Pathways to Improving Financial Inclusion through Mobile Money: A Fuzzy Set Qualitative Comparative Analysis

SCHOLARONE™
Manuscripts

Source	Comment	Response
Senior Editor	The reviewer(s) have recommended minor revisions to your manuscript. Therefore, I invite you to respond to the reviewer(s)' comments and revise your manuscript.	Thank you for your decision on the manuscript. Please find responses to all suggestions as follows. All revisions are highlighted in green in the revised manuscript.
Reviewer 1	This study seeks to explore new pathways in understanding mobile money- a timely and interesting topic. The authors have used a mixed-methods approach to identify said pathways. The study has rigour and is reasonably well constructed. It will make a meaningful contribution to the literature. Please see my comments for ways to improve the work before publication.	Thank you for your overall assessment of the manuscription for the useful suggestion. Please find below responses to the suggestions.
	1. Originality: Does the paper contain new and significant information adequate to justify publication?: The application of UTAUT and fsQCA is not new as such, but still there is more work to be done on this mixed methods approach. So, in that regard the manuscript will add value to the literature.	Thank you for supporting the manuscript's originality and potential to offer research and practical contributions.
	Abstract Comments: Please review structured abstract formats to enhance your own. The purpose should not begin with a definition of mobile money. There is very little added value. The maximum word count for this journal is 250 words, so use them strategically. The key sentence in your purpose statement is: The purpose of this study is to investigate and explain pathways through which mobile money can improve financial inclusion. I would delete the two sentences that precede this one and build it up from there. Why are these pathways important? Specifically, how many pathways are there? The findings statement alludes to seven components (4 plus and 3) and the "associated" pathways. Does this mean that there are seven pathways? Clarify for the reader. Your practical implications statement is also vague. In what way are the findings of value to managers? How do you expect them to use your findings? Word usage: consider using more analytical phrases rather than unearthing and unravelling. Consider sharpening the Design Statement. This really does not say much. What type of data did you use? How many observations etc.?	We have revised the entire abstract to ensure more clarity. We have made the purpose concise, expanded and provided more details on the research design, findings, practical implications and originality sections.
	2. Relationship to Literature: The authors have not gone far enough to understand new developments or applications of UTAUT in the literature. The literature on UTAUT as presented is standard. There is scope for improvement	We have introduced Table 2, which synthesises current research on UTAUT to reflect recent development of the theory. We have also justified the use of original UTAUT as follows: *Venkatesh et al.*

	given the calibre of the journal in which you seek to publish: The review needs updating to include 2018-2020 works on UTAUT to show where the model is moving (for example, Rahi et al. 2019, Chao, 2019, Al-Saedi et al., 2020, Patil et al., 2020). So, even though you purport to innovate on UTAUT by incorporating (fsQCA), the literature review needs to reflect the most recent developments and applications of UTAUT better.	*(2012) extended the theory to UTAUT2 through the introduction of new constructs. In spite of the extension, there is limited differences in the variances explained by the original and the extended theory. Given that this study is arguably the first to utilise UTAUT in fsQCA within the context of mobile money, which is regarded as a new domain, it was deemed prudent to apply the original theory to ensure parsimony.* These changes are highlighted under Section 2.2
	3. Methodology: This is a mixed methods approach although you do not indicate as such. And as a mixed methods study, you needed to clearly lay out each methodology. For stage 1 analysis, developing the UTAUT constructs, it is not clear what software or tests you ran to get the analysis (R seems to be applied only to the second stage analysis of fsQCA). This needs to be written in on page 9, from line 9 when you discuss the pilot, or in the construct measurement section, pg. 9, line 34 and 35. You say that you conducted correlation analysis and Cronbach's Alpha. Did you use SMARTPLS or some other software and which test did you run for this? PLS-SEM or CB-SEM? You have not discussed discriminant validity, nor AVE, HTMT, Fornell-Larcker criterion… all the greatest hits of SEM are missing from your discussion. Therefore, the reader is not convinced of the rigor of stage I analysis that then feeds into stage 2. Secondly, you need a stronger justification of why you are using UTAUT and not UTAUT2 (this goes back to a more rigorous reading of the literature). UTAUT2 has the added constructs of price value, hedonic motivation, and habit. Given that your study is looking at financial inclusion, I would have thought a consideration of price value and habit would be critical. This is not to say that you should not use UTAUT, but you needed to defend/justify the model choice better (hopefully with some literature). In disaggregating the UTAUT model, facilitating conditions would be interpreted differently in a developing country than a developed country. So, you do not interrogate the model in any way for usage in developing economies in the literature review. You seem to take the model for granted. The fsQCA analysis is much better treated than the stage 1. However, I would remove the long quote by Zadeh (1975) on pg. 10, lines 32-40. Summarise it. This looks like a master's thesis. My guess is that the fsQCA might be a newer	Though QCA holds a middle ground between quantitative and qualitative research, it is not a traditional mixed-method approach. Therefore, this study did not use the mixed method approach. Given that this study is not a traditional quantitative study, we did not use any form of Structural Equation modelling (SEM) as this will be contrary to the gaps this study seeks to address. Using SEM leads us to assess the individual effect of variables instead of their combinatory explanation. Rather, we used SPSS to assess validity of the data collection instrument and data collected to enable us performed fsQCA. This is a common convention in prior QCA studies for example Misangyi and Acharya (2014). Misangyi, V.F. and Acharya, A.G., 2014. Substitutes or complements? A configurational examination of corporate governance mechanisms. *Academy of Management Journal,* 57(6), pp.1681-1705. We have added the use of SPSS for the validity analysis to the revised manuscript under the construct measurement subsection (3.2). We have removed the long quote by Zadeh as suggested. We have also revised the justification for using Ghana as the case. This is presented under Section 3.1 as follows: *Data collection was conducted in Ghana, a middle-income Sub-Saharan African country. We selected Ghana for the following two reasons. First, the country has recently emerged as one of the fast-growing mobile money environments (Mattern, 2018). Second, in spite of this growth, cash remains the dominant mode of financial transactions in Ghana (Cobla and Osei-Assibey, 2018). As such, many people are still unbanked (Senyo and Osabutey, 2020). In the light of these unique contrasting*

	approach for you, therefore, you spent time delineating each step and expectation, grounding it well in the literature. This is good but this may have been done to the detriment of the SEM (CFA or whatever analysis was done in stage 1). Case Justification Why Ghana? You have not made any assertion as to why this context matters nor how it would be different from mainstream literature or other geographies. Does this contribute in some way to the literature? I wondered if your focus on Ghana might offer a chance to develop a theoretical contribution. In this regard, you might like to read: Crane, A., Henriques, I., Husted, B.W. and Matten, D., 2016. Publishing country studies in business & society: or, do we care about CSR in Mongolia? Business & Society, 55(1), pp.3-10.	*characteristics, this study deemed Ghana as a suitable empirical context to investigate the configuration of pathways that could improve financial inclusion through mobile money.*
	4. Results: The Findings are laid out well, thorough, and reasonably grounded in the literature for the fsQCA (the pathways). However, a better job could be done for the standard SEM measurements, in line with my point that your methodology section seems to side-line the stage 1 analysis. In table 5, the symbols used for high and low are unusual. Wouldn't plus or minus be more visually effective? Table 3 needs cleaning up. Please find a better way to represent the Case IDs. Maybe add an instrument development section for the SEM? This is a normal inclusion on papers that employ this methodology.	The symbols used in "Table 5" now Table 7 are the usual way of presenting QCA results as these are automatically produced by the R analysis software. Please see prior studies (e.g., Oana and Schneider, p. 523) that has produced the same tables. Also, see Park, Sawy and Fiss (2017) and Misangyi and Acharya (2014) for similar presentation. Oana, I.E. and Schneider, C.Q., 2018. SetMethods: an Add-on R Package for Advanced QCA. R J., 10(1), p.507. Park, Y., El Sawy, O.A. and Fiss, P., 2017. The role of business intelligence and communication technologies in organizational agility: a configurational approach. *Journal of the association for information systems*, 18(9), pp. 648–686
	5. Practicality and/or Research implications: The Practical Implications are weak. Assuming that you are based in Ghana or at least have some attachment to the country, you will need to do the following to add value to paper: You need to speak about mobile money for financial inclusion in a Ghanaian or West African marketplace. This will have implications not only for local businesses but also global businesses who are increasingly access African markets through e-commerce. You do not show any awareness of this. In other words, Ghana is not a unique case, but it could be a representative case of similar markets in Africa. You point out that managers should segment users and try to tailor products	Thank you for this suggestion. We have revised the practical and policy implications to reflect awareness of other contexts. At the moment, mobile money services are provided without user differentiation. This is what has motivated the framing of the practical implications. We have revised the policy implications to highlight practicable suggestions as well as incorporated direction to deal with disruptions like the recent COVID-19 Though the use of fsQCA within the context of mobile money is

