direct financial behavior of the consumers. Similarly,

there is a lack of research output that examines this in the initial period of a new FinTech innovation.

Therefore, this thesis will examine how the expansion of FinTech services materializes in the financial behavior of users and how this can be related to the idea of further financial inclusion. This will be conducted by examining whether the development of FinTech can be put in the context of financial inclusion or rather be seen as a natural capitalist process within the financial sector. As most contemporary research focuses on the impact of FinTech on the financial sector and economy, this thesis aims to look at the phenomenon of financial inclusion in itself and analyze the direct impact of the users rather than the users in relation to the financial sector.

## 1.1 Background

This section will provide information regarding the occurrence, adoption, impact, and development of FinTech services in Kenya and how it is correlated to the surge in financial inclusion in the country. Through this, the terms and concepts which are central for this thesis will be presented and defined.

### 1.1.1 The Kenyan FinTech miracle

Since it gained independence in the 1960's, the economic development of the Sub-Saharan African country Kenya was slow and tainted with low rates of participation in the formal financial sector (Rono 2002). However, when new financial technologies were introduced in the mid-2000's, a revolution occurred within the financial sector. As of 2005, approximately 25% of Kenya's adult population was connected, or had access, to formal financial institutions and the main method for financial inclusion were microfinance institutions (MFIs) and other, similar providers. A decade later, the number of Kenyans with access to financial institutions had risen to approximately two-thirds of the population, as

technological advancements and innovations propelled digital finance to reach people that has been previously excluded. This development has led Kenya to be regarded as a frontrunner of FinTech innovation and an example of modern financial inclusion (Gibson 2016; Van Hove & Dubus 2019). Being the frontrunner of FinTech providers in Kenya, the mobile network provider Safaricom had over 31 million active users of its different services approximately ten years after its launch (Krell et al 2020: 109). Starting as a facilitator of financial transactions through M-Pesa, a mobile phone-based money transfer product, Safaricom has developed to offer a wide range of banking services to its users, moving away from the first generation FinTech-driven inclusion (Guguyu 2020; Gibson 2016). Due to its accessibility and convenience, M-Pesa substituted the formal banking system for a large amount of the Kenyan population (Jack & Suri 2016; Mbiti & Weil 2015).

Lateral with the FinTech development, the World Bank (n.d.) and World Inequality Database (n.d.) have, during the last decade, presented how economic indicators such as increased average income and GDP suggest a well-functioning economy. However, in relation to this, there is still a high level of income inequality and poverty throughout the population in Kenya (World Inequality Database n.d.; World Bank 2018). In the shadow of the FinTech success story, the public debt of Kenya has also risen steadily in the last decade and by the end of 2020 it reached Ksh 8.4 trillion, approximately three quarters of the country's GDP (Omondi 2020; Central Bank of Kenya n.d.). This contemporary development of Kenya's financial sector has created a rift between scholars on whether the rapid innovations and diffusion of FinTech services are good or bad.

### 1.1.2 Access to credit and savings through M-Shwari

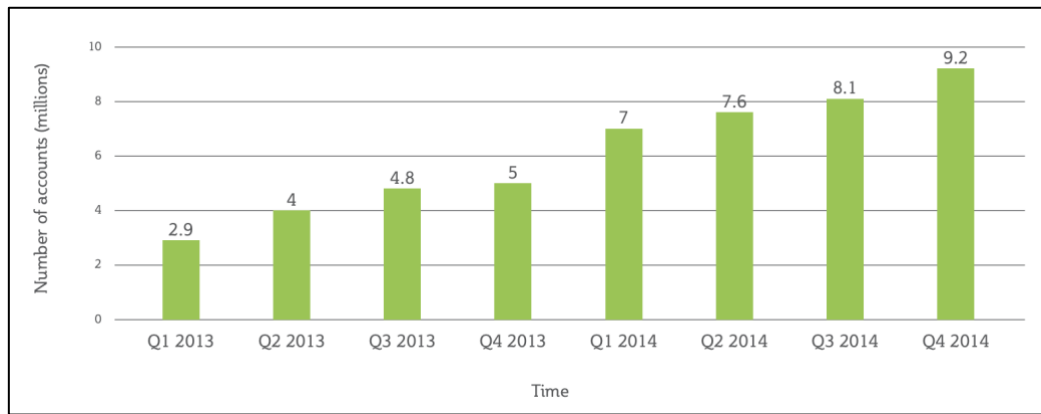
M-Shwari is a paper- and contactless banking service that allows the user to open a bank account free of charge, building on the successful infrastructure of M-Pesa. M-Shwari was launched in 2012 through a collaboration between Safaricom and the Commercial Bank of Africa (Safaricom n.d.; Van Hove & Dubus 2019). The dual knowledge development and contribution of M-Shwari led the service to offer access to retail banking through M-Pesa, allowing the users to transfer money



between their accounts and ‘mobile wallet’ (Lashitew, van Tulder & Liasse 2019). However, for this service, a commission was charged (ibid.).

Moreover, the service offers a combination of savings which earn interest on between two and five percent of the balance, and short-term credit ranging from Ksh 100-50.000 without any collateral, for which a facilitation fee of 7.5% is charged when the loan is taken (Suri & Gubbins 2018; Safaricom n.d.). Furthermore, the savings account is protected by deposit insurance, making it a safer option to informal saving. The only prerequisite of opening a M-Shwari account is that the user has an M-Pesa account which has been activated and utilized for at least six months and in order to access credit, the user must save money through the service (Safaricom n.d.).

This development signified a shift in services administered by Safaricom as it facilitated its users to make use of advanced services within digital credit and savings through a formal institution, the bank (Sy et al. 2019; Van Hove & Dubus 2019). Albeit some of the services provided by M-Shwari were already accessible to the masses, the idea to draw on the successful infrastructure of M-Pesa proved to be ingenious. This as the freedom of the consumer to utilize the loan in any manner they deemed appropriate, setting it aside from lenders such as MFI’s and their paternalistic design (Sherratt 2015: 3) led to that at the time of roll out M-Shwari was uncontestedly the most successful digital micro-credit service to be established in Kenya (Cook & McKay 2015; Lashitew, van Tulder & Liasse 2019). Approximately two years after its launch, 9.2 million accounts had been opened in the service. Figure 1 shows the uptake of the source within its first two years. In the 2019 FinAccess Household Survey, an increase from 75% to 89% of the population was considered financially included (FSD Kenya & Central Bank of Kenya 2019).



*Figure 1 Initial uptake and growth of M-Shwari in Kenya. Source: FSD Africa (2016).*

## 1.2 Purpose and scope

The purpose of this thesis is to investigate if the development of FinTech services can be considered a tool for deepening financial inclusion. With this purpose at hand, the research will focus on a case where FinTech services are shifting their functions from providing access to delivering advanced services to users. Therefore, this thesis will through the theoretical framework examine what patterns of deepened financial inclusion can be detected in M-Shwaris services, and later examine the financial behaviors of early adopters of M-Shwari to examine if these patterns can be detected in practice. This will, hopefully, enable the researcher to draw conclusions on what impact M-Shwari has on deepened financial inclusion. The implementation of M-Shwari provides an excellent setting for a shift in financial services, which makes it a solid case to study. Therefore, this thesis will add to the ongoing debate about FinTech-driven financial inclusion and the ground for an analysis on how early consumers utilize the services. In addition to this purpose the thesis has two aims, where the first is to establish a measurement of financial inclusion based on existing theoretical frameworks, further discussed in section 2.2. The third and final aim is to examine what patterns of deepened financial inclusion that can be detected through the analysis.

To set this thesis aside from other research made on the topic of FinTech and financial inclusion in Kenya and ensure the significance of the thesis, there is a need

to delimit the scope. This is also done to aid the purpose and aims of the thesis. The focus of this thesis will be delimited to how financial inclusion has deepened in relation to the evolution of FinTech services, and thus not analyze the initial process of financial inclusion through FinTech in Kenya. This will be done by focusing on the employment of the FinTech service M-Shwari. This is since it is a service provided by the biggest FinTech provider in Kenya, Safaricom. The focus will also be on the behavior of individuals at the micro-level, and thus not examine the macro-economic impacts of this service. Furthermore, there are several factors included in the discussion of financial inclusion, and these will unfortunately also be delimited.

Albeit important for all economic developments, the scope of this thesis has excluded aspects such as financial literacy and insurance and thus have savings and credit as focal points. This delimitation is further discussed in the theoretical framework which can be found in section 3. The delimitations to the applied methodology and material will be presented in [Chapter 3: Method and material](#).

To facilitate and guide the research process within the above-mentioned scope, a research question has been formulated. It reads:

*To what extent can indicators of deepened financial inclusion be detected in the development of FinTech services in Kenya?*

## 2 Literature and theoretical review

This chapter will provide insights on existing empirical and theoretical material related to this thesis.

### 2.1 Literature review

This section will discuss previous research on the relationship between FinTech and financial inclusion which relates to the research presented in this thesis. This will be followed by a brief examination on existing literature which focuses on savings and credit.

