



Strathmore
UNIVERSITY

Strathmore University
SU+ @ Strathmore
University Library

Electronic Theses and Dissertations

2018

Factors affecting liquidity challenges among digital finance agents in Nairobi County

Irene W. Wachira
Strathmore Business School (SBS)
Strathmore University

Follow this and additional works at <https://su-plus.strathmore.edu/handle/11071/6064>

Recommended Citation

Wachira, I. W. (2018). *Factors affecting liquidity challenges among digital finance agents in Nairobi County* (Thesis). Strathmore University, Nairobi. Retrieved from <http://su-plus.strathmore.edu/handle/11071/6064>

This Thesis - Open Access is brought to you for free and open access by DSpace @Strathmore University. It has been accepted for inclusion in Electronic Theses and Dissertations by an authorized administrator of DSpace @Strathmore University. For more information, please contact librarian@strathmore.edu

**FACTORS AFFECTING LIQUIDITY CHALLENGES AMONG DIGITAL
FINANCE AGENTS IN NAIROBI COUNTY**

IRENE WAGAKI WACHIRA

MBA/90724



A dissertation submitted in partial fulfillment of the requirements for the Degree of
Master of Business Administration of Strathmore University

STRATHMORE BUSINESS SCHOOL

MAY, 2018

This dissertation is available for Library use on the understanding that it is copyright material and that no quotation from the thesis may be published without proper acknowledgement.

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 thesis contains no material previously published or written by another person except where due reference is made in the thesis itself.

© No part of this thesis may be reproduced without the permission of the author and Strathmore University.

Irene Wagaki Wachira

May, 2018

Approval

The thesis of Irene Wagaki Wachira was reviewed and approved for examination by

Dr. David Mathuva (Supervisor)

Strathmore Business School.



Professor Ruth Kiraka

Dean, School of Graduate Studies, Strathmore Business School.

ABSTRACT

This study sought to investigate the factors affecting agents' liquidity challenges in Nairobi County. It adopted a mix method cross-sectional study of agents, master agents, provider representatives and bank representatives. The study had three-fold objective: to establish the relationship between agent factors and liquidity challenges, to establish the effect of supply side factors on agent liquidity challenges and to explore agent perceptions towards liquidity management mechanisms. Liquidity challenges were defined as too frequent or few rebalancing visits and high numbers of transactions denied due to lack of float.

The study found that agents experience in the agency was an important determinant of the frequency of rebalancing because they have established rebalance routines and relationships with rebalancing facilitators thus minimizes liquidity outages. In cases where rebalancing is conducted by owners, there are more rebalancing visits due to the instantaneous decision making as compared to when employees perform rebalancing due to longer decision making approval processes which leads to prolonged liquidity outages. The capital layout of the main business is another important determinant of the frequency of rebalancing visits. Higher capital investments in their primary business means less liquidity outages as the agency can tap into the working capital flows of the primary business to meet its liquidity needs. Banks were the primary mode of rebalancing to acquire electronic float. Distance to the nearest bank branch was a very important factor in determining liquidity challenges whereby agents located further away from banks denied more transactions due to lack float and rebalance less often than agents located closer to banks. This was attributed to the travel costs incurred during rebalancing visits and the opportunity cost such as loss of potential business of the primary business.

The study recommended continuous revision of the profile of a suitable agent to include experienced, owner-operated and high cash-flows of the primary business. The study also recommends an industry rather than provider specific perspective to solving liquidity challenges. Managerial level recommendations included decentralization of liquidity hubs beyond bank branches, regular agent training and monitoring.

Key words: Liquidity Management, Agent Networks, Agency Banking

TABLE OF CONTENTS

ABSTRACT.....	iii
CHAPTER ONE: INTRODUCTION	1
1.0 Introduction.....	1
1.1 Background of the Study	1
1.2 Statement of the Problem.....	4
1.3 Research Objectives.....	5
1.4 Research Questions	5
1.5 Significance of the Study	5
1.6 Scope of the Study	6
CHAPTER TWO: LITERATURE REVIEW	7
2.1 Introduction.....	7
2.2 Theoretical Review	7
2.2.1 Agency Theory.....	7
2.3 Empirical Review.....	8
2.4 Summary of Literature Review.....	12
2.5 Research Gaps.....	14
2.6 Conceptual Framework.....	14
CHAPTER THREE: RESEARCH METHODOLOGY.....	17
3.1 Introduction.....	17
3.2 The Research Design	17
3.3 Population and Sampling	17
3.4 Data Collection Methods	19
3.5 Data Analysis	19
3.6 Research Quality and Validity	21
3.7 Ethical Issues in Research.....	21
CHAPTER FOUR: PRESENTATION OF RESEARCH FINDINGS	23
4.1 Introduction.....	23
4.2 Response Rates	23
4.2 Respondent Demographic Information.....	23
4.4. Diagnostic tests	29
4.5 Bivariate analysis	29
4.5.1 Chi-square tests of agents' years of experience vs. Liquidity challenges.....	30

4.5.2 Chi-square tests of capital layout of the main business vs. Liquidity challenges	31
4.5.3 Chi-square tests of owner involvement vs. Liquidity challenges.....	31
4.5.4 Chi-square tests of education level vs. Liquidity challenges	31
4.5.6 ANOVA analysis of transaction cost vs. Liquidity challenges	32
4.5.5 ANOVA analysis of Distance to bank vs. Liquidity challenges	32
4.5.7 Chi-square tests of agent training vs. Liquidity challenges	32
4.5.8 Chi-square tests of agent monitoring visits vs. Liquidity challenges.....	33
4.7. Inferential Analysis.....	33
CHAPTER FIVE: SUMMARY OF FINDINGS, CONCLUSIONS AND RECOMMENDATIONS	36
5.1 Introduction.....	36
5.2 Summary of findings.....	36
5.2.1 Relationship between agent factors and agents' liquidity challenges	36
5.2.2 Effect of supply side factors on agents' liquidity challenges.....	37
5.2.3 Agents' perceptions towards liquidity management	38
5.3 Conclusions.....	39
5.4 Recommendations.....	40
5.4.1 Managerial Recommendations.....	40
5.4.2 Policy Recommendations.....	41
5.5 Limitations of the Study.....	41
5.6 Areas for Further Studies	41
REFERENCES	42
APPENDICES I: Findings from Qualitative Interviews.....	44
APPENDICES II: Interview Guide-Provider Representative.....	46
Appendix 2: Quantitative Questionnaire.....	47
Appendix 3: Key Informant Interview Guide-Agents	53

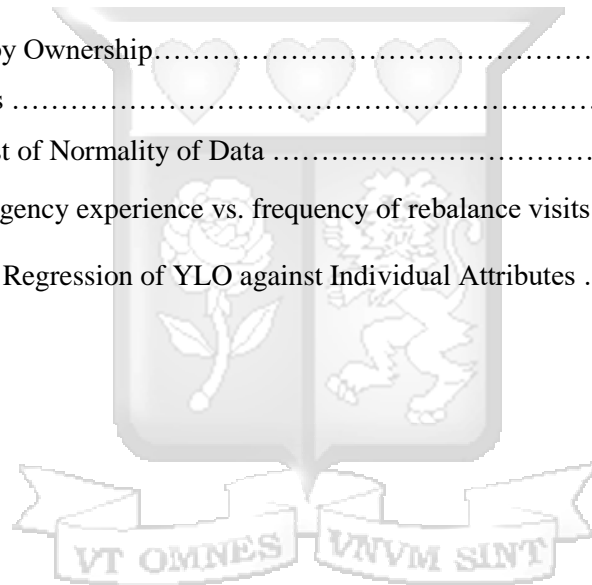
LIST OF FIGURES

Figure 2.1 Conceptual Framework	15
Figure 4.1: Capital layout of primary business	26
Figure 4.2: Agents' Perception of their Liquidity Management Capability	28
Figure 4.3: Agent Concerns with Existing Liquidity Mechanisms.....	28



LIST OF TABLES

Table 1.1 Agent Numbers in Kenya	2
Table 2.1 Summary of Literature Review	13
Table 3.1 Qualitative Research Sample	18
Table 3.2 Research Analytical framework.....	20
Table 3.3 Research Instrument Reliability Analysis	21
Table 4.1 Sample for Quantitative Research.....	23
Table 4.2 Respondent Demographic Data.....	24
Table 4.3 Education Level by Ownership.....	25
Table 4.4: Rebalance points	26
Table 4.5: Shapiro-Wilk test of Normality of Data	29
Table 4.6: Chi-square test agency experience vs. frequency of rebalance visits	30
Table 4.7: Ordinal Logistic Regression of YLO against Individual Attributes	34



KEY DEFINITIONS

The following definitions have been adapted from the), and the IFC *Digital Finance Handbook* (2016), *GSMA State of the Industry 2016 report* (2016) and the *MicroSave Agent Network Accelerator Kenya report* (2014).

Active agent outlet- An active agent outlet is an agent outlet where any of the tills were used to facilitate at least one transaction within the last 30 days (GSMA SOTIR, 2016).

Agent non-exclusivity- Non-exclusive agents are agents serving multiple financial service providers (IFC, 2016).

Agent outlet- An agent outlet is a location where one or several provider-issued tills are used to conduct financial transactions digitally for clients. These transactions include deposits (cash-in) and withdrawals (IFC, 2016).

Agent tills- Agent tills are provider-issued “lines”, which can be SIM cards or PoS (Point of Sale) machines, authorized and used to facilitate CICO transactions (GSMA, 2016), (MicroSave, 2015).

CICO services- Deposit and withdrawal transactions to either a mobile money account or bank account (MicroSave, 2015).

Main/Master agent- Common term among MNOs in Kenya, refers to the agent holding the agency contract and is responsible for recruiting (sub-agents) to conduct cash-in cash-out transactions (GSMA, 2016).

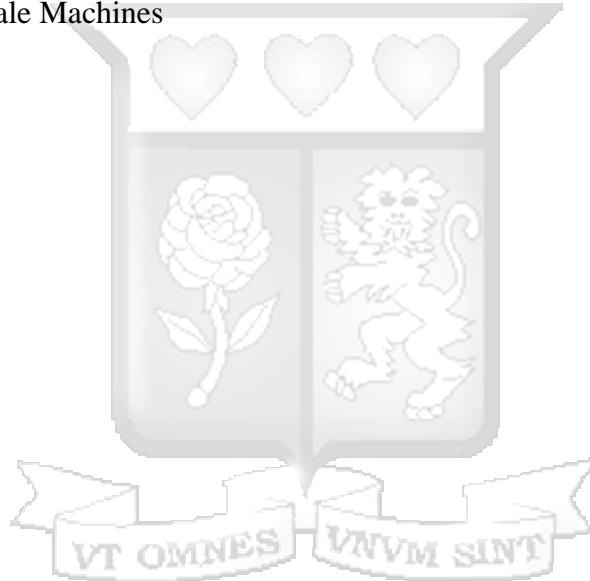
Primary business- The main business conducted by an agent alongside the agency business (MicroSave, 2015).

Rebalance – A transaction conducted by the agent or their representative to trade cash for float and vice versa (MicroSave, 2015).

Super agents- These are designated rebalancing facilities for agents usually banks but can also be supermarkets and other cash rich entities depending on service level agreements with the mobile money providers (GSMA, 2016), (IFC, 2016).

LIST OF ABBREVIATIONS

ANM	Agent Network Management
CICO	Cash-in Cash-out transactions
DFS	Digital Financial Services
FSPs	Financial Services Providers
HO	Head office
MNOs	Mobile Network Operators
POS	Point of Sale Machines



ACKNOWLEDGEMENTS

I am grateful to the almighty God for enabling me to undertake this study and my rock-it-team who have been more than encouragers. I wish to thank my supervisor for his guidance and the Strathmore Business School fraternity for the support accorded in the thesis writing.



DEDICATION

This thesis is dedicated to my family and the financial inclusion fraternity.



CHAPTER ONE: INTRODUCTION

1.0 Introduction

This section provides a contextual understanding of the background of the study and defines the importance and scope of the study. It includes sub-sections namely; background of the study, statement of the problem, research objectives, research questions, significance of the study and scope of the study.

1.1 Background of the Study

Emerging evidence in financial inclusion suggests that access to financial services through formal accounts can enable individuals and firms to smoothen consumption, manage risk, and invest in education, health and enterprises. With over 2 billion people in the world without access to a bank account, there is a call for efficiency in the current interventions to achieve a consistent and steady growth in financial access (World Bank, 2017).

Globally, mobile money has responded to this call accelerating financial inclusion for the poor evidenced by 19 countries or markets having more mobile money accounts than bank accounts in the last decade. On average an active mobile money user conducts approximately twelve transactions per month. These transactions include airtime purchase (4.8), merchant payments (2.6), deposits (2.2) and withdrawal (1.7) transactions respectively in order of volume of transactions per month. Notably, despite the high uptake of mobile money, activity of these accounts is low with about 32% of the mobile money accounts in Sub-Saharan Africa estimated to be inactive on a thirty-day basis, according to the GSMA State of the Industry (2016) and (2017) reports. There is a call to develop more use cases for mobile money to grow the account activity, however, this will be turbo-charged by optimal use of agents as the key facilitators of cash-in and cash-out services, customer enrolment and customer service for the mobile money service. The same GSMA study (2017) has reported high growth in agents with 37 markets of countries globally, registering more agent than bank branches in the last decade.