	and services accordingly. Is there evidence that this is not being done in Ghana? This also brings us to a minor point of whether a preference for cash necessarily means that one is financially excluded. It is interesting how technological determinism has come to dominate the literature on mobile banking. Anyway, food for thought rather than a criticism of you research. The Policy Implications: This too needs some thought in terms of the practicality of what you are suggesting. The provision of basic and affordable mobile devices is probably not a reasonable policy suggestion in terms of cost. I would also suggest that you incorporate recent events such as the COVID 19 pandemic and governments' reliance on mobile banking to pay out the subsidies for lost wages and income. How could the government use your findings to understand how to adapt to such a situation? The Theoretical Implications are good. Is there any methodological contribution? This needs to be flushed out and discussed at least in two or three sentences. Are there no limitations to the study?	innovative, we do not see this as a strong methodological contribution. Limitations are presented in the last paragraph under the conclusion, Section 6 as follows: *In spite of the contributions, this study has a few limitations. First, the study utilised only the QCA methodology. Though the use of QCA brings new inspiration to mobile money research, it would be interesting for future studies to qualitatively examine this phenomenon. Second, the study is limited to constructs of the UTAUT, thus, future research can explore the configuration of other conditions that are not captured in this study. Lastly, the study was conducted in Ghana—a developing country. Given that there are differences in the development and idiosyncrasies between countries, a cross-country investigation between developed and developing countries could reveal further nuances as well as engender a broader understanding of how mobile money can improve financial inclusion.*
	6. Quality of Communication: Introduction So, on page 3, line 9 you mention that there are four pathways through which mobile money can improve financial inclusion. You should include this number in the abstract. The contributions are nicely set up. Again, the use of term "unearthing" sound anthropological, very exploratory, which given that you are using a UTAUT model, is probably not the best term to use. Background and Theoretical Foundation Pg. 3, line 55: not sure "effect" is the right word? Maybe conduct? Pg. 4, line 5: Donovan (2012) is now quite dated in 2020. Please update this source and information. Pg. 4, line 9: please given an example of telecom companies offering financial services? Maybe a product? In fact, this whole paragraph reads as a series of sentences with little coherence. What is the topic sentence of that paragraph? What are the supporting sentences? Pg. 4, line 38: include a reference for this statement about the Ghana Central	Thank you for critically reviewing the entire manuscript. We have thoroughly proofread the entire manuscript to address grammatical, word choice and spelling errors.

		Bank. Overall Writing Style There are several small but consistently present grammar errors, particularly around the use of definite and indefinite articles. Therefore, it is recommended that close-text editing be done (i.e., a professional service) to mitigate this annoyance. Presentation: Table 2 Case ID is very messy. Please engage with other studies that use fsQCA for design inspirations. I am not even sure if this "ramble" of IDs is even helpful.	
Reviewer 2		Thank you for providing me the opportunity to review this interesting piece of research. I enjoyed reading your paper and see merit in your study. That being said, I do have some minor suggestions for improvement that I detail below, suggestions that I hope will support you in bringing this piece of work forward. Overall, it was interesting to review your paper. I think this work does address an important gap and can make a solid contribution to the literature in the area with some minor amendments. I hope that you will find my comments helpful in taking this work forward.	Thank you for your overall assessment of the manuscript for the useful suggestion. Please find below responses to the suggestions.
		You identify an important gap in the literature. This is based on two key arguments. Your first argument regarding a lack of research that explains pathways to improving financial inclusion was well developed. You identify the gap and make a convincing argument as to why it is essential to fulfil this. Your second argument centres on how the majority of prior studies have adopted quantitative methodologies however, there is a need to extend your discussion surrounding the implications of this. You state that the "use of traditional quantitative methods like regression result in often treating factors individually with the effects of their combination arguably ignored". The gap you have identified and noted in your research question involves examining a complex phenomenon involving complex causality. Therefore, there is more scope for critical discussion surrounding the implications of this and more importantly why, it is therefore important to close this gap. I believe this would add value to your introduction and outline the distinct value in your approach.	Thank you for this critical suggestion. We have revised the second research gap as follows: *Second, majority of extant mobile money studies (e.g., Lashitew et al., 2019; Narteh et al., 2017) have predominantly adopted quantitative methods such as multiple regression analysis, limiting a configural understanding of conditions required to improve financial inclusion. As echoed by Veríssimo (2016) and Fiss (2007), the use of traditional quantitative methods like regression result in often treating factors individually with the effects of their combination arguably ignored. As human behaviour is complex and can be influenced by a combination of different factors, it is important to understand the configural effect of various constructs. Given that mobile money is a financial technology, it has inherent risk which makes it different from other innovations. As such, the effect of a single variable might not adequately explain users' behaviours towards the technology. Therefore, there is a need for research into the combinatory effect of different constructs and how these affect the viability of using mobile money for improving financial inclusion.*
		At the end of section 2 (p. 4, l. 59) you state that "prior studies have largely explored adoption of mobile money while there is a lack of research that explains pathways to improving financial inclusion", while this may be the	Based on this insightful suggestion, we have introduced Table 1 to synthesis extant studies on mobile money to strengthen the research gaps and contributions of the study. Table1 as presented under section

case, I feel a critical review of some of the related literature is warranted to illustrate/convince the reader of this, the deficiencies' in the current literature and to illustrate that the UTAUT has not been previously applied to understand pathways between conditions (e.g. see Senyo and Osabutey (2020) which you cite yourself for a tabular approach here, or Pappas et al. (2017) for an alternative more narrative approach). In my opinion, a short summary table would suffice here and enable you to emphasise the important contribution your paper makes.	2.2 shows extant studies, their focus, methodological orientation, and theoretical underpinning.
- This brings me to the next suggestion. The theoretical foundation is the UTAUT. While this may be appropriate (given your scope and selected methodological approach), you should at least recognise the development of UTAUT 2 and discuss briefly why this was not deemed applicable here.	We have revised the theoretical foundation as follows: *The UTAUT is a theoretical lens that explains acceptance and use of a technology (Venkatesh et al., 2003) by exploring the relationships between performance expectancy, effort expectancy, facilitating conditions, social influence and behavioural intention. Venkatesh et al. (2012) extended the theory to UTAUT2 through the introduction of new constructs. In spite of the extension, there is limited differences in the variances explained by the original and the extended theory. Given that this study is arguably the first to utilise UTAUT in fsQCA within the context of mobile money, which is regarded as a new domain, it was deemed prudent to apply the original theory to ensure parsimony.*
- Figure 1 – the research model/Venn diagram- could be depicted/labelled more clearly/explained better. Depending on the adjustments made here, it may then be better positioned following your discussion of the key conditions. I do appreciate the brief discussion of the five conditions and your approach in documenting the anticipated relationships.	We redesigned Figure 1 to ensure more clarity.
- Although the fsQCA analysis is explained well in the methodology section, the inclusion of a stronger and more critical justification at the outset of this section would add value.	Justification for the use of QCA is outlined under Section 3
- The demographic characteristics of your sample are provided in Table 4. It is useful you included this information but again this may be better placed alongside your discussion of your sample in the methodology section.	Given that current structure is logical and not complex for readers, we decided to present the descriptive statistics of the respondents under the findings to ensure a good balance between the content of the findings and other sections.
- The limitations of your analysis also need to be recognised and addressed in the paper (i.e. sampling approach, additional constructs etc.).	The limitations of the manuscript have been revised to recognise the limit of the analysis approach.

Pathways to Improving Financial Inclusion through Mobile Money: A Fuzzy Set Qualitative Comparative Analysis

Abstract

Purpose—The purpose of this study is to investigate and explain pathways through which mobile money can improve financial inclusion.

Design/methodology/approach—The study used 294 survey responses from mobile money users in Ghana. The data was analysed using fuzzy set qualitative comparative analysis (fsQCA).

Findings—The findings reveal four pathways for improving financial inclusion through mobile money. In addition, the study identified three distinct user topologies as well as their associated pathways through which mobile money can be used to improve financial inclusion.

Practical implications—Managers and financial services organisations need to design products and services to align with different pathways and user topologies to improve financial inclusion through mobile money. Moreover, they need to take into account people's diverse social and economic backgrounds.

Originality/value—The study makes theoretical and empirical contributions by unpacking pathways through which mobile money can improve financial inclusion. In addition, this study reveals three distinct user topologies, being ease-of-use, behavioural intention and coverage-price-service driven, and associated pathways through which mobile money can improve financial inclusion. These pathways and user topologies are important to tailor mobile money services and financial inclusion policies. Lastly, this study is arguably the first to utilise UTAUT in fsQCA to extend the mobile money literature.

Keywords: Mobile Money; Financial Inclusion; fsQCA; FinTech; Technology Innovation

1. Introduction

There is uneven access to financial services in the world and about 1.7 billion people are unbanked. While mobile money—a form of financial technology (fintech) has contributed to reducing financial exclusion, there is still a long way to achieving global financial inclusion (World Bank, 2018). Mobile money enables access to financial services such as cash deposits, savings, money transfer, micro-loans and payment for goods and services. In addition, mobile money offers a wide range of advantages such as convenience, rapid payment processes, accessibility and reduced transaction cost (Senyo and Osabutey, 2020). As a result, mobile money is touted as a technology that can transform economies due to its applicability across sectors such as health, commerce, agriculture and education (Senyo and Karanasios, 2020).

