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ACCESS TO DIGITAL NANO-CREDIT AND THE ECONOMIC WELFARE: A CASE STUDY OF THE LOW-INCOME EARNERS IN NAIROBI COUNTY

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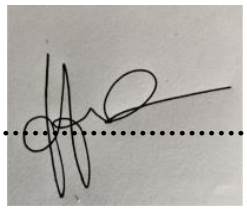
MBA/114476/2018

A RESEARCH DISSERTATION PRESENTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE AWARD OF DEGREE OF MASTER OF BUSINESS ADMINISTRATION AT STRATHMORE UNIVERSITY

MAY, 2020

DECLARATION

I declare that this work has not been previously submitted and approved for the award of a degree by this or any other University. To the best of my knowledge and belief, the dissertation contains no material previously published or written by another person except where due reference is made. © No part of this dissertation may be reproduced without the permission of the author and Strathmore University.

Signature…….  **Date:……12/062020……**

Jared Oyier

MBA/114476/2018

This project has been submitted with my approval as the university supervisor.

Signature……. **Date……**

Dr David Mathuva

School of Business

Strathmore University

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DEDICATION

I dedicate this research to the voiceless

ACKNOWLEDGEMENT

I am grateful to my Supervisor, Dr David Mathuva, of the Strathmore University Business School, for invaluable guidance, he provided during my research.

I also acknowledge the support of my family and friends without whom the temptation to procrastinate would have overwhelmed me.

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ABSTRACT

Digital nano credit has gained prominence in Kenya because it serves the portion of the population which has not been reached effectively by commercial banks. The requirements for qualification are relatively relaxed as compared to those of the commercial banks; they also process loan request faster than most of the commercial banks. The justification for the study is premised on the fact that little attention has been devoted to study the impact of digital nano credit on the economic welfare of the recipients. Moreover, the existing empirical evidence is inconclusive in the direction of the association. Therefore, the study sought to find out the impact of access to digital nano credit on the economic welfare of the low-income earners in Nairobi. The supplementary objective of the study included; investigating the factors considered by digital nano credit companies before they issue digital-nano credit and how the usage of digital nano credit affect the economic welfare of the low-income earners. The study was anchored on three theories; the neoclassical theory of welfare, restriction of opportunities theory of poverty and the individual deficiency theory. The research used a cross-sectional survey research design to collect and analyze the data. Purposive stratified random sampling technique was used to select a representative sample size of 196 respondents from the population. Data was gathered through a structured questionnaire on a target sample size across the 17 sub-counties in Nairobi. The response rate for the study stood at 85.71%. The study found that there is a statistically significant positive relationship between economic welfare, access to digital nano credit, usage of digital nano-credit, the age of the breadwinner, household income. The size of the household was found not to have a negative relationship with economic welfare; however, this relationship was not statistically significant. The study also concluded that there is a constant level of economic welfare which is not affected by access to digital nano credit. The study also confirmed the assumptions of the neoclassical theory of welfare and restrictions of opportunities theory. However, the results of the study do not support the assumptions of the individual deficiency theory. The research, therefore, proposes that the government should regulate the issuance of digital nano credit and engage in market correction policies which can ensure that micro businesses are adequately supported to grow. Finally, the study suggests that an independent study should be undertaken to assess the impact of digital nano credit to the performance of sole proprietorship micro businesses.

LIST OF ABBREVIATIONS

APR	Annual Percentage Rate
ATMs	Automated Teller Machines
BFID	Banking Fraud and Investigation Department
BRN	Branch
CBK	Central Bank of Kenya
DNSC	Dagoretti North Sub County
DSSC	Dagoretti South Sub County
ECSC	Embakasi Central Sub County
EESC	Embakasi East Sub County
ENSC	Embakasi North Sub County
ESSC	Embakasi South Sub County
EWSC	Embakasi West Sub County
EQUI EAZY	Equitel Eazzy Loan
EQUI PLUS	Equitel Eazzy Plus Loan
FSPs	Traditional Financial Services Providers
ICT	Information Communication and Technology
IT	Information Technology
KAMSC	Kamukunji Sub County
KASSC	Kasarani Sub County
KSC	Kibra Sub County
KCB	Kenya Commercial Bank (KCB M-pesa)
KOCHA	Kopaa Chapaa
LSC	Langata Sub County
MAKSC	Makadara Sub County
MATSC	Mathare Sub County
MIM	Micro Mobile
MJI	Mjiajiri
MPA	M-Pawa Sacco

M-SH	Mshwari
OKST	Okoa Stima
PEPE	Pesa na Pesa
PEP	Pesa Pata
PEZ	Pesa Zetu
ROYSC	Roysambu Sub County
RSC	Ruaka Sub County
SACCOs	Savings and Credit Cooperative Organizations
SAI	Saida
SSC	Starehe Sub County
TAL	Tala
WSC	Westlands Sub County
ZIN	Zindisha

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DEFINITION OF TERMS

Fintech: is a portmanteau of 'financial' and 'technology' and can broadly be defined as the use of technology to deliver financial solutions. (Blythin, J., & Cooten, J. Van., 2017)

Nano-credit: These are loans between KES. 50 to KES 5000 that make use of simple mobile user interfaces, and provide funds in real-time (Walle, 2016)

Economic welfare: Defined as the ability of a household to afford basic necessities of life such as food, clothing and shelter. Economic welfare also includes the ability to pay school fees and pay for the healthcare of the family.

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CHAPTER ONE
INTRODUCTION

1.0 Introduction

This chapter discusses the background of the study where the two concepts are introduced; access to digital nano credit and the economic welfare of the recipients. The chapter also looks at the problem statement detailing the academic problem (contextual, conceptual and methodological gaps) which inspired the study. Research objectives and research questions are also be analyzed. Finally, the chapter looks at the scope of the study and the significance (Contributions to academia, theory and practice) of the study.

1.1 Background of the Study

Financial services are the most critical cog of an economic gear, facilitating individuals and businesses to save, invest, and mitigate themselves against potential risk. Today, in most third world economies, majority of individuals and small businesses are confronted by inaccessibility to primary savings and credit products, hindering economic growth and consequently perpetuating poverty (Manyika, Lund, Singer, White, & Berry, 2016). The Digital financial ecosystem is vast, fast-evolving, and continuously metamorphosing. Globally, as of 2017, there were over 500 million registered mobile money accounts, and mobile money services were accessible in 66% of low- and middle-income countries. The growth and potential of digital financial services for the underbanked continue to generate significant enthusiasm from financial sector players (Alexandra, Isabelle, & Elisabeth, 2017).

The critical implication of the evolution of the digital financial ecosystem or Fintech is the digital credit models and the emergence of mobile-based lending platforms. The primary objective is to ease access to credit and consequently reducing the costs of intermediation (Yum et al., 2012; Balyuk, 2016). The credit market is changing across the world with the

emergence of digital credit providers who harness increasingly digitized and accessible consumer data from social media. Advances in analytics and machine learning and the ability to remotely deliver digital products in microseconds to an increasingly connected global clientele further exemplifies the metamorphosis of the credit market.

Whereas most fintech lenders previously targeted on developed markets and higher-income populations, today, many are focusing on emerging markets and competing for traditionally underserved, underbanked low-income customers. The market opportunity is enormous; a report found that alternative finance globally had become a US$145 billion industry, growing 264% in just one year, from 2014-2015. In many cases, smaller fintech startups have competed for this alternative lending space (Stewart, Yaworsky, & Lamont, 2018). This study corroborates GSMA (2018) report that projects that more than six in ten worldwide smartphone connections will come from the developing world within the next five years. The advent of the low-cost smartphone is expected to change the dynamics of financial access further.

Balyuk (2016) reckons that financial novelty taking the design of disintermediated lending may alter the consumer credit markets balance in either two directions. The first proposition is that a technological shock lowers the cost of credit appraisal and results in household credit price restructure. This entices debtors to refinance the existing loan by seeking a loan from less expensive alternatives. The second-way effect is due to the ability of financial innovation to diminish credit rationing. Financial innovation that improves the information environment and the loan underwriting process is expected to result in credit provided to those categories of borrowers who are willing and able to repay the debt but were credit-rationed because of information asymmetry.

The theory anchoring the concepts conflict, the assumptions of the individual deficiency theory as proposed by Rainwater (1970) posit that the economic welfare of an individual is a personal decision affected by the individual traits of a person. The theory assumes that poor people are genetically poor and that they lack the entrepreneurial traits that can make them escape from the pangs of poverty. Digital lending is, therefore expected to not affect the welfare status of individuals because poor individuals already lack the necessary natural ability to make wealth.

However, the Neo-classical theory of poverty Jencks (1996) postulates that the economic market is the leading cause of poverty. The theory, therefore, postulates that programs like micro-lending targeted to the low-earning citizens are likely to improve their economic welfare because it distorts the market imperfections. Additionally, the restriction of opportunities theory of poverty (ROTP) as proposed by Appadurai (2004), postulates that the leading cause of poverty is the limitations of socio-economic capital. The theory, therefore, concludes that individuals can escape the pangs of poverty if the necessary resources are provided to them.

Globally Abhijit et al. (2014) assessed the out-turn of microfinance on the performances of business and the economic welfare of the households in India. The study concluded that as an increase in the uptake of credit by 8.4%, moreover, the businesses which benefited from the micro-lending increased their profits significantly. However, there was no relationship between micro lending and the welfare of the households who benefited from the funds. Using the Mongolian experience Attanasio et al. (2015) concluded extant of a statistically substantial positive tie-in between the joint loans and the consumption patterns of the 710 women under investigation.