In Kenya, the proportion of financially excluded populations has reduced from 41% to 17% in the last four years, attributed to the reduction in the proportion of the population using informal financial mechanisms. This trend is attributed to formal banking services becoming more

accessible through alternative delivery channels such as agent banking and mobile money according to the Central Bank of Kenya (2018) report. Mobile money is leading in financial inclusion with the M-PESA service holding a majority market share (70%) in terms of registered customers according to the Communications Authority of Kenya (2018). In terms of agent performance there has not been recent studies providing a comparison of mobile money and bank agents except for the MicroSave Agent Network Accelerator study (2014). The study shows that M-PESA agents are leading in physical presence at 79% while noting the increase in physical presence of bank agents from a negligible share to 15%. The (CBK) Central Bank of Kenya (2016) acknowledged the increasing acceptance of agency banking by Kenyans. The CBK report noted that local commercial banks are leading in use of banking agents as part of their channel diversification strategies to reach new market geographies at a reduced cost and offer more convenient access to financial services among other rationales. The number of agents for the leading banks in Kenya is shown in the Table 1.1

Table 1.1 Agent Numbers in Kenya 2016

Financial Service Provider	Number of agents	Percentage
Safaricom ‘M-PESA’	124,084	65
Equity Bank ‘Equity Agent’	25,428	13
Airtel ‘Airtel Money’	18,354	10
Kenya Commercial Bank ‘KCB Agent’	12,883	7
Co-operative Bank ‘Kwa Jirani’	8,856	5
Total	189,605	100

Source: Central Bank of Kenya (2016 Report), Communications Authority of Kenya (2016/7), Author computations.

The digital financial service providers in Kenya are primarily regulated by separate bodies namely; the Communications Authority of Kenya (CAK) for mobile money service providers while banks are regulated by CBK. However, the distribution of financial services through agents is regulated by The National Payments Act (2013) by CBK which provides guidelines on among other issues, the use of the agency model by various providers. In particular it requires financial service providers to recruit agents with basic requirements as to have a main business

for one year, attained 18 years of age and be able to raise the required initial capital as float among others. The regulation requires the financial service provider to train the agent, ensure that their shop is branded with the providers and issue contracts outlining the responsibilities of the agent including among others adherence to Know Your Customer (KYC) and Anti-Money Laundering (AML) and appropriate escalation of matters. The act also mandated non-exclusivity to allow all agents to serve multiple providers without contractual consequences from either provider.

The agent business according to McGrath (2014) is a liquidity management business since it involves “loading value into the mobile money or bank agent system, and then converting it back out again into cash” which is commonly referred to as liquidity. Agent’s liquidity management takes two forms electronic cash and float according to the International Finance Corporation (IFC) Liquidity Management Toolkit (2015). Agents’ balances in the wallet or agency bank account for mobile money and bank services respectively, may fluctuate up and down depending on the number and value of cash-in (deposit) and cash-out (withdrawal) transactions conducted throughout the day. While it is unlikely that the customer deposit and withdrawal transactions will balance out at the end of the day, the agent may run of electronic cash or float. If an agent does not have a bank account linked to their agent till (wallet or bank account) they will have to make a trip to the bank. In Kenya, providers like M-PESA have involved other players in the agent management chain such as master agents to help agents acquire electronic float without visiting a bank branch.

The IFC (2015) remarked that unlike electronic float which can be managed remotely, obtaining physical cash requires physical interventions. Financial service providers globally such as GCASH in The Philippines are linking agents with microfinance banks to have their branch managers pick up excess cash from the agents. Others in Pakistan and Bangladesh according to MicroSave (2017) hire float runners to deliver physical cash to agents at the door step of their premises. Wing in Cambodia according to IFC (2016) finances cash rich entities to facilitate agent rebalancing in areas where it is difficult to access a bank or a provider facility.

The MicroSave ANA (2014) and IFC (2015) concur that despite the considerably mature agent networks and banks ‘enthusiasm to agent banking in Kenya, liquidity management is still a top concern for the industry. Issues such as unpredictability of customer demand for agent services,

agents' lacking adequate capital to invest in the agency business, time taken to travel are among reasons cited by agents in the MicroSave (2014) study as the top barriers to liquidity management.

1.2 Statement of the Problem

In Kenya, digital finance has turbo-charged financial access according to Financial Inclusion Insights (2016), with 67% of Kenyans have access to an agent within a kilometer from their home. However, the access to financial services through agents has not been optimal. Often, Kenyans have to visit more than one agent further from their home to complete a single transaction (FII Kenya 2016). The GSMA (2017) also points to the shrinkage of once robust agent networks in Sub-Sahara Africa recording a lower growth in agent activity than the growth in overall agent registrations. This situation is even more real in Kenya where a significant proportion of agents (11%) in Kenya operate below profitability while at the same time denying at least three transactions daily due to liquidity challenges. This according to MicroSave (2014) is attributed to agent liquidity challenges which were evidenced in the same study by agents saying that liquidity is a top concern for their business.

Furthermore, an earlier study by CGAP (2011) noted that agents spend a significant proportion of their income in liquidity management activities. This is telling of looming agent sustainability problems if the agent's liquidity issue is not adequately addressed. The McKinsey 'Digital Finance for All' 2018 report estimated the transaction costs saving potential of digital finance at 80-90% of the brick-mortar unit transactional costs. The agents' liquidity challenges and the resultant shrinkages in the agent network may undermine this cost-saving promise. The liquidity management challenge is being addressed in variant ways across the globe. For example, in Pakistan and Bangladesh, financial service providers use of float runners, and advance float mechanisms to supplement bank branches in offering liquidity facilities to agents. However, these solutions may or not work in the Kenyan context due to unique factors such as infrastructure, regulation, security among others. It was therefore important to investigate ways of adapting such solutions to Kenyan context as well as innovative ways to abate the agent liquidity challenges in Kenya.

Reviewed literature suggests that even developed agent networks like Kenya's M-PESA continue to face agent liquidity challenges. Agents' liquidity challenges have implications on the reliability of the service offered to customers and even more on the sustainability of the agency business. This study was therefore necessitated to aid financial service providers in overcoming agent liquidity challenges for optimal utilization of their digital finance agent channels.

1.3 Research Objectives

1.3.1 General research objectives

The general objective of this study was to investigate the factors contributing to liquidity challenges among digital finance agents in Nairobi. The specific objectives were as follows:

1.3.2 Specific research objectives

- I. To establish the relationship between agent factors and agents' liquidity management
- II. To establish the effect of supply side factors on agents' liquidity challenges.
- III. To explore agents' perceptions towards liquidity management.

1.4 Research Questions

The study sought to answer the following questions:

- I. What is the relationship between agent factors and agents' liquidity challenges?
- II. How do supply side factors affect agents' liquidity challenges?
- III. What perceptions are held by agents towards liquidity management?

1.5 Significance of the Study

1.5.1 To the Agency Theory

This study validated the information asymmetry argument as proposed by Jensen and Meckling (1976) in the agency theory to the extent that agents have more information about the demand for cash-in and cash-out services than the providers. This means that the agents can, therefore, determine the amount of liquidity required for the agency business more accurately compared to the providers.

1.5.2 To Financial Service Providers

This study has significance to mobile money service providers and banks by unveiling the liquidity challenges facing agents. The findings and recommendations of this study will enhance the financial service providers' support mechanisms to agents to ensure that they maintain adequate liquidity for their agency.

1.5.3 The Financial Inclusion Community

Donor agencies, central banks and other financial inclusion advocates will benefit from the findings of this study in designing interventions to support delivery of financial services to the low-income populations where there is limited access to bank branches.

1.5.4 The Academia Fraternity

This study provides insight into the agents' liquidity challenges thus providing a basis for further studies focusing on more specific themes such as women, youth or rural among others. Agents also touch on other verticals such as social protection, agriculture, health and e-payments, which are also potential research areas that are founded in this study.

1.6 Scope of the Study

This study was limited to analyzing the liquidity challenges faced by agents in their agency business and not their primary enterprise's business. The agents must be active, defined as having conducted at least one cash-in or cash-out transaction in the last thirty days. The study was limited to cash-in and cash-out services operations of an agency and no other aspects such as remittance, bill payments and customer service which are also conducted by agents. The study focused on DFS agents in the Nairobi County.

CHAPTER TWO: LITERATURE REVIEW

2.1 Introduction

This chapter provides a theoretical and empirical review of relevant literature forming the context under which this study is premised. It has five sections namely; theoretical review, empirical review, a summary of the literature review and research gaps and the conceptual framework.

2.2 Theoretical Review

The theoretical literature review has considered the agency theory and liquidity preference theory as relevant for this study. Although will benefit from some aspects of the liquidity preference theory, it was largely anchored on the agency theory which considers the interests of the principle and agents who are the DFS provider and retail agents and is applicable to the unit of analysis for this study; the agency outlet.

2.2.1 Agency Theory

Agency theory describes the relationship between principal and agent in the business Ross (1973), Barry (1975) and Jensen and Meckling (1976). Jensen and Meckling (1976) defined agency relationship as:

[An agency relationship is defined as]...a contract under which one or more persons (the principal(s)) engage another person (the agent) to perform some service on their behalf. This principal-agent relationship also involves delegating some decision making authority to the agent. (p. 308).

While the initial proposition of the theory focused on conflict of interest and varying risk appetite between the principals and agents, the revision of the theory by Jensen and Meckling (1976) addresses the issue of information asymmetry. The latter, explains circumstances whereby an agent has more information about the operations of the business than the principal.

This theory has relevance to this study whereby, providers are the principals and DFS agents are contractually engaged to provide financial services on their behalf. While providers are responsible for the actions of their agents to the regulator, agents are held to operational

standards described in service level agreements through contracts. Providers lay down supervision and monitoring procedures to ensure that they do not suffer losses, material or reputational damage due to the actions of their agents. Furthermore, providers provide support to the agents' business in managing liquidity through: quality of the service or platform, training, monitoring and customer engagement. Agents similarly have a hand in influencing the success of their agency business (MicroSave, 2017). Information asymmetry as proposed by Jensen and Meckling (1976) occurs in the agency agreement, whereby agents have better visibility of the demand for their cash-in cash-out services than providers. The agents are therefore likely to make decisions based on their information and not the providers' instructions. The agency theory has its limitations, while some unscrupulous agents deviate from compliance to laid provider procedures for their own interest, there are others who are trustworthy and work against all odds to create win-win situations for them and the principal whether or not their performance is monitored and output measured (GSMA, 2016). The study made findings which validate or concur with some of the arguments raised by Ross (1973), Barry (1975) and Jensen and Meckling (1976). Jensen and Meckling (1976) in the agency theory.

2.3 Empirical Review

The review of empirical literature is organized thematically according to the research objectives of the study. Three sub-sections emanate from research objectives, namely: relationship between agent factors and agents' liquidity challenges, supply side factors effect on agents' liquidity challenges, and agents' perceptions towards liquidity management.

2.3.1 Relationship between Agent Factors and Liquidity Challenges

Although there is limited literature on how individual agents vary in their liquidity management, few demand-side studies have made recommendations on agent factors that may determine effectiveness in managing liquidity. Mwangi and Mwangi (2014) investigated the factors influencing the uptake of agency banking services by customers in commercial banks in Kenya. The study which sought to determine how security, liquidity availability, customers and awareness influence the uptake of agency banking by customers, applied a descriptive research design with a sample of 497 customers of Kenya Commercial Bank (KCB) in Nairobi. The analysis was done by descriptive and probit regression. The study established that availability of

liquidity affected the uptake of agency banking by customers of the commercial bank and that majority of the customers had experienced a transaction failure and lack of liquidity at the agent banks (KCB *mtaani*). Similarly, Mosoti and Mwaura (2014) investigated factors influencing slow adoption of agent banking services by customers as a financial inclusion tool as compared to the use of mobile banking especially by the unbanked. A case study methodology was applied whereby, a sample of 100 bank customers residing in Roysambu constituency in Nairobi were selected. The study found that despite high levels of awareness and uptake of agency banking, customers, and liquidity outages among agents was the most pressing issue while other issues such as high transaction costs, frequent system failures were slowing down active usage of agency banking.

The “*Spotlight on rural supply*” study by GSMA (2015) noted that despite mobile money services going deeper into the rural areas the rural customers still remained underserved. The study which was conducted in rural markets of Mali and Chad, found that agents who had greater financial wherewithal did not have liquidity challenges and were more successful than their cash-constrained counterparts. The study also underscored the need for special liquidity facilities to meet the needs of agents in the rural areas. Another study by the Consultative Group for the Poor (CGAP) (2011) noted that some agents were selected to become agents without rigorous analysis of whether they have the right conditions in place to operate profitably-asking the question, how much capital can you raise? and whether you anticipate all transactions to be cash-out transactions, and how much it would cost to travel to exchange e-float for cash? The study recommended rigorous analysis of how these critical questions help providers select and maintain the right profile of agents (CGAP, 2011). This study made significant findings which may answer these questions.

2.3.2 Supply Factors Effect on Agents’ Liquidity Challenges

There are limited studies on the supply-side factors contributing to agents’ liquidity challenges. Ignacio Mas (2010) in the study ‘*Mobile Payments Go Viral*’ in Kenya, found that even the leading M-PESA service, had some of their agents experiencing liquidity challenges and were unable to meet requests for withdrawals, especially for large value transactions. The study notes that there are challenges such as the agent commission structure which discourages outlet from

handling large transactions. The study also notes that as a consequence of liquidity fears and challenges, agents require customers to split transactions over few days rather than withdrawing a lump sum, adding both cost and inconvenience on the customers. The study recommended streamlining of the agent management hierarchy whereby the main agents have liquidity management responsibilities over sub-agents (Mas, 2010).