While there is some research on mobile money use in general, some limitations still exist. First, prior mobile money studies (e.g., Lepoutre and Oguntoye, 2018; Malinga and Maiga, 2020; Rahman et al., 2017) have largely explored adoption of mobile money while there is a lack of research that explains pathways to improving financial inclusion. Consequently, the combination of conditions through which mobile money can be used to improve financial inclusion has not been fully established (Senyo and Osabutey, 2020). Moreover, there is limited understanding of the topology of users and their preferred pathways to using mobile money for financial inclusion. Given the diversity in user preferences, it is important to understand idiosyncrasies (Senyo et al., 2016) associated with user clusters that propel their use of mobile money for financial inclusion. Although mobile money is spearheading financial inclusion across developing countries, there is uneven uptake of the technology across countries (Lepoutre and Oguntoye, 2018). Thus, there is a need for research to investigate pathways through which mobile money can be deployed to improve financial inclusion. Second, majority of extant mobile money studies (e.g., Lashitew et al., 2019; Narteh et al., 2017; Osei-Assibey, 2015) have predominantly adopted quantitative methods such as regression analysis, limiting a configural understanding of conditions required to improve financial inclusion. As echoed by Veríssimo (2016) and Fiss (2007), the use of traditional quantitative methods like regression result in often treating factors individually with the effects of their combination arguably ignored. As human behaviour is complex and can be influenced by a combination of different factors, it is important to understand the configural effect of various constructs. Given that mobile money is a financial technology, it has inherent risk which makes it different from other innovations. As such, the effect of a single variable might

not adequately explain users' behaviours towards the technology. Therefore, there is a need for research into the combinatory effect of different constructs and how these affect the viability of using mobile money for improving financial inclusion.

To address these gaps, this study posits the research question: *what combination of conditions are sufficient pathways to improve financial inclusion through mobile money?* Based on the Unified theory of acceptance and use of technology (UTAUT), and the qualitative comparative analysis (QCA), this study unravels four pathways through which mobile money can improve financial inclusion. Through the findings, this study makes three critical contributions. First, the study offers an understanding of the pathways through which mobile money can improve inclusion. Second, this study reveals three distinct user topologies and associated pathways as mediums through which mobile money can improve financial inclusion. These pathways provide new knowledge on clusters among mobile money users. Moreover, this insight is critical in shaping the design of mobile money solutions as well as formulating financial inclusion policies. Lastly, this study demonstrates how the UTAUT can be applied in a configurational investigation (Fiss et al., 2013). This application of the UTAUT brings an alternative perspective to the usual application of the theory in traditional quantitative or qualitative research.

The rest of this study is organised as follows. Section 2 establishes the background and theoretical foundation. Section 3 discusses the research methodology, data collection, construct measurement, and the fsQCA method. Section 4 presents findings while Section 5 discusses the findings and presents theoretical, practical and policy implications. Finally, Section 6 concludes with limitations and future research directions.

2. Background and Theoretical Foundation

2.1 Financial inclusion through mobile money

Though several gains have been made, there are still a large number of people without access to financial services worldwide (Demirgüç-Kunt et al., 2018). Financial inclusion assesses the degree to which there is access to and use of financial services (Senyo and Karanasios, 2020; Senyo and Osabutey, 2020). In addition, it concerns delivery of banking services at an affordable cost to a wide range of people with low income. While financial inclusion is specifically targeted at enabling universal and affordable access to financial services, its benefits have far reaching economic and development impacts in many parts of the world. Thus, developing innovative solutions for financial inclusion is urgently needed.

Globally, it is estimated that two-thirds of the 1.7 billion unbanked adults own a mobile phone that could help them access financial services (World Bank, 2018). Hence, providing financial services through mobile money is a viable option for the poor. Mobile money innovation operates in an ecosystem with different actors (Senyo et al., 2019). These actors range from users, merchants, service providers, agents, banks and regulatory agencies. Users represent individuals and organisations who utilise mobile money services. Merchants are firms that accept mobile money payment for goods and services. Service providers are developers of mobile money services (David-West et al., 2018). Service providers include telecommunication network operators and fintech firms. Agents are intermediaries between users and mobile money service providers and offer services such as cash deposits, withdrawals, and registration. Banks are responsible for holding in trust monies used in mobile money transactions. Lastly, regulators are government organisations mandated by law to supervise activities in the mobile money ecosystem (Senyo and Osabutey, 2020). The mobile money ecosystem is relatively immature compared to the traditional financial sector (David-West et al., 2018). However, the ecosystem is witnessing a rapid development characterised by the number of fintech start-ups and mobile network operators offering mobile money services (Senyo and Karanasios, 2020). Indeed, significant efforts are being made to develop the ecosystem given the importance of mobile money in addressing economic and social issues such as financial inclusion. For instance, in Ghana, due to the potentials of the mobile money innovation, the central bank has opened up the ecosystem to private fintech firms, a situation previously inconceivable.

In spite of the increasing interest and the rapid development of mobile money ecosystem, there are aspects of the innovation that could benefit from further research attention. The needs for the financially excluded remain high as a large number of people in the world still do not have access to financial services (World Bank, 2018). Exclusion to such an extent can be partly attributed to a limited understanding of pathways through which mobile money can be positioned to improve financial inclusion (Senyo and Osabutey, 2020). We argue that for a better alignment and targeting of mobile money innovations, there is a need to thoroughly understand how to position the technology to drive optimum use. Though there is some research on mobile money (e.g., Cobla and Osei-Assibey, 2018; Lashitew et al., 2019; Lepoutre and Oguntoye, 2018; Rahman et al., 2017), prior studies (see Table 1) have largely explored adoption of mobile money while there is a lack of research that explains pathways to improving financial inclusion. Moreover, there is limited understanding of the topology of users and their

preferred pathways to using mobile money for financial inclusion. In response, this research

extends previous studies by adopting a combinatorial approach to evaluate pathways through

which mobile money can be used to improve financial inclusion.

Table 1 Summary of selected mobile money studies

Studies	Focus	Methodological orientation	Theoretical underpinning
Malinga and Maiga (2020)	Explore challenges traders face in using and adopting mobile money services	—Quantitative method —Regression analysis	UTAUT
Lashitew et al. (2019)	Examines factors that affect the development and diffusion of mobile money services	—Mixed method —Tobit regression analysis and case study	Technology innovation and Power-interest framework
Lepoutre and Oguntoye (2018)	Seeks to understand mechanisms that explain these differences in mobile money adoption rate across different countries through a comparative case study analysis of Kenya and Nigeria	—Comparative case study —Cross-case analysis	Sociotechnical transformation and innovation ecosystems
Rahman et al. (2017)	Examines the influence of optimism, innovativeness, discomfort and insecurity on bKash[1] entrepreneurs' perceived ease of use (PEOU) and perceived usefulness (PU) of bKash technology as well as effect of 'bKash' entrepreneurs' PEOU and PU on their well-being.	—Quantitative method —PLS-SEM	Technology readiness index and technology acceptance model (TAM)
Osei-Assibey (2015)	Investigates the behavioural intention or willingness of susu[2] collectors and users to adopt a mobile money platform as part of their savings practices.	—Quantitative method —Logistic regression analysis	Diffusion of innovation (DOI) and TAM
Narteh et al. (2017)	Examines the determinants of mobile money service adoption	—Quantitative method —Partial least square structural equation modelling (PLS-SEM)	TAM and DOI
Senyo and Osabutey (2020)	Examines technological and behavioural antecedents that influence users' behaviour toward financial technologies	—Quantitative method —PLS-SEM	UTAUT2 and Prospect Theory
Upadhyay and Jahanyan (2016)	Explores factors affecting usage intention of mobile-based payment services	—Quantitative method — CB-SEM data analysis	TAM, Task-technology fit, and Absorptive capacity
Chauhan (2015)	Seeks to understand the acceptance of mobile-money	— Quantitative method —PLS-SEM data analysis	TAM

---

[1] bKash is a mobile financial service in Bangladesh

[2] Susu is a traditional cooperative money pooling scheme

5

Studies	Focus	Methodological orientation	Theoretical underpinning
Cobla and Osei-Assibey (2018)	Examines how the use of the mobile money technology among students affects their spending behaviour	—Quantitative method —Ordinary least squares regression analysis	The modern theory of consumption

2.2 Unified theory of acceptance and use of technology (UTAUT)

The UTAUT is a theoretical lens that explains acceptance and use of a technology (Venkatesh et al., 2003) by exploring the relationships between performance expectancy, effort expectancy, facilitating conditions, social influence and behavioural intention. Venkatesh et al. (2012) extended the theory to UTAUT2 through the introduction of new constructs. In spite of the extension, there is limited differences in the variances explained by the original and the extended theory. Given that this study is arguably the first to utilise UTAUT in fsQCA within the context of mobile money, which is regarded as a new domain, it was deemed prudent to apply the original theory to ensure parsimony.

