KWAME NKRUMAH UNIVERSITY OF SCIENCE AND TECHNOLOGY

SCHOOL OF BUSINESS

MOBILE MONEY AND FINANCIAL INCLUSION IN GHANA: THE MODERATING ROLE OF SOCIAL NETWORKS

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DECLARATION

I hereby declare that this submission is my work toward the award of the Master of Business Administration in Accounting and that to the best of my knowledge, it contains no material previously published by another person, nor material which has been accepted for the award of any other degree of the University, except where due acknowledgement has been made in the text.

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DEDICATION

I dedicate my thesis to the Almighty God for giving me the strength, good health and wisdom to conduct this research. I also dedicate this thesis to my supportive wife who helped me and encouraged me to conduct this research. Her kind words and support motivated me to strive for the best.

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ABSTRACT

This study investigates whether social networks moderate the relationship between mobile money use and financial inclusion in Ghana. The study uses survey data from 120 households in the Ashanti Region of Ghana and employs the hierarchical regression method and Mod Graph as estimators. The empirical results indicate that mobile money usage and social networks increase the financial inclusion of households in Ghana. In addition, the results show the positive effect of mobile money on financial inclusion in stronger, particularly within a strong social network. Furthermore, the empirical results reveal that social network among households increases the positive effect of mobile money on financial inclusion. This study concludes that social network is useful for making mobile money financially inclusive. In light of these results, the study recommends that mobile money operators such as telecommunication companies, financial institutions, Fintech companies and governments must promote affordable mobile money services and infrastructure to enhance financial inclusion. In addition, this study recommends that mobile money network operators design a service which enhances social interaction to achieve higher financial inclusion. For instance, mobile networks must leverage social ties to spread mobile money to increase adoption. In addition, mobile money users must use their social sites to share useful mobile financial innovation information to improve access to financial services. For instance, by sharing the credibility and dependability of the mobile money services with other closely related people.

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LIST OF ABBREVIATIONS

FII	Financial Inclusion Index
GPS	Ghana Payment System
PCA	Principal Component Analysis
GSMA	The Global System for Mobile Communication Association
MTN	Mobile Telecommunication Network
UNCDF	United Nations Capital Development Fund
WDI	Word Development Indicators

CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

There has been an increase in mobile money usage, a financial transaction service operated on mobile phone devices (Myeni et al. 2020). Several studies indicate that the use of money mobile has significant benefits, some of which are poverty alleviation, increase in investment activities, improvement the payment systems and reduced communication costs (Myeni et al. 2020; Abdul-Rahaman and Abdulai, 2021; Adeleye et al. 2019; Asongu and le Roux, 2023; Bongomin et al. 2023). Moreover, advocates of financial inclusivity such as the World Bank and UN Capital Development Fund (UNCDF) observe that mobile money holds the potential to enhance financial access, particularly in rural areas (UNCDF, 2015). Up to this point, the benefits associated with the use of mobile money have been established in the literature. However, little is known about how other factors such as social networks can influence the relationship between mobile money usage and financial inclusion in Africa, particularly Ghana.

Upadhyay and Jahanyan (2015) define mobile money as" financial services on mobile devices which use information and communication technology to extend financial services to subscribers of the services (mobile money users). The services offered include deposits and withdrawals, loans, insurance and settlements of bills (Upadhyay and Jahanyan, 2015; Pobee et al 2023). Hence, the introduction of mobile money services by telecommunication companies in partnership with financial institutions companies in some countries in Africa, including Ghana has enhanced the payment system and increased financial inclusion.

Myeni et al. (2020) define "financial inclusion" as a system where a significant number of the population, particularly the people living in the rural communities have access to affordable, adaptable and essential financial products and services. Bank of Ghana (2018) defines mobile money as regulated financial services provided by mobile telecommunication networks and other partners. Evidence shows that price and non-price barriers such as loan application externalities, fees and minimum balances requirements, collateral provision and non-physical access to formal financial institutions have been significant barriers and contributed to voluntary and involuntary financial exclusion worldwide (Okello et al. 2018a). However, the advent of mobile is closing the gap (Okello et al. 2028b)

Network theory is relevant in this study. The theory emphasizes the connections among people which can have economic and financial benefits (Granovetter, 1973; Burt, 1992). This suggests social networks can be leveraged to increase financial access (Okello et al. 2018). According to Wasserman and Faust (1994), social network refers to social ties among individuals in household stings and their related interactions. The network derives its strength through love, affection, reciprocity of service and commitments to household members (Okello et al. 2018). Indeed, the strength of a tie enhances resource flow and sharing between individuals in dyadic relationships (Okello et al. 2018). According to Okello et al. (2018b), the extent to which people use mobile money services as a medium of financial transaction is significantly influenced by their families, relatives and close friends. Thus, the poor, particularly, rely on close relatives and associates to share relevant information and knowledge regarding the use of mobile money technology. However, there a limited studies on the role of social networks in digital finance and financial inclusivity (Okello et al. 2018a).

Indeed, the Work Bank Report in 2016 indicates that in underdeveloped markets such as markets in Sub-Saharan African countries, people rely on ties and close associates to enable trade. According to Okello (2018b), most poor households in Sub-Sahara Africa rely on social network groups such as religious groups, and community associations to access new ideas from the market. Additionally, Slade et al. (2015) assert that a social network is a great tool for people trying out technology for the first time (see also Yang et al. 2012). Information shared among and within social network groups is credible and can be relied on by members of such groups.

Consistently, the Consultative Group to Assist the Poor (CGAP, 2018); and the World Bank (2018) note that the use of mobile phone by individuals, particularly the poor, promote savings, transferring and sending money, especially from a relative in the urban city to family, relatives, or close associates in the rural area, or enhance transferring of money among rural communities. Therefore, in Ghana, where people rely on social networks to achieve economic benefits, they would use social networks as a tool for financial services outcomes. This study, therefore, argues that social network is an important tool which influences the use of mobile money service and financial inclusivity. The study, thus, contributes to the literature in Ghana, for the first time, the role of social networks on mobile financial service usage and financial inclusion.

1.2 Statement of the Problem

Studies exist on the impact of mobile money and financial inclusion, but their findings have been mixed. For instance, studies show that the use of mobile money significantly promotes and improves financial inclusion (e.g., Abdul-Rahamanand Abdulai, 2021; Ahmad et al. 2020; Amoah and Korle,2020; Anarfo et al. 2020; Asongu, et al. 2020; Chikalipah,2017; Maëlle, 2018; Mwangasu et al. 2020; Myeni et al. 2018; N'dri, L. Kakinaka; Okello et al. 2018a; Okello et al. 2018b). In contrast, other studies, albeit a few, report a negative relationship between mobile money usage and financial inclusion (e.g., Takyi, et al. 2022). On the other, other studies find no significant relationship between mobile money usage and financial inclusion (e.g., Lungu et al. 2017; Owusu et al. 2017). The conflicting results on mobile money on financial inclusion have raised questions about the consistency in evidence of existing studies. However, the majority of studies report and commonly agree that mobile money significantly improves financial inclusivity, reduces poverty and increases welfare.

This study introduces a new variable, social network in the mobile money use and financial inclusion relation, which is absent in previous studies. Empirical and theoretical studies on social networks in promoting financial access are limited. The only study in Africa on the role of social networks on the relationship between mobile money use and financial inclusion was conducted in Uganda by Okello et al. (2018a) where they found a significant positive moderating effect of social networks on the relationship between mobile money use and financial inclusion. Up to this point, no study exists in Ghana on the role of social networks on mobile money use and financial inclusion, especially when CGAP (2018); and World Bank (2018) observe that social networks among relative and close associates facilitate the transfer of money by using mobile financial

services. This study, thus, provides relevant literature and policy contribution in Ghana by investigating, for the first time, the role of social networks in mobile money–financial inclusion nexus in Ghana.

1.3 Research Objectives

Generally, this study investigates the role of social networks in the relationship between mobile money and financial inclusion in Ghana. Specifically, the study seeks;

1. To examine the extent to which mobile money contributes to financial inclusion in Ghana.
2. To investigate the effect of social networks on financial inclusion in Ghana.
3. To test the moderating effect of social networks on the relationship between mobile money usage and financial inclusion in Ghana.

1.4 Research Questions

Accordingly, the following research questions will be answered.

1. Does the use of mobile money improve financial inclusion in Ghana?
2. Could social networks be a leverage to increase financial inclusion in Ghana?
3. Could social networks play a role in the relationship between mobile money usage and financial inclusion in Ghana?

1.5 Significance of the Study

The study has implications for poor households, governments, policymakers, financial institutions, mobile money network operators and literature. Firstly, this study has encouraged mobile money network providers to design services that promote social ties and interaction to promote financial inclusion. Secondly, this study has implications for sound policies that promote mobile money services through laws that protect users and encourage mobile money expansion. Third, this study, for the first time in Ghana explores the extent to which mobile money can promote financial inclusion by leveraging social networks. This enhances earlier results and provides a new insight into the explored variables.

1.6 Summary Methodology

This study uses a cross-sectional survey design. This approach allows for the observation of a population at a time. In addition, large data can be collected within a short time using this approach. Random sampling is used to select 120 poor households in the Ashanti region of Ghana. This study targets mobile money users. The items used to construct mobile money and financial inclusion are adopted and modified to improve their reliability (Okello et al. (2018). The study adopts hierarchical regression to determine the predictive power of the independent variable on the dependent variable.