A census quantitative study by Gichana (2013) in the West Pokot region in Kenya on challenges facing agency banking interviewing all the forty Equity Bank agents located in the region noted that liquidity challenges were highly prevalent with 50% of the agents saying that it was a concern for their business. It was found that the agents deny up to 5 transactions per week, which leaves customers dissatisfied. The study also found that there are infrastructural challenges whereby agents travel long distances to obtain rebalancing services. It is reported that nearby small and medium enterprises rely on agents to tidy up cash balances at the end of the day, thereby increasing the agents' demand for somewhat bigger value deposit and withdrawal transactions. This aggravates the liquidity management challenges among agents in the area who have to travel some distance to access a bank branch. The study recommended enhanced support of agents in remote areas by providers to ensure that they reap the full benefit of the agency banking transformation. The Consultative Group Action for the Poor (CGAP) conducted a study on best practices of agent network management. The study found that agents' security concerns are a factor that limits agents' liquidity management efforts noting that '*agents worry about robbery all the time*'. Agents are liable for some or all of funds lost via theft. The study also singles out the differences in agency arrangements in Kenya versus other countries as implicative on the agent liquidity challenges. For example, M-PESA agents in Kenya invest their own cash in the till and bear the entire cost of a robbery incidence. In the contrary agents in Brazil are not required to invest their own cash, but banks ask them to share some of the cost of insurance for the cash and to share some of the risks by being responsible for the first portion of any stolen funds. The study further noted that agents in both arrangements are skeptical of holding large values of float due to security reasons and eventually incurring a large proportion of their income on liquidity management (CGAP, 2011).

2.3.3 Agents Perception of Liquidity Management

Few studies have focused on the suitability of the liquidity management support for agents and what other alternatives mechanisms agents use in their agency outlets. Gichana (2013) noted the liquidity mechanisms used by agents reporting that agents rely on banks to rebalance and identified the need for commercial banks to provide alternative rebalancing mechanisms to support agents in the rural areas preferably via automatic float top-up. Mwangi (2012) earlier discussed study recommended that banks should consider to restructure and re-evaluate the criteria for selecting and locating their retail agents to overcome the liquidity management problem.

Another study by CGAP notes that agents incur a large proportion of their income on liquidity management. Thus, it recommends that providers learn from leading markets on tactics for averting the liquidity management challenges. The study discussed a case study of WING Cambodia and FINO who pay “master merchants” a small fee for them to hold a constant amount of US\$2,000 in e-float and make it available on demand to a group of “subagents” (who were required to keep only US\$200 in float). Under this arrangement, liquidity balances held by agents doubled (CGAP, 2015).

MicroSave (2015) in the *Agent Network Accelerator Project* in Uganda commissioned a study to understand determinants of successful agents adopting a quantitative cross-sectional survey methodology and interviewing 2,000 mobile money agents to understand their operations. The study reported liquidity management as an important aspect of agent operations, whereby, most Ugandan mobile money agents prioritized liquidity management as a top concern in growing their agent business. The study also found that agents are also increasingly rebalancing from peer agents (MicroSave, 2015).

Ignacio Mas in the study *‘Mobile Payments Go Viral’* in Kenya, recommended streamlining of the agent management hierarchy whereby the main agents have liquidity management responsibilities over sub agents providing three main options. First, the main agent provides direct cash support to stores -where an agent has float delivered by a store clerk or the agent sends cash runners to deliver the float although this is not common. Secondly, the main agent uses their respective bank accounts -in which case, if a sub agent has excess cash and wants to buy e-float, the agent will deposit the cash into the account of the main agent at the nearest bank

branch or ATM. Once the main agent confirms receipt of the funds into its account, the main agent transfers M-PESA e-float to the sub agent's M-PESA account. Thirdly, the main agent deposits (or transfers) money into their account at the branch then withdraws the cash at the nearest branch or ATM. However, this mechanism can only be used during banking business hours. This presents a problem for stores in the evenings and on weekends (Mas, 2010).

Other studies such as Iqbal (2012) investigated at the institutional level how banks perceive and manage liquidity risk. In a comparative study investigating liquidity risk management between 23 conventional and 5 Islamic banks of Pakistan using secondary data for the period 2007-2012. Liquidity risk, measured in the study by most liquid assets of the banks, was defined as the problem arising when depositors want to redeem deposits at a time when the commercial bank lacks enough cash in hand. The study investigated the size of the bank, Non-performing loan ratio (NPL), return on assets (ROA), and return on equity (ROE), capital adequacy ratio (CAR) and determined that significant and positive relation of CAR, ROA, ROE and size of the bank with the liquidity risk. Using ratio analysis of the averages of the variables, descriptive and regression analysis, the study found that, Islamic banks had more liquid assets to pay off its obligations than conventional banks. Larger banks had higher liquidity risk. The study recommended that commercial banks should have a stand-by account and increase of their liquid assets. It was also recommended that banks should estimate more accurately their short-term demand for liquidity, create a contingency funding plan and combine cash flow. This study is limited to a great extent on liquidity management but missing the agency aspect in their scope hence findings of Iqbal (2012) can only inform the proposed study with regard to liquidity management of retail banking service providers rather than agents.

2.4 Summary of Literature Review

Although the empirical studies reviewed in this study demonstrated the challenges facing agents in Kenya and developing countries, limited research exists on how agents cope with liquidity management challenges facing them. Authors such as Gichana (2013) identified existence of liquidity management challenges among agents, and informed the focus and knowledge gaps sought to be addressed by this study as summarized in the Table 2.1.

Table 2.1 Summary of Literature Review

Author	Year	Scope	Findings and recommendations	Gaps
Mwangi and Mwangi	2014	Factors influencing uptake of agency banking services by customers in Kenyan commercial banks Descriptive research, stratified sampling Sample of 497 KCB Bank customers	Liquidity availability was a top driver of uptake. Recommended that banks should consider to restructure and re-evaluate the criteria for selecting and locating their retail agents to overcome the liquidity management problem	Does not discuss the characteristics that make a right profile of agents Does not cover agents of mobile money providers
MicroSave ANA	2015	Agent Network Accelerator study in Uganda Quantitative cross-sectional survey of 2,000 mobile money agents	Liquidity management was a top concern for agents Unpredictable customer demand and travel costs associated with rebalancing among key barriers to liquidity management Agents innovated work arounds such as rebalancing from their peers. Recommends that providers provide diversified rebalancing options for agents	This study will validate the peer to peer rebalancing in Kenyan context
Gichana	2013	West Pokot region in Kenya A quantitative study on challenges facing agents - Equity Bank agents. Sample- 40 agents	50% prevalence of liquidity challenges Infrastructure challenges Rural areas may experience demand for large value transactions due to unique clientele such as SMEs wanting to tidy up cash balances at the end of the day. Unique liquidity management solutions.	Focuses on agents of one bank Misses out on qualitative agent attributes
CGAP	2011	Best practices of agent network management- Evaluation of M-Pesa agents in Kenya	Whose money is invested in the till (agent's or bank's) determines the value of float held by agents Agents incur a large proportion of their income on liquidity management Security concerns keep agents from holding adequate values of float Agents are selected without rigorous analysis of their right profile	These two studies recommend further research on capital raised by agents and costs involved in rebalancing e-float for cash and their bearing on liquidity challenges. These factors are addressed in this study.
GSMA	2015	'Spotlight on rural supply' in Mali and Chad Qualitative research	How rural agents choose to rebalance and access to substantial capital is potentially a factor in overcoming liquidity management problems	

2.5 Research Gaps

Some studies such as by Iqbal (2012) have very sound findings, conclusions, and recommendations about general liquidity management, however, these studies are generic and do not apply to digital finance agents. The CGAP study has noted that providers are in a dilemma as to what is the profile of agents that would invest adequate float, how much to rely on banks for liquidity services as well as quantifying the risk of float delivery to agents in far to reach areas. These questions have not been addressed in the past research agents and liquidity management studies. Further research is required to answer these questions and help providers identify ways of supporting agents in liquidity management activities. Furthermore, the Digital Financial Services (DFS) industry in Kenya has evolved greatly since 2013 when the comprehensive agent study by MicroSave (2014) study was conducted. The regulatory framework on digital finance has evolved (Central Bank Kenya, 2013) with new guidelines requiring providers to issue non-exclusive contracts to their agents making them (agents) available to other providers. It was therefore important to –through this study- investigate if the agents’ liquidity management mechanisms had evolved as a result of this and other market trends.

2.6 Conceptual Framework

The factors affecting agents’ liquidity challenges were categorized into three factors namely agent factors, supply side factors and agents’ perceptions towards liquidity management. Figure 2.1 is the conceptual framework demonstrating the relationship between the variables of interest.

Independent variables

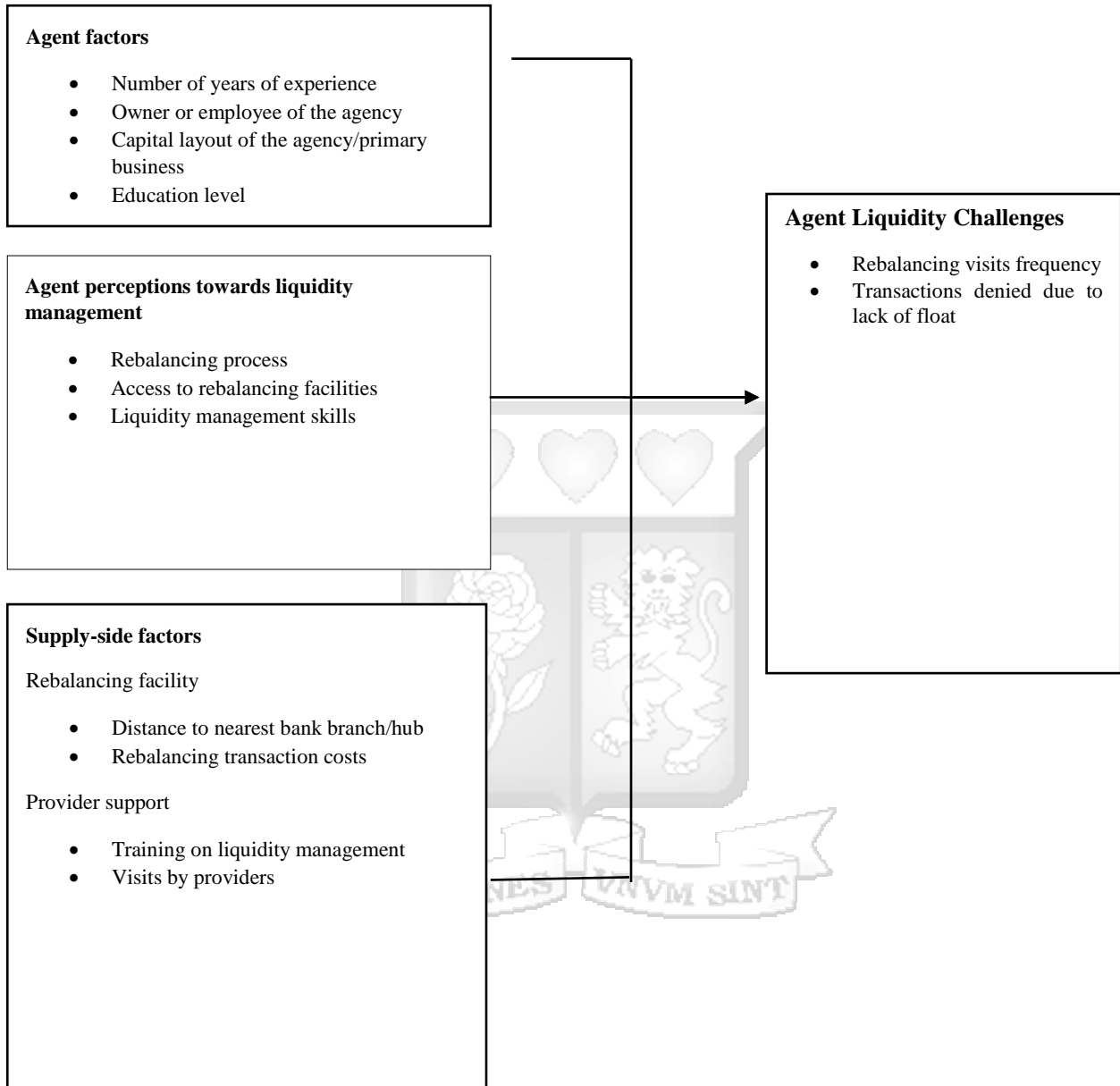


Figure 2.1 Conceptual Framework

Operationalization of the Variables

The variables of interest to this study were categorized into dependent variable and independent variables.

Dependent variable

Agent liquidity challenges are the dependent variables under investigation. It was measured by the number of times an agent visits a rebalancing point as found in the CGAP (2011) study that agents often close their shops to visit a rebalance point usually a bank branch. The number of transactions denied per day will be another measure of agents' liquidity management practices as noted in the MicroSave (2014) agent study.

Independent variables

Three categories of independent variables have been identified as; agent factors and supply-side factors and agent perceptions towards liquidity management mechanisms. Agent factors include number of years of experience in the agency, owner involvement in liquidity management, capital layout of the primary business. Supply-side factors were measured by accessibility of bank branches (estimated distance from the bank to agents' location, proxy by the walk time from an agents' premise to a near bank branch), cost of rebalancing facilities available to agents (including travel and rebalance transaction costs), agent training on liquidity management, and the frequency of providers' (FSPs) monitoring visits to agents premises. Agent perceptions towards liquidity management mechanisms were measured through; agents experiences with the liquidity management process, access to rebalancing facilities and agents' perspective of their liquidity management needs.