Locally Langat (2016) looked at the out-turn of microcredit on the welfare of Ainamoi residents in Kericho county, Kenya. The study concluded that microcredit facilities enhanced borrowers' living standards. Regionally Crépon et al. (2013) looked at the ramifications microcredit has in Morocco's rural areas. The study concluded that microlending had no effect on the welfare of the households. There was no significant growth of consumption intensity for both the reference group and the group with access to credit.

1.1.1 Digital Nano Credit in Kenya

Traditional Financial Services Providers (FSPs) in Kenya have faced challenges in extending financial services to the unbanked and underbanked population. According to Dapp (2015), the greatest challenge for the banking sector is how to actively develop fintech solutions that offer new methods for conducting principal banking transactions. A study by KNBS (2015) reveals that merchandisers or retailers were the most sought (28.2%) source of credit in Kenya, coming second at (19.4%) are chamas/self-help groups; and friends, relatives and neighbours (14.0%). Among the formal sources, Savings and Credit Co-operative Societies (SACCOs) were the most popular (11.2%) followed by commercial banks (8.8%) and Mobile Phone Platforms at 7.6%. followed at (8.8%) by commercial banks and lastly at 7.6% are Mobile Phone Platforms. The study further found that 72.3% of the credit acquired through Mobile Phone Platforms (digital lending) were used for subsistence purposes.

According to FSD Kenya (2019) survey on financial inclusion, Kenya's financial landscape has transformed since 2006. Formal financial inclusion has risen from 26.7 in 2006 to 82.9 per cent, while total exclusion had reduced by 30 per cent to 11.0 per cent between 2006 and 2019. The differences in financial access between traditional dichotomies of wealth, gender and location have also reduced significantly. Critical reasons for these changes

include the growth of digital money (mobile money), government efforts, and rapid developments in information technology. There are four business models for digital credit in Kenya.

First entrants into the digital loans spaces were commercial banks in partnership with mobile network operators (MNOs). This model is characterized by the likes of Safaricom & Commercial Bank of Africa with the M-Shwari offering and Safaricom and Kenya Commercial Bank with the KCB-Mpesa Loan (FSD Kenya, 2019). This constitutes the first model, and they depend on the Credit Information Sharing Framework through Credit Reference Bureaus for credit appraisal.

The second model is a result of many startups offering digital credit through mobile apps. Ahead of the park are Tala and Branch going by the number of downloads from Google Playstore downloads. These financiers utilize mobile phone data such like call logs, Short Message System (SMS), GPS, data from social sites, and contact log acquired via digital consent from the customers to generate a credit risk score and appraise loans. Performance records and number credit accounts are shared out at the lender's volition with the Credit Reference Bureaus (Gubbins & Totolo, 2018).

The third model is, though not standard in Kenya involves the peer-to-peer (P2P) lenders. The P2P frameworks enable linkage of debtors and creditors. P2P credit platforms empower people to solicit for credit digitally, and credit providers to appraise and disburse credit (Balyuk, 2016). This space is filled by the likes of Zidisha & Kiva Loan. The last business model, though not typical, is a bank offering digital services. This emerged because of the central bank of Kenya CBK licensing Mobile Virtual Network Operators (MVNO). The banks do not need a partnership with mobile network operators as they

develop their digital infrastructure (Kilonzo, 2017). Examples for such ventures are the likes of Equity bank Eazzy Loan via Equitel.

The transformation in the financial landscape in Kenya can be attributed to the flexible fintech regulatory framework or lack of it. Gutierrez & Singh (2013) showed empirically that the regulatory framework mattered. The study found a strong correlation between high usage of digital banking by both the banked and unbanked and the underlying regulatory environment. The key characteristics of a progressive regulatory framework include predictability (that regulations are stable and do not change often); openness (to allow new entrants and novelty); and e-contracting principle (to allow for electronic signatures); interoperability (to enable customers to switch between providers—e.g., mobile number portability quickly).

Gutierrez & Singh (2013) additionally, found that a more concentrated banking system is associated with less use of mobile banking services. Nevertheless, the growing uptake of technology-accelerated, unsecured consumer credit has led to rising household indebtedness and lowered the customers 'capability to ease-out income variations and expenditure. For instance, empirical proof suggests an increase in unsecured easy-to-access consumer lending is establishing a "debt trap" and pushing further financial misery amongst (Baugh, 2015)

Momanyi (2018) concluded that financial regulatory frameworks in Kenya aim to ensure stability in the financial sector and they are an impetus to economic growth. The effect of financial control on financial inclusion cannot be devalued, particularly in the banking division. Emerging advancement with the prospect to enlarge financial inclusion is the idea of regulatory sandboxes. A legislative sandbox is a designed, safe harbour for carrying out experiments. Fundamentally, a sandbox creates room for businesses to innovate and test

new solutions under the scrutiny of the regulator (McKee, Kaffenberger & Zimmerman, 2015).

However, an argument for a lazy approach to regulation has been proposed owing to the historical success of M-PESA in Kenya, where mobile banking was allowed to grow unhinged (Spratt, 2016). It is important to empower, and not restrain novelty, even so, it is evident that regulatory frameworks need to be exhaustive in the long term. How to strike the right balance here is an essential area of research (Mwega, 2014).

1.1.2 Economic Welfare of Low-Income Earners

Economic welfare is defined as the economic wellbeing of an individual, the welfare of an individual is therefore measured by how well an individual is doing in terms of the ability to purchase the necessaries of life (food, shelter, clothing, education for the children and the ability to afford medical services (Adams,2011).On the other hand, the World Bank (2018) defined low-income earners as those individuals or households which are living below the set international poverty of $1.90.In this context, low-income earners is defined as households which spend less than KES 190 in Kenya. Moreover, low-income earners are severely affected by income volatility and daily fluctuations on their ability to afford the necessaries of life. This condition affects their ability to access credit and to realize the full potential of their dreams (Financial Sector Deepening, 2014). Consequently, the economic welfare of the household was assessed based on the level of consumption—the economic welfare with reference to the international poverty line of 190.

Manyika, Lund, Singer, White, & Berry (2016) found that low-income consumers continue to benefit significantly from expanded accessibility and affordability digital financial services (DFS). However, a larger population of these consumers both financially ignorant and technologically handicapped, but they also live a financial edge that allows little room

for mistakes (McKee, Kaffenberger, & Zimmerman, 2015). Factors such as low levels of literacy and numeracy, lack of awareness of data protection rights, little representation, reduced options, and reduced assets and savings compound their vulnerability to abuse.

On the demand side, studies have sought to analyze factors that contribute to borrowers accumulating excess, welfare-eroding credit. Empirical evidence shows credit consumers who do not fully comprehend the underlying terms and conditions the credit facility are rendered vulnerable to fees and other consequences of default and often experience challenges in offsetting their loans and have lower welfare (Lusardi & Tufano, 2015). The Financial Sector Deepening (FSD) Kenya also found that 80 per cent of digital borrowers are susceptible to acute cash flow affiliated exposure; these debtors lie between 20 and 40 per cent more probable of late repayments or default than debtors with low exposure. Additionally, one in four digital debtors considers the repayment time on digital loans inadequate (Gubbins & Totolo, 2018).

Economic, social clarification and rationalization for legislation both anchor in part on the customer as the primary recipient of legislation. Customers, nevertheless, are diversified rather than comparable groupings. Some are opulent; others are not. While some are extremely learned; others are not (Malala, 2013). An investigation by Citigroup on Bridging Financial Gap established that worldwide 75% of low-income earners with financial access lacked the knowledge and skills they require to make an enlightened financial judgement (Deb & Kubzansky, 2012).

Inferior financial literacy levels and know-how make it challenging for individuals to manoeuvre and utilize financial solutions and often results in an unsuitable financial judgement, particularly for the impoverished. The non-existence of advanced proficiency and gears to scheme and estimate households or small establishments' income and

expenses, individuals with little financial knowledge are vulnerable to additional risk through borrowing from non-formal sources, having too little savings, and falling short of acquisition of fitting financial solutions.

Being overly indebted is most likely for consumers with lean financial competence in the event of non-impediments to loan overuse. Several consumers in shallow financial dimension setting find utilizing client credit attractive as it permits them to fulfil – at least in the short run– their plans and demands much swiftly than before (World Bank, 2013).

FinAccess (2018) revealed that several customers find difficulties in fully comprehending financial proposition and the disposition of formal financial solutions: just about 37% of interviewees could precisely solve rudimentary numeracy concepts. It also established that complex issues such as pricing are not comprehensible to mass-market consumers. This information asymmetry can result in market collapse by inferior value, high magnitude payments issued across mass-market solutions that mobile payments offer (Malala, 2013).

1.1.3 Access to Digital Nano Credit

A study by FSD, 2018, found that acceptance and use of digital loan was largest among adults in urban areas, in Nairobi for example, about 50% and 45% in urban areas outside of Nairobi. The current product offerings, however, raise many concerns and risk, at the top being consumer rights. Besides, the effective annual percentage rate (APR) is even higher in cases of early settlement. As mentioned, the offerings come with other strings attached or hidden risks, especially to the borrower. With such factors as low levels literacy and numeracy, lack of awareness of data protection rights, little representation, reduced options, and minimal assets and savings are compounding low-income earner's vulnerability to abuse. The critical question for this study is how digital credit influences these demographics.