1.7 Scope of the Study

The study targets 100 poor households' residing in rural, peri-urban and urban communities of the Ashanti region. The Ashanti region is the second most populous and economic region in Ghana, after the Greater Accra region, with several rural, peri-urban and urban communities suitable for the study's objectives

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1.8 Organization of the Study

This study has five chapters. Chapter one presents the background of the study, the problem statement, and objectives of the study, the significance of the study, the scope of the study and the organization of the study. Chapter two presents the literature review of the study. It covers the conceptual review, theoretical review, empirical review and conceptual framework. Chapter three presents the methodology. Chapter four presents the results and discussion. Chapter five summarizes the findings and provides recommendations.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

The chapter reviews related studies on the topic. The chapter has five (5) chapters as follows: Section 2.2 presents the conceptual literature review, discussing concepts such as mobile money, financial inclusion, and financial, and social networks. Section 2.3 presents a theoretical review and review of the network and the financial innovation theory. Section 2.4 presents the literature. Finally, Section 2.5 presents the conceptual framework.

2.2 Conceptual Review

2.2.1 Mobile Money

Running in parallel with the formal financial institutions, integrated into the banking sector, mobile money, conceived in the idea of branchless financial institutions, provides traditional banking services to the unbanked population with convenient access to essential financial products and services, while promoting financial inclusion (Serbeh et al., 2021; Demirguç-Kunt et al., 2018). According to Upadhyay and Jahanyan (2015), "mobile money" is financial services on mobile devices which use information and communication technology to extend financial services to subscribers of the services (mobile money users). Mobile money services allow the storage of money digitally and facilitate the transfer of it from one mobile money user to another user (Myeni et al. 2020). In addition to transforming financial access, mobile money service has several other benefits, some of which are secure and available financial services, ubiquity of service provision, relatively lower transaction cost, alleviation of poverty and encouragement of savings and wealth accumulation (Guermond, 2022; Adiana et al., 2022; Abdul-Rahaman et al. 2021)

On the contrary, without access to finance, individuals and households may suffer deprivation due to increased income inequality and lack of social protection (Aboagye and Anong, 2020). Currently, a third of the adult population uses mobile money in Ghana (Ghana Payment Report, 2021). Generally, mobile money usage has increased partly as a result of the unprecedented shift and promotion of formal digital finance and financial innovation services in ways never witnessed in the recent past (Anarfo et al., 2020). For instance, as of 2021, the mobile money market in Ghana stood at US$ 92 Billion in value and is expected to increase to reach US$ 494 Billion by 2027, representing a growth of 32.5% between 2022 to 2027 (Ghana Payment Report, 2021). Mobile money accounts stood at 24 million as of 2021, double of the registered bank account holders which stood at 11.5 million (Ghana Payment Report, 2021). Mobile money service in Ghana offers a per-to-person transaction, with less involvement in banking transactions. Mobile money has solidified to the extent that it is a bigger platform than all the payment systems platforms in Ghana combined.

Different approaches have been used to measure mobile money usage to identify the adoption rate of the service. Some studies use a binary indicator where "1" is used for several individuals with mobile money accounts, and" 0" for otherwise (e.g., Myeni et al., 2020). Others also capture mobile money usage by the total annual volume of mobile money transactions (Bahati and Aziakpono, 2022; Chen et al., 2019; Chikalipah et al., 2017). All the approaches indicate a higher mobile money adoption rate globally. As a result, several empirical studies point to the conclusion that mobile money is the pathway to financial inclusion (e.g., Abdul-Rahaman and Abdulai, 2021; Ahmad et al. 2020; Amoah and Korle, 2020; Anarfo et al. 2020; Asongu, et al. 2020; Chikalipah, 2017)

2.2.1.1 Mobile Money in Ghana

Ghana, as in many other countries (Nelms and Rea 2017), mobile money services started as a domestic person-to-person money transfer product. Mobile was operationalized in 2009 as a mobile device financial service delivery for receiving and sending money. For the two major regions in Ghana (i.e., Accra and Kumasi), the common mobile money transaction in Accra is Cash-ins (cash deposits), while in Kumasi, Cash-outs (cash withdrawals) (GPS, 2021). In effect, the peer-to-peer mobile money transaction has replaced the traditional means of sending and receiving remittances (. i.e., through post office and bus drivers) (Takyi et al., 2022). While the vast majority – 94% – of domestic transfers were either sent through a friend/relative or brought back by migrants themselves on visits home in 2011 (Plaza et al. 2011), only 13% of recipients received their remittance in person and cash in 2017 (Demirgüç-Kunt et al. 2018).

While about 94 per cent of all domestic transfers were made either through a friend/relative or by the migrants themselves in 2011(Plaza et al. 2011), only 13% of recipients received their remittance in person and cash in 2017 (Demirgüç-Kunt et al. 2018)). Up until the mid-2010s, Dzokoto and Appiah (2014, p. 41) had reported lower adoption of mobile money in Ghana. However, in 2017, the number of people reported to have received money through personal bank accounts or mobile money had increased from 30% to 59% from 2014 to 2017 (Demirgüç-Kunt et al. 2018). Currently, as of August 2021, about 65% of the adult population in Ghana has mobile money account (GPS, 2021). Currently, three Mobile Network Operators (MNOs) - MTN, AirtelTigo and Vodafone, offer mobile money services, with MTN having the largest market as the oldest (Bank of Ghana, 2021).

As of February 2020, active mobile money accounts stood at 7 million, with 235, 000 active mobile money agents (Bank of Ghana 2020). Compared with the 345, 000 active mobile money accounts and 5, 900 agents in 2012 (Bank of Ghana 2019), this indicates higher mobile money penetration. The growth of mobile money began when new e0money guidelines were implemented in 2015 to allow non-bank entities (MNOs) to issue electronic money alongside formal financial institutions. This indicates that regulation is an important market setting that gives the market a form and contributes to new realities. At the origin of the new guidelines was the view that the regulatory environment hampers investment because of a lack of incentives for banks and non-bank operators. While the Bank of Ghana was very proactive in the domain, the changes were promoted by a group of actors, termed as fintech-philanthropy-development complex by Gabor and Brooks (2017). A new alliance made up of developing countries, international organizations, philanthropic investors and Fintech companies which have embraced digital financial inclusion as a new paradigm shift.

The Bank of Ghana accepted the Maya Declaration in 2012 to revise and improve regulations which promote branchless banking and aimed that by 2017, at least 70% of the Ghanaian population be financially included. An additional hurdle to take-up identified by many organisations of the complex and the MNOs is the compliance to Know Your Customer (KYC) procedures and Anti-Money Laundering and Combating the Financing of Terrorism (AML/CFT) regulations. The latter requires MNOs to receive sufficient proof of identity from customers before registering them as mobile money users (Guermond, 2022). When the threshold about what constitutes proof of identity is too high or when customers lack IDs, financial inclusion efforts are thwarted (Guermond, 2022). Supported by the momentum that the new guideline brought about, MNOs in Ghana started to figure out ways of engaging potential subscribers, from door knocking

to drama sketch promoting the benefits of the service as part of their ‘Direct Consumer Contact’ approach.

Furthermore, and as a response to a malfunctioning decentralized ID system – there are nine separate databases across various government and public entities – and the difficulty for financial institutions to pinpoint with precision the address of prospective customers, a national biometric identification programme coupled with a new national address system based on GPS coordinates has been launched by the government in 2018 (Aboagye and Anong, 2020). By facilitating the monitoring and tracking of persons and the assets and properties they own, it is argued that the schemes would increase the capacity of financial institutions to ensure the integrity of KYC and AML reporting (Guermond, 2022). The leveraging of digital ID would also allow people to activate accounts remotely through electronic KYC, or 'e-KYC' (Amoah et al. 2017). Importantly, alongside the 2015 e-money guideline, a regulatory framework for mobile money agents – the Agent Guidelines – was issued by the Bank of Ghana to promote financial inclusion (Guermond, 2022).

The guideline emphasises the key tenets that underpin any contract between an agent and the 'principal', i.e., the e-money issuer. Through these contracts, new relationships of obligations, rights and monitoring but also mutual reliance are established. Grocery stores, multiservice boutiques and airtime vendors are turned into mobile money agents, an essential element of the ecosystem. Not only do agents receive a new legal status by entering into this contractual relationship, but they also are encouraged to transform their daily practices and behaviours. One of the new ‘permissible activities’ of agents is the active ‘marketing of credit, savings and

insurance products offered and underwritten by duly licensed financial institutions' (Bank of Ghana 2015, p. 8).

As mobile money agents become financial institutions' new front officers – and market sites that contribute to summon Homo Economicus –, a complex range of commissions has been set up to sign up agents and ensure they fulfil their duties – that is, making sure cash is available at all times for customers (Guermond, 2022). Financial incentives are, however, far from being sufficient when more structural problems are at play. While mobile money in the southern parts of the country is now fairly developed and tends to work quite smoothly, the same cannot be said about the North of the country (Guermond, 2022). Structurally underdeveloped since the colonial period, the Northern, Upper West and Upper East regions are zones of domestic emigration (Ouma 2015, p. 3). As a result, mobile money agents have much bigger liquidity issues in these regions because the demand for cash is disproportionally larger than any other type of transaction, especially cash-ins (Guermond, 2022).