CHAPTER THREE: RESEARCH METHODOLOGY

3.1 Introduction

This chapter presents the research methodology from research design to the target population, data collection methods, data analysis, research validity and quality and ethical issues in research.

3.2 The Research Design

The study adopted a cross-sectional survey design employing a mix of qualitative research and quantitative methods. Qualitative interviews were conducted to understand agents' perceptions towards liquidity management and the provider support mechanisms for liquidity management. These interviews were conducted with a range of respondents, namely; agents, master agents, agent managers, providers' field staff and super agents. The findings of the qualitative research were utilized to refine the agent quantitative questionnaire and to validate the quantitative survey findings.

A quantitative survey was conducted with agents to gather data on agent factors, liquidity supply factors and the agent liquidity management practices. The data collected included the agent profile; age, education level, owner involvement in liquidity management, capital layout of the primary business, agents' perceptions towards liquidity management. On the liquidity supply factors, agent data such as distance to rebalancing facilities and cost of rebalancing trip including travel and transaction cost was gathered. Provider support factors were also captured through data on liquidity mechanisms availed to agents, training by providers and the availability of regular liquidity support by providers. The survey also sought to validate agent perceptual factors gathered in the qualitative study. Agent liquidity factors measured were; number of weekly trips made to rebalancing facilities and the number of daily transactions denied due to lack of liquidity.

3.3 Population and Sampling

The Finscope study (2014) recorded a total of 100,000 agent tills in Kenya. However, since the 2013 non-exclusivity mandate on agents by the Central Bank of Kenya, one agent outlet in Kenya is shared by an average of 2-3 agent tills as noted by Mike & Bersudskaya (2017) estimating the number of agent outlets at 67,506 nationally. Majority of agents in Kenya are

located in urban areas with Nairobi metropolitan area accounting for 43% of the national agent footprint. Nairobi has the highest balance of mobile money and banking agents 76% and 24% respectively compared to other urban areas and rural areas of Kenya, according to the MicroSave national agent survey (2014). The study targeted eight low income- middle class settlements of Nairobi such as Kawangware, Ngara-CBD, Kasarani, Githurai, Kangemi, Umoja, South B, and Gikomba. These are the areas are likely to have many agents due to the high rates of financial exclusion compared to other upper- class suburbs of Nairobi.

This study targeted agents conducting cash-in and cash-out services the Nairobi County. Other players in the agent network management chain were also interviewed through qualitative research techniques. Specifically, the study involved agents, master agents, super agents (including bank branches and supermarkets) and field staff of the leading digital financial services providers of Equity Bank, KCB bank, Co-operative bank, Safaricom, Family bank and Airtel according to MicroSave (2014) agent study in Kenya. A sample of 20 respondents was drawn from a diverse set of respondent profiles namely; agents, master agents, super agents and financial service provider representatives as shown in Table 3.1.

Table 3.1: Qualitative research sample

Target respondent	Number of interviews
Agents	10
Provider representatives	4
Master agents	3
Rebalancing facility representatives	3
Total	20

Non-probability sampling techniques such as snow-balling were used to identify the various respondent profiles comprising of master agents, agents, provider representatives and rebalancing facility representatives.

For the quantitative survey, a research sample size of 194 agents was computed as follows (Fisher et al., 1995).

$$n = \frac{1.96^2 \times 0.5 (1-0.5)}{0.07^2} = 194 \text{ agents}$$

$$1 + \frac{(1.96^2 \times 0.5 (1-0.5))}{0.07^2 \times 29000}$$

Whereby: N= Population 43% of 67,000 (29,000), z = Standard score at 95 percent confidence level (1.96), p = the proportion of occurrence of the variable of focus (which is 0.5), e= Margin of error or level of significance (which is 7%).

The significance level was marked at 7% since the study seeks to gather agents' financial data which may be considered confidential. The researcher obtained authorization from the providers and worked closely with the field supervisors to enhance the credibility of the study and attract a 100% response rates from agents. This is however within the 5%-10% range recommended by Fisher et al as applicable for social and economic studies (Fisher RA., 1950). Stratified random sampling technique was used to select the agents in the quantitative survey as Robson (2004) recommends ensuring that all regions are represented.

3.4 Data Collection Methods

Qualitative research, in-depth interview guides were designed for each profile of respondents - agents and providers as advocated by (Kennedy, 2006). In-depth interviews were recorded through note taking by trained research assistants. Quantitative data was gathered through researcher administered structured questionnaire. The quantitative questionnaires were programmed on dooblo-data-collection-software to ensure quality control through timely transmission of data after each interview. Consistency system checks were put in place to ensure that only valid responses were input thus eliminating coding errors during data entry. Research assistants were hired from colleges and universities and facilitated to travel to allocated areas. The researcher trained the research assistants in a central location and supported them remotely throughout the data collection exercise.

3.5 Data Analysis

The qualitative and quantitative data gathered was analyzed through complementing techniques. Qualitative data was analyzed on a rolling basis through a thematic analysis approach. Emerging cues from the initial interviews were validated in subsequent interviews. The findings of qualitative interviews (Appendix Table 7.1a, 7.1b and 7.1c) were utilized in refining the quantitative survey and substantiating the findings of the quantitative research where applicable.

Quantitative data on the other hand was collected on an android-tablet survey application and analysed using STATA and SPSS software. Table 3.2 details the mix-method analytical approaches employed to answer to the objectives of the study.

Table 3.2 Research Analytical Framework

Research Objective	Variables of interest	Data type	Type of analysis
To establish the relationship between agent factors and agents' liquidity challenges	<ul style="list-style-type: none"> • Years of agent experience vs. rebalance visits • Years of agent experience vs. transaction denials • Education level vs. rebalance visits • Education level vs. transaction denials • Capital layout of the primary business vs. rebalance visits • Capital layout of the primary business vs. transaction denials • Owner involvement in operations vs. rebalance visits • Owner involvement in operations vs. transaction denials 	Ordinal Qualitative interviews	Chi-square tests Thematic analysis
To establish the effect of supply side factors on agents' liquidity challenges.	<ul style="list-style-type: none"> • Distance to nearest bank branch vs. rebalance visits • Distance to nearest bank branch vs. transaction denial • Cost of rebalancing transactions vs. rebalance visits • Cost of rebalancing transactions vs. transaction denial 	Ratio Qualitative interviews	ANOVA Correlation Thematic analysis Ordered regression
	<ul style="list-style-type: none"> • Training on liquidity management vs. rebalance visits • Training on liquidity management vs. transaction denial • Agent monitoring visits vs. rebalance visits • Agent monitoring visits vs. transaction denial 	Ordinal Qualitative interviews	Chi-square tests Thematic analysis Ordered logistic regression
To explore agents' perceptions towards liquidity management mechanisms	<ul style="list-style-type: none"> • Agents experiences with the liquidity management mechanisms • Agents' liquidity management needs. 	Nominal Qualitative interviews	Descriptive analysis Thematic analysis

3.6 Research Quality and Validity

To ensure validity of the research, all data collection instruments were pilot testing were pilot tested and refined before actual data collection. The pilot test data for the quantitative survey was statistically tested for reliability before the actual data collection using the Crobach Alpha split-half technique. This procedure involves splitting the questionnaire into two halves and comparing respondent feedback patterns for the two halves. Then calculating a correlation coefficient based on the two data sets. The research instrument for this study attained a correlation coefficient of 0.763 (see Table 3.3) which was considered adequate as it surpasses the 0.7 threshold as proposed by Cronbach (1951).

Table 3.3: Research Instrument Reliability Analysis

Cronbach's Alpha	Part 1	Value	.763
		N of Items	45 ^a
	Part 2	Value	.353
		N of Items	45 ^b
	Total N of Items		90
Correlation Between Forms			.001
Spearman-Brown Coefficient	Equal Length		.001
	Unequal Length		.001
Guttman Split-Half Coefficient			.001

To ensure objectivity of the researchers, research assistant training was conducted to ensure consistent application of the data collection procedures in the selection of respondents and administration of the survey.

3.7 Ethical Issues in Research

Finance is the bed-rock of this study since digital finance agents are an extended channel of delivering financial services from the conventional banks. Therefore, information sharing was treated with as much caution as a typical bank. It was therefore necessary to obtain authorization from the financial service providers to interview their agents. Formal introduction letters were sent to representatives of agent operations in leading financial service providers to seek support during the data collection exercise. The other issue was voluntary participation of the agents whereby agents were encouraged to answer only questions that they were comfortable with at the introduction of each interview. Some agents were not comfortable providing financial

information of the agency despite proof of authorization by the providers leading to incomplete interviews. Their findings were therefore excluded in the analysis of this study. Finally, this study experienced agents who were very busy to respond to a thirty-minute survey and even more for lengthy in-depth discussions. As a principle code applied by all research assistants, at no time was any agent required to halt their business to respond to the survey.



CHAPTER FOUR: PRESENTATION OF RESEARCH FINDINGS

4.1 Introduction

This chapter presents the findings of the study organized by research objective. The first segment contains findings of the respondent demographics and attributes of agents followed by descriptive analysis of the study, bivariate analysis and inferential analysis of variables of interest as depicted in the research analysis framework in the previous chapter Table 3.3.

4.2 Response Rates

The study realized a response rate to the quantitative research was 81% whereby 37 out of the 196 surveys conducted were ruled as incomplete interviews due to dormancy and agents who were engaged with their business enough not to complete the survey. Table 4.1 shows the achieved sample.

Table 4.1: Sample for Quantitative Research

Target number of respondents	Target number of interviews	Number of interviews achieved	Response Rate
Number of respondents	194	159	81%

4.2 Respondent Demographic Information

Table 4.2 is a display of demographical agents' information from the quantitative research.

Table 4.2: Respondent demographic information

Attribute	Category	Frequency	Percent
Gender	Male	111	69.8%
	Female	48	30.2%
Age group	18-25	6	3.8%
	26-33	63	39.6%
	34-41	67	42.1%
	42-49	20	12.6%

	50-57	3	1.9%
Service provider for which agent was interviewed	Safaricom	77	50%
	Airtel	9	6%
	Equity bank	31	19.5%
	Family bank	8	5.5%
	Co-op bank	15	9.5%
	KCB bank	16	10.5%
Education level of respondent	University degree	30	17.9%
	College diploma/tertiary college	72	62.3%
	Secondary school certificate	31	18.9%
Years of experience	Less than 6 months	7	4.4%
	6 months -1 year	24	15.1%
	13 months -2 years	70	44.0%
	2-3 years	34	21.4%
	3-4 years	17	10.7%
	4-5 years	3	1.9%
	More than 6 years	2	1.3%
Operator of the agency	Owner	103	65.6%
	Employee	54	34.4%
Rebalancing frequency	Every day	99	62.7%
	Thrice a week	32	20.3%
	Twice a week	15	9.5%
	Once a week	7	4.4%
	Twice a month	4	2.5%
	Once a month	1	0.6%
			Mean
Access to nearest primary rebalance	Estimated distance to nearest bank branch (in walking minutes)	39	
Daily transactions	Transactions conducted per day	54	
Transaction denial	Transactions denied per day	10	

4.3.1 Demographics

Seventy percent of agents interviewed were male while only 30% of respondents were women. This finding points to the reality that most micro and small enterprises are owned by male. Interpreting this finding alongside feedback on ownership of agencies in Table 4.2 above whereby 66% of respondents indicated they were the owners, it is apparent that most agencies are owned by men. Most agents interviewed were middle aged with majority being between the ages of 26-41 years old. Agents who were employees were comparatively younger than owner agents interviewed in this study. However, agents were only interviewed for one particular provider as shown in Table 4.2. Agents interviewed had attained at least secondary education level. It emerged that employee agents were more educated than owner agents as shown in Table 4.3.

The respondents of this study had served as agent for an average of 1-2 years as shown in Table 4.2. However, employee agents were less experienced having served for 6-12 months on average, a finding which is attributable to possible employee/staff turnover rates in the agencies. The level of involvement in the agency was owner dominated (66%) while employees accounted for only 34% of the agency operators. However the involvement of employees reduced when it came to performing liquidity management activities due to increasing owner involvement up to 73% while employees and other rebalancing assistants involvement was at 27%.

Table 4.3 Education Level by Ownership

		A5. What is the highest level of education you have attained? (Education level)				
		University degree	College diploma	Tertiary college certificate	Secondary school	Total
What is your involvement in this agency?	Owner	7.4%	27.4%	13.7%	14.7%	64.2%
	Employee	11.6%	16.8%	3.2%	4.2%	35.8%
Total		17.9%	45.3%	16.8%	18.9%	100.0%

4.3.2 Agency demographics

Respondents interviewed in this study operated other businesses primary to the agency business. These businesses ranged from local dukas, hardwares, grocery stores, salons/ barber shops, cyber and bureau services, and pharmacy stores among others. Retail stores and petrol stations were among agencies whose primary businesses had high capital outlay. Approximately 49% of the respondents operated a primary business with investments of between 100,000-500,000 KES. Figure 4.1 shows respondent data on the capital invested in the primary business (other than the agency business).