Kaffenberger, Totolo, Soursourian (2018) looked at the digital revolution in Kenya and Tanzania. The study concluded that access to digital credit is still disproportionate. Most of the applicants of digital nano credit reside in urban centres. The study identified three reasons which limit access in rural areas. The rural population may lack the necessary technology to access digital credit; smartphone, the network coverage is also not very stable in some of the rural regions. Finally, the culture of borrowing is not well entrenched in rural areas. These three reasons lead to financial exclusion in rural areas.

1.2 Research Problem

Nano and Microcredit have experienced rapid growth in the past years, providing access to financial services to a large population that ware otherwise excluded from the financial system. The minimum amount extendable to borrowers has also reduced bringing forth a new lexicon, nano-credit. These are loans between KES. 50 to KES 5000 that make use of simple mobile user interfaces, and provide funds in real-time**.** (Walle, 2016). Whether these types of loans help, the poor has been a subject of intense debate. The empirical literature has not provided conclusive results; some studies show that there is a positive impact between microcredit and the welfare of the individuals, yet others show that there is no relationship between microfinance and economic welfare.

Omondi and Ogaga (2015) looked at the impact of microcredit facility on the welfare of households in Suna East Migori Kenya. They concluded that there is a positive relationship between microcredit and economic well-being. Kawira (2016) also looked at the effect of microcredit on improving the living standards of the poor people in Tharaka Nithi and concluded that there was a positive relationship. Langat (2016) also found that there was a positive relationship between microcredit and the welfare of Ainamoi residents in Kericho County, Kenya.

However, Crépon et al. (2013) looked at the impact of microcredit in rural areas of Morocco and found that there was no relationship between welfare and micro-lending. Banerjee et al. (2013) used a randomized control evaluation technique top assess the impact of microcredit on the welfare of the respondents. Their study concluded that there was no relationship between the microcredit and welfare of the respondents.

The current study is set in an urban area. There is a significant difference between the level of income in urban areas as compared to the rural areas. Additionally, the urban area has more opportunities as compared to the rural areas. Moreover, James and Kyle (2015) aver that residents of the city have more access to credit as compared to residents in the village. This is because these residents have access to smartphones which are used to access the digital nano credit loans. Because of this difference, the results are likely to be different. Therefore, the study seeks to find the impact of digital lending on the welfare of low-income earners in Nairobi County.

1.3 Research Objective

The study sought to find the relationship between access to digital nano credit and the economic welfare of the low-income earners in Nairobi County.

1.3.1 Other Objectives

I. To identify how household income, affect household economic welfare
II. To identify how the size of the household affect the economic welfare of the household
III. To identify how the level of education of the breadwinner affects the economic welfare of the household.

1.4 Research questions

I. To what extent does access to nano-credit influence economic welfare of low-income earners in Nairobi?

II. How does household income affect economic welfare?

III. Does the size of the household affect economic welfare?

IV. Does the level of education affect the economic welfare of the household?

1.5 The Scope of the Study

The study mainly focused on low-income earners in Nairobi county. Low-Income Earners are hereby defined as people leaving below the international poverty line of 1.9 dollars a day. These are people whose daily expenses are below the 1.9 dollar mark. Primary data was collected using a structured questionnaire. The unit of analysis is the family, with the breadwinner being the source of information.

1.6 Significance of the Study

The study has a twofold contribution to academia; the theoretical contributions and contributions to the existing literature. The empirical evidence on the relationship between access to digital nano credit and economic welfare is inconclusive. Some authors found a positive relationship; concluded that access to digital credit increases the opportunities of doing business, and therefore, this increase welfare. On the other hand proponents of a negative relationship avers that digital credit leads to indebtedness and thus leading to reduced economic welfare.

The theories anchoring the study also give conflicting results. The Neoclassical theory of poverty blames the economic market imperfections as the leading cause of declining welfare. The Restriction of opportunities theory of poverty (ROTP) postulates that the leading cause of poverty is the limitations of resources. While the individual deficiency

theory avers that, the economic welfare of an individual is a personal decision affected by the individual traits of a person. Given the foregoing, the study sought, therefore, to validate or confirm the assumptions of the three theories.

The results of the study is also instrumental to both the consumers and the providers of the digital nana credit. The consumers can be able to analyze the real impact of digital nano credit on their economic welfare using the most recent data. This can then help them in making objective decisions with regards to accessing the digital nano credit. The providers of digital nano credit can also draw essential lessons from the study. The study provides insights into how digital nana credit is used. The providers can then use this information to tailor-make products which will be suitable to the consumers. Moreover, the providers of digital nano credit can also use the results of the study the real impact of their services on the recipients of the credit.

The study provides valuable insights to policymakers and regulators in Kenya. Digital money lending has gained its roots in Kenya. There is empirical evidence detailing the adverse effects of overcharging the customers and therefore affecting the economic welfare of the recipients. However, despite this knowledge, little attention has been devoted to regulating the operations of the sector. Policymakers and regulators can draw valuable insights from the results of this study which can help them to come up with objective regulations geared towards protecting the consumers of digital nano credit.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter reviews the past empirical studies detailing the relationship between welfare and digital lending. The chapter also looks at the theoretical review, which covers the theories anchoring the concepts. The chapter will also look at the determinants of welfare. A conceptual framework detailing the pictorial outlook of how the variables relate is also discussed in this chapter. Finally, the chapter discusses the summary of the literature detailing the research gaps.

2.2 Theoretical Review

This section will look at the theoretical framework underpinning the study three theories will be reviewed ;(Individual Deficiency Theory, Restriction of Opportunities Theory of Poverty (ROTP), and Neoclassic Theory). For each theory, the researcher discusses the proponents if the theory, the assumptions of the theory, the analogy of the expected outcome given the premises of the theory. Therefore, this section will show the theoretical relationship between the dependent and independent variables.

2.2.1 Neoclassic Theory of Welfare

Korynski (2007) concluded that market failures impair the economic welfare of the people affected. These failures are caused by incomplete information and uncertainty in the economic environment. The theory, therefore, assumes that a lack of proper information needed to support assessment for credit hence leading to financial exclusion. This will then lead to reduced spending and welfare of the households. However, Mwawana (2011) avers that government intervention through macroeconomic policies and monetary policies help in correcting market failures. Expansionary monetary policies increase the flow of money

in the economy and, this leads to reduced interest rate and consequently increased access to credit. Given these assumptions, it is expected that digital money lending will lead to improved welfare. This is because access to credit corrects the market imperfections, thus leading to more opportunities and enhanced welfare.

2.2.2 Restriction of Opportunities Theory of Poverty (ROTP)

Appadurai (2004) proposed the restriction of opportunities theory of poverty to explain the causes of poverty. The theory explains how individual welfare is affected by external environmental forces. The theory avers that social and economic capital are prerequisites of a good life. The environment where one grows determines the proportions of social and economic capital possessed by an individual. The belief system of an individual is also assumed to affect how an individual makes an economic decision, and to that extent, it affects the economic welfare of individuals. Capitalistic environments promote hard work, while communistic cultures may promote laziness because of the concept of shared prosperity.

Chakravarti (2006) found that individuals can improve their welfare by learning new skills necessary to survive in an environment and unlearning bad behaviours and practices. A savings and investment environment can influence the behaviours of an individual positively. External environment plays a crucial role in improving the economic welfare of an individual. Good associates and mentors provided in the external environment are likely to guide individual investment and borrowing decisions. To this extent, the environment plays a crucial role in enhancing business skills and consequently increases the chances of getting credit. Access to credit can also increase the available investment opportunities and lead to improved economic welfare. ROTP is relevant for this study because it explains the

role of external environmental factors in accessing credit. The theory also explains how the environment impact on how credit facilities are used.

2.2.3 Individual Deficiency Theory

The individual deficiency theory as proposed by Rainwater (1970) postulates that economic welfare is a function of the natural abilities bequeathed on a person at birth; The genetic traits of an individual determines the kind of life lived by an individual. People with natural business acumen are likely to have better economic welfare than those who are less talented. The theory further argues that hard work and wise economic choices can enhance the welfare condition of an individual. Therefore, the theory assumes that the genetic makeup of a person has a very high relationship with the economic decisions that one make.

In the digital-nano credit space, the risk assessment criteria used to award credit is designed to identify the talented persons amongst the applicants. Those who have natural business acumen are likely to be given credit. They can then reinvest the money in their business and gain more returns over and above the interest rate charged by the lenders. If this process is repeated, overtime talented people will have better economic welfare. On the other hand, the credit market is less likely to give credit to individuals with little business acumen. This is because the risk assessment criteria are designed to exclude people with less business talent from accessing credit. The expenditure level of these people will, therefore, be limited. These group of people will also not be able to afford basic social amenities such as proper health care, food and clothing. The theory, therefore, concludes that lack of natural business acumen leads to lack of credit and consequently reduced economic welfare Gwartney & McCaleb, 1985).

2.3 Determinants of Economic Welfare

This section deals with the determinants of economic welfare and how the variable will be measured. Economic welfare is a multidimensional variable which is affected by demographic characteristics such as age, income, the gender of an individual, dependency level and education (Jones & Klenow,2016). the economic welfare of a household is measured by the extent to which they are able to afford the necessaries and the luxuries of life. Horlings and Smits (2019) proposed an all-inclusive dashboard approach as a measurement criterion for measuring economic welfare. The dashboard included the qualitative and quantitative constructs of economic welfare. The models aver that an individual's level of education, level of dependency (how many people depend on his/her income), age, gender and level of income (How much one earns) determines the level of the economic welfare of an individual.