#### 2.1.1 The role of FinTech in processes of financial inclusion

According to the World Bank, financial inclusion<sup>1</sup> “[...] *means that individuals [...] have access to useful and affordable financial products and services that meet their needs – transactions, payments, savings, credit and insurance – delivered in a responsible and sustainable way*” (World Bank 2018). Thus, this means that the financially included individual or household should have access to, as well as utilize, financial services in an effective manner which is sustainable in relation to its economic capabilities (Demirguc-Kunt, Klapper & Singer 2017). Due to its almost unprecedented impact on the financial sector, the last decade has seen a great output on research examining the positive correlation between FinTech services and financial inclusion in Kenya, and more specifically on the service M-Pesa (Jack & Suri 2011; Jack & Suri 2016; Mas & Radcliffe 2010; Krell et al. 2020; Komen 2016). As discussed in the introduction to this thesis, the contemporary research trajectory has to a large extent been centered on access and macro-economic long-term impacts of this relationship. This has resulted in an extensive accumulation of

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<sup>1</sup> Appendix A.1 provides a table with definitions of financial inclusion derived from the qualitative material utilized in this thesis.

knowledge on the impact M-Pesa had on financial inclusion in, and the economic development of Kenya. However, some examinations have been done on a micro-level, where the individual user is functioning as the unit of analysis. For instance, in a study on MFS in rural areas, Alinaghi (2019) found that there is a positive relation between the use of M-Pesa and improved financial health. In a more general study, Mbiti & Weil (2015) examined how Kenyans utilized M-Pesa and how this impacted their economic behavior, finding that it increased the probability of people being banked and transferring money, but that little correlation to an increase in savings could be found. This is further discussed by Van Hove & Dubus (2019) who examined whether financial inclusion could be improved through an increase in savings. They found that in relation to M-Pesa, only low levels of saving could be detected. This, they argued, stemmed from the inaccessibility of the poorest households to do so, as well as the lack of incentives for the rest. The lack of access for low-income households was further discussed by Nan & Markus (2019), who suggested that digital lending platforms such as M-Shwari failed to reach people that are not yet financially included.

### 2.1.2 Development of FinTech lending - a double-edged sword?

Parallel with the development of FinTech services, there has been an increase in both quantitative and qualitative studies that examine the relationship between this development and credit extension (Bharadwaj & Suri 2020; Buku & Meredith 2013; Jack & Suri 2010, 2016). Rowlingson & McKay (2014: 30) examine this phenomenon and its correlation to levels of debt, finding that low levels of debt could indicate a healthy economy as borrowing can, much like savings, help households to combat unexpected or high, one-time expenses in the United Kingdom. However, the debate surrounding this in a setting of developing economies is more critical, further illustrating the research gap concerning this specific topic. Particularly, scholars have raised concerns regarding the lack of regulations surrounding FinTech lending and its potential to push low-income households into over-indebtedness and debt cycles (Greenacre 2020; Johnson 2016; Karuitha 2019). Donovan & Park (2019) stress the fact that most FinTech providers are companies which are based on profit, and that their main concern is thus not to

elevate people out of poverty, but to earn money. In 2019, Bateman, Duvendack & Loubere raised concerns regarding pushing the FinTech agenda as a panacea for poverty alleviation in the global South. This is as the levels of over-indebtedness in countries in the global South which promote financial inclusion through microcredits and FinTech are higher than in those who do not. In Kenya specifically, the levels of over-indebtedness have reached high levels and are continuously growing (Bateman, Duvendack & Loubere 2019; Fick & Mohammed 2018). Safani & Zia (2018) suggest that these levels emanate from the highly unregulated credit market in which commercial banks could, unchecked, implement extreme interest rates. Bharadwaj, Jack & Suri (2019) examine how digital loans impact households, finding that it increases their resilience to unexpected events. Furthermore, they find that digital loans to a large extent are used as an extra source of credit, and thus do not replace other credit sources. Drawing on these findings, they suggest that the short-term microcredits could be regarded as a safety net for households, rather than as a main source of credit (Bharadwaj, Jack & Suri 2019).

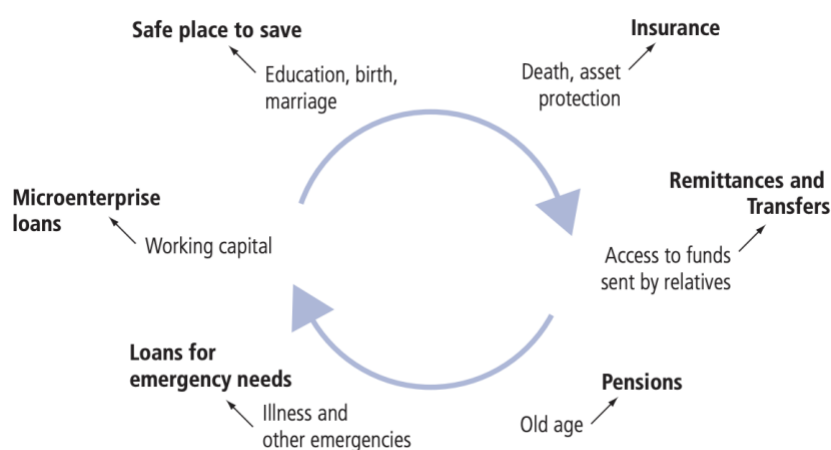
### 2.1.3 FinTech improving financial inclusion?

There are some scholars who discuss how the development of FinTech services has affected financial inclusion. Obiero & Kiarie (2019) examine the expanding digital credit sector and find that the distribution of digital loans had doubled between 2016 and 2019. By comparing these numbers to the amount of financially included people in Kenya, they found that there was a positive correlation between the two.

Similarly to the purpose of this thesis, Bharadwaj & Suri (2020) seek to understand what impact savings and credit have on financial inclusion by examining the role of M-Shwari in Kenya. However, dissimilarly to this thesis, they examine what role promotional incentives have on consumers of the service, starting 2016 and forward. In their findings, they could detect that the promotion led to more savings as it ran, but that no lasting impact could be detected after it ended.

## 2.2 Theoretical framework

This thesis bases much of its theoretical framework on the findings in Helms' (2006) 'Access for All: Building Inclusive Financial Systems' in which she presents a structure for an inclusive financial system. The system suggests that the individual is dependent on the actions and provision of services of actors on three different levels of the financial system: micro, meso and macro. This framework thus puts the individual at the center of the system and suggests that the only way for an individual to be considered 'included', its interests must be fulfilled by in any of these levels (Helms 2006: 14). Furthermore, she argues that these interests emanate from three categories of events where the first one is life-cycle events in which natural life-occurrences such as life and death as well as reoccurring expenses such as school tuition fees are prevalent. The second category encompasses emergencies, in which the loss of incomes, expenses in relation to sickness and injuries and other catastrophes are examples. The third and last category is labeled as opportunities, where household- and business investments as well as durable purchases are included (Helms 2006: 22). In order to fulfill the needs represented in these three categories, Helms presents a list of services which encompasses the needs of an individual within the economic realm. These services are access to credit, the possibility of saving, the ability to transfer money and the access to insurance (Helms 2006: 22-27). Figure 2 provides an example of how these needs and services are connected.



*Figure 2 Link between financial needs and services of low-income households.*

*Source: Helms (2006: 23).*

Building on Helms' framework, Kablana & Chhikara (2013) propose that these services can be divided into three processes of integration, which could be seen as dimensions of inclusion. Here the first dimension of and thus the initial step towards financial inclusion entails access to transmission services, allowing the consumer to utilize general banking services such as money transfer. This allows the user to get a better understanding of its finances and more control over them. The second dimension allows the consumer to utilize protective services, which suggests that individual becomes increasingly financially resilient through stabilizing services such as savings, access to credit and insurances. The third and final dimension entails the access and use of promotional services, which will make the individual further self-reliant by way of expanding businesses or investing in their livelihood (Kablana & Chhikara 2013).

Deepened financial inclusion can, according to Helms (2006) and Kablana & Chhikara (2013), thus be measured by looking at what services are accessible and the events and categories that encourage people to use them. As mentioned in the scope of this thesis, the services that will serve as units of analysis and thus will be examined in depth are savings and credit. This delimitation was made on the basis that it is, indeed, the two services provided by M-Shwari. This decision was further justified through the interpretations of financial inclusion presented in Appendix A.1, where both savings and credit were deemed important in the definition. These indicators will be further discussed in the empirical analysis.

The following sub-sections will therefore further present how deepened financial inclusion can be explained by looking at savings and credit behaviors.

## 2.3 Financial inclusion through savings

Drawing on ideas from Keynes, Browning & Lusardi (1996) argued that there are nine motives for saving: to build resilience for unforeseen events, to build resilience for expected events, to enjoy interest, to increase their consumption, to become increasingly financially independent, to save for business expenses, to save for others to inherit, to create a buffer for down payment on durable purchases, and



finally, merely to have money stored due to greed. Although he suggests that many of them are complementary, it is enough that one is fulfilled to give the individual incentive to save money. Further, they argue that the motivation for an individual may shift over time, both as the general financial conditions alter as well as when the individual's living situation changes. Moreover, Browning and Lusardi (1996) stress that the need for a motivation to save is more critical for low-income households and thus, that creating incentives to save is an important aspect to shift the financial behavior of these households. The motives can, according to Browning & Lusardi (1996), however, establish a pattern displaying the financial behavior of the individual depending on why they save money. Here, by connecting their ideas to Helms's (2006) three categories, it thus suggests that the strongest indicators for a deepened financial inclusion of the individual can be detected in the down-payment and business expenses motivation as these are directly linked to the individuals' financial opportunities.