Problems of connectivity and infrastructure are also deemed to hamper the development of the ecosystem in the North. Beyond that, operating and sustaining a mobile money ecosystem in the North proves more difficult due to a different rainfall pattern than in the South. While southern Ghana experiences two rainy seasons a year, there is only one rainy season in northern Ghana. In regions where a large part of the population in rural areas work in agriculture, this means that smallholder farmers receive their main bulk of income once a year after the harvest. For mobile money agents, this results in a significant amount of cash floating around and a heavy spike in demand during one time of the year, whereas the number and volume of transactions flatten out

during the rest of the year. Unsustainable demand paired with stable and high operational costs makes it difficult for MNOs to sustain a viable agent network across the country (Guermond, 2022). Meteorological materialsities shape the process of domestic remittance marketisation and market makers have to find ways to circumvent these constraining natural properties.

Nonetheless, mobile money adoption in Ghana has now reached a certain threshold that allows the service to keep growing: When it comes to mobile money, once you've hit a certain threshold, the human factor, the individual interactions and the numbers tend to influence the growth (Guermond, 2022). Because a certain number of people are now using it and whoever has an account is likely to convince another person to also open a wallet. (MTN, 2019). By actively contributing to the formation of the material, regulatory, informational and human infrastructures of the mobile money ecosystem, MNOs have made possible the centralization and incorporation of vast amounts of geographically dispersed cash into formal financial circuits.

2.2.2 Financial Inclusion

Financial inclusion is a process of ensuring access to financial services and timely and adequate credit where needed by vulnerable groups at an affordable cost (Adeleye et al., 2019). Contextually, the Bank of Ghana (2014) refers to it as the "usage of financial services provided by regulated, other formal, and informal financial institutions." According to Upadhyay and Jahanyan (2015), "mobile money" is a mobile-based money transfer service that uses information and communication technology tools and non-banking channels to offer and extend financial services to subscribers who are not profitable to be reached by formal and traditional financial services providers like banks. Indeed, mobile money provides basic financial services such as deposit, withdrawal, remittance delivery, and payment of bills. Thus, the launch of Mobile Money Services by telecom companies in several countries, especially in Sub-Saharan Africa has boosted the provision of financial services among low-income earners.

2.2.3 Financial Inclusion Commitment, Mobile Money Penetration and Savings in Ghana

Reform efforts intended to deregulate the banking industry and lay the foundation for Ghana's financial inclusion agenda began in the 1980s as part of the International Monetary Fund (IMF) and the World Bank–led Economic Recovery and Structural Adjustment Program (SAP). In 1988, the government of Ghana launched a three-phase comprehensive Financial Sector Adjustment Program (FINSAP), namely FINSAP-1 (1988–1991), FINSAP-2 (1992– 1995) and FINSAP-3 (started in 1995) to liberalize interest rates, restructure institutional norms and improve the legal and regulatory framework for banking operations. Specifically, while FINSAP 1 focused on revitalizing the financial sector to make it more viable and efficient, the programmatic schedule of

FINSAP-2 and FINSAP-3 ensured continuity in restructuring the financial sector (Bawumia, 2010).

The revision of the Banking Law (PNDCL 225) of Ghana in 1989 ensured that the limits of risk exposure, including capital adequacy ratio were tightened, and accounting standards were made uniform while broadening the scope for auditing banks and imposed stringent reporting requirements to tighten Bank of Ghana's (BOG's) grip over onsite and offsite supervision of banks. In addition, the Ghanaian government passed the Financial Institutions (Non-Banking) Law (PNDCL 328) in 1993 to expand the BOG's scope of supervision over the activities of such financial institutions as Microfinance Institutions (MFIs), savings and loans companies, credit unions and cooperatives, discount houses, finance houses, acceptance houses, building societies, leasing, hire-purchase companies, venture capital funds and mortgage financing companies (Bawumia, 2010).

From the mid-2000s, the Ghanaian government further bolstered its commitment to promote financial inclusion. For instance, in 2008, the BOG issued a branchless banking regulation to encourage banks to use evolving digital technologies to accelerate the government's financial inclusion agenda. In furtherance of this goal, the government signed the Maya Declaration in 2012 to revise the regulatory framework of branchless banking to achieve 70% financial inclusion by the year 2017 and implement interoperability in the JEAS mobile (money) financial services sector. Again, the government later joined the Better than Cash Alliance (BTA) in 2014 to help Ghana move toward a cashless economy, expand access to electronic payments, and reduce time and costs associated with business and economic transactions (Boateng, 2018).

Together, these governmental reforms and strategies generated dynamism in the financial sector and helped the government to put in place appropriate institutional structures and incentives to realize its long-term financial inclusion agenda. The number of financial institutions has increased from 428 in 2004 to 1,198 in 2015, albeit dropping to 1,111 in 2018 (BOG, 2018). In particular, the number of credit unions and cooperatives more than doubled, increasing steadily from 277 in 2004 to 566 in 2018 (BOG, 2018). Banks other than commercial banks also increased from 131 to 209 within the same period. (BOG, 2018). Changes in the number of commercial banks have, however, been quite marginal, only increasing by ten (BOG, 2018). Meanwhile, during the period MFIs increased significantly as deposit-taking and non-deposit-taking MFIs almost tripled, increasing from 90 in 2012 to 253 in 2018 (BOG, 2018).

Mobile money adoption has also seen astronomical growth. The total number of registered and active mobile money agents swelled by 2,962% from 5,900 in 2004 to 180,664 in 2018 while the growth rate of registered and active mobile money users (account holders) from 2004 to 2018 averaged about 93%. Arguably, the number of active mobile money users accounts for more than one-third of the country's population (BOG, 2021). In addition, mobile money could serve as a vehicle for individuals in society to improve their savings habits (Amoah and Korle, 2020). In Ghana, at the macro level, mobile money adoption has led to an increase in overall savings in the economy (Amoah and Korle, 2020).

2.2.4 Social Network

According to Wasserman and Faust (1994), social network involves social actors such as family or organisations, and their interactions with each other in a social setting. The social ties can be either strong or weak. Strong social ties show high commitment to each other, reciprocate service share common intimacy and emotions, and usually exists among close family member. On the other hand, weak social ties refer to people who are not tied to a group and usually live or move in isolated areas and are normally friends and acquaintances (Bongomin et al. 2018; Olaoye and Zerihun, 2023; Osei-Gyebi et al. 2023). The strength of the social ties improves the dyadic ties among individuals in social settings. According to Granovtter (1977) who proposes the social network, creating connection ties can be leveraged to achieve economic benefits.

Authors such as Mishkin (1988) and Stiglitz (1990) note that market infection and insufficient access to financial services by the poor can be a result of inability to access financial information through asymmetric information characteristics as well as lack of collateral to access loan service (also Akerlof, 1970). There is a general perception that lending to the poor is risky due to high default probability. , in such circumstances, strong and weak social ties can be leveraged to utilize financial services and overcome financial barriers through social ties with people (Bongomin et al. 2018). In addition, connection with other members can be utilized as a form of collateral in accessing and screening for credits. These social ties enhance access to credit and financial information among members of a group. According to Biggs et al., (2020), social tis enhance information flow to the poor and its enforcement mechanism.

This is useful in developing countries with prevalent educational inefficiencies and underprovided financial services. Such frictions limit people from having access to mobile innovation services to achieve financial inclusion. Mobile phones are social interaction platforms linking several people to share useful information (Bongomin et al. 2018). Moreover, mobile money transfers can be a form of communication (Taylor and Horst, 2013). Mobile money transfer can be an extension of social interactions where people settle the debts of others, support livelihoods and take care of the people financially, and through that mobile money and financial inclusion can be promoted.

2.3 Theoretical Review

2.3.1 Network Theory

The network theory was proposed by Granovetter (1995). The theory posits that the centrality, node, and strength of social ties among people in social settings can be leveraged to achieve economic benefits (Ajani et al. 2019). According to the World Bank (2002) in underdeveloped financial systems, the poor rely on social ties to enable trade. Indeed, strong social ties enhance access to information and other essential resources (Granovetter, 1985). These are further supported by Ajani and Tijani (2019) who show that strong social ties enhance access to credit for the poor. According to Sun and Barnett (1994), mobile infrastructure spurs economic growth and development. Therefore, social connection among people can promote technology use to achieve socio-economic outcomes

Moreover, the intention to adopt new technology is influenced by societal acceptance and opinions from family members and friends (Riquelme and Rios, 2020). Indeed, the need to share valuable information among people in social settings increases gnarl credibility in using mobile phone services. Thus, this study argues that the existing social ties among people, and the need to share useful information among social stings, will encourage mobile bile us which will later enhance financial inclusion.

2.3.2 The Innovation Diffusion

The innovation theory was proposed by Rogers (1995). The theory explains the approaches of technology dissemination into culture to fit in (Al-Jabri and Sohail, 2012). Information diffusion theory is the most popular theory which explains the adoption and spreading of information technology in a community (Zhou and Tao, 2011). The theory defines innovation as a new idea to be received and adopted by users (Rogers, 1995). The theory posits that new ideas or innovations are adopted based on reliability, relative advantage, complexity and compatibility (Rogers,1995). Relative advantage, compatibility and reliability relate positively to innovation adoption while complexity relates negatively to innovation adoption. The theory is relevant in this study because it describes how money is adopted based on its perceived ubiquity, relative advantage, and relative cost and how such adoption could influence financial inclusion.