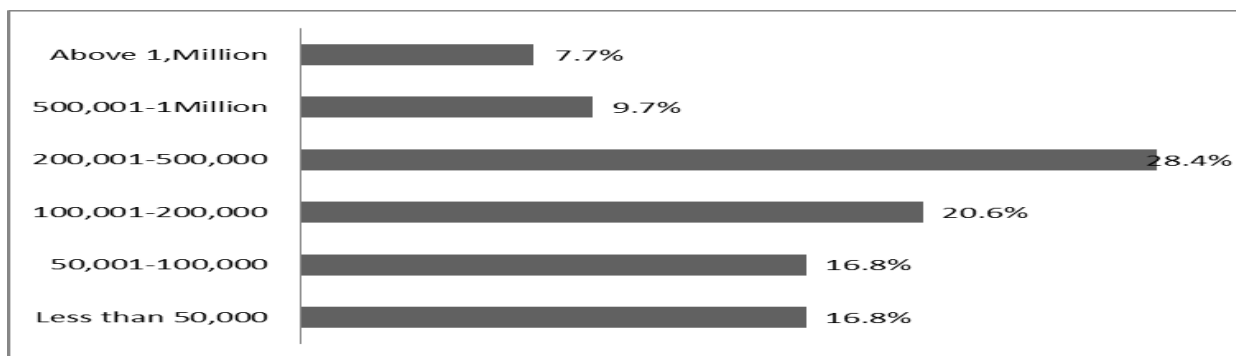


Figure 4.1: Capital layout of primary business

Respondents interviewed were located on average 39 minutes from the nearest bank branch and performed on average 54 transactions in total per day as shown in Table 4.3. However it was intriguing that they still denied up to 10 transactions per day due to lack of float which compounds to approximately 15% loss of business per day. While majority (83%) of agents rebalanced three times or more per week, this can be argued as ineffective liquidity management especially when travel related mechanisms are the most common forms of rebalancing as confirmed in this study and in Table 4.4.

Table 4.4: Rebalancing options

Rebalancing option	Percent
Bank	80.0
Another agent	12.6
Provider office/branch	5.3
Delivered by provider staff	2.1
Total	100

Of the agents interviewed 80% accessed liquidity from a bank while the rest use other mechanisms; another agent (13%), providers' office (5%) and delivered by provider staff (2%) respective as depicted in Table 4.2. Further to this finding, qualitative interviews with agents reported that they relied on bank branches to access float. Half of the respondents reported that they rebalance equally for electronic float and physical cash, 35% of reported rebalancing mostly for electronic float and 15% rebalanced for physical cash only. However, it is plausible to attribute the higher prevalence of e-float than cash due to easy access of electronic float from diverse sources such as mobile banking, ATMs and peer rebalancing reported by agents also shown in Table 4.2. However, it also emerged through this study that master agents facilitated access to float by agents through advance electronic loading of float to agent accounts. Furthermore, financial service providers reported that they had introduced new ways of accessing float such as partnerships with cash-rich entities such as supermarkets; however, most agents were not aware of such facilities and still considered banks as the primary rebalance point.

4.3.3 Agent perceptions towards liquidity management

This study established that more than half of the agents (54%) are confident about their capability to perform rebalancing services, while 33% said they depend on support from others and 11% saying they require further liquidity management training to utilize new rebalancing options. In-depth interviews with agents under further reported that agents' fears of theft and fraud were informed by the high prevalence among their peers but not necessarily out of their own experience. As a result, agents schedule their rebalance visits at times when they perceive are more secure, in particular, early mornings. It is no wonder that agents cited banking hours as more concerning and not closer proximity to the bank branches. This study also established a result of the heightened fear of fraud agents preferred operating with lower amount held as float at any one time and similarly lower amounts carried during a rebalance trip. Interestingly, agents were not bothered by the cost of travel to nearby bank branches for rebalancing but rather by the lengthy process of acquiring the float once at the banking hall and the banking hours. Behaviorally, agents postponed rebalancing activities as it requires closing the shop which might result to loss of customers for the primary business as well.

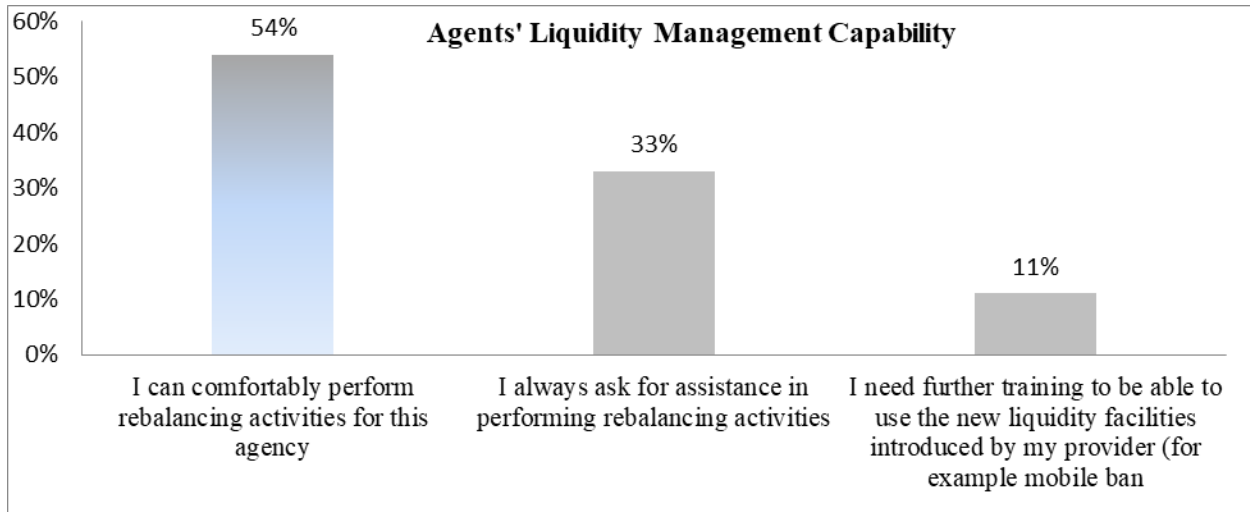


Figure 4.2: Agents' Perception of their Liquidity Management Capability

Other concerns raised were availability of adequate float investments (raised by 6% of the agents) and long queues at the banking hall (5%) as shown in Figure 4.3. In terms of mechanisms adopted to 'attempt' to solve liquidity challenges, FSP representatives interviewed in this study claimed that as part of the agent support mechanisms, bank branches were required to provide dedicated counters for quick service of agents and an express queuing system for agents. However, the implementation of this initiative was not matched by the agents' experience at the banking halls. Agents on the other hand reported spending about thirty minutes at the banking halls waiting to be served. In some instances, agents were treated to cold customer experience by tellers who 'see agents as a nuisance'. This was intriguing as bank branches are the primary rebalancing points for majority of agents.

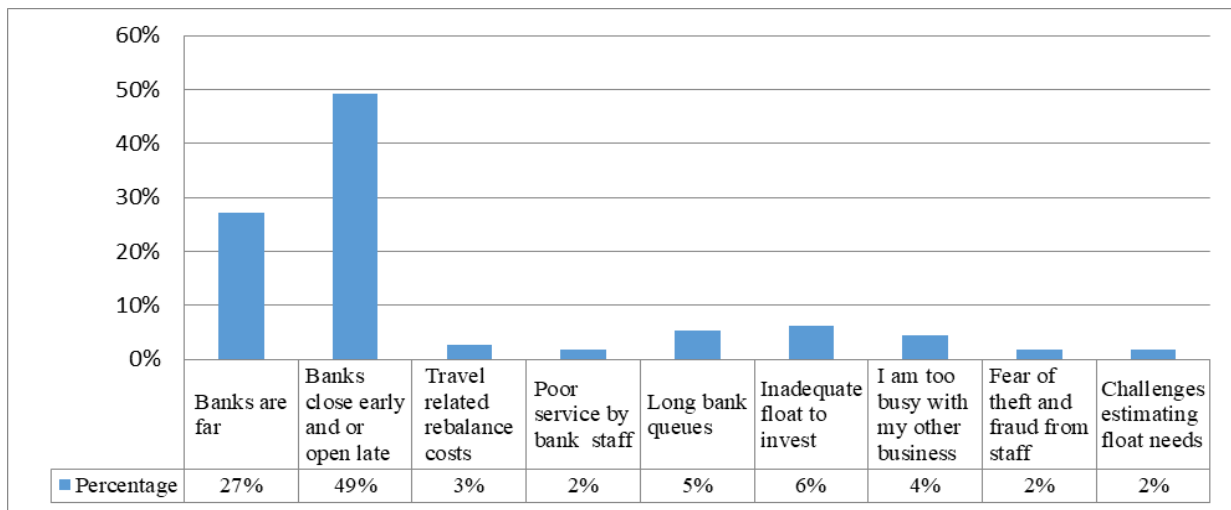


Figure 4.3: Agent Concerns with Existing Liquidity Mechanisms

4.4. Diagnostic tests

A Shapiro-Wilk test of normality was conducted to determine the distribution of data for agent demographic variables (gender and age) and key variables investigated to affect liquidity management (namely distance to the nearest bank branch, number of times agents receive provider visits and access to agency training). The test was published by Samuel Sanford Shapiro and Martin Wilk in 1965 and works by calculating a *W* statistic that tests whether a random sample comes from a population with a normal distribution (Shapiro and Wilk, 1965). Large values of *W* closer to 1.0 statistic point towards normal distribution. Also S-Wilk test rejects the hypothesis of normality when the p-value is less than or equal to 0.05. Table 4.5 has the findings.

Table 4.5: Shapiro-Wilk test of Normality of Data

Variable	Observations	W	Prob>Z
Gender	159	0.695	0.06
Age group	159	0.985	0.35
Distance to the nearest bank branch (walking minutes)	159	0.903	0.09
Number of times received provider visits	159	0.905	0.00
Access to training	159	0.732	1.00
Number of times agent denies transactions for lack of float	159	0.897	0.11

On the basis of the relatively high *W* statistics for age, distance, frequency of rebalance visits, access to training and transaction denials we cannot reject the null hypothesis that data for those variables comes from a normally distributed population.

4.5 Bivariate analysis

Three types of analytical approaches used to conduct bivariate analysis are Chi-square analysis of independence and analysis of variance (ANOVA) as prescribed in the analytical framework of this study. These tests were applied for agent factors namely; agent years of experience, capital layout of primary business, owner involvement and supply-side factors namely; distance to the

nearest rebalance point, transaction costs, agent training and monitoring visits. The results are provided and interpreted in the following sub-headings.

4.5.1 Chi-square tests of agents’ years of experience vs. Liquidity challenges

To establish the relationship between agents’ experience in the agency and frequency of rebalance visits, Chi-square test of independence was conducted. Chi square is a test of independence between two discreet variables, which claims-in null hypothesis-there is no dependency between the variables of interest. The test works by comparing the calculated Chi-square statistic with the critical statistic at the corresponding degrees of freedom. The criteria is to reject the null hypothesis (Ho) if the calculated statistic is greater than the critical statistic in which case the statistic is considered significant ($p < 0.05$). Rejection of Ho implies lack of independence between the two variables of interest which in turn means presence of a relationship. The results of this study established a significant Pearson Chi-square statistic of 37.055 ($p = 0.043 > 0.05$) as verified in Table 4.6 which is interpreted to mean existence of a significant relationship between agency experience and frequency of rebalancing. Agents with several years of experience conduct fewer rebalance visits than their counterparts who conduct rebalance visits more often.

Table 4.6: Chi-square test agency experience vs. frequency of rebalance visits

	Value	df	Significance
Pearson Chi-Square	37.055 ^a	24	.043
Likelihood Ratio	24.110	24	.455
Linear-by-Linear Association	1.841	1	.175
N of Valid Cases	159		

This finding was similar to the tallied opinions of master agents and field agent managers reported that agents with more years of experience in the agency business had nurtured the skills of anticipating demand for their services and therefore plan their rebalancing tasks in advance. These agents also had established relationships with the liquidity facilitators who advance float to them to meet unanticipated demand for example, during weekends. Master agents in particular had systems to monitor agent’s transactional history based on which they provide advance float.

4.5.2 Chi-square tests of capital layout of the main business vs. Liquidity challenges

To establish the relationship between capital investments of the primary business and the frequency of rebalance visits, a Chi-square test was conducted. The results were a significant Pearson Chi-square statistic of 38.043 ($p=0.034 < 0.05$ 24df). This means that agency outlets with higher investment conducted less rebalance visits than agency outlets that had fewer investments in their primary business. In line with this finding, financial service providers who were key informants to this study reported that the composition of agent layout in the agent profile has changed over time to include agents with lower capital investments than initially recommended. Instead, the providers emphasize on nature of cash-flows of the main business as a proxy for the agency ability to potentially turn-around cash from physical to liquid cash. FSPs therefore require provision of six months bank statements of the agency's main business as proof of business liquidity position, which is analyzed to determine suitability to become an agent.

4.5.3 Chi-square tests of owner involvement vs. Liquidity challenges

This study established, through Chi-square tests, that the frequency of rebalance visits depends on the owner involvement in the agency operations. In cases where rebalancing is done by the owner, the number of rebalancing visits conducted per week is higher than when non-owners are involved. This is verified by a Chi-square statistic of 8.506 ($p=0.075 < 0.1$ 4df). In spite of this in-depth interviews with agents established that rebalancing decisions made by the agency owners. This often leads to delays or postponements in rebalancing as employees await approval from the owners of the agency. Owner-agents cited prevalence of robbery and fraud cases propagated by employees of the agency or other agencies who '*divert*' with the money meant for the business during rebalancing visits.