Savings is a powerful tool in dealing with unexpected expenses as well as economic fluctuations in prices, loss of income and debt (Rowlingson & McKay 2017: 24). Therefore, savings can be seen as an important aspect in achieving financial inclusion. However, low-income households are less likely to save, both due to lack of finances and negative attitude towards it (ibid.). Due to this, Rowlingson & McKey (2017: 24) stressed the importance of incentives that would encourage more people to save money, much like Browning & Lusardi (1996). They suggest that this could be achieved by means of providing interest on savings and other perks that would benefit the household. In that sense, the incentives seek to target and change underlying negative behavioral and relational attitudes that hinders people from saving money (Johnson 2016).

In their research on the correlation between financial inclusion and savings in Indonesia, Shrestha & Nursamsu (2021: 232) find that low-income households that reside in an area with high density of bank branches were more likely to acquire a savings account than those who lived further away. The access to a financial institution consequently led to a higher degree of financial inclusion. Along the same lines, Karlan & Morduch (2010: 4740) suggested that as the poor often lack access to affordable formal services to save in, they are traditionally forced to save

in informal constellations such as rotating savings and credit associations (ROSCAs). Thus, they suggest that rather than focusing on pushing for savings, formal saving services should be made available. They thus state that “*the development challenge in encouraging savings lies in the design of financial technology to serve these specific needs*” (Karlan & Morduch 2010: 4741).

## 2.4 Financial inclusion through credit

The lack of access to credit is, according to Taylor (2011), one of the central impediments for individuals to successfully integrate into the financial sector and thus become financially included. Financial disenfranchisement, as he describes it, deprives low-income households and individuals the opportunities to invest in business expenditures or other income-generating activities that could benefit them in the long term. Stressing the possibilities made available through the access of credit, he thus suggests that it is a necessity for deepened financial inclusion (Taylor 2011). Using the microfinance crisis of Andhra Pradesh<sup>2</sup> as an empirical example, he stressed that as households started utilizing credits to maintain an income that meets their social and economic needs as well as to repay other loans, patterns of spiraling indebtedness could be detected. This in turn, he argued, could rather be seen as a development towards further financial exclusion rather than deepened inclusion (ibid.). This is further conceptualized by Ghosh (2013) who suggested that pushing for financial enfranchisement through credit could either elevate the borrower from poverty through entrepreneurial investments, or further perpetuate the situation with a dependency on loans to meet every-day consumption needs. This suggests that one can look to the purpose of a loan as an indicator for financial inclusion or initial process of exclusion.

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<sup>2</sup> Following the liberalization of India’s economy 1990’s, a demand in credit led the Indian government and the World Bank to initiate a program in Andhra Pradesh which urged households and SMEs to utilize microcredits for smoothing their finances during agrarian transformation and thus escape poverty. This led to an expansion of MFIs pushing people into lending led to an increase in over-indebtedness amongst the population, which in turn led many borrowers to commit suicide. In reaction to this the state suspended repayments to MFIs, ultimately leading to the collapse of the microcredit system (Taylor 2011; Kaur & Dey 2013).

Concerning FinTech development, Taylor (2011) points to the neoliberal development discourse as an explanation to both the development of FinTech services and the individuals demand for credit, suggesting that this is a natural progression for financial interests within the capitalistic system. Here, he suggests that development of financial services and financial inclusion are correlated, as when people start becoming financially included, they will by nature seek to access additional financial services.

To conclude the arguments made by Taylor (2011) and Ghosh (2013), they suggest that by looking at the purpose of a loan, one will get a better indicator of the level of financial inclusion of an individual than by looking at the amount, as there is no unilateral way or set framework for examining credit extension as a means for deepened financial inclusion. Therefore, looking at patterns of credit use could generate a more nuanced understanding of the topic at hand.

As previously mentioned, the aspects that are of central for the analysis in this thesis are savings and credit. Drawing on the measures presented in the theoretical framework, the main unit of analysis that will be utilized regarding credit is thus how users are utilizing their M-Shwari credits. This will be conducted by analyzing how M-Shwari are corresponding with loans taken through other type of lenders. Drawing on the above-mentioned arguments, the main unit for analysis of saving behaviors will thus be access and motivation. This will be executed by examining variables as to see if these patterns are visible and how they relate to the idea of deepened financial inclusion.

## 3 Method and material

This chapter will present and discuss the research method and materials utilized in the construction of this thesis. It will also discuss the chosen data analysis technique. The limitations to each component will be discussed in the sub-sections.

### 3.1 Research design

With the intent to answer the research question at hand in a coherent and legitimate manner, there is a need to frame the research process within a research design (Halperin & Heath 2020: 160). The research in this thesis will be framed within an intrinsic case study design, as it allows the collection of contextual information that will aid in understanding and analyzing the central processes about the specific case (De Vaus 2001: 50; Punch 2005: 144). Thus, the case study design allows this thesis to look in depth at development of deepened financial inclusion as a phenomenon and place it within the actual context of Kenya (Hauge et al. 2016: 92). This case will be examined from multiple approaches, where the analysis will be grounded in the theoretical framework, which makes the case study design further appropriate (Punch 2005: 163).

The case study design is, just like any research method, imperfect. One of the most apparent delimitations is the dilemma of generalizing findings and applying these to further contexts (Halperin & Heath 2020: 237; De Vaus 2001: 137). Admitting external validity to be an important as to ensure the quality of the research, it does not restrain this thesis, as its purpose is not to establish a transferrable framework for analysis of different cases. Rather, it is possible that the results of this study will aid further theoretical frameworks on the topic. However, it is important to consider this aspect when conducting a case study (Punch 2005: 255-256).

## 3.2 Material

In order to examine the defined case of this thesis, the researcher deemed that secondary quantitative data would be the most beneficial. This rationalization was based on a few conditions, where the first was the need for an extensive dataset well-suited for the research purposes (Punch 2005: 103). The second was the impetus to perform the research within the allocated timeframe and within the limitations caused by the Covid-19 pandemic, and the third was the notion to fulfill the aim of examining data that was collected at the period of analysis. This was thus determined to yield the most transparent result of the analysis (Johnston 2017).

As the collected data is of secondary nature, and thus collected by other scholars, it is of importance to acknowledge the potential biases of the researchers which who initially collected the data (Halperin and Heath 2020: 201). Therefore, to ensure the quality of the collected data source, an initial analysis was conducted based on characteristics discussed by Halperin & Heath (2020: 195) and Johnston (2017). These suggest that in pursuance to assure that the secondary data is of high quality, there should be a clear presentation of how the data was collected, for what purpose, by whom and who funded it. As the dataset presented by Jack & Suri (2017) clearly answers all of these, an initial ruling judged that the source was of high quality and appropriate to utilize (Johnston 2017). The material was further deemed appropriate for this due to the comprehensive and detailed contents which encompasses the variables which this thesis will examine (Punch 2005: 103).

Therefore, this thesis builds its empirical analysis on secondary quantitative data collected by Jack & Suri in 2014 and presented in 2017 (Jack & Suri 2017). The dataset was collected as part of a five-round household panel survey conducted between 2008 and 2014, which sought to observe the impact of M-Pesa use and its expansion in relations to financial inclusion in Kenya. The decision of not utilizing data that solely focuses on M-Shwari was founded on the aim of analyzing the financial behavior of M-Shwari users by comparing it to that of non-users. In this thesis, only the fifth and final round, conducted in 2014, will be utilized as a unit of analysis. The survey consists of data collected from 1608 households, from which

the initial sample were randomly selected households throughout Kenya. However, due to the increase in users, the samples from Nairobi were excluded in this round (Jack & Suri 2016). The research was funded by Financial Sector Deepening-Kenya (an independent trust) (FSD Kenya n.d.), the Consortium on Financial Systems and Poverty (Private research organization) (IPA n.d.), and the Bill and Melinda Gates Foundation (Non-profit organization) (Jack & Suri 2017). The data has also served as material for research published in journals such as *National Bureau of Economic Research and Science* (Jack & Suri 2010, 2016).

The chosen dataset provides an excellent number of variables and encompasses several different levels and parts of household finances. Besides the variables which are of interest to this thesis, the data set includes variables measuring agricultural inputs, household expenditures, property, and land. However, due to the scope and aims of this thesis, most of these variables were omitted for the analysis as they were not relevant for this thesis as the focus of the paper is to examine savings and borrowing behavior. In Table 4.1 the descriptive statistics of variables concerning savings which are utilized in the empirical analysis are presented. Table 4.2 presents the descriptive statistics of variables on borrowing. Presented in [Appendix B](#), tables 3 and 4 serve as an explanation to the described variables. The data was inspected for missing values, outliers, and skewness. The missing values were omitted from the analysis.