As presented in Table 2, in recent times, UTAUT has been used to investigate different phenomena. For instance, Naranjo-Zolotov et al. (2019) combined UTAUT with empowerment theory to investigate how citizens' perception of empowerment influence intention to use and intention to recommend e-participation. Similarly, Mansoori et al. (2018) utilised UTAUT to explore factors that motivate citizens to adopt e-government public services. In other instances, the UTAUT was utilised to investigate acceptance of mobility as a service in transportation (Ye et al., 2020), normative behaviour (Maity et al., 2019) and mobile payment (Patil et al., 2020). Though UTAUT has been widely used in prior studies, there is limited knowledge on how it can be applied in a configural context. As this study seeks to understand a configuration of pathways through which mobile money can improve financial inclusion, we deemed the UTAUT suitable as the overarching theoretical foundation.

Table 2 Summary of selected UTAUT inspired studies

Studies	Application of the UTAUT
Naranjo-Zolotov et al. (2019)	Combined UTAUT with empowerment theory to investigate how citizens' perception of empowerment influence the intention to use and recommend e-participation
Mansoori et al. (2018)	Utilised UTAUT to explore factors that motivate citizens to adopt e-government public services
Ye et al. (2020)	Used UTAUT to investigate acceptance of mobility as a service in transportation
Maity et al. (2019)	Employed UTUAT to explain normative behaviour in information technology use

6

Studies	Application of the UTAUT
Patil et al. (2020)	Extended UTAUT with personal innovativeness, anxiety, trust, and grievance redressal to examine consumer use behaviour towards mobile payment
Malinga and Maiga (2020)	Extended UTAUT with security and sensitization to investigate mobile money adoption among traders

Based on the UTAUT, this study presents a model (see Figure 1) to address the research question. Following a combinatorial approach, we represent the five conditions in a Venn diagram to signify various pathways through which mobile money can be used to improve financial inclusion. We discuss hereafter each of these five conditions.
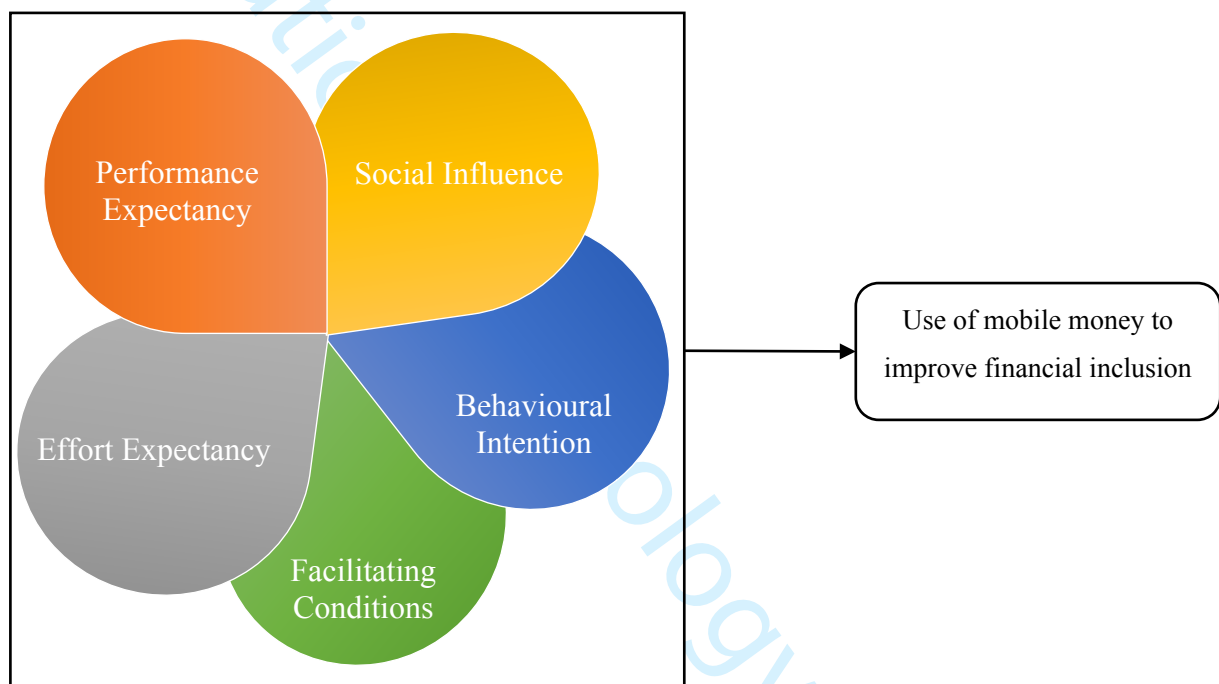

Figure 1 Research Model

2.2.1 Performance expectancy

According to Venkatesh et al. (2003), performance expectancy describes users' perception of a technology to support in the achievement of intended goals. For instance, in the context of this study, performance expectancy is the perception that mobile money offers access, convenience and low cost financial transactions compared to existing services (David-West et al., 2018). Although the effect of performance expectancy has been documented in several studies (e.g., Macedo, 2017; Yueh et al., 2016), there is a limitation in the mobile money literature. Rationally, people will use a technology that support the attainment of their goals and avoid others that are considered not useful. Arguably, there is limited knowledge on the effect of performance expectancy in the use of mobile money, hence the need to investigate

7

this construct. It makes theoretical sense to expect that high-performance expectancy of mobile money relates to higher financial inclusion. This establishes a relationship between performance expectancy of mobile money and improving financial inclusion.

2.2.2 *Effort expectancy*

Effort expectancy concerns users' perception of ease in using a technology (Venkatesh et al., 2003). Simply, effort expectancy examines how easy users find it to use a technology. For a technology to attain wide usage, it has to be easy to use. Irrespective of the benefits a technology offers, without it being easy to use, there is bound to be low usage (Kim et al., 2016). The impact of effort expectancy has been established in several studies (e.g., Duarte & Pinho, 2019; Veríssimo, 2016). However, in the context of mobile money, the effect of effort expectancy in improving financial inclusion is arguably underexplored. Given that prior studies have articulated the importance of effort expectancy, this study deems it appropriate to investigate this condition. Following the literature, we contend that low effort expectancy in the use of mobile money will improve financial inclusion. Therefore, we propose a relationship between effort expectance in the use of mobile money and improving financial inclusion.

2.2.3 *Facilitating conditions*

Sometimes the use of a technology is dependent on the availability of other resources and support. Therefore, to determine users' decision to use a technology, it is important to assess the effect of facilitating conditions—the availability of technical infrastructure and support in the use of an innovation (Venkatesh et al., 2003). In the context of mobile money services, facilitating conditions pertain to availability of resources such as mobile network coverage, affordability of mobile devices and support from service providers (David-West et al., 2018). In the extant literature, facilitating condition is identified as a useful predictor of technology use. Hence, the availability of more facilitating conditions can lead to a favourable decision to use a technology. Based on this assertion, this study seeks to determine the effect of facilitating conditions in the use of mobile money to improve financial inclusion. Precisely, we expect that high facilitating conditions can improve the use of mobile money services for financial inclusion. Consequently, we propose a relationship between facilitating conditions of mobile money and improving financial inclusion.

2.2.4 Social influence

Social influence is defined as the extent to which the opinion of important others such as families and friends affect a user's decision to use a technology (Venkatesh et al., 2003). According to Macedo (2017), people are likely to form favourable behavioural intention to use a technology if important and influential people have positive perceptions about the technology. In prior studies, inconclusive results have been attributed to social influence due to its complex nature. In some instances (e.g., Magsamen-Conrad, Upadhyaya, Joa, & Dowd, 2015) social influence is identified as insignificant in technology use. On the other hand, other studies (e.g., Yueh et al., 2016) found a significant effect of social influence. Within the mobile money literature, there is a knowledge gap on the effect of social influence. Thus, there is a need for further studies to establish the effect of social influence on mobile money use. Following this inconclusive result in the literature, we propose a relationship between social influence in the use of mobile money and improving financial inclusion.

2.2.5 Behavioural intention

According to Ajzen (2002), behavioural intention refers to the propensity of users' to engage in a behaviour. Thus, behavioural intention is manifested through people's action. The effect on behavioural intention on the use of a technology is well established in the literature (Venkatesh et al., 2012). For instance, in investigating the use of mobile apps, Chopdar et al. (2018) show that behavioural intention has a significant effect on actual use. However, in the context of mobile money services, extant studies (e.g., Chauhan, 2015; Narteh et al., 2017; Upadhyay & Jahanyan, 2016) have largely focused on behavioural intention without establishing its effect on actual use of the innovation. Although there is a significant difference between behavioural intention and actual use of a technology (Venkatesh et al., 2012) there is limited understanding of the relationship between behavioural intention and actual use of mobile money services. We propose a relationship between behavioural intention in the use of mobile money services and improving financial inclusion.

3. Research Method

To obtain a holistic understanding of the configuration of pathways to improve financial inclusion through mobile money, we used QCA, a set-theoretic approach as the overarching methodology (Fiss, 2007). QCA is a research design method and analysis technique that bridges qualitative and qualitative research (Ragin, 2008; Schneider and Wagemann, 2012).