4.5.4 Chi-square tests of education level vs. Liquidity challenges

Chi-square tests on the independence of education level to rebalance visits did not establish a significant lack of independence which was interpreted as lack of relationship between the two variables.

4.5.6 ANOVA analysis of transaction cost vs. Liquidity challenges

This study established that agents incur transaction costs during rebalancing and the cost was a significant influence on the frequency rebalancing visits conducted by agents, as verified by ANOVA (F statistic of 1.818 $p=0.098$). This means that agents who incurred high transaction costs conducted less frequent rebalancing visits. Agents who had access to diverse rebalancing options utilized the option with the least charges on rebalance transactions. For example, M-Pesa agents who were able to access rebalancing services from any bank branch reported preference to banks which had lower or no charges on rebalancing transactions.

4.5.5 ANOVA analysis of Distance to bank vs. Liquidity challenges

Analysis of Variance (ANOVA) test was conducted to establish if there exists a relationship between distance from the nearest bank and the number of transactions denied due to lack of float. ANOVA works to compare means of a variable across a variable of interest and calculates an F statistic. The criteria is to reject the null hypothesis, which is that the average of a variable does not differ by the other variable, if the $F_{Cal} > F_{alpha}$ and $P < 0.05$. From the study an F statistic of 14.15, $P=0.000 < 0.05$ was established meaning that the null hypothesis is rejected, that transaction denial due to lack of float does not differ by distance. Therefore, the further away that an agent is located from a bank branch, the more the number of transactions denied due to lack of float. A further Pearson's correlation co-efficient of 0.246 ($p=0.0096 < 0.05$) was established, meaning that there is a positive correlation between distance and transaction denials. Thus, the further away the agent is located from the nearby bank branch, the more the number of transactions denied due to lack of float. This study, through agent qualitative interviews, reported that agents were located within close proximity with the banks; however, rebalance visits took unnecessarily long to access float due to long queues in the banking halls.

4.5.7 Chi-square tests of agent training vs. Liquidity challenges

Training on liquidity management and provider visits were other factors studied. Agents reported high rates (93%) of receiving initial training, however, only half of them said they have received training support on liquidity management. Chi-square tests on the effect of liquidity management

training on transaction denial due to lack of float resulted in a statistically significant Chi-square statistic of 18.005 ($p=0.001$ 4df). This is interpreted to mean existence of a relationship between training on liquidity management and transaction denial due to lack of float. The qualitative findings reported that agents considered the initial training offered by the financial services providers as inadequate to equip them with liquidity management skills needed to utilize new liquidity access solutions such as mobile banking and Pesa link services.

4.5.8 Chi-square tests of agent monitoring visits vs. Liquidity challenges

Of the agents surveyed, 59% reported that they received regular visits from providers for an average of two times per month. Chi-square tests, however, did not establish lack of independence between provider visits and frequency of rebalance visits nor number transactions denied due to lack of float. This means that there is no established relationship between agent visits with agents' liquidity. Qualitative interviews with FSPs found that new mechanisms to monitor agents through real-time system checks had been adopted. However, this kind of monitoring was popular with mobile money agents than is among bank agents. Inadequate technological capacity and human resources to monitor agent float balances were among impediments cited by banks in providing liquidity support to agents. Providers reported that they had introduced new liquidity management mechanisms such as linking of agent accounts with mobile banking, offering advance float during weekends.

4.7. Inferential Analysis

Further investigation to the casual relationship between the variables was conducted, particularly, regression analysis for test of determination on the effect of supply-side factors on agent liquidity challenges. Ordered logistic regression was the regression technique adopted as it applies maximum likelihood estimation iterative (repetitive) procedure on ordinal outcomes, in the case of this study were rebalance visits and transaction denials. Ordered logistic regression is a discreet regression model for ordinal discreet outcome dependent variable (Wooldrige, 1999; Gujarati, 2004). The coefficient of determination is a pseudo R^2 which indicates the prediction power while the measure of joint significance of predictors is log-likelihood chi-square (LR χ^2 statistic). Four supply side variable attributes namely; distance to nearest bank branch, rebalancing transaction cost, access to liquidity management training and provider visits were

used to predict the relative probability of agents having higher outcomes of rebalance visits (model 1) or transaction denials (model 2). Results from the two models are presented in Table 4.7.

Table 4.7: Ordinal Logistic Regression of YLO against Individual Attributes

Predictor	Rebalance Visits (Model 1) Estimated Coefficients			Transaction Denials (Model 2) Estimated Coefficients		
	Odds Ratio (β)	Significance (p>Z)	Change in probability	Odds Ratio (β)	Significance (p>Z)	Change in probability
Distance	0.0243**	0.005	-0.006**	0.0279**	0.000	0.006**
Rebalancing cost	0.1947	0.344	-0.048	0.1867	0.387	0.044
Access to training	0.2505	0.609	0.062	0.3235	0.474	-0.076
Agent visitations by service provider	0.1706	0.119	0.042	-0.0689	0.515	-0.016
<i>Pseudo R²</i>	0.0682			0.0941		
<i>LR chi2(4)</i>	14.86**	0.000		22.51**	0.0002	
<i>Probability of correct predictions</i>	0.52 (52%)			0.37 (37%)		
<i>Obs (n)</i>	158			158		
<i>/cut1</i>	1.854787			1.247247		
<i>/cut2</i>	3.316811			3.114361		
<i>/cut3</i>	4.557742			4.425667		

Notes:

*LR means Likelihood Ratio*and **indicates that parameter attained significance at 5% and 1% test levels (p< 0.05 and p< 0.01)*

Assessing the power of the model, a significant LR $\chi^2=14.86$ (d.f. =4; $\rho=0.000$) is attained (The formula for LR χ^2 is $-2*(L(\text{null model})-L(\text{fitted model}))$ for each model (Wooldridge, 1999). Given the low p-value, then at least one of the regression coefficients in the model is not equal to zero hence all predictors (distance, rebalancing cost, access to training and visitations by service provider) jointly help to improve the model . The model converges at the 4th iteration with a log likelihood of -101.4379 for Model 1 and for Model 2. -108.3264¹ The model for rebalance visits can correctly predict actual number of visits using distance, rebalancing cost, access to training

¹Ordered logistic regression applies maximum likelihood estimation iterative (repetitive) procedure. The analysis algorithm starts with a model without predictors (intercept alone) in the first iteration but adds independent variables in subsequent iterations. The aim is to maximize the log likelihood to a point where the difference between successive iterations is most minimal in which case an optimal solution will have been found.

and visitations by service provider as independent variables with 52% accuracy while the model for transaction denials can do the predictions with 37% accuracy.

Access to rebalancing facilities emerged as a very important determinant of both rebalance visits and transaction denials. For every extra minute an agent has to walk to the nearest bank branch, the probability of rebalance visits decrease by 0.0065 *ceteris paribus* (holding other factors constant). On the other hand for every extra minute an agent has to walk to the nearest bank branch, the probability of transaction denials increases by 0.0066 *ceteris paribus*. The coefficient of access to rebalancing services as measured by distance to the nearest bank branch had a significant effect ($p < 0.005$) on both the number of rebalance visits and transaction denials.

The model implies that a shilling increase in rebalancing cost reduces the probability of rebalance visits by 0.048 and increases transaction denials by 0.044, *ceteris paribus*. Access to training increases the probability of rebalance visits and decreases the probability of transaction denials by 0.062 and 0.076 respectively, *ceteris paribus*. An additional visit by service provider increases the probability of rebalance visits and decreases the probability of transaction denials by 0.042 and 0.016 respectively, *ceteris paribus*. However, the coefficient of rebalancing transaction cost, access to liquidity management training and frequency of provider visits did not attain statistical significance ($p < 0.05$). Therefore, from the inferential analysis of the supply-side factors effects on liquidity challenges it was found that distance to a nearest bank branch had a bivariate relationship with agent liquidity management challenges (measured by rebalance visits and transaction denials) as well as a cause-effect relationship on the same dependent variables. However, whereas rebalancing cost, access to training and visitations by service provider had bivariate relationships with liquidity management among agents, they failed to attain a cause-effect relationship with liquidity management challenges.

CHAPTER FIVE: SUMMARY OF FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This chapter presents a summary of findings organized by the objectives of the study, conclusion, recommendations, limitations of the study and areas for further study.

5.2 Summary of findings

5.2.1 Relationship between agent factors and agents' liquidity challenges

This study established that agents' frequency of rebalance visits depends on agent factors particularly: number of years of experience, owner involvement in agency business and capital layout of the primary business. Liquidity management is a skill through which agents who have operated for more years are able to anticipate demand for cash-in and cash-out services and are therefore able to plan their rebalancing tasks in advance. This finding supports the information asymmetry argument by Jensen Meckling (1976). Furthermore, agents with more years of experience can also leverage on relationships built with master agent and other liquidity facilitators to offer services beyond banking hours. The study also established that frequency of rebalance visits depend on owner involvement in the agency business so that owner-agents rebalance more frequently than non-owner agents. Liquidity management tasks are considered sensitive and are therefore not delegated to employees of the agency which could be due to fear of theft and fraud as explained by CGAP (2011). The CGAP (2011) study found that security concerns by agents influence their decisions on float investments. Capital layout of the primary business was established in this study to influence frequency of rebalance visits such that, agents or agencies with higher capital layout had less rebalance visits compared to agencies with less capital layout. High capital layout of the primary business implies a more sound liquidity position of the business of the agency which translates to ability to meet demand for cash-in and cash-out transactional needs. Further it was established that cash flow statements of the primary

business of the agency could be a better indicator of the agency's ability to meet demand for cash-in and cash-out needs. The above findings respond to the dilemma of the exact definition of an ideal agent profile which other studies reported in the literature review did not answer expressly. The CGAP (2011) study in particular noted that financial service providers (FSP) are in a dilemma as to what is the profile of agents that would invest adequate float, how much to rely on banks for liquidity services as well as quantifying the risk of float delivery to agents in far to reach areas. These questions had not been addressed in the past research studies.

5.2.2 Effect of supply side factors on agents' liquidity challenges

This study established that travelling to a nearby bank branch was the primary mode of rebalancing as established by other studies. For example, Gichana (2013) noted the liquidity mechanisms used by agents reporting that retail agents rely on banks to rebalance and identified the need for banks to provide alternative rebalancing mechanisms to support agents in the rural areas preferably via automatic float top-up. Additionally, it emerged that distance to the nearest bank branch was an important determinants of transaction denials. The further away the distance to the nearest bank branch, the more the transactions denied due to lack of float. This is because customers. This study established that owner-agents are hesitant to delegate rebalance activities which tends to prolong the liquidity outage period, effectively leading to high transaction denials. Agents further from bank branches experience long outage periods, due to the time spent in travel as compared to their counterparts with closer proximity to bank branches.

Similarly, it emerged that the distance to the nearest bank branch was a very important determinant of the rebalance visits conducted by an agent and number of transactions denied due to lack of float. Agents located near the bank branches visited the banks for rebalancing at a higher frequency than agents located further from the bank. This study found that the process of acquiring float at the bank was tedious and therefore any extra travel time aggravates the agents' patience with the rebalancing tasks. Agents reported in this study that they often postpone the rebalance visits until a time when the primary business is on the low. Agents are caught up in the agency dilemma where they have to weigh risking their primary business in the interest of the agency business. It is therefore imperative that agents prioritize their primary business or another

agency over the agency business -especially if the rebalancing process is more accessible. FSPs have provided interventions such as linking of agent accounts with mobile banking which significantly improves access to electronic float. However, this study found that solutions for access to physical cash have not been addressed in concurrence with the IFC (2015) study which reported that managing electronic float can be done remotely unlike the management of obtaining of physical cash which requires physical interventions. The study also established that the higher the transaction cost, the less likely the agent is to rebalance. Although there was no causal relationship established between transaction costs and liquidity management, it was reported that agents preferred to rebalance with banks which had lower or no costs. This finding is explained by the need to optimize returns by agents as proposed in the agency theory which states that agents tend to consider their business interests above the FSPs interests (Barry, 1985).

5.2.3 Agents' perceptions towards liquidity management

The study identified perceptions of agents that could have a bearing on their liquidity management practices; fear of robbery and fraud, perception of their liquidity management capability and towards liquidity management processes. Agents expressed great fears about the occurrence of theft and fraud incidences by either their employees of external parties (such as impersonators of FSPs staff) against their agency. Due to the fears of fraud, agents preferred operating with lower float levels while reducing the number of rebalance visits in a day. This is intended to minimize the loss incurred in the event of theft or fraud. This concurs with the MicroSave (2015) study in Uganda where agents cited incidents of theft and fraud from their employees, customers, and impersonators of providers' staff. The current study also established that agents, who are not confident with performing liquidity management tasks, often ask for help from their peers. Despite more than half of the agents being capable of performing rebalance activities on their own; a significant proportion of them (11%) needed further training to utilize new liquidity management interventions. Agents, as noted in this study were not much concerned about the cost of travelling to nearby bank branches for rebalancing than they were about the time consumed acquiring the float once at the banking hall. Agents reported that they

often postponed rebalancing activities due to the opportunity cost of the time consumed in the rebalancing services.