**Table 1 Descriptive statistics of savings variables**

	N	Minimum	Maximum	Mean	Std. Deviation
Name of the saving instrument	33811	1	20	10.49	5.768
Do you or any other household member use this instrument to store or save money	33760	1	2	1.85	.354
How often do you save using this instrument (on average over the last 12 months)	4471	1	3	2.48	.690
How much do you save using this instrument in kshs (on average over the last 12 months)	4832	0	5000000	4574.22	73460.770
How would you rank instrument in order of importance	5011	1	9	2.25	1.325
How would you rank instrument in order of safety	5010	1	10	2.50	1.654
Why do you use this particular instrument	4884	1	9	3.09	2.259
Why don't you use this particular instrument	27109	1	96	7.36	11.311

\*N = valid cases

**Table 2 Descriptive statistics on credit variables**

	N	Minimum	Maximum	Mean	Std. Deviation
Amount borrowed (in Kshs)	336	200	5000000	111597.17	379567.297
What is the interest rate (%) on this loan	320	.00	70.00	8.6669	8.35474
What is each installment Principle (in Kshs)	325	.00	468000.00	9642.8826	34512.5916
What is each installment Interest (in Kshs)	313	.00	93000.00	2749.9002	10548.7404
How much is still outstanding (Kshs)	326	0	5000000	94984.52	375555.476
What is the time period over which the interest rate is calculated	256	1	5	3.22	.640
How often do you make a payment	306	1	4	2.82	.474
What was the purpose of the loan	327	1	7	4.79	2.255
Who lent you the money	336	1	12	4.26	3.628
How did you get the money	334	1	16	7.62	5.164
How are you making payments	327	1	16	6.51	3.913
Have you been unable to make any payments for this loan	338	1	2	1.91	.293

\*N = valid cases

Qualitative sources in the form of academic books and journals as well as newspapers will be utilized to aid the analysis and to explain the results findings from the quantitative data (Bryman 2012: 635). Ensuring their relevance to the topic at hand, they were sampled through keyword search based on the definitions of financial inclusion presented in [Appendix A.1](#) and the indicators presented in [Appendix A.2](#) well as through snowballing (Overton & van Diermen 2014: 45). The sources were collected using the search engines LUBsearch Discovery<sup>3</sup> and Google Scholar<sup>4</sup>.

### 3.3 Data analysis

<sup>3</sup> <https://eds.b.ebscohost.com/eds/search/basic?vid=0&sid=01ae6a93-c3f6-490d-bde0-8d6e23f1ddd2%40pdc-v-sessmgr01>

<sup>4</sup> <https://scholar.google.se>

The chosen method for analyzing the above-mentioned data is quantitative exploratory analysis, which generates a clear summary of the data and enables and aids a discussion of the empirical patterns (Halperin & Heath 2020: 349-350). As this thesis has a starting point in the theoretical framework, that in turn will guide the analysis, there is less of a need to test causal relationships (De Vaus 2001: 34). By using descriptive statistics in the quantitative exploratory analysis, it allowed for calculations of relative frequency and percentages of different variables and has thus enabled the researcher to conscientiously analyze the phenomena at hand (Borg & Westerlund 2012; De Vaus 2001: 89-90). As the aim of the data analysis is to understand how the different factors of savings and borrowing affecting financial inclusion through FinTech present themselves and how they affect the financial inclusion process, the data will be examined through frequency distribution, measures of central tendency as well as cross-tabulations. In order to establish if the relationship between specific variables is statistically significant, an independent t-test will be conducted.

IBM SPSS version 26 and Excel were used to analyze the data. The results from the data analysis will be presented in the empirical analysis in the following section.



## 4 Empirical analysis

In this chapter, the result from the data analysis will be presented simultaneously with the empirical analysis. This as the quantitative data was processed using exploratory analysis and is presented using visualizations in the form of graphs and tables. Therefore, to make the discussion more flowing and comprehensive, the results will be presented throughout the discussion. The discussion will be conducted using the measures discussed in the theoretical framework.

To guide the empirical analysis, the research question construed for this thesis will be restated: *What patterns of deepened financial inclusion can be detected amongst early users of advanced FinTech services in Kenya?*

To efficiently answer the question, the analysis will be divided into three sections, where the first one will discuss the concept of deepened financial inclusion. This will be followed by two sections which separately will examine this phenomenon by analyzing how the two measures, savings and credit, impact it. At the end, a brief suggestion for possible further research avenues will be presented.

### 4.1 Establishing levels of financial inclusion

As this thesis seeks to examine and measure a phenomenon that lacks a universal definition, and thus also lacks established indicators to utilize for measuring, it is important to disclose the indicators that will be used in the discussion. Therefore, the level of financial inclusion in Kenya will be defined based on the measures established in the theoretical framework as well as through indicators extracted from different definitions of the concept.

To initiate the discussion, this thesis establishes that already when individuals start using M-Shwari they are, to some extent, financially included by default. This is

because one of the prerequisites of opening an M-Shwari account is that the individual already is an active user of M-Pesa (Safaricom n.d.), and that when opening an M-Shwari account, the individual gain access to a free-of-charge formal bank account. By looking at the interpretations drawn from the definitions of financial inclusion presented in Appendix A, it can thus be argued that these two reasons alone are encompassing enough for a conclusion that the individual is financially included. However, by some of these definitions (Shrestha & Nursamsun 2021; Johnson 2016; King 2014; World Bank 2018), M-Pesa is not to be regarded an effective means for achieving financial inclusion due to its limited services. Rather it can be seen as a facilitator of financial inclusion. However, based on the discussion in section 1.1.1 and 2.1.1, this thesis will argue that M-Pesa in fact should be regarded as a means for achieving financial inclusion.

According to the framework presented by Helms (2006), by utilizing M-Pesa, the consumer will have access to one of the four services that encompass their financial needs, namely the ability to transfer money. If the individual then starts using M-Shwari, it will extend their access to include two more services, namely savings and credit. When arguing that savings and credit can function as a mean of insurance due to its ability to strengthen the individuals' economic resilience to expected and unexpected shocks, M-Shwari can indeed be seen as a service which enables deepened financial inclusion. This is also the case when looking at the framework of dimensions drawn up by Kablana & Chhikara (2013). Here, M-Pesa facilitates the users' inclusion to reach the first dimension by accessing its transaction services. Albeit this indirectly can enable the user to reach credit and saving services outside of the FinTech realm, it does not directly grant them access to services which will deepen their inclusion to dimension two and three. M-Shwari, on the other hand, can facilitate this deepening as the use of savings and credit can, as mentioned above, lead to increased resilience of the individual as well as enable it to promote their interest, both on a household and business level.

In contrast to the above-mentioned idea, by examining the expansion of M-Shwari in relation to the ideas presented by Taylor (2011), it could be argued that the shift from access to advanced services merely reflects the natural progression of financial development within the capitalistic system. This suggests that as when the

individuals' financial capabilities increase, so will their demand for further services. From this perspective, there are no levels of financial inclusion, and it can therefore not be neither deepened nor improved. The development of services such as M-Shwari are therefore not enabling people to become more included but merely facilitates their further needs once they are included.

Thus, by examining the shift from M-Pesa to M-Shwari, which indeed represents a shift of services granting access to advanced use, one can argue that in theory, the latter will lead the individual to become increasingly financially included, or rather, will experience deepened financial inclusion. However, in order to answer the research question, it will be examined how this is translated into practice. The following sections therefore seeks to examine if the patterns that could be found in the empirical examination is detectable in the financial behavior of the individuals using M-Shwari.

## 4.2 Deepened financial inclusion through savings

As stressed by Taylor (2011) and Ghosh (2013), motivation and incentives are two important drivers to ensure that people save money, and in order to ensure that the individual sustains a savings buffer, these incentives need to alter in relation to the shift in economic interest of the individual. Therefore, it should not be enough to merely offer a safe way in which to store money as M-Pesa does. Due to this, M-Shwari has established promotional campaigns which stressed the importance of savings to low-income households (Bharadwaj & Suri 2020). Other than this, M-Shwari provides its users with two strong incentives to save money through the service. The first one is that for individuals to gain access credit from the service, they must have money saved on the account. The second is that when saving money through M-Shwari, the individual earns interest based on the amount saved. As the interest is measured by the balance on the savings account, giving further incentives to save considerable amounts over a sustained time. Further motivations include the design of M-Shwaris' infrastructure, which is built on that of M-Pesa, making transferring money and keeping track on them easy. Moreover, it is a safer way to

store money than through informal channels or by informal means, which often include hiding cash at home (Jack & Suri 2010). Thus, drawing on the last two reasons alone, the mere development of M-Shwari provides affordable access to savings. The service is designed to incentivize use by easy access and through several motivations. However, when examining the quantitative data to examine how the sample group is saving their money, only 5.42% stated that they utilize M-Shwari. The most common saving instrument was informal saving groups such as Merry go rounds, ROSCAs and ASCAs at 22.54%. The third most frequent saving instrument was bank accounts at 19.96%. Approximately 10% of the sample group said that they saved their money by keeping cash at home. Further distribution of saving instruments is presented on figure 3. An interesting finding is that 20.85% stated that they use M-Pesa as their main saving instrument.