QCA enables analysis of complex causality and logical relations among combinations of conditions and an outcome (Chaparro-Peláez et al., 2016; Misangyi et al. 2017). With this approach, researchers can assess the necessary and sufficient conditions in relation to an outcome (Ragin, 2008a). While a typical quantitative method such as multiple regression examines correlation, QCA on the other hand assesses a set of relations to provide a closer link to theory (Woodside, 2013). QCA rests on set theory, which relies on Boolean algebra to examine set relations between conditions and effects. Based on our research model in Figure 1, we consider five conditions: performance expectancy, effort expectancy, facilitating conditions, social influence, and behavioural intention as well as an outcome—use of mobile money to improve financial inclusion.

3.1 Data collection

Data collection was conducted in Ghana, a middle-income Sub-Saharan African country (Senyo et al., 2020). We selected Ghana for the following two reasons. First, the country has recently emerged as one of the fast-growing mobile money environments (Mattern, 2018). Second, in spite of this growth, cash remains the dominant mode of financial transactions in Ghana (Cobla and Osei-Assibey, 2018). As such, many people are still unbanked (Senyo and Osabutey, 2020). In the light of these unique contrasting characteristics, this study deemed Ghana as a suitable empirical context to investigate the configuration of pathways that could improve financial inclusion through mobile money. Data was collected through an online questionnaire consisting of two parts, namely demographic characteristics and perception of respondents on each condition in the research model. The demographic characteristics assessed included age, gender, level of education and frequency of mobile money service use. The second aspect of the questionnaire assessed the degree to which respondents agree or disagree with statements on each condition based on a 7-point Likert-scale ranging from strongly disagree to strongly agree.

Before the main data collection, the questionnaire was pilot tested to ascertain the face value and conceptual validity. This resulted in the modification of some questions on social influence and facilitating conditions to improve clarity. Next, we collected an initial 46 responses to ascertain appropriateness of the questionnaire and the results indicated a good fit of the instrument. The study used the convenience non-probability sampling method for participant selection and data collection. The convenience sampling method was chosen because of its effectiveness in supporting the collection of a large sample for generalisation.

The main data collection spanned a period of 6 months from October 2017 to March 2018. In all, we obtained a total of 460 responses of which 294 were deemed suitable for use.

3.2 Construct measurement

As the study is based on the theoretical lens of the UTAUT, items measuring the constructs were adapted from Venkatesh et al. (2003). To assess the validity of the data collection instrument, we performed two construct measurement analysis using SPSS: (1) correlation analysis and (2) Cronbach's Alpha. Table 3 presents the results of these analysis. In terms of the correlation analysis, the result shows that there is limited relationship between the constructs except for only two which exceeded the 0.60 threshold. Given that these factors combine to measure use of mobile money to improve financial inclusion, there is bound to be some correlation. With regards to Cronbach's Alpha, the result shows that there is support for construct reliability as values are between 0.95 and 0.79. From these reliability analysis results, it is evident that the data collection instrument has a good fit and provides sufficient support for the research model.

Table 3 Descriptive statistics and correlation matrix

Constructs	Mean	SD	α	1	2	3	4	5	6
Effort Expectancy	6.28	0.95	0.91	1.000					
Behavioural Intention	5.93	1.09	0.85	.291	1.000				
Performance Expectancy	6.01	1.02	0.79	.395	.360	1.000			
Social Influence	4.71	1.60	0.95	.676	.320	.311	1.000		
Facilitating Conditions	6.17	0.99	0.81	.578	.518	.539	.556	1.000	
Use of Mobile Money	5.70	1.17	0.89	.558	.367	.554	.539	.703	1.000

3.3 Fuzzy-set qualitative comparative analysis (fsQCA)

A three-step procedure summarises the fsQCA analysis: data calibration, truth table building, and truth table minimisation. We employed the fuzzy set variant of QCA (fsQCA) in this study because our data was not binary. In contrast, with crisp set analysis which involve binary conditions to build theoretically and/or empirically informed membership in sets that take only two values ("0" for "fully out" and "1" for "fully in"), fsQCA allows a fine-tuned granularity in a score of set membership ranging from "0" to "1". Whatever the variant, data processing in QCA starts with data calibration, which refers to a conversion of raw data into scores of set memberships. Simply, calibration implies that researchers have to decide which

raw data variable values should correspond to a full membership in a given set, crossover point and full non-membership.

In this study, we defined six sets, one represents the outcome on interest (i.e., use of mobile money for improving financial inclusion) and five corresponding conditions: *high* performance expectancy, *low* effort expectancy, *high* facilitating conditions; *high* social influence and *high* behavioural intention. The adjectives high and low preceding the conditions are important qualifiers that help in the construction of the sets. This conceptualising is in line with what Zadeh (1975 p. 201) called "linguistic variables". From the above calibration scheme, we applied membership scores in the set of the outcome and the five sets of conditions which takes two values: "1" ("fully in") and "0" ("fully out"). Thresholds for the five conditions were decided from their corresponding raw data made of the sum of the value of the items composing the measured of the latent constructs. We ran our QCA considering one crisp set (the outcome) and five fuzzy sets (the conditions). Table 4 sums up our data calibrations decisions.

Table 4 Data calibration

	Linguistic qualifier	Full non-membership	Crossover point	Full membership
Use of Mobile Money Services	Frequency of use	If the frequency of usage is "once a week" it is coded "0"	N/A	If the frequency of usage is otherwise, it is coded "1"
Performance Expectancy	High	0.85	3.5	10.64
Effort Expectancy	Low	24	25	28
Facilitating Conditions	High	12	18	21
Social Influence	High	12	15	18
Behavioural Intention	High	22	24	26

Secondly, we used the *R* packages *QCA 3.3* (Dușa, 2019) and *SetMethods 2.4* (Oana and Schneider, 2018) to build the truth table using sets created during the calibration process. A truth table is a data matrix containing the empirical information encapsulated in the sets formed from the raw data (Schneider & Wagemann, 2012). The truth table is an essential tool in QCA because it allows unravelling "set relations" and view observations as "configurations" of conditions (Schneider and Wagemann, 2012, p. 91). We construct a truth table with the five defined conditions. We obtained a Boolean property space (Ragin, 2008b) of 25 logically possible combinations that can be associated with mobile money use for improving financial inclusion (i.e., our outcome of interest). The truth table was constructed on the basis of two decisions—a requirement of a minimum number of empirical instances associated with a

configuration being considered as leading to the outcome and the minimum level of consistency for a given pathway (Ragin, 2008b; Schneider & Wagemann, 2012). As presented in Table 5, we set the first criterion at "at least one empirical instance" (see rows # 27 in Table 5 with two empirical instances) and the second at 0.95 (see column "incl" in Table 5). Indeed, a low consistency (<0.75) indicates that a given configuration of conditions leads to an outcome of interest that is not reliable (Ragin, 2008a). Conversely, high consistency value (>0.75 or close to 1) means that a given configuration of conditions leads to an outcome under investigation which is reliable (Ragin, 2008a). In other words, a consistency closer to 1 indicates that a given configuration of conditions is almost always associated with the outcome of interest. This implies that a consistency value of 1 evidence a perfect association between a given configuration of conditions and an outcome.

Lastly, the Quine–McCluskey algorithm is used to logically reduce or minimise the truth table (Schneider & Wagemann, 2012). The minimisation of the truth table produces a complex, parsimonious and intermediate solutions based on counterfactual analysis. Core to the counterfactual analysis is the logical possible combinations of conditions for which no empirical instances are attached, the so-called logical remainders. In Table 5, they are marked with a question mark ("?") in the column "OUT". The complex solution does not take into consideration the logical remainders. The parsimonious and intermediate solutions consider logical remainders upon which simplifying assumptions are made. In parsimonious solutions, assumptions are made on logical remainders without any distinction between "easy" and "difficult" counterfactuals. The intermediate solution considers only the "easy" counterfactual. Combining both parsimonious and intermediate solutions helps to differentiate core conditions (i.e., central contributing conditions) from peripheral conditions (weak contributing conditions) (Fiss, 2011; Misangyi and Acharya, 2014; Ragin, 2008a). The decision of a researcher is pivotal in the counterfactual analysis. Indeed, a researcher has to make an assumption on which easy counterfactuals should be considered to generate the intermediate solution. Following, Misangyi and Acharya (2014), we make some assumptions only on conditions upon which the literature is conclusive on the fact that their presence lead to the use of mobile money: high performance expectancy, high behavioural intention, low effort expectancy and high facilitating conditions. For social influence, existing literature does not have a conclusive strong stand, so, we did not impose any simplifying assumptions on this condition.