2.4 Empirical Review

2.4.1 Mobile Money and Financial Inclusion

Amoah et al. (2020) examine factors that influence the adoption of mobile money adoption in Ghana focusing on the people of Greater Accra. The study uses primary data and solicited data from 733 households. By applying the logit models, the study reveals that technologically savvy cohorts (youth population) service provision such as using mobile money for airtime and data bundle purchase, education and income are relevant factors to influence mobile money adoption. This implies that a significant number of people (youth can use mobile money to access financial products thereby increasing financial inclusion.

Okello et al. (2018c) assess the effect of mobile money use and financial inclusion in Uganda. The study uses data obtained from 200 households. The multiple regression estimation shows that mobile money use significantly improves financial inclusion. N'dri and Kakinaka (2020) examine the impact of mobile money in achieving financial inclusion and reducing poverty in Burkina Faso. The results show that mobile money increases financial inclusion and improves welfare. Pureta's (2018) study assesses whether mobile money adoption is high in countries with low er access to formal banking services. The results reveal that mobile money penetration is higher in countries with poor access to former baking services. This suggests that mobile money is a vital tool for increasing financial inclusion. Mwangasu et al. (2022) investigate the effect of mobile money use for transactional purposes, investment purposes and information access purposes on financial inclusion in Taita Taveta County Kenya. They find that mobile money use for all purposes has a significant positive impact on financial inclusion.

Myeni et al. (2020) examine factors responsible for influencing mobile money adoption in Eswatini. They use data from the FinScope Consumer Survey for Eswatini conducted in 2014. They apply the propensity score matching, kernel-based matching method and, they find that gender (female), education, improved work conditions and entrepreneurship are relevant factors which influence mobile money adoption. They further find that individuals with mobile money accounts are more likely to have bank accounts. Although a deviation from prior evidence, the results establish that mobile money usage is significantly associated with financial inclusion.

Takyi et al. (2022) explore the influence of mobile money on savings practices in Ghana. The study uses data from the Financial Inclusion Insight (FII) from 2014 to 2015. They used the variable (IV) estimation technique and found that mobile money increases the saving behaviour of individuals. This suggests that mobile money improves livelihood and increases financial inclusion by using mobile money as a medium of savings. Senyo et al. (2020) explore pathways for increasing financial inclusion using mobile money in Ghana. The study uses a survey to collect data from 294 active mobile money users in Ghana. They use the fuzzy set qualitative comparative analysis (fsQCA) for the estimation. Find that easy-to-use features, behavioural intention and coverage-price-service driven are pathways through which mobile money can influence financial inclusion. Shaikh et al. (2023) propose that the mobile money agent characteristics are the stimuli, that the mobile money customer is the organism, and that the response of the organism to the stimuli is continuous usage, which leads to financial inclusion in the developing country of Ghana. The continuous usage of mobile money services by customers encourages more engagement experiences and advocacy intentions. They provide empirical evidence suggesting that mobile money agent credibility and service quality stimulate customer empowerment. Furthermore, they

argue that for the less financially empowered customer segment, mobile money agent credibility provides the needed impetus for the continuous usage of mobile money services.

2.4.2 Social Network and Financial Inclusion

Wasserman and Faust (1994) define a social network as "a social structure made up of a set of social actors (such as individuals or organizations), sets of dyadic ties, and other social interactions between actors." While Granovetter (1973) refers to the "strength of a tie as a combination of the amount of time, the emotional intensity, the intimacy and the reciprocal service that characterize the tie." Strong ties refer to larger time commitments between individuals who are closely tied (family and relatives), whereas weak ties refer to individuals who are not closely tied to a group such as people who move frequently or live in isolated areas (friends and acquaintances). Indeed, the strength of a tie enhances resource flow and sharing between individuals in dyadic relationships. Thus, proponents of networks theory like Granovetter (1973); and Burt (1992) have advocated for the importance of personal connections in seeking information for economic benefits. Scholars such as Mishkin (1998) and Stiglitz (1990) argue that financial market imperfections such as transaction cost and information asymmetry are likely to limit access to credit by the poor, especially for those without physical collateral (see also Akerlof, 1970).

This is translated by the conventional understanding that lending to poor households will fail as the cost of doing so is too high and the risks are great with saving tendency too low. Thus, under such a situation, social connections through existing informal networks of strong and weak ties can be the only asset available to the poor that they can utilize to overcome barriers to accessing credit.

This also acts as an essential tool for screening loan applicants and for ensuring that contracts can be enforced. Indeed, van Bastelaer (2000a) states that social network increases the capacity of the poor to access market information and creates linkage and tie among members in groups (see also Yokoyama & Ali, 2006). Ahlin and Townsend (2007) observe that social ties among non-relatives reduce repayment rates through social sanction. Against this backdrop, Floro and Yotopolous (1991) suggest that social ties and the resulting potential for sanction among the poor help to mitigate adverse selection and moral hazard problems in joint liability lending contracts. Conclusively, Biggs, Raturi, and Srivastava (2002) argue that in accessing financial services, the social network helps the poor by supplying information and it acts as a mechanism for enforcement (see also Narayan & Prittchet, 1997). Karlan (2007) using a randomized experiment on 2,000 individuals participating in FINCA-Peru found that individuals who live closer to one another and are more culturally similar to others in the group are more likely to repay their loans and save more. The findings showed that members are better able to monitor each other and enforce each other's repayment.

2.4.3 The Role of Social Networks in Mobile Money and Financial Inclusion Nexus

Bongomin et al. (2018a) investigate the role of social ties in enhancing the effect of mobile money on financial inclusion in Uganda. They use a survey of 400 respondents and apply a graphical method. Their results demonstrate that social ties improve the positive effect of mobile money on financial inclusion. In addition, social ties and mobile money both have a direct positive effect on financial inclusion. The results imply that social ties among people in a group can be leveraged to increase mobile money use and financial incision.

Bongomin et al. (2018) investigate whether social ties among people in a group have financial inclusion benefits in rural areas in Uganda. They use a survey of 400 respondents and apply OLS and hierarchical methods. They find that social ties positively explain the level of financial inclusion in Uganda. Bongomin et al. (2020) investigate the moderating role of social networks in the relationship between financial literacy and financial inclusion in Uganda. Using 500 microfinance institutions and the structural equation modelling, they find that social networks positively explain the influence of financial literacy and financial inclusion by the poor.

2.5 Conceptual Framework

Moderation is illustrated graphically in Figure 2.1, which shows mobile money affects financial inclusion both directly (i.e., path a) and indirectly (i.e., the combination of paths a and c) through the moderator social network. The indirect effect represents that part of the effect of mobile money on financial inclusion is moderated by social networks, with the magnitude of this effect represented by the product of paths a and c.

Accordingly, mobile phone users like the poor, rely on their closed networks of families, existing open networks of friends, and peer groups to get and share useful information and knowledge about mobile phone use for saving, transferring, and sending money. Consistently, CGAP (2013); and the World Bank (2014) argue that the existence of social networks among mobile telephone users promotes its use for saving, transferring, and sending money, especially among the poor who have no access to formal financial services. Therefore, in Sub-Saharan Africa where most poor individuals live, they rely more on their existing social networks to achieve economic benefits such as the use of mobile phones for accessing financial services. A study by Rakhi and Mala (2013) found that social influence is a significant determinant of customers' intention to use mobile money in India. Henceforth, the study hypothesizes that: (path c): Social networks moderate the relationship between mobile money usage and financial inclusion