2.3.1 Household Income

Jorgenson and Schreyer (2017) identified the level of income as an important construct of household welfare. Stiglitz, Fitoussi and Durand (2018b) defined household income as the net earnings which are available for consumption after payment of taxes. The net income determines whether an individual/household is capable of affording the necessary goods and services meant to make them live a meaningful life. Horlings and Smits (2019) critiqued the traditional measures of economic welfare because they did not consider earnings at a household level. The study avers that the gross domestic product is an imperfect measurement of welfare since it does not consider the disposable income at the household level. The economy can be doing well without the impact trickling down to the citizens. Therefore an assessment of household income is essential in constructing the economic welfare of a household.

2.3.2 Size of the Household

The size of the household is measured by the number of people living in the house over a period. This can include both immediate nuclear family members, friends, and relatives, depending on the earning power of the household to meet the needs of their life (Tran, 2015). Empirical evidence shows that there is a negative relationship between the size of the household and economic welfare. Larger families devote more of their income in purchasing the basic necessities. There is little left to be consumed on luxuries, and this leads to reduced economic welfare (Gounder,2013) in Botswana Lekobane, and Seleka (2017) concluded that an increase in the size of the household increases the level of dependency and consequently reduces the household welfare. This is because there are too many people depending on a constant level of earnings

2.3.2 Level of Education of the breadwinner

The demographic characteristics (age and level of education) of the household breadwinner also affects household welfare. Nguyen and Tran (2018), in their assessment of these variables, concluded that an additional year of schooling for the breadwinner is likely to increase household welfare by 6%. Tran et al. (2018) explained that the increase in welfare due to education is linked to the additional skills acquired in schools which increase the level of income and eventually the economic welfare of the households they provide for. These results support the assumptions of the individual deficiency theory, which postulates that lack of required skills reduces the economic welfare of individuals. Acquisition of skills through formal education is likely to increase income and consequently improve economic welfare (Lekobane & Seleka,2017).

2.4 Empirical Studies and Knowledge Gaps

The section will analyze the past empirical literature detailing the relationship between digital lending and the welfare of households. The section is divided into two. The first

section reviews the global studies, followed by local studies. The review captures the substance of the topic, years under review, the population under review, the sample size, and the conflations made therefrom.

2.4.1 Global Studies

Abhijit et al. (2014) looked at the effects of microfinance on the performances of business and the economic welfare of the households in India. Data was collected from 52 randomly selected neighbourhoods. The study used the difference analysis and fixed effect regression methodology to analyze the data. The study concluded that there was an increase in the uptake of credit by 8.4%; moreover, the businesses that benefited from the micro-lending increased their profits significantly; there was a positive statistical relationship between profits and the level of micro-lending. However, the study did not find any relationship between micro lending and the welfare of the households who benefited from the funds. The study found no significant change in the consumption pattern of households. The; level of education and health also did not change significantly. This study concentrated on microfinance; it did not, however, consider the space of digital lending.

Attanasio et al. (2015) looked at the impact of micro-lending on the welfare of selected Mongolian citizens. Specifically, the study looked at the impact of joint liability lending on the welfare of women entrepreneurs. The study used judgmental sampling technique to select a sample of 710 women in business who were also willing to take a joint liability loan. The principal component analysis was employed to assess the impact of micro-lending on the composite score of welfare, and the study concluded that there was a statistically significant positive relationship between the joint loans and the consumption patterns of the women under investigation. This indicated that there is a positive relationship between microloans and welfare. This study looked at women entrepreneurs. The current study was interested in analyzing the entire population with no boas on gender.

Banerjee et al. (2013) analyzed the impact of microlending on the welfare of selected households in India. They used a randomized control evaluation technique top assess the impact of microcredit on the welfare of the respondents. The principal component analysis was used to identify the main factors. The study used a purposive sampling technique to come up with 6811 observations for the study. The results show that there was no statistically significant difference between the monthly expenditure of the group of households who got the loan and those who did not. The gap in this study is premised on the fact that the study looked at microlending; there was no consideration for digital nano credit.

Kaffenberger, Totolo and Soursourian (2018) assessed the digital credit revolution in Kenya and Tanzania. The study drew insights from borrowers in the two countries. The study found that most of the digital credit is accessed in the major cities. The residents of the rural areas are still fairly financially excluded from digital nano credit. The study also found that the exclusion is accelerated by inconsistent earnings in the rural areas, lack of information about the availability of digital credit and unstable network. The study also concluded that most of the recipients used the credit to buy essential goods and services. The study also found that digital credit is unregulated and that they charge exorbitant rates which may reduce the disposable income of the recipients. The conceptual gap is premised on the fact that the study did not look at the impact of digital nano credit on the economic welfare of the recipients.

2.4.2 Local Studies

Omondi and Ogaga (2015) looked at the impact of microcredit facility on the welfare of households in Suna East Migori, Kenya. Data was collected from a sample size of 306 respondents carefully selected using the Krajcie and Morgan's' table,1970. The research used the cross-section survey design to assess the impact of microlending on the welfare of

households. The study also used the multivariate ordinary regression methodology to assess the impact of the dependent variable on the independent variable. The study concluded that there is a positive relationship between microcredit and living standards, consumption patterns, health status, and children's education. The study looked at the rural population; moreover, the study looked at micro-credit and not digital credit.

Kawira (2016) looked at the effect of microcredit on improving the living standards of the poor people in Tharaka Nithi. The study used systematic sampling to select forty respondents; the study covered four years from 2013 to 2016, all years inclusive. Primary data was captured using structured questionnaires. The independent variables included the constructs of microcredit like loan size, loan period, interest rate, and frequency of borrowing. On the other hand, the dependent variable was the construct of welfare measured by the level of education clothing and feeding programs. The study concluded that there was a positive relationship between microlending and economic welfare of the respondents. The research gap in this studies lies in the fact that the study was done in the rural area; however, the current study focuses on the urban areas.

Langat (2016) looked at the effects of microcredit on the welfare of Ainamoi residents in Kericho county, Kenya. The study used stratified random sampling and picked a sample of 98 residents, and data was collected for a period of five years from 2008 to 2012. The study used the difference in difference analysis was used to analyze the effect of microcredit on the incomes of the households. The results showed that there was a definite increase in the number level of income of the respondents with access to microloans as compared to those with no access. Therefore, the study concluded that microcredit facilities improve the living standards of the borrowers. This study looked at microcredit, but the current study will focus on digital credit.

Crépon et al. (2013) looked at the impact of microcredit in rural areas of Morocco; the study examined 28 households per village totalling to 4495 surveys. The second control group, which was only given credit after two years, totalled 5551 households. The study used the experimental research methodology to identify the impact of microlending on the welfare of the selected households. The study used both a difference in difference analysis and principal component analysis to analyze the data. The results of the study concluded that microlending had no effect on the welfare of the households. There was no significant increase in the level of consumption for both the control group and the group with access to credit. The research gap here lies in the fact that the research concentrated on the rural areas, access and use of credit if fundamentally different in rural areas as compared to urban areas.

Bennett and Lyon (2017) investigated the impact of digital credit on the borrowers in Kenya; their study used a cross-sectional survey research methodology to conduct the study. A total of 3000 respondents were interviewed through a digital questionnaire administered via links shared on the WhatsApp. Purposive sampling was done to select the qualifying respondents. The research concluded that digital nano credit has increased financial inclusion in Kenya. There are 15 million people who were financially excluded from formal borrowing but now have access to digital credit. The study also concluded that a majority of Kenyans use digital credit to sort out emergencies, while there is also a growing number of young borrowers who use digital credit for entertainment and betting. However, the study also concluded that about 10% of this number have been negatively listed due to non-payment and are less likely to get access to credit in future. Even though the study looked at digital credit, it did not assess its impact on economic welfare. There is, therefore, a conceptual gap which will be fulfilled by the current study.

Kaffenberger and Chege (2016) looked at the adverse effects of digital nano credit in Kenya; the paper employed the use of desktop research and inductive research to review the literature on digital credit. The paper concludes that the digital credit space in Kenya is not regulated and this exposes the uses to predatory interest rates. The paper further found that customers are charged exorbitant interest rate way beyond the acceptable standards of responsible lending. The paper further concludes that the availability of credit encourages multiple borrowing over-indebtedness. The paper also reveals that there could be a data misuse by the provides of digital credit since most of the consumers do not understand the terms and conditions which they consent to. The paper has a conceptual gap since it did not review the relationship between digital credit and economic welfare; moreover, there is a methodological gap in the sense that the paper did not conduct a survey instead it relied on the desktop review to make inferences and conclusions. A cross-section survey would have revealed more robust results as compared to desktop review.

2.5 Research Gaps

Digital nano credit is a relatively new phenomenon in Kenya; there are, however few studies which have looked at its impact on the welfare of the people. Some empirical research such as Abhijit et al. (2014), Attanasio et al. (2015) and Omomdi and Ogaga (2015) looked at the effect of microlending on the economic welfare of the respondents. Digital credit is significantly different from micro-lending because it is accessed easily on the phone as opposed to the traditional microlending.