Table 5 Truth table for the sufficient analysis

#	PE	EE	FC	SI	BI	OUT	n	incl	PRI	Case ID
30	1	1	1	0	1	1	36	0.996	0.996	4,7,20,29,38,61,62,75,76,80,81,94,96,99,110,111,121,123,134,144,152,166,187,216,232,237,247,253,261,275,277,279,282,317,345,419
32	1	1	1	1	1	1	75	0.995	0.995	2,10,23,27,28,33,35,41,51,52,55,64,71,73,77,85,86,88,91,97,100,105,106,107,108,119,120,122,127,130,132,133,150,151,156,161,163,164,170,171,179,181,195,196,202,204,206,209,210,213,229,231,233,234,235,236,238,239,241,248,250,260,266,269,271,272,273,278,289,328,331,407,409,414,439
26	1	1	0	0	1	1	8	0.993	0.993	12,125,136,142,145,146,353,453
22	1	0	1	0	1	1	13	0.991	0.991	15,17,37,102,143,155,158,208,227,267,281,445,448
18	1	0	0	0	1	1	9	0.99	0.99	6,65,92,168,174,203,257,276,429
28	1	1	0	1	1	1	6	0.99	0.99	13,79,113,177,217,291
25	1	1	0	0	0	1	5	0.987	0.987	50,98,141,169,344
27	1	1	0	1	0	1	2	0.978	0.978	148,153
21	1	0	1	0	0	1	30	0.975	0.975	139,19,21,25,40,45,53,59,69,82,83,93,104,114,131,154,159,165,182,184,207,215,226,243,252,287,308,330,412,416
24	1	0	1	1	1	1	34	0.968	0.968	149,199,14,22,30,49,70,72,74,84,87,89,90,115,116,117,118,129,140,147,160,162,180,197,205,214,220,222,224,242,246,262,263,438
20	1	0	0	1	1	1	6	0.959	0.959	5,39,109,251,274,290
23	1	0	1	1	0	0	12	0.949	0.949	42,54,68,124,137,157,167,255,270,283,349,444
17	1	0	0	0	0	0	21	0.949	0.949	201,315,8,9,18,24,31,36,44,78,95,126,200,230,240,245,259,268,356,408,437
29	1	1	1	0	0	0	23	0.939	0.939	47,223,3,16,26,46,48,58,66,67,135,175,178,183,188,212,218,219,225,244,249,314,391
31	1	1	1	1	0	0	17	0.935	0.935	1,221,11,32,34,43,63,101,103,138,194,211,228,256,258,362,368
19	1	0	0	1	0	0	8	0.911	0.911	254,265,280,57,176,198,394,428
1	0	0	0	0	0	?	0	-		
2	0	0	0	0	1	?	0	-		
3	0	0	0	1	0	?	0	-		
4	0	0	0	1	1	?	0	-		

14

5	0	0	1	0	0	?	0	-
6	0	0	1	0	1	?	0	-
7	0	0	1	1	0	?	0	-
8	0	0	1	1	1	?	0	-
9	0	1	0	0	0	?	0	-
10	0	1	0	0	1	?	0	-
11	0	1	0	1	0	?	0	-
12	0	1	0	1	1	?	0	-
13	0	1	1	0	0	?	0	-
14	0	1	1	0	1	?	0	-
15	0	1	1	1	0	?	0	-
16	0	1	1	1	1	?	0	-

PE= *high* performance expectancy; EE= *low* effort expectancy; FC= *high* facilitating conditions; SI= *high* social influence; BI= *high* behavioural intention. The first column indicates number of rows in the truth table. 'OUT' refers to the outcome under analysis (*frequent* use of mobile money services). 'n' indicates number of empirical instances (i.e. respondents/cases) associated to each logical combination of causal condition reflected in each row (those cases have a fuzzy membership score higher than 0.5 in the corresponding truth table rows). 'incl': sufficient consistency. In this analysis, we set up the threshold of sufficient consistency at 0.95. We choose to sort the truth rows by 'OUT' and 'incl', which explains why the first column that represents the rank of the rows is disordered. 'PRI' stands for proportional reduction in inconsistency. '?' refers to the logical remainders (combination of conditions without empirical instances, yet essential for counterfactual analysis). 'Case ID' refers to respondents/cases' identification in the raw data.

15

4. Findings

4.1 Demographic characteristics

The demographic characteristics examine the profile of respondents of this study as presented in Table 6. The findings show that the dominant age group is between 25–34 years (n=194, 66%). This is followed by users between the ages of 35–44 (n=69, 23.5%) and 18–24 (n=17, 5.8%). Given that these three age groups constitute the majority of respondents, we can infer that mobile money resonates with the youth as compared to older age groups of 44–55 (n=13, 4.4%) and 55-60 (n=1, 0.3%). Also, the analysis reveals that the sample is dominated by males (n=191, 65%) as compared to females (n=103, 35%).

In terms of highest level of education, the results show that a large number of respondents have masters (n=192, 65.3%) and first degrees (n=83, 28.2%). The rest of the respondents have professional certificates (n=11, 3.7%), doctorates (n=7, 2.4%) and high school (n=1, 0.3%) level of education respectively. With regards to the frequency of mobile money use, the majority of respondents suggest that they use the service 2–3 times a week (n=105, 35.7%) and once a week (n=84, 28.6%). The rest of the respondents use mobile money services once a month (n=49, 16.7%), 4–6 times a week (n=32, 10.9%) and daily (n=24, 8.2%) respectively.

Table 6 Demographic characteristics

Variables	Levels	Frequency (n)	Percentage (%)
Age	18-24	17	5.8
	25-34	194	66.0
	35-44	69	23.5
	45-54	13	4.4
	55-60	1	0.3
Gender	Male	191	65.0
	Female	103	35.0
Highest educational level	High School	1	0.3
	Professional Certificate	11	3.7
	First Degree (Bachelors)	83	28.2
	Master's Degree	192	65.3
	Doctorate Degree	7	2.4
Frequency of mobile money service use	Daily	24	8.2
	4-6 times a week	32	10.9
	2-3 times a week	105	35.7
	Once a week	84	28.6
	Once a month	49	16.7

16

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60

4.2 fsQCA

Our fsQCA reveals four (4) empirically sufficient causal pathways to use mobile money to improve financial inclusion as presented in Table 7. Pathway 1 indicates that a combination of high-performance expectancy, high effort expectancy and low facilitating conditions would result in the use of mobile money to improve financial inclusion. The way facilitating conditions work in this first causal path contradicts the common wisdom which considers their effect in isolation. The set-theoretic approach helps introduce novel insights on how conditions might combine. Indeed, this first causal path could be explained as follows: high users' perception of the ease in using mobile money combined with high-performance expectancy within a context of minimum facilitating conditions leads to the use of mobile money to improve financial inclusion. Interestingly, in this pathway, high effort expectancy and low facilitating conditions appear to be core conditions (Fiss, 2011); which means that both conditions have a strong causal relationship with the outcome—use of mobile money to improve financial inclusion. Social influence and behavioural intention are redundant in this first pathway, meaning that their absence or presence has no effect on the outcome.

Pathway 2 indicates that a combination of high-performance expectancy, high facilitating conditions, and high behavioural intention leads to use of mobile money to improve financial inclusion. Similarly, pathway 3 shows that the use of mobile money to improve financial inclusion could be the result of a combination of high-performance expectancy, high effort expectancy, low social influence, and high behavioural intention. Both pathways 2 and 3 share the same core condition and reflect "neutral permutations" or "functional equivalence" (Schneider & Wagemann, 2012). A high effort expectancy and a minimum social influence (low social influence) (in Pathway 3) act jointly as functional equivalent to high facilitating conditions (in Pathway 3) in a situation of high-performance expectancy and high behavioural intention.

Lastly, pathway 4 combines high-performance expectancy with low effort expectancy (users' low perception of the ease in using the technology), high facilitating conditions, and low social influence to use mobile money to improve financial inclusion. Pathway 4 has low effort expectancy, high facilitating conditions, and low social influence as core conditions. However, high performance expectancy intervenes in all four pathways without being a core condition.

17

Table 7 Sufficiency analysis of mobile money use for improving financial inclusion

Condition	Pathways			
	Pathway 1	Pathway 2	Pathway 3	Pathway 4
Performance Expectancy (PE)				
High ● / Low Ø	●	●	●	●
Effort Expectancy (EE)				
High ● / Low Ø	●			Ø
Facilitating Conditions (FC)				
High ● / Low Ø	Ø	●		●
Social Influence (SI)				
High ● / Low Ø			Ø	Ø
Behavioural Intention (BI)				
High ● / Low Ø		●	●	
Topology of users	Ease-of-use-driven users	Behavioural intention-driven users		Coverage-price-service-driven users
Consistency[3]	0.99	0.98	0.99	0.97
PRI[4]	0.99	0.98	0.99	0.97
Raw coverage[5]	0.155	0.429	0.245	0.19
Unique coverage[6]	0.02	0.19	0.03	0.07
Overall solution consistency			0.98	
Overall PRI			0.98	
Overall solution coverage			0.59	

Note: Black circles indicate the presence of a condition, and circles with "/" indicate its absence. The meaning of presence and absence is a function of the way conditions are constructed. For example (●) for effort expectancy (EE) refers to user's high perception of the ease in using mobile money whereas (Ø) means the opposite. Large circles represent core conditions and small circles peripheral conditions (see Fiss, 2011). Blank spaces indicate, "insignificant" which means that the condition is redundant in achieving the outcome.