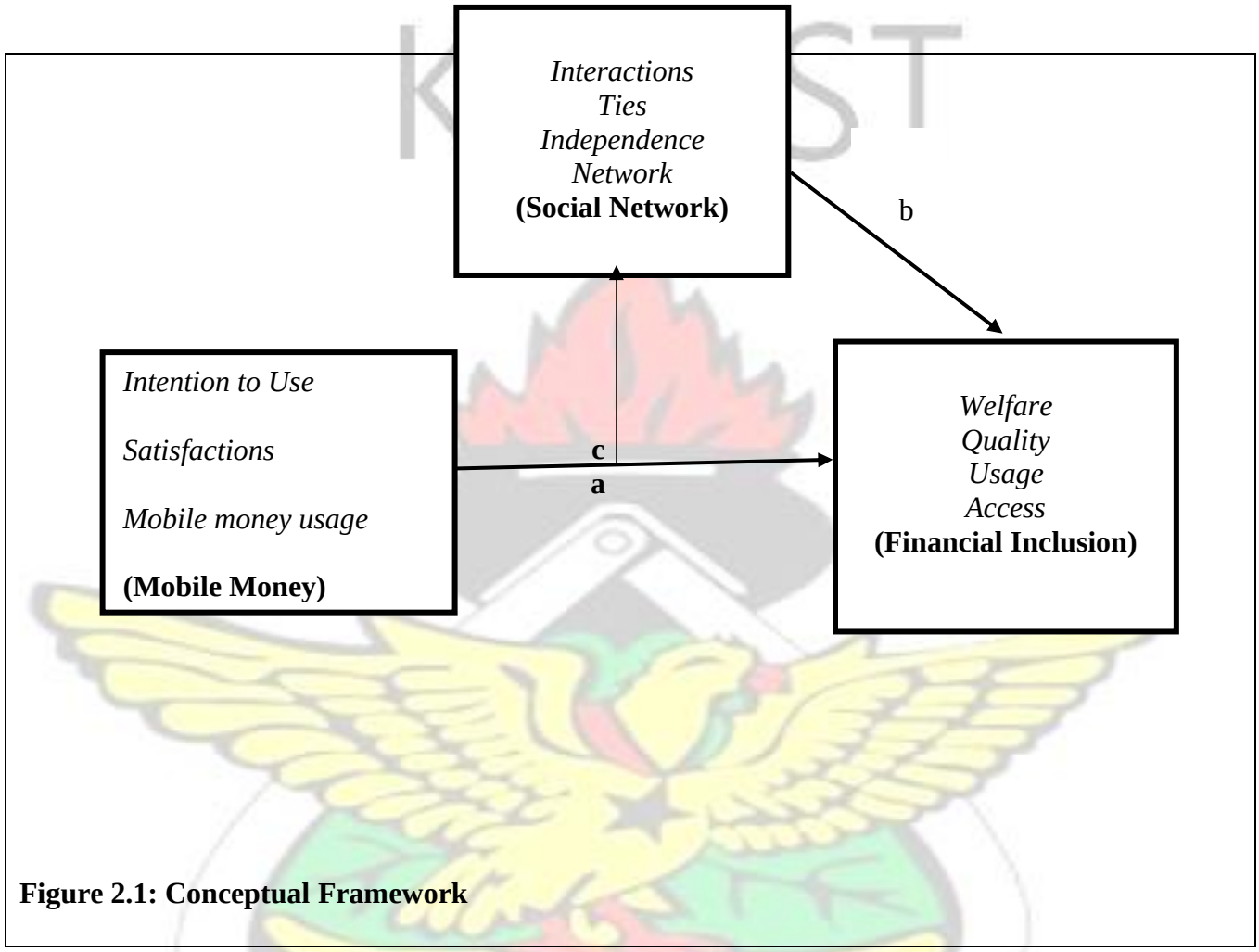

Figure 2.1: Conceptual Framework

Source: Author's Construction based on existing literature

CHAPTER THREE

METHODOLOGY

3.1 Introduction

This chapter presents a methodology for the study. The chapter is organized in eleven (11) sections. Section 3.1 introduces the chapter. Section 3.2 presents the research philosophy. Section 3.3 presents the research strategy. Section 3.4 presents the research design. Section 3.5 presents the population and sample. Section 3.6 shows the sampling strategy and sample size. Section 3.7 presents ethical considerations. Section 3.8 presents data collection. Section 3.9 presents a data analysis estimator. Section 3.10 presents the validity and reliability of data, and section 3.11 concludes the study.

3.2 Research Philosophy

Research methods come with pros and cons. Philosophical issues being addressed determine the research methodology. It is significantly influenced by the ontological issue, i.e., the nature of reality and epistemology, i.e., the nature of knowledge (Tuli, 2010). Positive paradigm has a quantitative methodology while qualitative methods are explained by interpretivist epistemology and constructionism (Tuli, 2010). Quantitative methods use data quantifiable, while qualitative research uses non-numerical data. Quantitative methods use measurable data. Qualitative research gathers data mainly from verbal or written sources, analyzed in a manner of subjectivity, interpretatively, and from impressions (Tuli, 2010). Qualitative research has the objective of providing a detailed description of the topic, usually explorative. On the other hand, quantitative research focuses on classification and measuring variables and using statistical models to explain an event (Tuli, 2010)

3.3 Research Strategy

This study uses positivism paradigms by focusing on the measurement of social issues where it is assumed that reality consists of facts and that the researcher can measure observed reality, in an objective way devoid of personal biases. The reason for this strategy is to generate explanatory associations that ultimately lead to the prediction and control of the phenomena under study. The study uses a qualitative positivism paradigm. The reason for using it is that it allows the researcher to identify issues from the perspective of behaviour, events and objects. The study uses contextual data because the study population involves a small number of participants, selected randomly.

3.4 Research Design

This study uses a cross-sectional survey design. This approach allows for the observation of a population at a time. In addition, large data can be collected within a short time using this approach. Random sampling is used to select 120 poor households in the Ashanti region of Ghana**.** The study uses a descriptive strategy. The reason for this strategy is to accurately give a description or presentation of facts about the phenomenon as it exists in reality, such as how mobile money and social ties influence financial inclusion.

3.5 Population and Sample of Study

The study's population is the total household population in the Ashanti region. The household population involves persons who are usual members of households and visitors to the households present at the time of the data collection. Ashanti region household population, according to the 2021 population and housing census, stands at 5, 247,870 (Ghana Statistical Service, 2021).

3.6 Sampling Strategy and Sample Size

The study uses the simple random sampling technique to select poor households to participate in the study. The choice of a simple random sampling technique is because of its unbiased sampling selection procedure which makes it more an unbiased surveying technique, thus robust results. The study targets 120 poor households residing in rural, peri-urban and urban of the Ashanti region. The region is the second top recipient of rural migrants leading to an increase in the number of migrants in the region. The study targets 120 poor households because it seeks to investigate whether people living in urban communities characterized by poor house settings and environment, and often considered urban poor are financially neglected and excluded despite close access to formal banking services. How does such an interrelationship contribute to the financial inclusion of the urban poor? This study targets four low-income communities (Ayigya, Ash-Town, Asawasi and Aboabo) in the Kumasi Metropolis. These areas are characterized as low-income areas based on the 2021 population census. In all, 120 respondents were selected to participate in the study.

3.7 Ethical Considerations

Several ethical issues are associated with questionnaire-information-eliciting studies. In such research, the privacy of the interviewer is crucial (Saunders et al, 2007). Time, confidentiality, data sensitivity and anonymity are important. In this study, the research purposes are effectively explained to the participants to improve cooperation and avoid ambiguity. Only participants who agreed to participate were involved.

3.8 Data Collection

This study uses a structured questionnaire to gather the data. This ensures the convenience of respondents in providing answers to the questions. The questionnaire is adopted due to its analysis simplicity and flexibility. Respondents who could provide immediate responses to the questionnaire were guided to complete it, while other respondents who could not respond to the questionnaire within an instant time were allowed 10 10-day time period to complete it.

3.8.1 Primary Data

The survey collects data structured on constructs such as financial inclusion, mobile money, and social networks. Structured questionnaires on the various constructs were developed. The items to measure the constructs were adopted from the literature. The constructs are financial inclusion as the dependent variable was adopted from Okello et al. (2018) and has five (5) items; mobile money as the independent variable was adopted from Okello et al. (2018) and has 5 items; and social network as a moderating variable was adopted from Okello et al. (2018) and has 6 items scaled using 7 Likert scale from (1= strongly agree to 2= strongly disagree). The study controls for age and size of the family group.

3.9 Data Analysis

This study follows Okello et al. (2018) this study uses the hierarchical multiple regression and moderation method to explore the effect of mobile money on financial inclusion and to further investigate the role of social welfare in this relationship. This method allows several stages of analysis where a model can have moderated variables at each stage of the process to achieve robust results (Osei et al., 2022).

The model is specified as:

$$FI_i = \beta_o + \psi_{1t} MM_i + \psi_{2t} SN_i + \sigma_3 (\mathrm{MM} * \mathrm{SN})_i + \varkappa_4 AGE_i$$

$$+ \lambda_5 TH_i + \text{Ч}_6 HS_i + \vartheta_7 GENDER_i + e_i \ldots\ldots\ldots 1$$

Where FI is financial inclusion; MM is mobile money; SN is social network, TH is type of housing; and HS is household size.

3.10 Validity and Reliability of Data

To improve the quality of the study and obtain a reliable outcome, the study adopted existing measures to capture the constructs. The reliability of each measure is assessed using Cronbach's alpha test, while their validity was assessed using confirmatory factor analysis and second, by comparing the strength of correlation between the scales.

3.11 Chapter Summary

The chapter discusses the methodology for achieving the study's objectives. It highlights that it uses a positivist strategy by adopting a quantitative approach, cross-sectional and descriptive strategy. The study uses a simple random sampling technique to select 120 households in the Ashanti region of Ghana by using a questionnaire. It discusses ethical considerations and instruments of data validity.

CHAPTER FOUR

RESULTS AND DISCUSSION

4.0 Introduction

This chapter presents and analyses the data and also discusses the findings. The data was collected using a self-administered questionnaire. This chapter has six (6) sections as follows; section 4.1 presents a descriptive summary and sample attributes. Section 4.2 presents results for validity and reliability. Section 4.3 shows correlation results. Section 4.4 shows empirical results, and section 4.5 shows robustness tests. Finally, 4.6 discusses the results.

4.1 Descriptive Summary and Sample Attributes

Table 4.2 presents the demographic distribution of the respondents. The majority (53.3%) of the respondents are males and 46.7 % females. Most of the respondents (40%) are of the ages 18-25. 17.5% of respondents are between the ages of 26 – 35. Further, 54.1% of the respondents indicate they live in a house with 6 – 10 more members, while 44.2% of the respondents live in a house with more than 10 members. 46.6% of the people live in a semi-permanent material building, while only 1% live in the first class permanent material building, suggesting that the respondents are predominantly poor people.