5.3 Conclusions

This thesis presented a study on the factors affecting agents' liquidity challenges in Nairobi County. It adopted a mix method cross-sectional study of agents, master agents, provider representatives and bank representatives. The study was guided by three objectives; 1) to establish the relationship between agent factors and liquidity challenges, 2) to establish the effect of supply side factors on agent liquidity challenges and 3) to explore agent perceptions towards liquidity management mechanisms. The definition of liquidity challenges was either too frequent or few rebalancing visits and/or high transaction denial due to lack of float, consistent with the MicroSave agent study (2014).

Key findings from both qualitative and quantitative data analyses were: first, significant positive relationship between agents' experience and frequency of rebalance visits ($p=0.043$). This means that experienced agents are capable of anticipating demand for agent services and have established relationships with the liquidity facilitators such as master agents and banks which make them effective in liquidity management. Secondly, a significant relationship between owner involvement in liquidity management and frequency of rebalance visits ($p=0.075$). This is because owner involvement quick decision-making which allows agents to respond to emergent rebalances needs due to change in demand. Thirdly, a significant relationship between the capital investment of the main business and the frequency of agency's rebalance visits ($P=0.034$). The interdependence between the primary business and the agency was confirmed by prior studies such as CGAP (2014) which states that as part of the agency business case an existing premise can mop-up cash through the agency's withdrawal services and access cash through customer withdrawals. The primary business' cash flow position is therefore a proxy for agency capability to operate with minimal rebalancing visits. Fourthly, a highly significant relationship between distance from the nearest bank branch, agents' frequency of rebalance visits ($p=0.0162$) and transaction denials ($p=0.000$) which points to the imminent liquidity challenges facing agents located further away from banks for as long as banks remain the primary rebalancing mode. Lastly, agents were especially constrained in accessing physical cash due to lack of

diversification of cash access points, furthermore, agents report the need for further training in order to utilize new liquidity management initiatives. 6) Agents are biased to the status quo thereby preferring conventional ways of rebalancing such as banks. New interventions should address this bias to ensure that agents make use of new initiatives to tackle liquidity challenges.

5.4 Recommendations

This study provides recommendations at the managerial and policy level towards solving the agent liquidity challenges.

5.4.1 Managerial Recommendations

Based on the findings and implications discussed in 5.1, the following recommendations can be made to financial services providers:

- 1) Regular revision of agents profile to suit changing liquidity needs of the agency business. The desired profile should include agents with several years of experience in the agency business, owner operated agencies and agencies with good working capital flow evidenced by transactional history or bank statements of the primary enterprise.
- 2) Decentralization of liquidity hubs. While banks provide a reliable source of rebalancing services, it limits geographical expansion of agents to locate in areas where banks do not have branches. While provision of electronic float can be done remotely, acquiring physical cash requires FSPs to provide alternative hubs in areas where there are no banks. Further, industry collaborations to share such hubs among several financial services providers should be considered to reduce the costs involved in delivering float to agents.
- 3) Improve agents' capability to minimize liquidity outages through training and financing agents to grow their float investment. Liquidity management is the core of the agency business and training agents can enhance the ability to anticipate demand, utilize new approaches and overcome perceptual barriers to liquidity management. Approaches such as data analytics can be used to determine agents that can repay financing if advanced in order to boost agencies float investments.
- 4) Build monitoring systems to identify non-performing agents for targeted support or sanctioning.

5.4.2 Policy Recommendations

This study has established that agents' liquidity challenges go beyond weaknesses in individual providers' strategic and managerial operations and is rather an industry challenge. This study recommends that the Central Bank regulator initiates industry level interventions to address the liquidity challenges ailing the agent network in general.

5.5 Limitations of the Study

This study involved agents in Nairobi County and the sample was therefore not representative on the rural context. The findings of this study should be considered in general as representative of the agent networks nationally (43% of agents nationally are located in Nairobi), however, specific niche uses cases of agent network such as rural areas, refugee camps or social payments corridors may exhibit unique liquidity challenges than those addressed in this study.

5.6 Areas for Further Studies

It has emerged in this study that agent non-exclusivity mandated by the National Payments Act by the Central Bank of Kenya (2013) had an influence on agents liquidity management practices and access to liquidity management training. For example in this study, agents who served multiple providers had diverse options for rebalancing and chose to utilize facilities of the provider with easier access and least fees charged on rebalancing transactions. Further studies are recommended to establish if and how agent non-exclusivity influences the quality of an agent network including training, support, liquidity management and business viability of the individual agencies. This would ideally shed light to the business case for a shared agent network in Kenya and globally.

REFERENCES

- B. Mitnick (1975) *The Theory of agency "Policy 'Paradox' and Agent Behavior"*
<https://link.springer.com/article/10.1007/BF01718413> Ohio State University, USA
- Central Bank of Kenya. (2018). *Annual Bank Supervision Report 2016* downloaded on 18th December 2013 from www.centralbank.go.ke, Nairobi.
- Central Bank of Kenya. (June 2015). *Quarterly Statistics* downloaded on 18th December 2013 from www.centralbank.go.ke, Nairobi.
- Central Bank of Kenya. (2016). National Payments Act (2013) downloaded on 18th December 2013 from www.centralbank.go.ke. Nairobi.
- CGAP. (2011). *Technical Guide-Agent Network Management Toolkit*. Retrieved from www.cgap.org.
- CGAP. (2014). *Banking Through Networks of Retail Agents*. Retrieved from www.cgap.org.
- CGAP. (2014). *Digital Finance Plus*. Retrieved from www.cgap.org.
- Fisher RA. *Statistical methods for research workers*. London: Oliver and Boyd; 1950. p. 80
- Fionan McGranah. (n.d.). *Mobile Money for the Unbanked 101*.
www.gsma.com/mobilemoneyfordevelopment, London.
- Gichana, A. (2013). Challenges of Agent Banking in West Pokot. University of Nairobi, Kenya.
- GSMA. (2010, July). www.gsma.com/mobilemoneydefinitions. Retrieved October 2017, from mmu@gsm.org
- GSMA, 2015 *Spotlight on rural supply* Retrieved from GSMA.
- GSMA. (2014). *Use of Mobile Financial Transactions by MSEs in Tanzania*. Retrieved from GSMA.
- GSMA.(2015).http://www.gsma.com/mobilefordevelopment/wp-content/uploads/2016/04/SOTIR_2015.pdf. Retrieved from GSMA.
- GSMA. (2016). *Agent Loyalty Programme- Payments and Distribution*. Retrieved from GSMA.
- Gujarati D. (2004). *Basic Econometrics*, New York: McGraw Hill.
- Holy, I. (2014). http://www.uncdf.org/sites/default/files/Documents/bn2_uganda_v7.pdf. Retrieved from UNCDF.
- Intermedia. (2016). Financial Inclusion Insights Tracker Kenya <http://finclusion.org/glossary/>.

- Intermedia. (2014). FII Survey Kenya 2013. *Financial Inclusion Insights -Kenya wave 1-2013*
<http://finclusion.org/topic/mobile-money.html#data>.
- International Finance Corporation. (2015). Downloaded as Toolkit-Agent *Liquidity Management*
[.http://www.ifc.org/wps/wcm/connect//Tool+10.5.+Liquidity+Management.pdf](http://www.ifc.org/wps/wcm/connect//Tool+10.5.+Liquidity+Management.pdf).
- Jensen, Michael, and William H. Meckling. (1976) (1984). "Theory of the Firm Managerial Behavior, Agency Costs and Ownership Structure". *Journal of financial economics*.
- Mas, I. (2010). Mobile Payments Go Viral. *Yes Africa Can: Success Stories From A Dynamic Continent* downloaded from the internet.
- MicroSave (2017) "*Success Determinants of Agent Networks*", downloaded from
["http://www.helix-institute.com/data-and-insights/successful-agent-networks-0"](http://www.helix-institute.com/data-and-insights/successful-agent-networks-0).
- Microsave, Helix Project. (2013). *Agent Network Accelerator Survey Tanzania Wave I*
 downloaded from www.microsave.org.
- Mike, M., & Bersudskaya , V. (2017). *True Size of Agents-Agent Count Paper* downloaded from
www.microsave.org.
- Pamela John Chogo & Eliamani Sedoyeka⁵. (2014). Exploring Factors Affecting Mobile Money Adoption in Tanzania.
- Phillip & Adrian, S. M. (2016). *Research Methods for Business Students*. United Kingdom: British Library.
- Ross, A. Stephen. (1973). *Economic Theory of Agency* Ohio State University, USA.
- Shapiro, S. S.; Wilk, M. B. (1965). "An analysis of variance test for normality (complete samples)". *Biometrika*. **52** (3-4): 591-611. doi:10.1093/biomet/52.3-4.591. JSTOR 2333709. MR 0205384. p. 593
- Takeshi Inoue & Shigeoyuki Hamor. (2016). *Financial Access and Economic Growth: Evidence from Sub-Saharan Africa. Emerging Markets Finance and Trade.N*
- World Bank. (2014). *The Global Findex report*. Retrieved on 25th October 2013.
- World Bank (2017). *The Global Findex report*. The World Bank. Retrieved from:
<http://globalfindex.worldbank.org>.
- World Bank (2012). *Kenya Overview*. Retrieved on 25th October 2013.
- Wooldridge, J.M. (1999). *Econometric Analysis of Cross-section and Panel data*. Cambridge, MIT Press, 1999.

APPENDICES I: Findings from Qualitative Interviews

The interviews findings are summarized in the Appendix Tables 1.1a, 1.1b and 1.1c.

Appendix Table 1.1a: Data Display from Qualitative Interviews

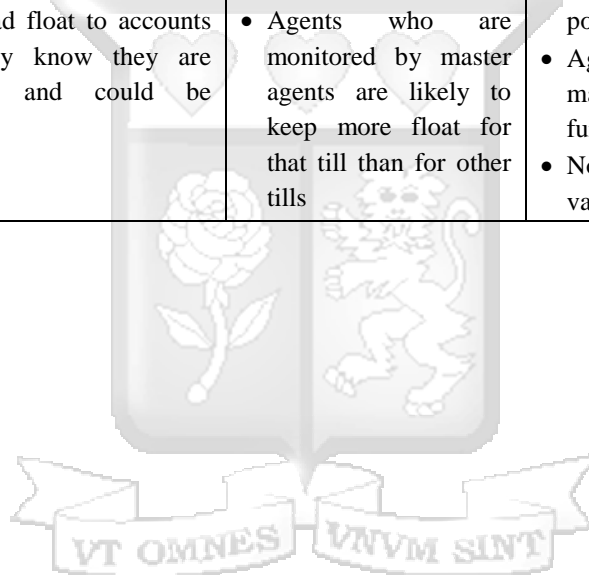
Objective	Financial Service Provider representatives	Master agents & Rebalancing Facilitators	Agents
Establishing the relationship between agent factors and agents' liquidity challenges	<ul style="list-style-type: none"> • Preference of non-exclusive agents and agents with experience. • There is more focus on agents' cash flows whereby agents provide 6 months bank statement for registration • Education level requirement is substituted by regular agent trainings. 	<ul style="list-style-type: none"> • Master-agents use the criteria of mandatory float of 50,000 for Safaricom's M-Pesa. • Master agents monitor agents' performance against transaction targets and adherence to recommended float threshold. Based on this they can advance float to top performing agents. 	<ul style="list-style-type: none"> • Ease of handling liquidity increases with the number of years of experience. • Experienced agents establish relationships with master agents and bank staff who can support them with almost real-time rebalancing facilities • Agents who hire operators/employees abstain from delegating the liquidity roles.

Appendix Table 1.1b: Data Display from Qualitative Interviews

Objective	Financial Service Provider representatives	Master agents & Rebalancing Facilitators	Agents
Supply side factors effect on agents' liquidity challenges	<ul style="list-style-type: none"> • Banks map their agents to nearest branch for liquidity and monitoring support. • Bank branches who are super agents of MNOs. • Initial agent trainings include liquidity management components. • Subsequent agent trainings focus on customer service, liquidity management and compliance. • Banks offer agents dedicated tellers to reducing rebalancing time. • Banks lack adequate agent monitoring systems and HR resources unlike MNOs. • Agents divert financing meant to enhance their liquidity which dampens initiatives by providers. 	<ul style="list-style-type: none"> • Bank branches are the leading liquidity facilities for both mobile money and bank agents • Master agents monitor float levels of their agents through a system. Thus deactivating agents who do not meet the float threshold required. • Banks allow express counters for agents to access float without the normal queuing. 	<ul style="list-style-type: none"> • Bank branches are the primary rebalancing point and are accessible within walking distance • Banks closing hours does not match agents demand for liquidity • Agents see rebalancing transaction costs high. • Training on liquidity management is mostly attended by owners. • Agents need further training to utilize additional rebalancing facilities. • Agents use digital credit products such as M-Shwari, KCB-MPesa, Tala and Branch among others to obtain for additional seasonal financing.

Appendix Table 1.1c: Data Display from Qualitative Interviews

Objective	Financial Service Provider representatives	Master agents & Rebalancing Facilitators	Agents
Agents perceptions towards liquidity management mechanisms	<ul style="list-style-type: none"> • Banks are making efforts to improve the agents experience during rebalancing points such as dedicated tellers for agents • Agents faced by fraud and robbery incidents tend to reduce their float dedication to the agent business • Agents load float to accounts where they know they are monitored and could be penalized. 	<ul style="list-style-type: none"> • Agents prefer to work with people who value and care about their business. This means putting the agents in the center of business. • Agents need partners not supporters. • Agents who are monitored by master agents are likely to keep more float for that till than for other tills 	<ul style="list-style-type: none"> • Agents fear robbery and fraud from employees and during rebalancing trips • Agents split the values of a rebalancing transaction due to fear of fraud and theft. • Agents dislike closing shops to travel to rebalance resulting to postponement of rebalancing. • Agents say bank tellers and they may prefer to rebalance at a further bank. • Non-exclusive agents visit various banks to rebalance.