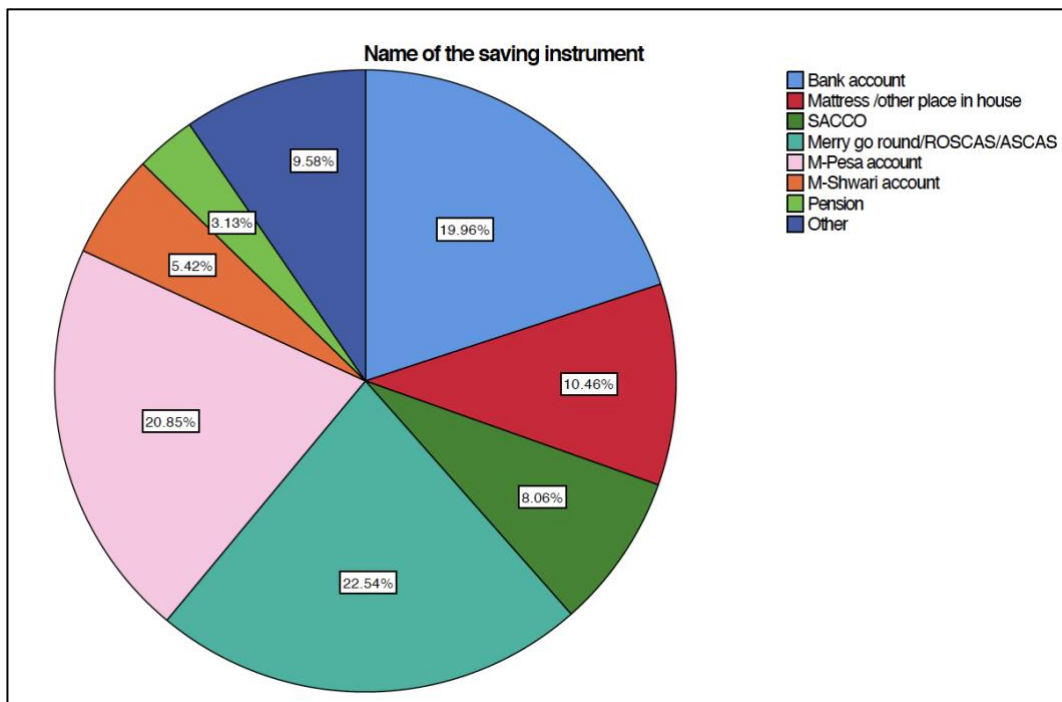


Figure 3 Division of saving instruments in 2014. Source: Harvard Dataverse V1 (Jack & Suri 2017).

As M-Pesa provides fewer incentives and motivations to save than M-Shwari does, the ideas of motives and incentives furthering savings presented by Taylor (2011) and Ghosh (2013) is thus not supported by the findings. Instead, the large frequency of savings in M-Pesa can be contributed to Shrestha & Nursamsu's (2021) argument of accessibility. This can be based on the fact that 64.51% stating that the main

reason they saved their money in M-Pesa was because of the applications conveniency and accessibility. The reasons as to why people are saving their money through M-Pesa is further presented in figure 4. Following its accessibility, approximately 22.15% stated that they saved their money in M-Pesa as they perceived it to be safe. 7.83% saved their money to utilize emergency use.

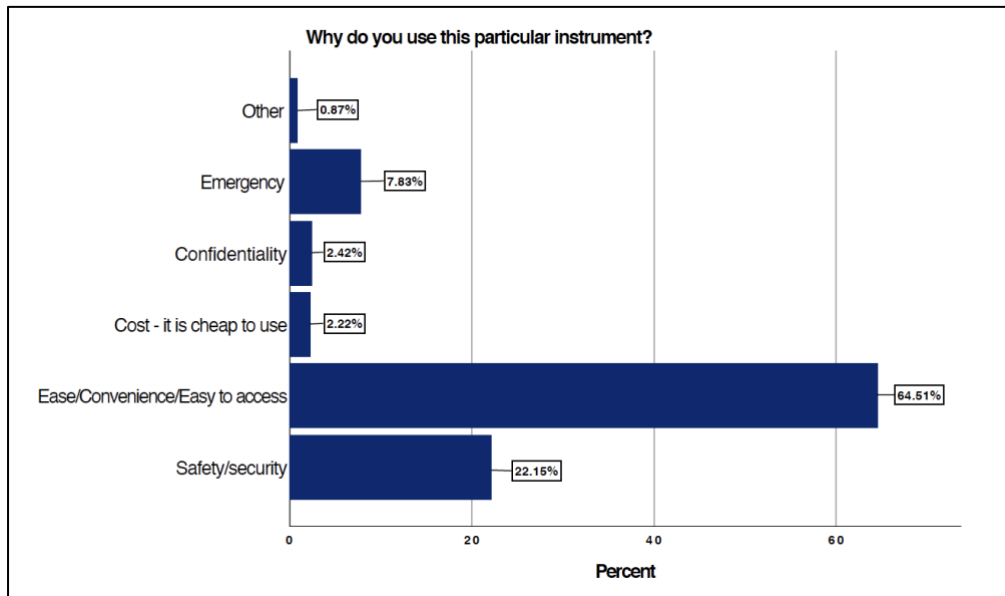


Figure 4 Reasons for using M-Pesa for savings. Source: Harvard Dataverse V1 (Jack & Suri 2017).

Figure 5 displays the reasons as to why people utilize M-Shwari for savings. In this group, around 36% stated that they used it due to its convenience and accessibility. Despite it being the most common answer, the frequency is half that of M-Pesa.

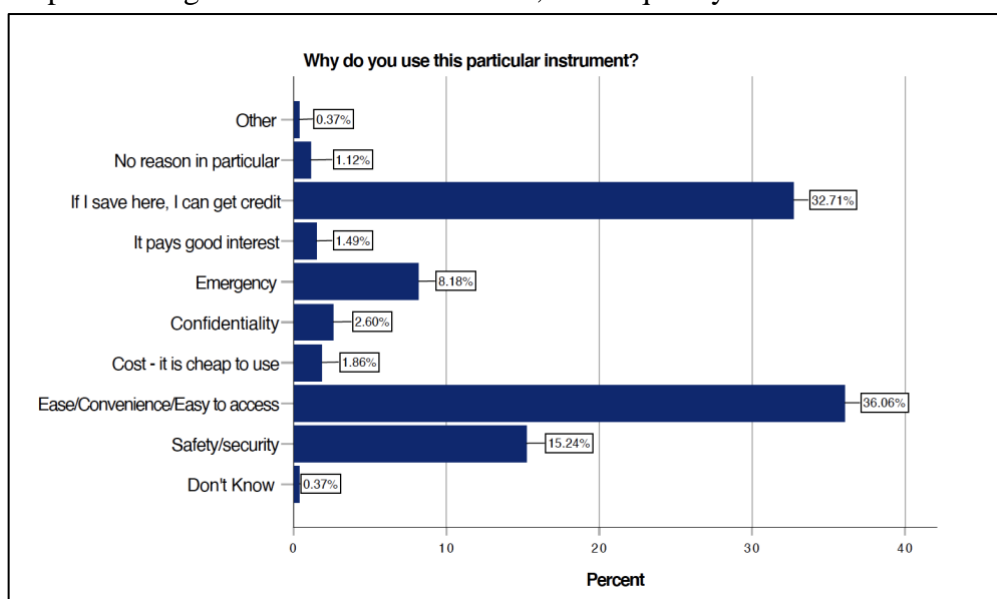


Figure 5 Reasons for using M-Shwari for savings. Source: Harvard Dataverse V1 (Jack & Suri 2017).

Instead, a third of the respondents, around 33%, stated that they save in M-Shwari in order to access credit. Around 15% saved in M-Shwari due to it being secure, whilst approximately 8% stated that they saved money for emergencies and 1.5% stated that they saved money as it paid good interest. Here, one can conclude that the incentives of interest and credit did indeed separate the financial interest of M-Pesa and M-Shwari users. This as the possibility of accessing credit extension services and earning interest has thus incentivized people to save money in M-Shwari.

By looking at the reasons why individuals save in M-Shwari based on the motivations provided by Browning & Lusardi (1996) in relation to Helms (2006), it is thus suggested that the motivation of gaining interest can be detected as a pattern of financial inclusion, and that is, based on these findings, possible to conclude that the group that saves through M-Shwari is experiencing deepened financial inclusion compared than those who save in other instruments. This is because to the fact that the stated reasons as to why the individuals save money through other services can be closely connected to the life-cycle- and emergency events explained in section 2.2, whilst the motivation to save to access credit can be labeled as an opportunity. Furthermore, one can argue that people started to save using M-Shwari based on its accessibility and a strong motivation to earn on said savings and although accessibility is still considered one of the most important aspects, one can detect a shift in savings behavior, as approximately one third of the people that save through M-Shwari do so due to accumulate interest and half of them due to convenience and safety, whilst two thirds of people that save through M-Pesa do so mainly because of its safety and convenience.