Regarding the summary statistics in Table 4.3, financial inclusion has a mean of 3.216 with a standard deviation of 0.201, suggesting inadequate financial inclusion in terms of welfare, quality and usage. Mobile money has an average of 4.921 with a standard deviation of 1.098, suggesting that about 100% of the sampled employees use mobile money services. Social network records a mean of 5.132 with a standard deviation of 0.113, which indicates strong social ties in households.

Table 4.2: Sample Attributes

Profile	Description	Frequency	Percentage
Gender	Males	64	53.3%
	Females	56	46.7%
Age	18-25	48	40%
	26-35	21	17.5%
	36-45	22	18.3%
	46-60	23	19.1%
	>60	5	0.8%
Number of People in a house			
	Less than 5	2	1.6
	6 -10	65	54.1
	More than 10	53	44.2
Type of Building	Temporary building material	52	43.3%
	Semi-permanent material	56	46.6%
	1st permanent material	12	1%
Total		120	100%

Source: Survey data, 2022

Table 4.3: Summary Statistics

Var.	Obs.	Mean	Std. Dev.	Min	Max
Financial inclusion	120	3.216	0.201	1	7
Mobile Money	120	4.921	0.098	1	7
Social Networks	120	5.132	0.113	1	7

Source: Survey Data, 2022

4.2 Reliability and Validity

This study evaluates the reliability of the items of each construct by outer loading, the Cronbach alpha, the average variance extracted (AVE) and the composite reliability (CR). Table 4.4 shows that most of the items of the constructs have an ideal reliability value greater than 0.8 (Hair Jr et al. 2016), with the most external load low at 0.822. The results show that the CR of constructs is greater than 0.7, and Cronbach's alpha is also greater than 0.8. The accepted convergent validity evaluated by AVE is less than 0.5. From the results the AVE has all the values greater than 0.6, from 0.643 to 0.687, suggesting that more than 50% of the variance of the items is explained by the latent variables.

Table 4.4 Construct Reliability and Viability

Constructs	Items	Loading	Cronbach's Alpha	Rho _A	CR	AVE
Financial Inclusion	FI1	0.882	0.867	0.876	0.864	0.765
	FI22	0.864				
	FI3	0.854				
	FI4	0.846				
	FI5	0.856				
	FI6	0.848				
	FI7	0.863				
Mobile Money	MM1	0.903	0.912	0.876	0.987	0.785
	MM2	0.877				
	MM3	0.881				
	MM4	0.897				
	MM5	0.900				
Social Network	SN1	0.934	0.937	0.543	0.986	0.854
	SN2	0.926				
	SN3	0.923				
	SN4	0.916				
	SN5	0.918				
	PD6	0.933				
	SN7	0.765				
	SN8	0.875				

Note: FI is financial inclusion and includes items which measure welfare, quality of life and financial access; MM is mobile money and captures items such as intention to use mobile money, satisfaction derived from using mobile money and mobile money usage; and SN is social network and measures items such as interaction ties and independence networks.

Source: Survey data, 2022

4.3 Correlation

Table 4.5 presents correlation results. The results show whether the variables suffer from multicollinearity problems. Mobile money has a positive and significant correlation with financial inclusion, ($\beta = 0.003$, $p < 5\%$). In addition, the social network has a positive and significant correlation with mobile money, ($\beta = 0.123$, $p < 5\%$). None of the correlation coefficients exceeds (0.7), therefore, this study concludes that the variables do not suffer from multicollinearity problems (Kennedy, 2008).

Table 4.5: Correlation

Var	FI	MM	SN
FI	1		
MM	0.003*	1	
SN	0.054*	0.123	1

Note: FI is financial inclusion; MM is mobile money; and SN is a social network.
Note 2: * is $p < 5\%$

Source: Survey data, 2022

4.4 Empirical Results

4.4.1 Interaction Effect of Social Network and Mobile Money on Financial Inclusion

The hierarchical regression in Table 4.6 shows results for (1) the effect of mobile money on financial inclusion; (2) the effect of social networks on financial inclusion; and the interaction effect of social networks on the relationship between mobile money and financial inclusion. The adjusted r-squared of models 1, 2 and 3 are 0.548, 0.515 and 0.557 suggesting that about 54.8%, 51.5% and 55.7% of the variations in the dependent variables are explained by the dependent variables in models 1 to 3, respectively. The results indicate that mobile money has a positive and significant effect on financial inclusion ($\beta = 0.795$, $p < 1\%$, model 3), suggesting that a percentage increase in the use of mobile money increases financial inclusion by 79.5%.

The results further show that social network has a positive and significant effect ($\beta = 0.076$, $p < 1\%$, model 3) on financial inclusion. The coefficient is 0.067 suggesting that a unit improvement in social networks will increase financial inclusion by per cent. Moreso, the hierarchical results reveal that social network as a moderator plays a positive and significant role in the mobile money–financial inclusion nexus. ($\beta = 0.184$, $p < 1\%$, model 3). The results indicate that the effectiveness of mobile money on financial inclusion is strong, particularly within strong social networks. Indeed, when the interaction term is added to the model, the predictive power of mobile money on financial inclusion increases from 7 per cent to 18 per cent. The results, thus explain that social network is important for mobile money to be inclusive in households in Ghana.

Table 4.6: The moderating role of Social Networks on the relationship between Mobile Money and Financial Inclusion

Var.	FI	FI	FI
	(1)	**(2)**	**(3)**
Age	0.019	-0.136	-0.161
	(0.077)	(0.155)	(0.153)
Gender	0.008	-0.125	-0.174
	(0.209)	(0.084)	(0.148)
Type of house	-0.038*	-0.033	0.119
	(0.194)	(0.059)	(0.080)
Household size	-0.262*	0.885***	0.079
	(0.108)	(0.272)	(0.067)
Mobile Money Usage (Main effect)	0.397***	0.364***	0.794***
	(0.097)	(0.096)	(0.072)
Social network (Moderator)		0.770***	0.076***
		(0.074)	(0.011)
MM*SN (Interaction term)			0.184***
			(0.052)
Constant	2.199***	1.035***	3.199***
	(0.755)	(0.387)	(0.299)
$Adjusted\ R^2$	0.548	0.515	0.557
F-statistics	16.714	17.543	50.654
Prob.	0.000	0.000	0.000

Notes: MM is mobile money and SN is social network

Note: *, **, *** denote 10%, 5% and 1% significance levels respectively

Source: Survey data, 2022

4.5 Robustness of Results

The study uses ModGraph as a robustness check on the interaction effect. According to Jose (2008), a Mod graph can be used to find whether a variable moderates the other two variables. Therefore, the interaction effect can also be assessed using a Mod Graph by plotting the coefficients (slopes) of the main effect variable (mobile money), the moderator, the interaction term and the constant. In addition, the mean and standard deviation of the main effect variable are plotted. The outcome is the Mod Graph. According to Jose (2008), Mod graphs must not be parallel. The interaction is significant when there are different gradients or slopes. The ModGraph results are shown in Figure 4.1. The lines are parallel indicating the interactive term of mobile money and social network positively influences financial inclusion. In this case, if mobile money usage increases, financial inclusion increases. But there is a steeper line for high social networks. High social network started a bit lower (start) but has a steeper line so a bigger space suggests that when social network among households is higher the effect of mobile money on financial inclusion is more pronounced.

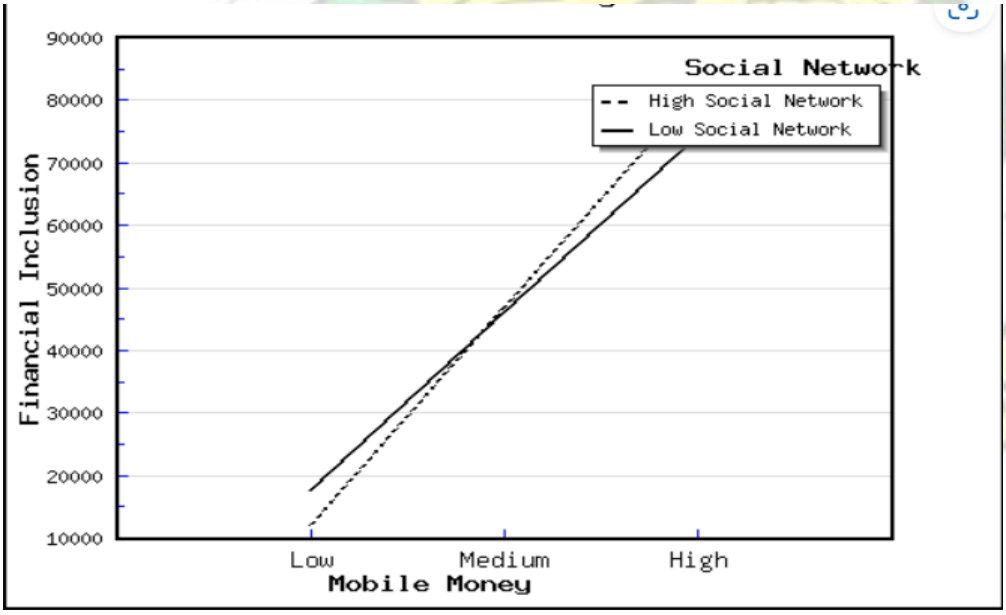

Figure 4.1. Mod Graph Showing the Interaction Effect of Redundancy Perception.