Drawing from the fsQCA results, we uncover three topologies of mobile money users and their associated pathways to financial inclusion. These user topologies are: *ease-of-use-driven users* (Pathway 1), *behavioural intention-driven users* (Pathway 2 and 3), and *coverage-price-service driven users* (Pathway 4). As presented in Table 5, all the four pathways exhibit acceptable parameters of fit as consistency is close to 1 (the perfect consistency value) and PRI

---

[3] Consistency measures the reliability of the empirical claim that a given combination of conditions leads to the occurrence of an outcome.

[4] PRI stands for proportional reduction in consistency and measures a degree to which a configuration is sufficient only for the outcome and not its complement, that is its negation. While there is no standard for this parameter of fit, a high PRI, close to 1 is acceptable as it indicates that a configuration is only sufficient for the positive instance of the outcome.

[5] Coverage is a measure of empirical relevance where raw coverage refers to proportion of memberships in the set of the outcome that are accounted for each given configuration of conditions, including overlaps.

[6] Unique coverage is the empirical relevance attributable to a particular configuration of conditions.

is also close to 1. The four pathways have varying degrees of coverage but it is important to note that empirical coverage does not equate to theoretical importance (Ragin, 2008a). Indeed, Schneider and Wagemann (2012:139) argue that "the empirical importance expressed by coverage is not the same as the theoretical or substantive relevance of a sufficient condition." Thus, low-coverage paths might still be of great substantive interest.

4.3 Predictive validity and sensitivity analyses

We test for the predictive validity of the study by gauging how well the model predicts the outcome of interest in additional samples. We followed Woodside (2014) and Ali et al. (2016) procedure specific to fsQCA analysis by splitting the sample into a modelling and a holdout sample. Table 8 shows the patterns of combination of conditions that are consistent indicators of high scores in mobile money use based on the modelling sample of 152 cases. The findings from testing the overall solution predictions on the data in the holdout appear below in Figure 2. The findings indicate a highly consistent model (1.00). Additional predictive test results support the conclusion that the highly consistent models (models 1, 2, 3 in Table 8) for the modelling sample have high predictive ability for the holdout sample and vice versa.

Table 8 Pattern of combinations of condition associated with mobile money use for the modelling subsample

Solution from the modelling subsample	inclS	PRI	covS	covU
1. PE*EE*BI	0.994	0.994	0.36	0.157
2. PE*si*BI	0.993	0.993	0.274	0.07
3. PE*EE*fc*si	0.983	0.983	0.126	0.033
Overall solution		0.991	0.991	0.464

Note: PE: High Performance Expectancy, EE: Low Effort Expectancy, FC: High Facilitating Conditions, SI: High Social Influence, BI: High Behavioural Intention. Lowercase condition name: negation of the condition, inclS: consistency for sufficiency, PRI: proportional reduction in consistency, covS: raw coverage, covU: unique coverage

Following Greckhamer et al. (2018), we evaluated the robustness of our findings. First, we checked for sensitivity of our findings with regard to the cross-over point. In this study, pathways obtained from the sample of cases have the exact value of 0.5 and that of the added 0.01 constant were logically equivalent. In fact, it is advisable practice to avoid the exact value of 0.50 by adding a small constant to the scores to guarantee that no cases are dropped from our analyses (see Fiss, 2011). Yet, in this study, drops in the number of cases did not affect the substance of the sufficient effective pathways for mobile money use.

19

Second, we performed another sensitivity analysis to examine the robustness of our results considering alternative specifications of the two extreme bound scores of our sets formed by the five conditions ("full membership" and "full non-membership"). The outcome in this analysis is a crisp set for which we did have plausible alternative coding. We only performed the sensitivity test for the five conditions and observed minor changes that do not affect the substance of the interpretation of our findings.

Figure 2: Sensitivity test for the overall solution obtaining from the modelling subsample using data from holdout subsample

5. Discussion

The purpose of this study is to investigate the combination of sufficient conditions as pathways through which mobile money can improve financial inclusion. Our results show that not all our conditions (captured in Figure 1 and Table 5)—performance expectancy, effort expectancy, facilitating conditions, social influence and behavioural intention combine to predict mobile money use by all categories of users. Rather, our results emphasise that four distinct pathways explain how mobile money use can improve financial inclusion for three categories of users. In accordance with our research question, we now discuss and interpret our results referring to the above mentioned three categories of users as shown in Table 9.

20

Pathway 1 suggests that high performance expectancy, high effort expectancy and low facilitating conditions influence mobile money use for one category (ease-of-use-driven) of users. This means that even though effective financial transaction is perceived as important; it is considered peripheral to the ease-of-use of the technology which is a core condition. Ease-of-use is paramount and the low facilitating conditions suggest that minimum facilitating conditions are sufficient. Facilitating conditions and ease-of-use are crucial for this category of users (Kim et al., 2016). Therefore, basic mobile coverage, affordability of mobile devices and some level of supporting services in situations where performance expectancy and ease-of-use are high will encourage mobile money use to improve financial inclusion.

Pathway 2 shows that high performance expectancy, high facilitating conditions and high behavioural intention will lead to mobile money use by the behavioural intention-driven users. In this regard, behavioural intention is the core condition. This is significant because behavioural intention has a profound effect on actual use of a technology (Chopdar et al., 2018). Therefore, where performance expectancy and facilitating conditions are favourable, behavioural intention is most likely to actualise technology use. Existing literature shows that effort expectancy influences behavioural intention (Duarte & Pinho, 2019), however, our findings extend this to reveal that where performance expectancy and facilitating conditions are high core conditions, behavioural intention will lead to actual use of mobile money to improve financial inclusion for this category (behavioural intention-driven) of users.

Pathway 3 shows that high performance expectancy, low social influence and high behavioural intention will lead to the use of mobile money services for the same category of users (behavioural intention-driven). Here again, behavioural intention is the core condition. Following mixed results from earlier studies about social influence on behavioural intention with respect to technology use (Magsamen-Conrad et al, 2015; Yueh et al, 2016), our findings show that even when social influence is low, high performance expectancy and behavioural intention will lead to actual use of mobile money. This means that people's social circles may differ significantly from the circles within which the use of a technology (mobile money) is patronised. People's technology use may be dictated more by business circle influences than social circle influences. Financial inclusion by nature is transactional and therefore the driving force for mobile money service use.

Pathway 4 reveals that high performance expectancy, low effort expectancy, high facilitating conditions and low social influence will lead to the use of mobile money for yet another category of users (coverage-price-service-driven). This shows that even when effort

expectancy and social influence are low, but performance expectancy and facilitating conditions are high, mobile money will be used. Therefore, once it is perceived that mobile money offers access, convenience and low-cost financial transactions compared to existing services and there are facilitating conditions such as mobile coverage, affordable mobile devices and support services (David-West et al., 2018), mobile money will be used to improve financial inclusion. This could mean that there are situations where the use of the technology becomes a necessity because it can work and the alternative is either costly or non-existent. To this extent, as our findings show the core condition of facilitating conditions become the crucial driving force to mobile money use. It is also important to note that in pathway 4, social influence is again low. Indeed, for all four pathways, social influence is either low or non-existent leading us to conclude that social influence does not significantly influence mobile money use towards improving financial inclusion.

Table 9 Topology of mobile money users

Label	Definition	Key drivers for financial inclusion
Ease-of-use-driven users **(Pathway 1)**	High level of ease-of-use, but high achievement of intended goals, with a minimum support	Intrinsic value benefits provided by the financial inclusion technology device
Behavioural intention-driven users **(Pathways 2 and 3)**	(a) High achievement of intended goals, with high support and high behavioural intention	(a) Personal willingness to engage in financial inclusion
	(b) High achievement of intended goals, with high behavioural intention, but minimum social circles' influence	(b) Personal willingness accompanied with minimum social circles' positive perceptions of financial inclusion technology device
Coverage-price-service driven users **(Pathway 4)**	High achievement of intended goals, with high support and high behavioural intention, but minimum social circles' influence and low level of ease-of-use	Affordability and availability of financial inclusion technology device

Note: The three core conditions give rise to three categories of users—ease-of-use driven, behavioural intention-driven, and coverage-price-service driven users.

5.1 Theoretical implications

Our findings have significant theoretical implications. The use of fsQCA reveals new perspectives on the utilisation of new technologies. Our study reveals that there is no single exclusive pathway leading to the use of mobile money towards improving financial inclusion. The findings suggest that multiple pathways explain the phenomenon. First, combinations of conditions under which a technology will be used to improve financial inclusion vary and that

22

it is important for researchers to divide users into distinct categories as emphasised by Torugsa & Arunel (2017) and that the pathways depend on the context. This means that the circumstances and indeed the level of need for the technology also vary and these considerations cannot be ignored.