APPENDICES II: Interview Guide-Provider Representative

My name is _____, a student at Strathmore Business School. I am conducting a research on the drivers of liquidity management practices among agents in Nairobi and would appreciate hearing your views as a representative of x provider (insert provider name). I will request for 30 minutes of your time and assure you that information gathered will be held anonymously and confidential for use for purposes of this study only.

- a. Opening remarks: Agents play a critical role in the distribution of financial services in areas otherwise not reached by banks before. However, liquidity challenges have been termed as perennially hurting the business both for agents and providers. As a provider representative, what are your thoughts on this?

Probe 1: What are the factors influencing agent's liquidity management practices

Probe 2: How do providers equip agents to handle the task of liquidity management

Probe 3: How does your agent selection strategy ensure that you hire agents with the capability of maintaining healthy liquidity balances?

Probe 4: What are the provider constraints in the above

Probe 5: What measures have providers taken to support agents or improve the liquidity of their agent network overall?

Probe 6: Why is it important for the provider to have agents with adequate liquidity

- b. Some agents are good at managing liquidity than others. Why do you think this is so?

Probe 1: Criteria in the selection of agents-mandatory float levels

Probe 2: Monitoring of agents' float in the system

Probe 3: Retraining of illiquid agents on liquidity management practices

Probe 4: Actions taken against illiquid agents

- c. How suitable\constrained from your experience is the training, agent visits, liquidity mechanisms and agent management structure in ensuring that agents maintain adequate levels of float?

Probe 1- How has your approach changed over the years

Probe 2- What has influenced this change?

- d. Some providers in other markets deliver float to agents while others offer agents advance float facilities during weekends and public holidays? What do you think of these ideas

Probe 1: What other interventions are you aware of in the market?

- e. What plans do you have in ensuring that agent liquidity is guaranteed for your customers? Any other suggestions? Thank you very much for your time.

Appendix 2: Quantitative Questionnaire

Introduction

My name is _____, a student of Strathmore Business School. I am conducting a study on agents' liquidity in Nairobi area. Your participation will contribute to the enhancing of agent support by providers in making liquidity more accessible. Information gathered will only be used for purposes of this study and will be anonymised and treated with utmost confidentiality.

Section A: Agent Demographics

A1. Agent Name _____

A2. Location

1. Kawangware
2. Ngara-CBD,
3. Kasarani
4. Githurai
5. Kangemi
6. Umoja
7. South B
8. Gikomba

A3. Gender

1. Male
2. Female

A4. Age

1. 18-25
2. 26-33
3. 34-41
4. 42-49
5. 50-57
6. 58 and Above

A5. What is the highest level of education you have attained? (*Education level*)

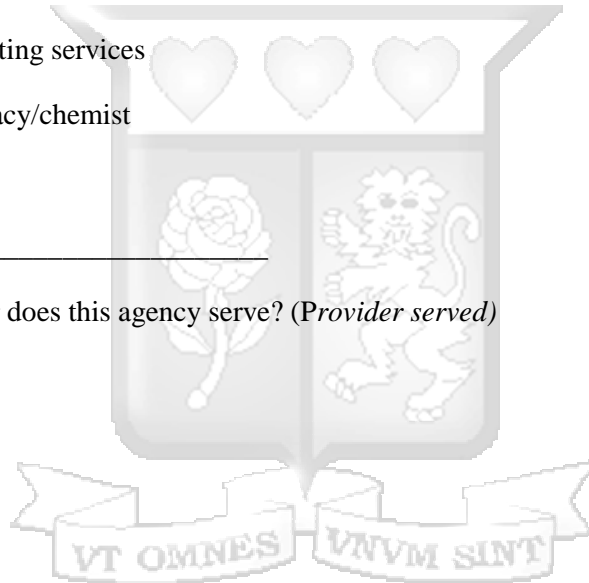
1. Phd, Master's degree
2. University degree
3. College diploma
4. Tertiary college certificate



5. Secondary school
6. Primary school
7. Others(specify) _____

A6. Type of primary business? (*Business type*)

1. Retail store(supermarkets)
2. Local *duka*
3. Petrol station
4. Grocery store
5. Salon/barbershop
6. Bureau-Cyber, printing services
7. Drugs store-pharmacy/chemist
8. Boutique
9. Others(specify) _____



A7. Which service provider does this agency serve? (*Provider served*)

1. Safaricom
2. Airtel
3. Equity bank
4. Family bank
5. Co-op bank
6. KCB bank
7. Other specify _____

A8. Have you conducted at least one transaction, either deposit or withdrawal, in the last one month? (*Agent Activity*)?

1. Yes
2. No

Section B: Agent Operations

B1. For how long have you been managing this agency?

1. Less than 6 months

2. 6 months -1 year
3. 13 months -2 years
4. 2-3 years
5. 3-4 years
6. 4-5 years
7. 5-6 years
8. More than 6 years

(Agent Vintage)? _____

B3. What is your involvement in this agency (*Ownership*)?

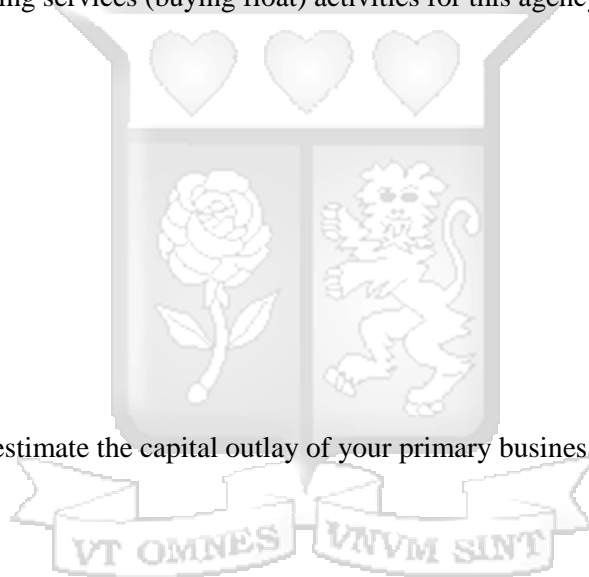
1. Owner
2. Employee
3. Other(specify) _____

B4. Who conducts rebalancing services (buying float) activities for this agency?

1. Me
2. The owner
3. My colleague
4. Provider staff
5. Another agent
6. Other specify

B7. How much would you estimate the capital outlay of your primary business at in KES? _____

1. Less than 50,000
2. 50,001-100,000
3. 100,001-200,000
4. 200,001-500,000
5. 500,001-1Million
6. Above 1,Million
7. Other specify _____



Section C: Liquidity Supply Factors

C1. When you require either cash or e-float which mechanisms do you use to rebalance?

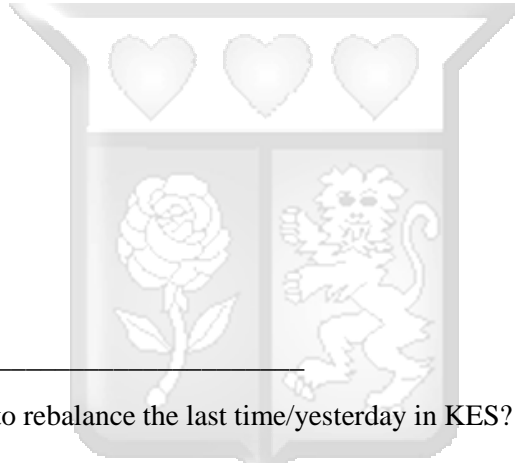
1. Bank

2. Another agent
3. Provider office/branch
4. ATM
5. Delivered by provider staff
6. Other specify _____

C3. How far in estimated walking minutes is the nearest bank branch that can serve this agency?(Limit 5 and 2000)_____

C4. How long did it take you to get float in your last rebalancing trip?

1. Less than 30 minutes
2. Between 30-1 hr
3. Between 1-2 hrs
4. Between 2-3 hrs
5. Between 3-4 hrs
6. Between 4-5hr
7. More than 5 hrs _____



C5. How much did it cost you to rebalance the last time/yesterday in KES?

1. Travel _____
2. Transaction cost _____
3. Other specify _____
4. I did it together with other business errands and not just to buy float

Section D: Provider Support

D1. Did you receive any initial training from the provider when you started (*Training received*)?

1. Yes
2. No

D2. Did you receive training on liquidity management from your provider?

- a) Yes
- b) No

D3. Does the provider or their representative visit you to offer liquidity management assistance?

- c) Yes
- d) No

D4. If Yes, how many times does the provider visit you in a month? _____

D5. What new liquidity management options availed to you by the provider?

- a) None
- b) Float delivery
- c) Advance float on weekends
- d) Linkage with standby liquidity rich entities
- e) Advice on float levels to maintain during peak seasons
- f) Other (Specify) _____

Section E: Liquidity Management Practices

E1. How many times in a week do you visit to rebalance (*rebalance frequency*)?

- 1. Every day
- 2. Thrice a week
- 3. Twice a week
- 4. Once a week
- 5. Twice a month
- 6. Once a month

E2. When you go to rebalance, do you require more of cash or e-float in your agency?

- 1. Cash
- 2. E-float
- 3. Both equally

E3. On a normal day, how many customers do you deny transactions due to lack of float (either cash or e-float)?

- 1. 0-5
- 2. 5-10
- 3. 10-15
- 4. 15-20
- 5. 20-25
- 6. Above 25

Section F: Agent Perceptions towards Liquidity Management Mechanisms

F1. As an agent which of the following statements is true about your ability to perform liquidity management activities*MR* ideally each of the options below should be a binary variable

- a) I can comfortably perform rebalancing activities for this agency

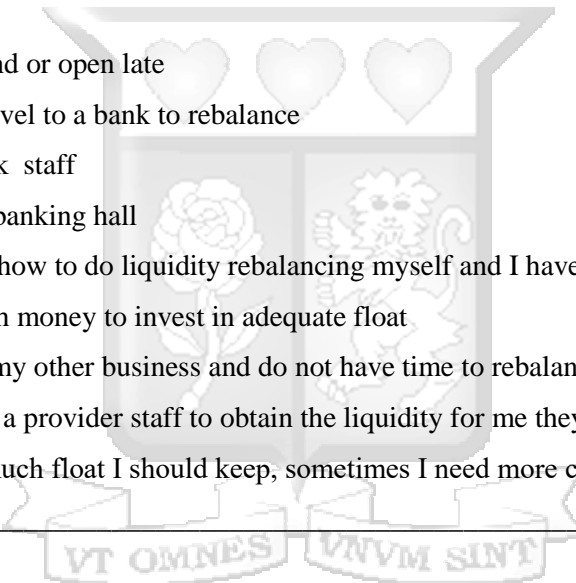
- b) I always ask for assistance in performing rebalancing activities
- c) I need further training to be able to use the new liquidity facilities introduced by my provider (for example mobile banking)
- d) Other agents come to me for assistance to perform rebalancing services

F2. In your opinion, how adequate is the support given by your provider in liquidity management?

- a) They call me or visit to inform me about new products and solutions
- b) They resolve any complaints in accessing liquidity quick enough
- c) They try compared to other providers
- d) They do not support me as promised whenever I have challenges
- e) They think agents are a nuisance

F3. Which of the following issues are the 5 key challenges for this agency in managing liquidity needs?

- 1. Banks are far
- 2. Banks close early and or open late
- 3. It is expensive to travel to a bank to rebalance
- 4. Poor service by bank staff
- 5. Long queues at the banking hall
- 6. I do not understand how to do liquidity rebalancing myself and I have to rely on someone
- 7. I do not have enough money to invest in adequate float
- 8. I am too busy with my other business and do not have time to rebalance my float
- 9. If I send my staff or a provider staff to obtain the liquidity for me they might defraud or rob me
- 10. I don't know how much float I should keep, sometimes I need more cash other times more e-float
- 11. Other specify _____



THANK YOU FOR YOUR PARTICIPATION

Appendix 3: Key Informant Interview Guide-Agents

My name is _____. I am conducting a study on the factors affecting agents' liquidity challenges in Nairobi County. Kindly spare 25 minutes of your time to discuss some of the practices and challenges experienced in this agency outlet while managing liquidity. You have a right to skip questions that you might not be willing to answer. Kindly note that information gathered will be treated with utmost confidentiality and will only be used for purposes of this study.

Name_____

Opening question

1. Agency business involves dealing with cash and electronic float. What is your experience in keeping adequate balances while offering deposit and withdrawal services to customers?

Probe 1: How do you reconcile, discover that you need to rebalance?

Probe 2: What are your fears and worries when you think of rebalancing for cash or e-float?

2. Kindly take me through a typical day; how you prepare to ensure that you have an adequate float to perform all customer transactions for the day? /

Probe 1: What are the challenges?

Probe 2: How does demand for CICO agent services vary

Probe 3: Concerns for holding adequate float for the day

Probe 4: What can be done to ensure you hold enough float?

Probe 5: How is the experience at the various liquidity access points?

3. How has the experience in liquidity management changed over time?

Probe 1: Does the experience vary over the years of becoming an agent?

Probe 2: How do various providers support agents in liquidity management?

4. What suggestions would you make to the provider on what support agents like you require in managing liquidity.

Thank you for your time.