Source: Survey data, 2022

4.6 Discussion of Results

4.6.1 Effect of Mobile Money on Financial Inclusion

The empirical results as indicated in the main effect results in Table 4.6 indicate that mobile money usage improves financial inclusion. The findings are consistent with prior empirical studies which demonstrate that mobile money promotes financial inclusion (see, e.g, Serbeh et al., 2021; Demirguç-Kunt et al., 2018; Myeni et al. 2020; Guermond, 2022; Adiana et al., 2022; Abdul-Rahaman et al. 2021). For instance, as observed by Adiana et al., (2022), a large number of rural inhabitants migrate from rural communities to urban places to improve their livelihoods. Due to the distance between their families, the need and the urge to send money is high. However, the means of transferring money pre the mobile money era can be difficult, unsafe and expensive (Adiana et al., 2022; Abdul-Rahaman et al. 2021). Thus, in such circumstances, mobile money has become the safest, fastest and cheapest means of transferring money.

In addition, a study by Serbeh et al., (2021) and supported by the Bank of Ghana report (2021), reveals that, as of 2021, the mobile money market in Ghana stood at US$ 92 Billion in value, and expects to increase to reach US$ 494 Billion by 2027, representing a growth by 32.5% between 2022 to 2027 (Ghana Payment Report, 2021). Mobile money accounts stood at 24 million as of 2021, double of the registered bank account holders which stood at 11.5 million (Ghana Payment Report, 2021). Mobile money service in Ghana offers a per-to-person transaction, with less involvement in banking transactions.

Mobile money has solidified to the extent that it is a bigger platform than all the payment systems platforms in Ghana combined. Therefore, the use of mobile money has enhanced access to essential financial products and services for the previously unbanked population and serves as a useful tool to improve financial inclusion (Anarfo et al., 2020; Myeni et al., 2020; Abdul-Rahaman and Abdulai, 2021; Ahmad et al. 2020; Amoah and Korle, 2020; Anarfo et al. 2020; Asongu, et al. 2020; Chikalipah, 2017). The results support the innovation theory proposed by Roger(1995) which argues that characteristics of innovation such as ubiquity, relative advantage, and relative cost enhance the adoption of such technology. Indeed, the feature of mobile money as cost-effective, cheaper, and convenient has increased its adoption and hence promoted financial inclusion (Yang et al., 2012; Slade et al., 2015)

4.6.2 Effect of Social Networks on Financial Inclusion

The results indicate that social networks positively and significantly affect financial inclusion. The results are consistent with a study by Bongomin et al. (2018). In addition, a strong social network among people in a group allows members to share useful financial information that expands financial access. For instance, some family members can guarantee a loan for a member. Such action expands financial access since that person will have been denied the loan due to a lack of collateral or guarantor (Ndassi et al., 2023). Conclusively, social ties enhance financial information sharing, financial education, and improv contract enforcement through guaranteeing Social (Telukdarie and Mungar, 2023). Thus, social network among people in a household helps to bank the unbanked which is consistent with the network theory by Granovetter in 1985 (Granovetter, 1985)

4.6.3 Interaction effect of Social Networks on the relationship between Mobile Money and Financial Inclusion

The results reveal that the effect of mobile money on financial inclusion is stronger, particularly within a strong social network consistent with Bongomin et al., (2018). Thus, strong social network among households or mobile money users promotes financial inclusion. People in a social group such as family or friends share common interests and are connected by love, affection, reciprocity of service and emotion. This special interaction effect allows them to communicate useful information that has economic benefits. Mobile money service is itself a communication tool where people can share their financial burden. In addition, people with close ties are more likely to send money to each other to improve their welfare. Mobile money services allow for quick and convenient money transfers. This can lead to high adoption of mobile money as a money transfer channel among people in a social network which enhances financial inclusion.

CHAPTER FIVE

CHAPTER FIVE SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.0 Introduction

This chapter summarizes the study, concludes and provides some recommendations. It has four (4) sections as follows; section 5.1 summarizes the study. 5.2 presents conclusion. 5.3 provides recommendations, and 5.4 suggests recommendations for further studies.

5.1 Summary of Findings

This study investigates whether social networks explain the effect of mobile money on financial inclusion in Ghana. It further examines the direct effect of mobile money and social networks on financial inclusion. The results are summarized in the next sections.

5.1.1 To examine the effect of Mobile Money on Financial Inclusion

The empirical results show that mobile money usage has a positive and significant effect on financial inclusion, suggesting that mobile money usage has expanded access to essential financial products and services to households. Indeed, the advent and promotion of mobile money services particularly among poor households has eliminated financial barriers and increased financial accessibility, depth and visibility thereby banking the unbanked.

5.1.2 To investigate the influence of social networks on financial inclusion

The study finds that social network promotes financial inclusion. Indeed, the results confirm that in underdeveloped communities, the financial and trade transactions of poor people rely on existing social networks. Thus, users of mobile phone including the poor depends on closed networks of families, friends, and peer to access useful information and knowledge about mobile money technology and usage.

5.1.3 To investigates whether social Network Moderates the relationship between Mobile Money and Financial Inclusion

Finally, the study finds that social network positively and significantly moderates the relationship between mobile money and financial inclusion. The results suggest that the interaction effect of social networks enhances the positive effect of mobile money on social networks. Thus, poor people or household social ties with close and open associates are useful in determining how mobile money will increase financial inclusion. Because the poor rely on the existing network of people to acquire knowledge on the usage of technology such as mobile money, and through positive interaction, financial inclusion improves for the poor.

5.2 Conclusion

This study investigates whether social networks moderate the relationship between mobile money use and financial inclusion in Ghana. The study uses survey data from 120 households in the Ashanti Region of Ghana and employs the hierarchical regression method and Mod Graph as estimators. The results answer the research questions in this study.

The findings from the study revealed that there is a significant and positive relationship between mobile money usage and financial inclusion. This implies that mobile money usage has an impact on the financial inclusion of the poor in rural Ghana. This means that a change in mobile money usage results in a change in financial inclusion. This answered the first research questions set in this study.

Furthermore, the findings also indicated that social network has a significant and positive effect on financial inclusion. This provides an answer to research question 2 of this study. Besides, the findings showed that social networks significantly and positively moderate the relationship between mobile money usage and financial inclusion. The results indicated that the interaction effect boosts the main effect of mobile money usage in explaining financial inclusion. Conclusively, it can be deduced that including social networks in the relationship between mobile money usage and financial inclusion explains the variation in financial inclusion of poor households in rural Ghana. Thus, answering research question 3 of this study.

5.3 Recommendations

Mobile telephone companies should consider developing mobile money services that promote social networking among the users of mobile money services. They should also ensure that there is mobile phone network efficiency to promote the use of mobile money services in rural areas. Besides, they should protect mobile money users from sim-card swaps, which are used for fraudulent mobile money transactions. The government should ensure that there is effective law to protect mobile money users and operators, especially in circumstances where wrong transactions have been remitted. The law should enable mobile money users to recover their monies sent erroneously to the wrong recipients. In addition, the government should embark on awareness creation about the importance of mobile money, which is an affordable, convenient, and accessible platform for carrying out financial transactions as opposed to banks, which are expensive with limited outreach in rural areas.

The government through its communication regulatory authority should ensure that affordable transaction fees are set by mobile money operators and agents to attract more financially excluded poor households to use mobile money as a tool for access to and use of basic financial services. Financial institutions, especially microfinance institutions and commercial banks should develop financial products and services that can easily be transacted through the mobile money platform.

In addition, they should use existing social networks in rural areas to attract more poor households to use financial products and services like savings accounts using mobile wallet products to

minimize the problem of dormant accounts rampant among microfinance institutions and commercial banks. Mobile money operators and agents should use social networks to promote the use of mobile money to achieve financial inclusion for the poor. Specifically, mobile money operators should use existing social networks to spread information on varieties of financial services offered on the mobile money platform to promote its increased usage. Finally, mobile money users such as the poor should use their existing social networks to share and learn new knowledge and information about improvements on mobile money apps to increase access to and use of financial services. This can be achieved through sharing experiences on the credibility and reliability of the mobile money platform.

5.4 Limitations and Recommendations for Further Studies

The study relies solely on quantitative data and the findings are based specifically on cross-sectional research design, thus, ignoring qualitative data and longitudinal survey design. Future research may adopt the use of qualitative data and data collected through longitudinal study design. In addition, other financially excluded populations such as disabled persons and refugees may be used as samples in future studies.

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Questionnaire

KNUST School of Business

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MOBILE MONEY AND FINANCIAL INCLUSION IN GHANA: THE MODERATING ROLE OF SOCIAL NETWORKS

Introduction,

Thank you for considering participating in this research that seeks to assess how social networks influence the effect of mobile money on financial inclusion in Ghana. While this research is for academic purposes, it also seeks to generate practical insights to help governments leverage financial innovation services for social good.

For confidentiality reasons, kindly do not indicate your name to us. Only reflect on your personal experience with mobile money services to respond to the statements/questions in the questionnaire. We assure you that your responses will be anonymised and used only for statistical and academic purposes.