Drawing on these findings, one can argue that the pattern of financial behavior that is the most prevalent is still that of convenience. However, the fact that individuals are actively utilizing M-Shwari to gain further credit can indeed, drawing on the theoretical framework, be seen as an indicator for a deepened financial inclusion. In the same way, merely the shift to save money in M-Shwari is arguably a progress towards deepened financial inclusion, as argued by Karlan & Morduch (2010). This implies that the individual uses formal financial services by means of a bank account, rather than relying on informal means. In that sense, M-Shwari proves to

be useful in the shift from informal to formal savings. However, the lack of incentive to sustain savings besides that of credit access are low, suggesting that this indicator is not fully satisfied.

To conclude the findings, one can detect patterns of deepened financial inclusion in a both indicators established in the theoretical framework, as the financial behavior of the people M-Shwari to some extent indeed is separate to that of M-Pesa users. However, based on the arguments of motives and incentives made by Browning & Lusardi (1996) and Rowlingson & McKey (2017), a bigger separation between the groups should be detected, which indicates that the incentives to save in M-Shwari thus is not wholly fulfilling the motivation indicator. A generalized pattern of deepened financial inclusion in the saving behavior of M-Shwari users can therefore not be detectable based on these measures and indicators.

### 4.3 Deepened financial inclusion through credit

As discussed in section 2.3 of this thesis, there are a few ways to examine whether access to credit, or rather credit extension, can lead to deepened financial inclusion. As argued by Taylor (2011) and Ghosh (2013), one important indicator can be the found in the purpose of the loan. Therefore, as previously mentioned, the main unit of analysis will therefore be how M-Shwari users are utilizing their loans.

Figure 6 displays the distribution of lenders amongst the examined sample group. The responses stated that M-Shwari was the most frequent credit distributor as approximately 26% of the individuals used it as their main source of credit. The second most common credit distributor was non-governmental organizations (NGOs) and community-based organizations (CBOs) at 20.35%. 18.29% indicated that they borrowed from large companies, followed by 16.52% borrowing from MFIs. 12.39% of the group borrowed from a retailer, labeled in the figure as 'stokist'. Frequency distribution of the remaining individuals can be observed in figure 6. As mentioned, M-Shwari was the most common lender, encompassing approximately one fourth of the sample group. This division can be explained by Taylor (2011), suggesting that it is a natural progression for people to pursue

lenders such as M-Shwari, due to its convenience and the freedom of choice which is bestowed upon the user. Here, the later motivation is based on M-Shwari's lack of a paternalistic design, which lenders such as MFIs have (Sherratt 2015). Thus, M-Shwari has provided a platform for people to utilize their own financial capabilities in order to improve their own living situations, which was suggested by

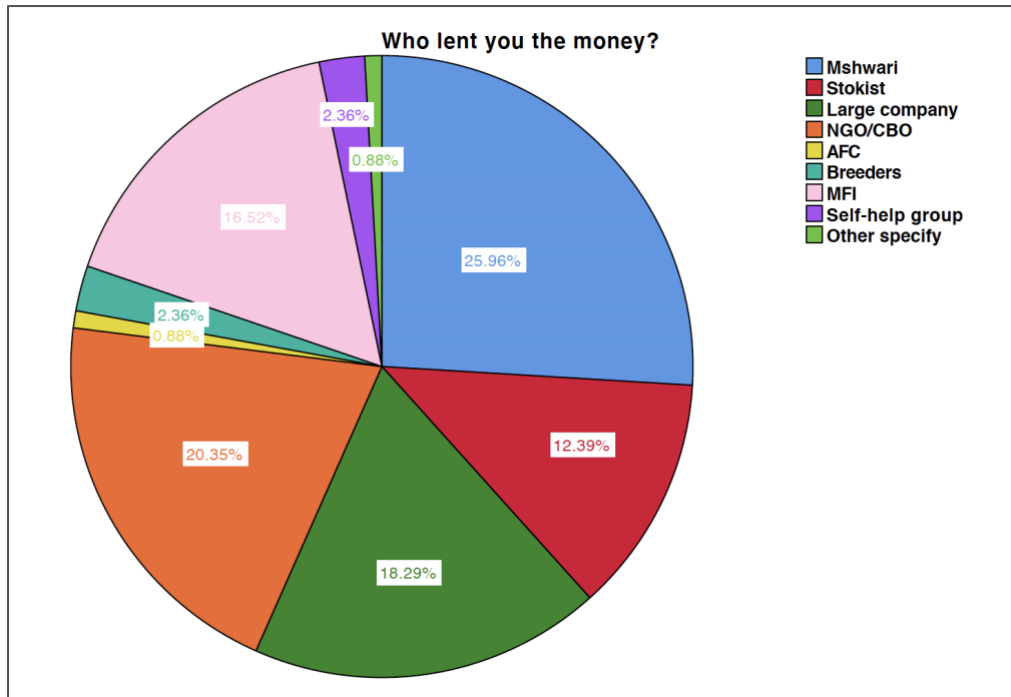


Figure 6 Distribution of lenders. Source: Harvard Dataverse V1 (Jack & Suri 2017.)

Taylor (2011). This implies degree of deepened financial inclusion as the individual seeks to be further financially independent.

Furthermore, by looking at the purpose of loans taken through M-Shwari compared to loans taken through other credit distributors, another finding can be detected. Figure 7 demonstrates the division of purposes of loans taken through M-Shwari in the last 12 months. Here, approximately 42% of the loan takers stated that they were investing the money to cover business expenditures. 20.45% stated that they were lending money to make large, durable purchases and 20.45% to pay for school tuition fees. Only 6.86% stated that the money was being used for emergency purposes and 2.27% for recreational purposes. Here, we find that most of the people accessing credit through M-Shwari do so to promote and maintain their businesses.



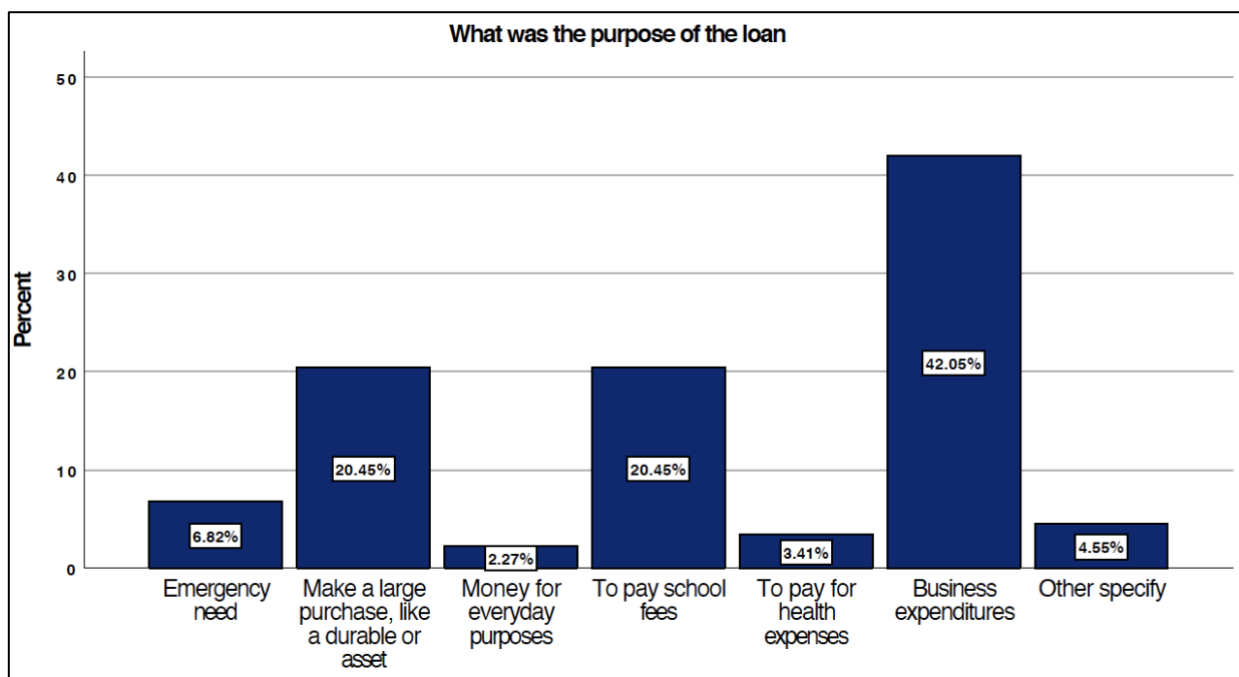


Figure 7 Purpose of M-Shwari loan. Source: Harvard Dataverse V1 (Jack & Suri 2017).

Figure 8 demonstrates the division of purposes of loans that was taken through credit distributors besides M-Shwari in the last 12 months. Here, approximately 35% of the individuals stated that they used the credit to cover their business expenditures. 22.31% indicated that they would use the credit to cover school tuition fees and approximately 16% stated that they were borrowing money for emergency purposes. Furthermore, 7.17% were lending money to make large, durable purchases and 7.17% used money to cover health expenses. 6.37% used their credit to cover their everyday expenses and 2.79% sought to access credit to pay off old loans, debt, or obligations.