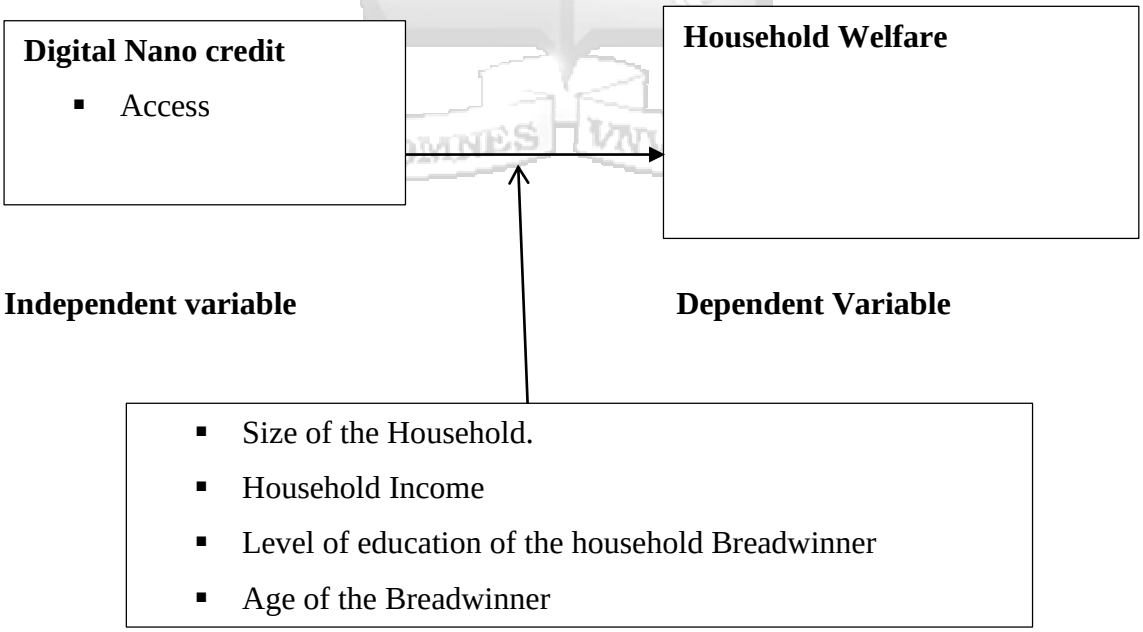
Additionally, the setting of most of the studies is in rural areas. Kawira (2016) looked at the effect of microcredit on improving the living standards of the poor people in Tharaka Nithi. Langat (2016) looked at the effects of microcredit on the welfare of Ainamoi

residents in Kericho County, Kenya. Crépon et al. (2013) looked at the impact of microcredit in rural areas of Morocco. The current study analyzed the impact of digital nano credit on the welfare of Nairobi residents' targeted population is different in terms of education and levels of income. Therefore, a different result is expected from the analysis.

2.6 Conceptual Framework

Figure 2.1 below, places forward a conceptual framework that expresses the relationships between digital Nano credit and the economic welfare of the households in Nairobi County. The independent variables include the size of the household, gender of the breadwinner of the household, level of education of the breadwinner, and Age of the breadwinner. The dependent variable is the economic welfare of households measured by the extent to which the level of income has changed over time.

Figure 2.1: Conceptual Model of the effect of digital Nano credit on the economic welfare of households in Nairobi County.



Source: Author (2020)

The size of the household is the number of family members living in a household; this number has a moderating role in the relationship between access to digital nano credit and household welfare. The more the number, the less the welfare of the household, because many people will depend on fewer resources. Household income is the average income earned by the breadwinner of the house. The larger the income, the better the economic welfare of the household. The age of the breadwinner is the total number of years of the breadwinner. It is expected that age and welfare are positively related. Households with older breadwinners are expected to have better welfare. Usage is the proportion of digital nana credit which goes to the enhancements of economic welfare like buying food, clothing and paying hospital bills.

2.7 Measurement Criterion

This section deals with how the various variables under the study are measured. Economic welfare is measured as a composite variable detailing the extent to which an individual can afford the various constructs of welfare (housing, furniture, health, clothing, food, emergencies, education for children, social amenities and control over assets). Access is measured by the extent to which digital nano credit affects the purchase of the various constructs of economic welfare. The measurement criteria assess the degree to which an individual is capable of purchasing the social goods after receiving a digital nano credit.

The level of education is measured by assessing the highest level of education attained by the breadwinner. The following scale was used to process data about the level of education. If the breadwinner has finished primary education that will be labelled 10, if the highest level of education is secondary the response is labelled 12, if the highest level is university degree the data was labelled 16 and if the respondent has a master and above it was labelled 18. The labels represent the optimal number of years taken to complete a level of education.

Age is measured as the total number of years of the respondent; the researcher used average age where the respondents gave a range. The size of the household is the total number of family members living in a household. Household income is measured by the net income earned by the breadwinner after deduction of taxes.

2.8 Summary

Three theories were reviewed the individual deficiency theory avers that the economic welfare of an individual is affected by the genetic traits embedded in an individual. The theory explains that poverty is a natural calamity that resides within an individual. Society and belief systems also play a role in the welfare condition of an individual. According to this theory, access to digital Nano-credit is likely to have no effect on poor households because they lack the requisite natural ability to make money.

On the other hand, the restriction of opportunities theory of poverty (ROTP) postulates that the leading cause of poverty is the limitations of resources. The theory assumes that the lack of socio-economic capital can incapacitate an individual's capacity to be productive. The theory, therefore, concludes that individuals can escape the pangs of poverty if the necessary resources provide them. On the other hand, the neoclassical theory of poverty blames the economic market imperfections as the leading cause of poverty. The theory avers that the lack of macroeconomic policies on labour and welfare issues has banished a large population in abject perpetual poverty. The theory, therefore, postulates that programs like micro-lending targeted to the low earning citizens are likely to improve their economic welfare because it distorts the market imperfections.

The empirical literature is also not conclusive, and some studies show that there is a positive relationship between microlending and economic welfare, while others show that there is no relationship between micro-lending and economic welfare of households. Omomdi and

Ogaga (2015), Kawira (2016), and Langat (2016) found a positive correlation between microcredit facilities on the welfare of households in the rural setup. However, Crépon et al. (2013) looked at the impact of microcredit in rural areas of Morocco and found that there was no relationship between welfare and micro-lending.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

The chapter presents the tools and techniques that were used for this study. It discussed the methodology used in achieving the study's objectives. Specifically, the chapter will explain the research design. It will define the population and the sampling techniques to be used to arrive at a representative sample. The chapter will also discuss the study period. Procedures for data analysis will be discussed together with the necessary statistical tests to be conducted on the data. This chapter will also discuss the appropriate regression model to be used in determining the relationship between the dependent and independent variables. The chapter will also discuss the data collection instrument that will be used during the research.

3.2 Research Design

Research design is the stepwise plan followed by an academician to meet the objectives of the study. It is a systematic scientific methodology followed in order to achieve the research goals. The design outlines how research hypotheses will be designed and tested. It outlines the basis upon which the null and alternative hypotheses can be accepted or rejected. The research design also provides the conditions under which the results of the study can be inferred on the entire population (Mugenda & Mugenda, 2009).

The current study used the use of a cross-sectional survey to collect and analyze the data. Bryk and Raudenbus (1992) analyzed advanced qualitative techniques in social sciences and the application of data analysis methods. Their research concluded that cross-sectional survey design is relevant for studies where the researcher is assessing a variable at a point

in time and using the results therefrom to make an informed decision. In this case, the researcher relied on the historical data that has happened already happened. This methodology was proposed since both the dependent and independent variables are factors that cannot be manipulated. The research depended on historical data to assess the impact of the variables.

3.3 Population of the Study

Cooper (2006) defined the population as a collection of all observable components in a context that have similar observable characteristics. The population, in this case, was seen as the sum of all the possible outcomes. The population for this study was the low-income earners in Nairobi county. These low-income earners must also have at least borrowed on one or more digital lending platforms. This population had been chosen because most of the residents in Nairobi have higher access to credit than individuals from rural homes due to greater access to information. Moreover, most residents of Nairobi County have access to the requisite infrastructure needed to access a digital nano credit (James & Kyle, 2015).

However, the study faced the problem of estimating the desired population, the low-income earners who stay in Nairobi and have borrowed a digital nano credit facility. Similar studies in the area (Crépon,2013; Kawira,2016) faced a similar challenge in defining the population with certainty. The problem is premised on the fact that there is no authoritative source for estimating the population of slum dwellers, moreover not everyone in the slam is a low-income earner. Additionally, there is no registry of low-income earners who have borrowed a digital nano credit. Past studies used purposive sampling technique to deal with the problem. The researcher applied this methodology, where the respondents were asked preliminary questions before they were allowed to respond to the rest of the questions. Respondents who did not meet the description of the targeted group were excluded from the research after the preliminary questions.

Nairobi county is selected because most of the digital borrowers reside on Nairobi (FSD,2015). Moreover, most of the residents in Nairobi have smartphones as compared to any other city in Kenya. Most of the appraisal process for the digital nano credit require transactional data and other information which is only accessible using a smartphone. Smartphone penetration is better in cities like Nairobi as compared to rural areas. Moreover, there is a more stable network in Nairobi as compared to rural areas. Additionally, the residents of Nairobi are more aware of the available digital credit platforms as compared to the residents of rural setups (Kaffenberger, Totolo & Soursourian,2018). These factors have led to a disproportionate distribution of digital nano credit. Nairobi region is the largest consumer of digital nano credit. The reasons above, therefore, justified the choice of Nairobi for the study.