The questionnaire has specific instructions to follow and scales to use to indicate your responses. Every statement/question included in the questionnaire is relevant, and although some appear quite similar, they are also unique in many ways, so **kindly do well to respond to each**. The questionnaire will take about **20 minutes** to complete. All questions and concerns about the research can be directed to **Mr Prince Sefah Opoku** (Tel:0240878724), a postgraduate researcher who is leading the fieldwork.

As a token of appreciation for participating in the study, you will receive a summary report of the study's key findings and recommendations. Please provide your email address here (in case you are interested in this package):

_____
___

Thank you in advance for participating; your cooperation is much appreciated. By continuing, you are consenting to participate.

Yours sincerely

Name

Prince Sefah Opoku

SECTION A

This section presents different scales for evaluating different sets of statements. Using the respective scales, kindly tick/circle a number that represents your opinion on each statement.

Kindly use the following scale to evaluate the statements in the subsequent table:

Strongly disagree	Disagree	Somehow disagree	Neither agree nor disagree	Somehow agree	Agree	Strongly agree
1	2	3	4	5	6	7

To what extent do you agree or disagree with the following statements? ***In the last 3 years,***	***Strongly disagree***						***Strongly agree***
Mobile Money Usage							
I expect to use mobile money services in the next few weeks	1	2	3	4	5	6	7
I intend to use mobile services in the coming months	1	2	3	4	5	6	7
I intend to use mobile money for services beyond money transfer	1	2	3	4	5	6	7
I intend to continue using mobile money services in the coming years	1	2	3	4	5	6	7
I have a strong positive perception toward the use of mobile money services	1	2	3	4	5	6	7
My attitude toward the use of mobile money services is always positive	1	2	3	4	5	6	7

Kindly use the following scale to evaluate the statements in the subsequent tables:

Strongly disagree	Disagree	Somehow disagree	Neither agree nor disagree	Somehow agree	Agree	Strongly agree
1	2	3	4	5	6	7

To what extent do you agree or disagree with the following statements? ***In the last 3 years***	***Very infrequent***						***Very frequent***
User satisfaction							
I enjoy using mobile money services for my transactions	1	2	3	4	5	6	7
My mobile money system meets my financial needs well	1	2	3	4	5	6	7
My mobile money system meets my expectations regarding financial services	1	2	3	4	5	6	7
I usually have no complaints about my mobile financial service provider	1	2	3	4	5	6	7
I am content with the costs incurred in using the mobile money financial system	1	2	3	4	5	6	7
I do not find mobile money costly in terms of interest	1	2	3	4	5	6	7
Mobile money services are always reliable to me	1	2	3	4	5	6	7

Kindly use the following scale to evaluate the statements in the next table:

Not at all	To a slight extent	To a moderate extent	To a great extent	to a greater extent	To the greatest extent
1	2	3	4	5	6

To what extent do you agree with the following statements?	***Not at all***					***To the greatest extent***
Social network						
In this household, some members are leaders in social groups to which they belong	1	2	3	4	5	6

In this household, we belong to social groups where most members are neighbors	1 2 3 4 5 6
Members of this household belong to social groups with members from diverse ethnicity	1 2 3 4 5 6
Members of this household belong to social groups with members from diverse age groups	1 2 3 4 5 6
Most of the members in this household are friends to friends who know each other	
In this household, we belong to social groups with members from diverse occupations	1 2 3 4 5 6
In this household, we belong to social groups with members from diverse religions	1 2 3 4 5 6

Kindly use the following scale to evaluate the statements in the subsequent table:

Strongly disagree	Disagree	Somehow disagree	Neither agree nor disagree	Somehow agree	Agree	Strongly agree
1	2	3	4	5	6	7

To what extent do you agree or disagree with the following	***Strongly disagree***						***Strongly agree***
Interactions							
In this household, we belong to social groups which frequently interact with other groups outside this community	1	2	3	4	5	6	7
In this household, most members participate in activities of diverse social organizations	1	2	3	4	5	6	7
Members of this household always get together with others regularly to do an activity	1	2	3	4	5	6	7
In this household, most members are highly involved in activities of social organization to which they belong	1	2	3	4	5	6	7
My household members have many friends with whom we are very close within and outside this community	1	2	3	4	5	6	7
In this household, most members participate in social organizations in this community	1	2	3	4	5	6	7
In this household, some members are friends with prominent people in the community	1	2	3	4	5	6	7
In this household, members always get together with friends to play games and recreational activities	1	2	3	4	5	6	7

Kindly use the following scale to evaluate the statements in the subsequent table:

Not at all	To a slight extent	To a moderate extent	To a great extent	To a greater extent	To the greatest extent
1	2	3	4	5	6

To what extent do you agree or disagree with the following	***Not at all***					***To the greatest extent***
Interdependence						
In this household, members have many people beyond this household that we can turn to in case we need help	1	2	3	4	5	6
In this household, we have many stable friendships and we support and trust each other	1	2	3	4	5	6
In this household, members have people they feel at ease with	1	2	3	4	5	6
In this household, we have people we can talk to about our private matters	1	2	3	4	5	6
Members within this household can easily approach other households within this community when they have problems	1	2	3	4	5	6

Kindly use the following scale to evaluate the statements in the subsequent table:

Not at all	To a slight extent	To a moderate extent	To a great extent	To a greater extent	To the greatest extent
1	2	3	4	5	6

To what extent do you agree or disagree with the following	***Not Not***					***To the greatest extent***
Financial Inclusion						
There are many financial services delivery channels nearby this household	1	2	3	4	5	6

There are many financial institution branches near this household	1 2 3 4 5 6
The initial account opening fees charged by the financial institution are affordable	1 2 3 4 5 6
The account maintenance fees charged by the financial institution are affordable	1 2 3 4 5 6
The loan fees charged by the financial institution are affordable	1 2 3 4 5 6
The number of days taken by the financial institution to process loan applications is favourable	1 2 3 4 5 6

Kindly use the following scale to evaluate the statements in the subsequent table:

Not at all	To a slight extent	To a moderate extent	To a great extent	To a greater extent	To the greatest extent
1	2	3	4	5	6

To what extent do you agree or disagree with the following	***Not*** ***Not***	***To the greatest extent***
Quality/relevance		
The savings product provided by the financial institution suits our needs	1 2 3 4 5 6	
The loan product provided by the financial institution suits our needs	1 2 3 4 5 6	
The payment services provided by the financial institution suit our needs	1 2 3 4 5 6	
The saving product provided by the financial institution satisfies us	1 2 3 4 5 6	
The payment services provided by the financial institution satisfy us	1 2 3 4 5 6	
The payment services provided by the financial institution are useful to us	1 2 3 4 5 6	

Kindly use the following scale to evaluate the statements in the subsequent table:

Not at all	To a slight extent	To a moderate extent	To a great extent	To a greater extent	To the greatest extent
1	2	3	4	5	6

To what extent do you agree or disagree with the following	*Not* *Not*					*To the greatest extent*
Usage						
The cost of making a trip to the financial institution is low	1	2	3	4	5	6
The paperwork requirements by the financial institution are favorable	1	2	3	4	5	6
The fees charged by the financial institution on the use of its services are favorable	1	2	3	4	5	6
The financial institution always provides its services on a regular basis	1	2	3	4	5	6

Kindly use the following scale to evaluate the statements in the subsequent table:

Not at all	To a slight extent	To a moderate extent	To a great extent	To a greater extent	To the greatest extent
1	2	3	4	5	6

To what extent do you agree or disagree with the following	*Not* *Not*					*To the greatest extent*
Welfare						
The products/services provided by the financial institution have improved our standard of living	1	2	3	4	5	6
The products/services provided by the financial institution have increased our income	1	2	3	4	5	6
The products/services provided by the financial institution have enabled us to acquire more assets	1	2	3	4	5	6
The products/services provided by the financial institution have led to improved literacy in this household	1	2	3	4	5	6
The products/services provided by the financial institution have improved our housing condition	1	2	3	4	5	6

SECTION B

This section collects profile information about you and your company.

>> Your Gener? ☐ Male ☐ Female

>>Kindly *provide your age group*. ☐ 18-25 ☐ 26-35 ☐ 36-45 ☐ 46-60 ☐ >60

>> Number of people in your household ☐ 5 years or less ☐ 6-10 years ☐ 11-15 years ☐ More than 15 years

>>Type of dwelling unit for this household? ☐ Temporary building material ☐ Semi-permanent Building Materials ☐ 1st Permanent Building Materials

To what extent do you disagree or agree with the following statements?	***Strongly disagree***						***Strongly agree***
The questionnaire deals with issues I am very knowledgeable about	1	2	3	4	5	6	7
The questionnaire deals with issues that I am very interested in	1	2	3	4	5	6	7
I am completely confident about my answers to the questions	1	2	3	4	5	6	7
I am confident that my answers reflect the organization's situation	1	2	3	4	5	6	7
Minor setbacks tend to irritate me too much	1	2	3	4	5	6	7
Often, I get irritated at little annoyances	1	2	3	4	5	6	7
There are days when I am "on edge" all of the time	1	2	3	4	5	6	7
I am capable of recalling past events accurately	1	2	3	4	5	6	7
I can present critical details of my past experiences quickly	1	2	3	4	5	6	7
I can give accurate accounts of the most memorable events I had during my childhood days	1	2	3	4	5	6	7

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