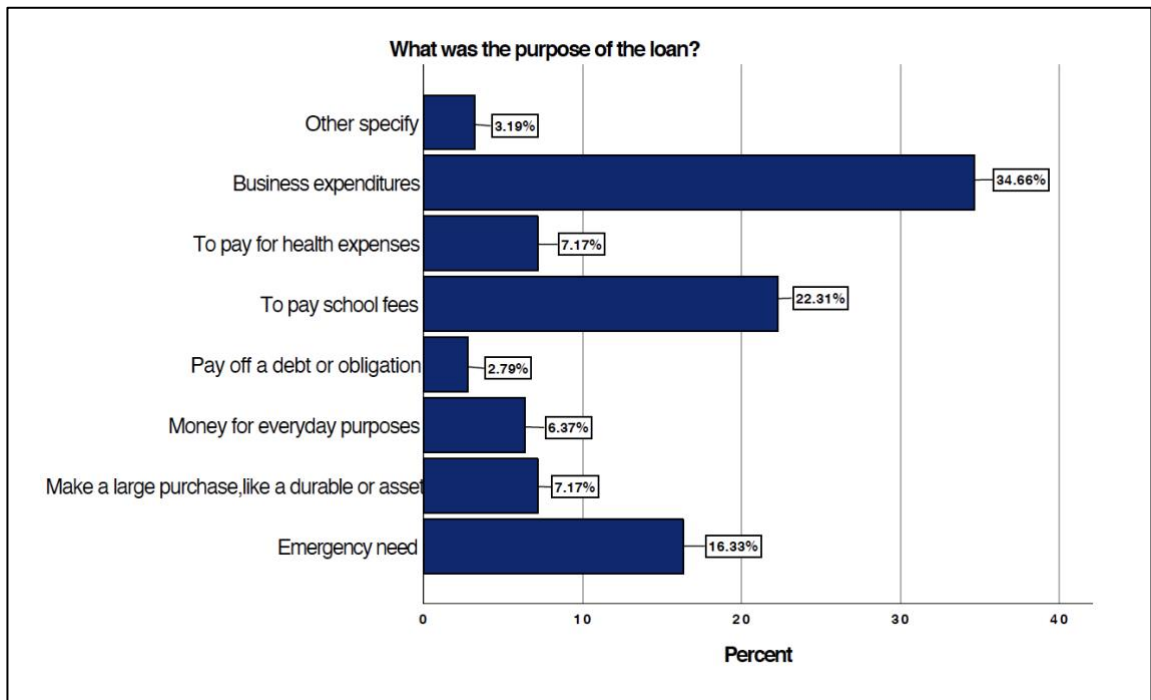


Figure 8 Purpose of non-M-Shwari loan. Source: Harvard Dataverse V1 (Jack & Suri 2017).

One can thus, by comparing the results from figure 7 and 8, detect some differences in the borrowing behaviors of the individuals using M-Shwari and those who lend from other credit providers. First, there is a significant increase in people that use the loan for business purposes. Second, there is a substantially lower amount of people using M-Shwari credits for emergency purposes compared to other lenders. Instead, one can see a decrease in people using M-Shwari credits to make large, durable purchases, thus indicating a decrease in consumption loans. Moreover, as presented in the variable description of table 3 in appendix B, the dataset utilized in this thesis examined if individuals sought to take loans from M-Shwari to use for paying off existing debt. However, none of the individuals in the sample group put this as the purpose of the loan, compared to the 2.79% indication of other lenders. Thus, based on these three findings alone, one can detect a pattern where the majority of the loans taken through M-Shwari is used for investment purposes, both on a business and household level. This, in itself, is an indicator for deepened financial inclusion which is perpetuated through arguments of Taylor (2011) that when financially included people have access to credit, they will reinvest it in income-generating activities or investments in the household.

The patterns of loans taken through M-Shwari thus indicates that it is more common for business and life-cycle investments, which according to the theoretical framework indicates that the service indeed promotes further financial inclusion. As there is no pattern detected of using M-Shwari to pay off existing loans, and only 2.27% of the respondents stating that they would use the loan for everyday purposes, this thesis argues that there are no negative financial patterns detected in the use of M-Shwaris credit extension amongst the sample group. This argument is based on the framework presented by Taylor (2011), which is further discussed in section 2.4 of this thesis.

When analyzing the amount borrowed from M-Shwari compared to other credit distributors, one can find that the difference is statistically significant. Presented in appendix C, the result of a T-Test established that the amount borrowed from M-Shwari is significantly higher than that of other providers. This can be seen as an indicator of the negative pattern of FinTech lending leading to further indebtedness and debt traps as discussed in section 2.1.2. However, when looking at the frequencies of defaulted loans of M-Shwari compared to other lenders as presented through figures 9 and 10, one can see that the frequency of repayment is higher amongst M-Shwari users. This thus indicates that it is not a FinTech issue, but a credit issue in general.

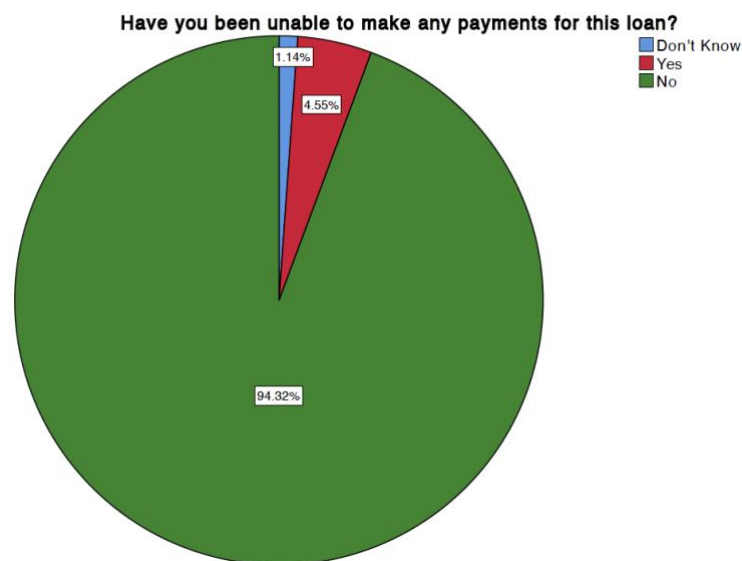
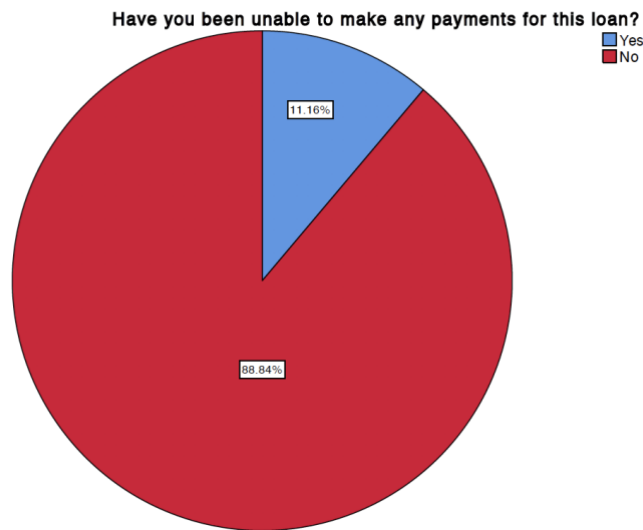


Figure 9 Frequencies of repayments on M-Shwari loans. Source: Harvard Dataverse V1 (Jack & Suri 2017).



*Figure 10 Frequencies of repayments on non-M-Shwari loans. Source: Harvard Dataverse V1 (Jack & Suri 2017).*

The historical emphasis on credit in the microfinance movement implicitly assumes that the poor cannot save up for investments and instead must borrow at relatively high interest rates in order to make investment (Karlan & Murdoch 2010: 4740).

Thus, without contesting the growing amount of scholars which suggests that the expansion of credit can lead to further indebtedness through spikes of unnecessary borrowing, the patterns detected from the initial process does not indicate that. Rather, amongst the early adopters of M-Shwari, patterns of further financial inclusion could be detected through their borrowing behavior. However, due to the already-mentioned scope of this thesis, the lasting patterns of the credit behavior will not be examined.

#### 4.4 Avenues for further research

An interesting route for further research lies still in focusing on the shift towards M-Shwari-based borrowing. As the findings in this thesis implies, there is a higher rate of individuals seeking access to credit using FinTech, formal financial

institutions and NGOs. This shift can indeed lead to deepened financial inclusion for the user but has naturally led to less reciprocity of financial means amongst low-income households in Kenya. Therefore, a potential avenue for further research could be to examine how the individuals and households that are dependent on P2P lending, and thus marketplace lending is impacted by the shift towards FinTech lending.

Another possible avenue of research could be that of financial insurance in relation to FinTech development, and whether it strengthen it or not. During the research of this thesis, I found that there was a lack of research output on this topic. This would thus move focus away from economic resilience, and focus more on the reasons as to why FinTech providers are, or are not, providing financial insurance besides deposit insurance and arguably, access to formal finances.