3.4 Sampling Design

Mugenda and Mugenda (2009) defined sampling design as the method of selecting a portion of the population for analysis. The selected sample is then used as a benchmark upon which the characteristics of the population can be measured. Sampling is relevant in instances where the population is too big, thus making it impossible for the researcher to collect data from the entire population. The researcher, therefore, selects a portion of representatives called a sample to analyze the effects of the independent variables on the dependent variable.

The study used purposive stratified random sampling to select a representative sample from the population. Battaglia (2011) defined stratified random sampling as a statistical method that involves the separation of a population into different segments called strata. Membership into the strata is based on specific shared attributes. The first stage of stratification included the identification of respondents who have taken a digital loan. The

second stage was to distinguish the borrowers based on whether they are paying their loans or not. The last step of stratification was to identify respondents who have never benefited from digital loans. The last group was used as a control group.

3.5 Sample Size

Anderson *et al*. (2007) defined sampling size as the acceptable proportion of the population that can be relied upon to infer the population characteristics. Their study proposed the following formulae (n = pqz2/ $E2$). Where n is the sample size, p is the segment of a population containing the interest group, q is equal to (1 – p), z = confidence level at 95% confidence interval ($\alpha = 0.05$), E is the allowable error term. The research further suggests that in instances where the proportion of the population is not known, the researcher can use the following figures. p=0.5, q = 1-0.5= 0.5, Z = 1.96 and E = 0.07. This results in a sample population of 196 respondents. These respondents were distributed based on the population densities of the 17 sub-counties as represented in table 3.1.

Table 3.1: Distribution of Sample Size

#	Nairobi Sub Counties	Population	Sample Size
1	Dagoretti North Sub	302,104	13
2	Dagoretti South Sub County	257,104	11
3	Embakasi Central Sub County	187,762	8
4	Embakasi East Sub County	297,422	13
5	Embakasi North Sub County	217,062	10
6	Embakasi South Sub County	207,562	9
7	Embakasi West Sub County	197,742	9
8	Kamukunji Sub County	268,276	12
9	Kasarani Sub County	385,569	17
10	Kibra Sub County	185,077	8
11	Langata Sub County	197,476	9
12	Makadara Sub County	189,536	8

13	Mathare Sub County	206,564	9
14	Roysambu Sub County	339,271	15
15	Ruaraka Sub County	339,271	15
16	Starehe Sub County	310,423	14
17	Westlands Sub County	308,854	14
	Total	**4,397,073**	**196**

Source Research Findings

3.6 Data Collection

The study collected data using both open-ended and closed questionnaire; this methodology is deemed appropriate because respondents were subjected to the same set of questions. Moreover, the questionnaire method eliminates the researcher's bias in the study. The differences in household income, expenditure, and other variables were captured using the same questionnaire administered to a different group.. The data collectors were all provided with a copy of the introduction letter and the research approvals and permits, which they used to identify themselves and seek the permission of respondents to participate in the research. The respondents were assisted by the data collectors to ensure that data was captured efficiently.

3.7 Validity and Reliability of the Instruments

Kothari (2009) defined validity as the degree to which the data collection instrument measures what it purports to measure. Instrument validity is assessed by research experts, who also make necessary adjustments based on the recommendations from the expert opinion. On the other hand, reliability is the extent to which the data collection instrument is consistent. This is captured by the way responses are coded in the questionnaire. A good questionnaire should be consistent all through. The questionnaire was piloted with a few experts to give their view on the suitability of the questions. The feedback of the experts was incorporated into the questionnaire before it was rolled out and eventually used in the

study. The study proposed to use the Cronbach Alpha to test for internal consistency; this is a statistical method of testing for reliability.

Data were collected using a structured questionnaire; it was, therefore, important to test statistically, the internal consistency in the instrument of data collection. The statistical test for internal consistency is the Cronbach Alpha. The statistic is unidirectional, and it runs from 0.00 to 1.00 with lower figures indicating a lack of internal consistency and higher figures indicating the presence of internal consistency in the instrument. The rule of thumb avers that an Alpha figure of 0.7 is an indicator of internal consistency.

Table 3.7: Overall Cronbach's Alpha

Reliability Statistics	Number of Items
Cronbach's Alpha	6
0.788	

Source: Research Findings (2020)

The table above shows that the overall consistency for the entire model is 78%. This is above the threshold of 70%. Therefore, the research concludes that the questionnaire is internally consistent.

3.8 Data Analysis

The study used SPSS to analyze the data using descriptive statistics, ANOVA, correlation, and ordinary least square multiple regression. The descriptive provided the average mean responses, maximum-minimum, and standard deviation of the responses. This descriptive helped in identifying the outliers before a regression analysis is done. The analysis of variance was used to determine if the statistical model, as set out by the study, was significant in explaining the changes in the dependent variable. The study used the non-directional Pearson correlation to assess the direction of the association between the variables.

The study tested its hypotheses at a 95% confidence level, and this means that the null hypothesis is accepted if the p values are more than 5%; otherwise, the alternate hypothesis is accepted where the p values are less than 5%. The tested normality through skewness and kurtosis and autocorrelation through the Durbin Watson test. The target response rate for the study was 80%. Mugenda and Mugenda (2009) aver that a response rate of 80% or more is sufficient in conducting research.

The regression model (Cohen, West & Aiken, 2003), in its general form, is given below.

$$Y= \beta_0+ \beta_1X_1+\beta_2X_2 + \beta_3X_3 + \beta_4X_4 + e$$

Where Y = welfare of the respondent measured as a composite variable

X1 = Access to Digital Nano Credit

X2 = Household Income

X3 = Age of the Breadwinner

X4 = Size of the Household

β_0 is a constant, $\beta_1 – \beta_4$, are coefficients of the independent variables; they represent a unit change in the dependent variable given a unit change in the independent variable.

e = the error term

CHAPTER FOUR

DATA ANALYSIS, RESULTS AND INTERPRETATION

4.1 Introduction

This chapter has focused on presenting and analyzing the data collected from the respondents. Data is presented through graphs, pie charts, tables and figures. The analysis was done using descriptive statistics (maximum, minimum mean, median, mode and standard deviation) of the variables under study. The chapter also looks at the correlation between the independent variable and dependent variable. The correlation analysis provides the direction of the association and whether this correlation is statistically significant or not. Both the correlation and descriptive statistics are preliminary analysis preparing the ground for regression analysis.

First and second-order conditions were assessed to test the linearity of the data set before the regression analysis is done. Normality test was conducted using skewness and kurtosis. Heteroskedasticity and serial correlation were tested using the Durbin Watson test. The statistical model was tested for significance using the F test provided in the ANOVA table. The model summary presenting the proportion of the dependent variable explained by the independent variable is also explained. Finally, the chapter presents the regression model and a brief discussion of the results thereof.

4.2 Response Rate

The study investigated the effect of digital nano credit on economic welfare; the evidence was collected from the residence of Nairobi county. A sample of 196 respondents from 17 sub-counties was targeted to participate in the survey. The sample distribution was based on the population density of the various sub-county. However, only a total of 168 respondents managed to participate in the survey representing a response rate of 85.71%.

The high response rate was attributable to the fact that most of the respondents felt that their responses would be used to support policy formation based on with regards to the issuance and use of digital nano credit. Table 4.1 shows the response rate per county.

Table 4.1: The Response Rate Per Sub County

#	Nairobi Sub Counties	Sample Size	Actual	Response Rate
1	Dagoretti North Sub	13	10	76.92%
2	Dagoretti South Sub County	11	9	81.82%
3	Embakasi Central Sub County	8	7	87.50%
4	Embakasi East Sub County	13	10	76.92%
5	Embakasi North Sub County	10	8	80.00%
6	Embakasi South Sub County	9	7	77.78%
7	Embakasi West Sub County	9	8	88.89%
8	Kamukunji Sub County	12	11	91.67%
9	Kasarani Sub County	17	14	82.35%
10	Kibra Sub County	8	7	87.50%
11	Langata Sub County	9	8	88.89%
12	Makadara Sub County	8	8	100.00%
13	Mathare Sub County	9	8	88.89%
14	Roysambu Sub County	15	14	93.33%
15	Ruaraka Sub County	15	16	106.67%
16	Starehe Sub County	14	11	78.57%
17	Westlands Sub County	14	12	85.71%
	Total	**196**	**168**	**85.71%**

Source Research Findings (2020)

4.3 Digital Nano credit and Economic Welfare

Table 4.3: How Digital Nano Credit affect the various constructs of Economic welfare.

#	Details	Minimum	Maximum	Mean	Mode
1	Housing	5	2	4.3	4
2	Furniture	3	1	1.3	1

3	Health	5	3	4.5	4
4	Clothing	3	1	1.2	1
5	Food	5	3	4.7	5
6	Emergency finances	5	3	4.8	5
7	Savings	5	3	4.1	4
8	Education	5	3	4.5	5
9	Social Cultural Relations	4	2	1.1	3
10	Self Esteem and Knowledge	5	3	4.1	4
11	Control over Assets	5	3	4.5	4

Source: Research Findings (2020)

Table 4.3 shows the results of how the respondents ranked the usefulness of digital nano credit on the constructs of economic welfare. Welfare is a multi-dimensional construct, and the researcher needed to know how digital credit affects the various facets of economic welfare. The responses have been averaged, and the values have the following meaning, a score;1-1.9 digital nano credit does not affect the construct,2-2.9 it affects the construct to a limited extent,3-3.9 to a moderate extent,4-4.9 to a great extent and 5 is to a very great extent. The analysis will be done based on the means and mode.