## 5 Summary and conclusions

The purpose of this thesis has been to examine if the development of FinTech services can be considered a tool for deepening financial inclusion. This examination was set in the context of the launch of Safaricom-operated M-Shwari in Kenya, as it represented a shift in focus of FinTech companies providing low-income households access through mobile payments to offering advanced services. In order to fit the scope of the thesis, patterns and behaviors in regards to credit and savings were utilized. By building on frameworks concerning the idea of deepening financial inclusion, the thesis established certain measures as to examine the levels of inclusion in relation to financial services. These measures and indicators were adapted to the case of M-Shwari by using a quantitative exploratory analysis on a dataset, enabling the examination of financial behavior of early adapters of the service.

Through the analysis it was established that the services provided by M-Shwari in theory indeed enabled and promoted a deepening of financial inclusion. Looking at the financial behavior of users, patterns of deepened financial inclusion could indeed be detected. This as M-Shwari enabled its users to utilize services that in fact could deepen their inclusion in the financial realm, mostly due to the shift towards an increase use of formal institutions. In the examination of borrowing behavior, the analysis found that the patterns detected were indeed strong enough to find a positive correlation between M-Shwari and deepened financial inclusion. However, the analysis of savings behavior found that the patterns detected were not strong enough to established that the development of FinTech services, in fact, leads to deepened financial inclusion. This was due to the indicators utilized not being conclusive enough to establish a direct correlation.

So, as to provide a concise answer to the stated research question as to what extent the development of FinTech services is impacting financial inclusion:

Drawing on the measures established in the theoretical framework and based on the indicators utilized, one can detect that the evolution of FinTech services is indeed, to a shifting extent, impacting the individual's level of financial inclusion. Although a more definite answer cannot be given, it can however be argued that this research found that far more patterns of a positive correlation between financial inclusion and the development of FinTech services could be detected, than negative ones.

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## Appendix A.1

### Definitions of financial inclusion

Source	Definition
<b>World Bank (2018)</b>	<i>“Financial inclusion means that individuals and businesses have access to useful and affordable financial products and services that meet their needs – transactions, payments, savings, credit and insurance – delivered in a responsible and sustainable way”.</i>
<b>Demirguc-Kunt, Klapper &amp; Singer (2017)</b>	<i>“Financial inclusion means that adults have access to and can effectively use a range of appropriate financial services. Such services must be provided responsibly and safely to the consumer and sustainably to the provider in a well regulated environment”.</i>
Johnson (2016)	<i>” Financial inclusion refers to a state in which all working age adults have effective access to credit, savings, payments and insurance from formal service providers. Effective access involves convenient and responsible service delivery, at a cost affordable to the customer and sustainable for the provider, with the result that financially excluded customers use formal financial services rather than existing informal options”.</i>
Ozili (2020)	<i>”Financial inclusion is the ease of access to, and the availability of, basic financial services to all members of the population. Financial inclusion means that individuals and businesses have access to useful and affordable financial products and services that meet their needs in a responsible and sustainable way.</i>
Kempson & Collard (2012)	<i>“Everyone should have access to, use and retain: an appropriate account, or equivalent product, into which income is paid, can be held securely and accessed easily; an appropriate method of paying, and spreading the cost of, household bills and other regular commitments; an appropriate method of paying for goods and services, including making remote purchases by telephone and on the Internet; an appropriate means to smooth income and expenditure”.</i>
King (2014)	<i>“Access and usage of saving, transaction and credit services can play a central role in household efforts to smooth consumption, invest in human or productive capital, and reduce exposure to uncertainties”.</i>
Shrestha & Nursamsun (2021)	<i>”Financial inclusion can contribute towards poverty alleviation by enabling poor households to use products and services of formal financial institutions to optimally save, invest, and manage risks, and to benefit from the financial deepening of the broader economy.</i>

## Appendix A.2

<b>Indicator</b>	<b>Fulfilled by M-Shwari</b>
Access to transactions	X
Access to payments	X
Access to savings	X
Access to credit	X
Access to insurance	
Access to formal financial services	/
Convenient	X
Cost-effective	/
Well-regulated	
Safe	X

## Appendix B

*Table 3 Variables on borrowing used in the empirical analysis*

Variable name	Description	Type
Amount borrowed (in Kshs)	Open ended	Continuous
What is the interest rate (%) on this loan	Open ended	Continuous
What is each installment Principle (in Kshs)	Open ended	Continuous
What is each installment Interest (in Kshs)	Open ended	Continuous
How much is still outstanding (Kshs)	Open ended	Continuous
What is the time period over which the interest rate is calculated	1 Daily, 2 Weekly, 3 Monthly, 4 Annual, 5 Duration of the loan	Categorical
How often do you make a payment	1 Daily, 2 Weekly, 3 Monthly, 4 Annual	Categorical
What was the purpose of the loan	1 Emergency need, 2 Make a large purchase 3 Money for everyday purposes, 4 Pay off a debt or obligation, 5 School fees, 6 Health expences, 7 Business expenditures	Categorical
Who lent you the money	1 M-Shwari, 2 Stokist, 3 Large company, 4 NGO/CBO, 5 Farmer/neighbor/friend, 6 Farmer group, 7 AFC, 8 Breeders, 9 Banks, 10 SACCOs, 11 MFI, 12 Self-help group, 13 Co-operatives, 14 ROSCAs, 15 Small Trader	Categorical
How did you get the money	1 M-Pesa from my account, 2 ZAP from my account, 3 YU cash from my account, 4 Orange money from my account, 5 M-Pesa from someone else's account, 6 ZAP from someone else's account, 7 YU from someone else's account, 8 Orange money from someone else's account, 9 In Person (self), 10 Bus/matatu delivery, 11 Western Union, 12 Posta Pay, 13 Postal order, 14 Money gram, 15 Telegraphic money order, 16 Bank transfer	Categorical
How are you making payments	1 M-Pesa from my account, 2 ZAP from my account, 3 YU cash from my account, 4 Orange money from my account, 5 M-Pesa from someone else's account, 6 ZAP from someone else's account, 7 YU from someone else's account, 8 Orange money from someone else's account, 9 In Person (self), 10 Bus/matatu delivery, 11 Western Union, 12 Posta Pay, 13 Postal order, 14 Money gram, 15 Telegraphic money order, 16 Bank transfer	Categorical
Have you been unable to make any payments for this loan	1 Yes, 2 No	Dichotomous



*Table 4 Variables on saving used in the empirical analysis*

<b>Variable name</b>	<b>Description</b>	<b>Type</b>
Name of saving instrument	1 Bank account, 2 Informal/mattress, 3 SACCO, 4 MFI, 5 Merry go round/ROSCAS/ASCAS, 6 M-PESA Account, 7 M-Shwari account, 8 ZAP Account, 9 Yu Cash Account, 10 Orange Money Account, 11 A member of the HH, 12 Another family member, 13 A friend, 14 Advanced purchase, 15 Stocks and shares, 16 Governemnt bonds, 17 Education Savings Policy, 18 Retirement Annuity, 19 Pension	Categorical
Do you or any other household member use this instrument to store or save money	1 Yes, 2 No	Dichotomous
How often do you save using this instrument (on average over the last 12 months)	1 Daily, 2 Weekly, 3 Monthly	Categorical
How much do you save using this instrument in kshs (on average over the last 12 months)	Open ended	Continouous
How would you rank instrument in order of importance	Rank 1-9	Integer
How would you rank instrument in order of safety	Rank 1-9	Integer
Why do you use this particular instrument	1 Safety, 2 Conveniece, 3 Cheap to use, 4 Confidentiality, 5 Emergency, 6 Pays good interest, 7 If I save here I get credit, 8 No reason, 9 Other social reasons, 10 Long Term Savings, 12 For retirement, 13 Mandatory requirement, 14 Social Welfare, 15 Purchase Assets, 16 Don't save, 17 School fees, 18 Access Loans, 19 Convenient, 20 Dairy Farming Business, 21 Dividents And Share Growth, 22 His brother	Categorical
Why don't you use this particular instrument	1 Not safe, 2 Not convenient, 3 Expensive to use, 5 Not confidential, 6 No reason, 7 No need to save this way, 8 Other social reasions, 9 Don't know how it operates	Categorical

# Appendix C

## Results of an independent samples T-Test

### T-Test

Group Statistics					
	LENGER2G	N	Mean	Std. Deviation	Std. Error Mean
amount borrowed Kshs	1.00	88	281403.42	656150.333	69945.861
	2.00	251	50728.49	171785.573	10843.009

Independent Samples Test										
		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
amount borrowed Kshs	Equal variances assumed	43.777	.000	5.105	337	.000	230674.926	45186.663	141791.482	319558.371
	Equal variances not assumed			3.259	91.213	.002	230674.926	70781.313	90080.974	371268.879

The test seeks to establish whether there is a statistical significance between the amount borrowed using M-Shwari compared to other lenders.

LENGER2G = The two variables tested.

1 = M-Shwari

2 = The other lenders, as displayed in figure 6.

Analysis: There are a significant difference in the amount borrowed from the two tested variables. This since the significance is below 0.05.