Based on the mean, the study indicates that most of the users utilize digital nano credit to a great extent to sort out the essential needs. Housing, health, food, emergency finances and education have the following mean score (4.3,4.5,4.7,4.8 and 4.5) respectively, this shows that most of the respondents used the digital nano credit on essential goods and services. These results confirm the findings of Bennett and Lyon (2017) who investigate how digital credit is used in Kenyan and concluded that a significant number of applicants use digital credit to solve essential emergencies such as food, rent and paying for hospital bills. The results also confirm the assumptions of the neoclassical theory of welfare which avers that

a correction of market imperfection though access to credit can lead to improved welfare of the recipients (Korynski,2007).

Table 4.3 also provides evidence that there most of the applicants do not use digital nano credit on luxuries. Furniture clothing and social, cultural relations have a mean of 1.3,1.2 and 1.1, respectively meaning that most of the respondents do not use digital at all for these variables. Most people are less likely to use digital-nano credit for entertainment purposes. These findings support the conclusions of Kaffenberger and Chege (2016), the study concluded that only a little proportion of digital credit is used on luxuries. However, the results failed to support the assumptions of the individual deficiency theory which postulate that low-income earners are more likely to use digital nano credit to purchase luxury goods (Rainwater,1970)

4.4 Pearson Correlation

Table 4.4: Pearson Correlation

Correlations		Welfare	Access to Nano Credit	Income	Age	Size of household
Welfare	Pearson Correlation	1				
	Sig. (2-tailed)					
Access to digital	Pearson Correlation	.379**	1			
	Sig. (2-tailed)	0				
Income	Pearson Correlation	.388**	-0.042	1		
	Sig. (2-tailed)	0	0.593			
Age	Pearson Correlation	.881**	.302**	.333**	1	
	Sig. (2-tailed)	0	0	0		
Size of household	Pearson Correlation	0.028	0.043	-0.078	0.048	1
	Sig. (2-tailed)	0.715	0.576	0.315	0.538	

** Correlation is significant at the 0.01 level (2-tailed).

Source: Research Findings (2020)

A non-directional Pearson correlation statistic was used to investigate whether there is a statistically significant correlation between household welfare, Access to digital nano credit, household income, age of the breadwinner and size of the household. The correlation

statistic is a preliminary analysis which shows the direction of the association. The rule of thumb for Pearson correlation is given as follow ; The correlation statistic runs from -1to 1with the following meanings attached to the values in between +/- 0-0.24 means that there is no correlation,+/-0.25-0.49 means that there is a weak relationship,+/-0.5-0.74 means that there is a moderate correlation and +/-0.75-1 means a strong correlation. The sign shows the direction of the correlation.

Access to digital nano credit has a correlation coefficient of 0.379; this means that there is a weak positive correlation between access to digital nano credit and economic welfare. An increase in access to digital nano credit increases the economic welfare of the recipients. Age of the household head and economic welfare has a correlation coefficient of 0.881; this means that there is a strong positive correlation between age and economic welfare of the household. Size of household also has a weak positive correlation with economic welfare; however, the correlation coefficient of 0.028 is not significant. Income has a weak, statistically significant positive correlation with economic welfare; an increase in income is likely to lead to an increase in economic welfare.

4.5 Regression Analysis

The study used multiple ordinary lease square regression methodology to assess the effect of access to digital nano credit and economic welfare of the households. Regression analysis looks at the statistical significance of the individual relationship between the dependent and independent variable. The independent variables in the study include the following; Access to digital nano credit, household income, age of the breadwinner and size of household. This section will look at the model summary detailing the percentage of the dependent variable explained by the independent variables. F-test has been used to test

the statistical significance of the overall model through the ANOVA table. Finally, the section will look at the interpretation of the regression results.

4.5.1 Model Summary

Table 4.11: Model summary

Model Summary	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.897a	0.805	0.8	0.1287

a Predictors: (Constant), Size of household, Access to digital, Income, Age,
b Dependent Variable: Welfare

Source: Research Findings (2020)

The model summary estimates the proposition of the dependent variable (Economic welfare of the household) and independent variables (Access to digital nano credit, Size of households, Household income and Age of the respondents). The R square indicates that 80.5% of the changes in the dependent variables explained by the independent variables.

4.5.2 Analysis of Variance

Table 4.12: Analysis of Variance

ANOVAa		Sum of Squares	Df	Mean Square	F	Sig.
Model	Regression	11.157	4	2.789	168.315	.000b
	Residual	2.701	163	0.017		
	Total	13.859	167			

a Dependent Variable: Welfare
b Predictors: (Constant), Size of household, Access to digital, Income, Age

Source: Research Findings (2020)

The analysis of variance statistic tests whether the analytical model as set out in the research is statistically significant. The F-test gives assurance that the model as set out is statistically significant in the movements in the dependent variable. The ANOVA statistic looks at the overall impact of independent variables (Size of household, Access to digital, Income, Age) on the dependent variable (Household Economic Welfare).

The null hypothesis for the test assumes that the independent variables collectively does not affect the dependent variable. This null hypothesis is accepted if the probability of its occurrence (Alpha as represented by P-value) is more than 5%. The probability of the null hypothesis being true is 0.00% as represented by the Sig figure. The null hypothesis is therefore rejected and the alternate hypothesis accepted; The independent variables (Size of household, Access to digital, Income, Age) collectively explain the dependent variable (Household economic welfare).

4.5.3 Regression Model

The regression model shows the direction of the relationship and the strength of the relationship. Table 4.13 shows the results of the regression analysis.

Table 4.13: Regression Model

	Unstandardized Coefficients		**Standardized Coefficients**	**t**	**Sig.**
	B	**Std. Error**	**Beta**		
(Constant)	2.631	0.081		32.676	0
Access to Nano Credit	0.056	0.014	0.145	3.94	0
Household Income	0.048	0.014	0.129	3.449	0.001
Age	0.021	0.001	0.795	20.37	0
Size of household	-0.001	0.004	-0.006	-0.17	0.865

Source: Research Findings (2020)

$$Y = \beta o + \beta_1 x_1 + \beta_2 x_2 + \beta_3 x_3 + \beta_4 x_4 + \varepsilon$$

$$Y = 2.631 + 0.056\, x_1 + 0.048\, x_2 + 0.021\, x_3 + -0.001\, x_4 + \varepsilon$$

The results indicate that there is a constant level of economic welfare which is not dependent on any of the variables under consideration. Constant has a coefficient of 2.36 and a p-value of 0.0. This indicates that it is statistically significant and can be relied upon to make inferences in other populations. Access to digital nano credit ($B = 0.056$, $P < 0.05$) has a statistically significant positive relationship with economic welfare. This means that

an increase in access to digital nano credit increases the economic welfare of the receiving households. Household income has a statistically significant positive relationship with economic welfare (B = 0.048, P <0.05). This means that an increase in household income leads to an increase in economic welfare. The households are able to buy more of the necessaries of life with more income.

The age of the household breadwinner has a positive relationship with economic welfare (B = 0.021, P <0.05). These results mean that an increase in the age of the breadwinner leads to better economic welfare. As one grows older, they master their trade, and this leads to an increase in income and consequently improved welfare. However, the size of the household was found to have a negative relationship with economic welfare. An increase in the size of the household was found to lead to a decrease in the economic welfare of the household (B = - 0.001, P > 0.05). An increase in the household size leads to an increase in the demands of the families. With constant income and increased demands, families are unable to meet all their needs, and this leads to compromised welfare situations because these families can no longer afford all the basic necessaries of life.

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CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATION

5.1 Introduction

This chapter summarizes the research findings. A summary of the demographic characteristics of the respondents, descriptive statistics of the significant variables under consideration, correlation statistics, the results of the test of linearity, the Summary of ANOVA findings, a summary of the model summary and finally the summary of the findings therefrom will be presented in this chapter. The chapter will also discuss the conclusions made from the research findings based on the ordinary least square regression methodology. This discussion will indicate whether the results confirm or fail to confirm the assumptions of the theories and past empirical evidence. The chapter will also suggest policy recommendations based on the findings. Finally, the chapter will recommend areas for further research.

5.2 Summary

The study sought to find out the effect of accessing digital nano credit facility on the economic welfare of selected Nairobi residents(low-income earners). Finally, the study sought to find out how the usage of digital nano credit affects the economic welfare of the receiving households. The regression analysis shows that access to digital nano credit and economic welfare are positively related. These findings are consistent with the results of Omondi and Ogaga (2015), Kawira (2016) and Langat (2016) who found that there is a statistically significant positive relationship between access to nano credit and economic welfare of the beneficiaries. However, these findings conflict the assertions of Crépon et al. (2013) and Banerjee et al. (2013) who concluded that access to microcredit does not have any effect on the economic welfare of the recipients.

These results support the assumptions of the neoclassical theory of poverty and the restrictions of opportunities theory. These two theories aver that access to credit is likely to correct market imperfections and provide more opportunities to the low-income earners hence improving their earning and spending capacity and consequently their economic welfare. However, these results contradict the assumptions of the individual deficiency theory, which postulates that economic welfare is solely influenced by the personal traits of the individual. The theory assumes that personal deficiencies; lack of entrepreneurial talent and business acumen are the sole contributors to economic welfare. To this extent, the theory postulates that interventions such as the provision of credit to the less privileged are less likely to improve their welfare since they will just waste it on non-essential consumptions. However, the results of this study indicate that the provision of digital nano credit to low-income earners increases economic welfare to the extent that they use it to buy essential goods and services.

The results also indicate that a majority of the respondents use digital nano credit to purchase the essential goods and services needed to improve their welfare. Most of the respondents also indicated that they use digital nano credit to boost their business by buying stock and paying for business services. These results also indicate that low-income earners are less likely to spend digital nano credit on luxuries and entertainment. These results are in direct conflict with the assumptions of individual deficiency theory which assumes that low-income earners are more likely to misuse digital nano credit by spending it on non-essential services. These results confirm the findings of Abhijit et al. (2014) and Attanasio et al. (2015) who sought to find the impact of microcredit on the performance of business and welfare of the recipients in India. These studies found that microcredit affects both performance and welfare positively.

5.3 Conclusions

The study concluded that there is a statistically significant positive relationship between economic welfare, access to digital nano credit, usage of digital nano-credit, the age of the breadwinner, household income. The size of the household was found not to have a negative relationship with economic welfare; however, this relationship was not statistically significant. The study also concluded that there is a constant level of economic welfare which is not affected by access to digital nano credit. The study also confirmed the assumptions of the neoclassical theory of welfare and restrictions of opportunities theory. However, the results of the study do not support the assumptions of the individual deficiency theory.

5.4 Policy Recommendation

The study concluded that there is a positive relationship between access to digital nano credit and economic welfare. This, therefore, means that digital nano credit has the capacity of resolving the market imperfections. The restrictions of opportunities theory aver that the economic welfare of individuals can be enhanced if the individuals are given the right incentives and environment. The study, therefore, proposes that access to nano credit should be increased in order to enhance the general welfare of the people. The government should also look at regulating the industry in order to protect the interest of the general public which are vulnerable due to their need for the money.

The study also concluded that there was a positive association between income and the welfare of the respondents. The study, therefore, recommends to the government to engage in expansionary economic policies which expand the disposable income of the general population. This will lead to increased aggregate demand for the economy and improved economic welfare for the citizens. The study also recommends that the government should

issue grants and loans to entrepreneurs to enable them to grow their businesses. This will lead to increased income and consequently enhanced household welfare.

The study also concluded that there is a negative relationship between the size of the family and economic welfare. This means that increasing the number of family members and dependents affect welfare negatively. The research, therefore, recommends that families should know the optimal size which can be supported with the available income. This will lead to improved living standards and consequently, better economic welfare. The study also recommends that the government should discourage rural-urban migration, through investments in the rural areas and provision of opportunities to the youth in rural areas. This is likely to reduce the number of defendants living in urban areas and consequently improve household welfare.

5.5 Limitation of the Study

The study faced challenges in data collection; there was an initial resistance to provide demographic information. Female respondents were particularly not comfortable with disclosing information about their age. The male respondents, on the other hand, were not impressed with questions around the marital status. The researcher resolved these issues by promising the respondents anonymity. The researcher also assured the respondents that this research was going to be used for the purpose of academic research alone and that none of their names or identity of any kind will be published.

The second challenge that the researcher met during data collection was with regards to collecting data about the level of income. Some respondents thought that disclosing that information may be adverse to them since they feared that they could be tracked by KRA. Some of the respondents also feared to disclose whether they have a default history or not. These respondents thought that the research could be used as a tool to deny them credit in

future or worst still list them in CRB. The researcher managed to convince the respondents that he was neither working for KRA nor CRB. The researcher used the authority provided by the university as proof that data was being collected for the purposes of academic work.

The researcher also had challenges with regards to measuring economic welfare; this is because welfare is a multi-dimensional variable. There are many facets making up what welfare is the study; therefore, used qualitative measurements of welfare and computed a score for measuring economic welfare. The score was then turned into a scale variable which can be regressed with other variables in the regression model.

5.6 Suggestion for Further Studies

The research concluded that there is a positive, statistically significant association between access to digital nano credit and economic welfare. However, very few studies have been done on whether the interest rate has an intervening effect on welfare. This study, therefore, suggests that a study needs to be conducted in order to determine if there is a relationship between the interest rate charged by digital nano credit provides and economic welfare. One of the critical issues to be addressed by the research will be to find out if digital credit, in the long run, is likely to lead to increasing poverty, or it will reduce it.

The results failed to validate the assumptions of the individual deficiency theory, which assumes that individuals are born with natural abilities or disabilities, which may enhance or limit their economic welfare. The theory further posits that government intervention through grants or aid from financial institutions like loans are not likely to enhance economic welfare since the abilities or disabilities of creating wealth is embedded in a person's DNA. The theory, therefore, estimates that access to digital nano credit is likely to have no impact on the economic welfare of the recipients. However, empirical evidence fails to support these assumptions. There the study proposes further research to validate the

assumptions of the individual deficiency theory. This will contribute to the already developing theory. The proposed study will answer the question as to whether the capabilities of wealth creation are genetic traits or those abilities can be leant if individuals are placed in an enabling environment.

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APPENDICES

Appendix 1: Questionnaire

A. Background Information

1. What is the …….

1.	Total number of household members in this household	
2.	Number of people earning an income	
3.	Number of people under 16years in this household	
4.	Number of school-going children in this household	

2. What age group suitably describes you?

   20yrs-25yrs [ ] 40yrs-50yrs [ ]

   25yrs-30yrs [ ] 50yrs-60yrs [ ]

   30yrs-40yrs [ ] 60 above [ ]

3. Gender

   Male [ ] Female. [ ]

4. What is your marital status?

Single	
Divorced/separated	
Widowed	
Married/living with a partner	
Do not know/ refused to answer	

5. What is your relationship to the household head?

Head	
Spouse	
Son/daughter	
Father/mother	
Sister/brother	
Grandchild	
Other relative	
Other non-relative	

6. What is the highest level of formal education completed by the respondent?

None	
Some primary (specify level reached)	
Primary completed	
Some secondary (specify level reached)	
Secondary completed	
Technical training after secondary school	
University degree	

B. Income Information

1. Overall, including all your sources of income, how much money would you say you get on average in a month (KShs)?

Less than 100	01
101 - 1,500	02
1,501 – 3,000	03
3,001 – 7,500	04
7,501 – 15,000	05
15,001 – 30,000	06
30,001-100000	07
100,000 – 200000	08
Greater than 200000	09
Refused to answer	

2. What is the primary source of income for the head of the household?

	Activities to earn money	Mode of payment	Most Important	Primary source of income of
01. Farming (crops or keeping livestock)				
02. Employed				
03. Casual worker				
04. Self-employed/running own business				
05. Pension that you receive from the government, ex-employer or scheme				
06. Money/support from family/friends / spouse				
07. Sub-letting of land				
08. Sub-letting of house/rooms/ renting 09. Renting equipment				
10. Earning money from investments, e.g. shares, stocks				
11. Aid agency/NGO/govt assistance in the form of food or grants				
12. Others specify				

3. Has your income increased after getting the digital credit?

Yes [ ] No [ ]

If yes, by how much?.....

C. Accessibility of Nano-Credit

1. Have you ever borrowed via your mobile phone?
   (1) Yes [ ]
   (2) No [ ]

2. What was the highest amount of loan that you borrowed and when? ……
   (1) Below 10,000 [ ]
   (2) Above 10,000 [ ]

3. What was the repayment interest rate for the last loan? ……...

4. What was the repayment period
   (1) 1-30 days [ ]
   (2) 30-60 days [ ]
   (3) Unknown [ ]
   (4) Other (specify).....

5. Have you defaulted on any mobile money loan?
   (1) Yes [ ]
   (2) No [ ]

6. Were they fair in your view?
   (1) Yes [ ]
   (2) No [ ]

SECTION D: Determinants of Welfare

Given below are some selected determinants of economic welfare please indicate the extent to which you agree with the questions therein.

5 - Very great extent **4** - Great extent **3** - Moderate extent **2** - Little extent **1** – Not at all

#	**Determinants of welfare**	**5**	**4**	**3**	**2**	**1**
1	To what extent does access to digital nano credit affect your economic welfare					
2	To what extent does income affect your economic welfare					

3	Does the size of the household affect economic welfare					

SECTION E; Welfare Information

Comment briefly on the status of your living standards since you been using digital credit in terms of;

	Very Great Extent	Great Extent	Moderate Extent	Little Extent	Not at all
Housing	☐	☐	☐	☐	☐
Furniture	☐	☐	☐	☐	☐
Health	☐	☐	☐	☐	☐
Clothing	☐	☐	☐	☐	☐
Food	☐	☐	☐	☐	☐
Emergency finances	☐	☐	☐	☐	☐
Savings	☐	☐	☐	☐	☐
Education	☐	☐	☐	☐	☐
Social Cultural Relations	☐	☐	☐	☐	☐
Self Esteem and Knowledge	☐	☐	☐	☐	☐
Control over Assets	☐	☐	☐	☐	☐

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END