Second, the core conditions for each group also differ. The results clearly show that performance expectancy as supported in the literature (e.g., Macedo, 2017; Yueh et al., 2016) is generally high and social influence need not be high to facilitate mobile money use for improving financial inclusion. This perhaps explains the mixed results from previous studies with respect to social influences on the use of technologies. This is because it depends more on the primary use of the technology than the social circles within which users operate. Performance expectancy is a given, however, users are influenced differently whether they are ease-of-use-driven, behavioural intention-driven or coverage-price-driven users. Theoretically technology use should be examined according to what drives users because not all users are driven by the same issues irrespective of cultural idiosyncrasies (Senyo et al., 2016). In addition, our categorisation of the key mobile money users into ease-of-use, behavioural intention, coverage-price-service driven topology contribute a nuanced perspective to the mobile money literature. Our study is unique in the way we evaluate how different category of users interact with mobile money through different pathways towards improving financial inclusion.

5.2 Practical implications

Our findings are of value to financial services managers and organisations. The results reinforce that users are characterised by people from diverse social and economic backgrounds operating within a system where some have limited ability to access traditional banking services. Thus, managers would need to seriously consider the different combination of conditions favourable to groups of people who can use mobile money for financial inclusion. Moreover, managers will need to clearly recognise the categories of users and then match that with the combination of conditions that would lead them to use mobile money in particular or a given technology in general. Marketing communications experts will need to understand the different conditions that influence different categories of users to utilise mobile money for financial inclusion or, indeed, any other technologies. Certainly, being able to categorise users into ease-of-use, behavioural intention and coverage-price-service driven topologies would help in more efficient segmentation, targeting and positioning. Our findings give rise to key

considerations by both public and private social interventions and business opportunities that require financial inclusion of potential users or a product or service that can be supported by mobile money.

5.3 Policy implications

The first and foremost policy implication is the need to ensure that policy makers take cognisance of the category of users being ease-of-use-driven, behavioural intention-driven and coverage-price-service-driven. From a development perspective, concerns over mobile coverage in rural and remote areas need to be addressed by governments across the world with particular attention to policy makers in developing countries. Government policies need to encourage and support mobile network operators to have a reason to extend mobile phone coverage (Senyo and Osabutey, 2020). Our findings further emphasise the importance of facilitating conditions such as affordable mobile devices and support services (David-West et al., 2018). Policy makers need to ensure that beyond mobile coverage, steps should be taken to ensure affordability of mobile devices, whilst ensuring that there are good supporting services. For instance, Government can exempt taxation on the importation and sale of mobile devices to ensure affordability. Indeed, payments for some public sector services should be made through mobile money. For example, the recent COVID-19 pandemic has shown how mobile money was instrumental in government subsidy payment for lost wages and income. Again, mobile money payment was helpful during the lockdown and in helping people maintain social distancing guidelines. Therefore, there is a need for favourable policies to enable affordability, wide diffusion and use of mobile money. For such development initiatives to work, policy makers should examine the contexts and conditions before rolling out new technologies (Senyo et al., 2020). In addition, policy makers should consider making public services more widely available by using mobile money. In terms of introducing new technologies, policy makers should carefully study the conditions under which potential users are more likely to use the technology. They should also note that within the same country, the motivations and conditions that determine the use of a technology could vary from one category of users to the other and that wider use of that technology would need to take into consideration the needs of users.

6. Conclusion

Drawing on fsQCA and the theoretical lens of UTAUT, this study assesses the combination of conditions that are sufficient pathways to improving financial inclusion through

24

mobile money. We found four pathways and three categories of users and their individual pathways to financial inclusion. These findings advance empirical and practical understanding of the pathways through which mobile money can improve financial inclusion. To the best of our knowledge, this is the first study that empirically examines pathways to improving financial inclusion through mobile money. Thus, this study has addressed an important knowledge gap in the literature. In addition, this study extends research on mobile money and financial inclusion that have predominantly been aligned to traditional quantitative methods. By using QCA, this study offers an alternative perspective to the literature. Given the complexities in decision making to use or not use technological innovations, this knowledge is critically important to research, practice and policy. The new perspectives from this study should inspire future studies to examine the configuration of conditions to financial inclusion in other countries since context has been identified as important even in the same country.

In spite of the contributions, this study has a few limitations. First, the study utilised only the QCA methodology. Though the use of QCA brings new inspiration to mobile money research, it would be interesting for future studies to qualitatively examine this phenomenon. Second, the study is limited to constructs of the UTAUT, thus, future research can explore the configuration of other conditions that are not captured in this study. Lastly, the study was conducted in Ghana—a developing country. Given that there are differences in the development and idiosyncrasies between countries, a cross-country investigation between developed and developing countries could reveal further nuances as well as engender a broader understanding of how mobile money can improve financial inclusion.

References

Ajzen, I. (2002), "Residual effects of past on later behavior: Habituation and reasoned action perspectives", *Personality and Social Psychology Review*, Vol. 6 No. 2, pp. 102–107.

Ali, M., Seny Kan, K.A. and Sarstedt, M. (2016), "Direct and configurational paths of absorptive capacity and organizational innovation to successful organizational performance", *Journal of Business Research*, Elsevier Inc., Vol. 69 No. 11, pp. 5317–5323.

Chaparro-Peláez, J., Agudo-Peregrina, Á.F. and Pascual-Miguel, F.J. (2016), "Conjoint analysis of drivers and inhibitors of e-commerce adoption", *Journal of Business Research*, Elsevier Inc., Vol. 69 No. 4, pp. 1277–1282.

Chauhan, S. (2015), "Acceptance of mobile money by poor citizens of India: Integrating trust

into the technology acceptance model", *Info*, Vol. 17 No. 3, pp. 58–68.

Chopdar, P.K., Korfiatis, N., Sivakumar, V.J. and Lytras, M.D. (2018), "Mobile shopping apps adoption and perceived risks: A cross-country perspective utilizing the Unified Theory of Acceptance and Use of Technology", *Computers in Human Behavior*, Vol. 86, pp. 109–128.

Cobla, G.M. and Osei-Assibey, E. (2018), "Mobile money adoption and spending behaviour: The case of students in Ghana", *International Journal of Social Economics*, Vol. 45 No. 1, pp. 29–42.

David-West, O., Iheanachor, N. and Kelikume, I. (2018), "A resource-based view of digital financial services (DFS): An exploratory study of Nigerian providers", *Journal of Business Research*, Elsevier, Vol. 88 No. February, pp. 513–526.

Demirgüç-Kunt, A., Klapper, L., Singer, D., Ansar, S. and Hess, J. (2018), *The Global Findex Database 2017: Measuring Financial Inclusion and the Fintech Revolution*, World Bank, available at:https://doi.org/10.1596/978-1-4648-1259-0.

Duarte, P. and Pinho, J.C. (2019), "A mixed methods UTAUT2-based approach to assess mobile health adoption", *Journal of Business Research*, Elsevier, Vol. 102, pp. 140–150.

Fiss, P.C. (2007), "A Set-Theoretical Approach to Organizational Configurations", *Academy of Management Review*, Vol. 32 No. 4, pp. 1180–1198.

Fiss, P.C. (2011), "Building better causal theories: A fuzzy set approach to typologies in organization research", *Academy of Management Journal*, Vol. 54 No. 2, pp. 393–420.

Fiss, P.C., Marx, A. and Cambre, B. (2013), *Configurational Theory and Methods in Organizational Research: Introduction*, *Research in the Sociology of Organizations*, Vol. 38, Emerald Group Publishing Limited, available at:https://doi.org/10.1108/S0733-558X(2013)0000038005.

Greckhamer, T., Furnari, S., Fiss, P.C. and Aguilera, R. V. (2018), "Studying configurations with qualitative comparative analysis: Best practices in strategy and organization research", *Strategic Organization*, Vol. 16 No. 4, pp. 482–495.

Kim, S.C., Yoon, D. and Han, E.K. (2016), "Antecedents of mobile app usage among smartphone users", *Journal of Marketing Communications*, Routledge, Vol. 22 No. 6, pp. 653–670.

Lashitew, A.A., van Tulder, R. and Liasse, Y. (2019), "Mobile phones for financial inclusion: What explains the diffusion of mobile money innovations?", *Research Policy*, Elsevier, Vol. 48 No. 5, pp. 1201–1215.

Lepoutre, J. and Oguntoye, A. (2018), "The (non-)emergence of mobile money systems in
Sub-Saharan Africa: A comparative multilevel perspective of Kenya and Nigeria",
Technological Forecasting and Social Change, Elsevier, Vol. 131, pp. 262–275.

Macedo, I.M. (2017), "Predicting the acceptance and use of information and communication
technology by older adults: An empirical examination of the revised UTAUT2",
Computers in Human Behavior, Vol. 75, pp. 935–948.

Magsamen-Conrad, K., Upadhyaya, S., Joa, C.Y. and Dowd, J. (2015), "Bridging the divide:
Using UTAUT to predict multigenerational tablet adoption practices", *Computers in
Human Behavior*, Elsevier Ltd, Vol. 50, pp. 186–196.

Maity, M., Bagchi, K., Shah, A. and Misra, A. (2019), "Explaining normative behavior in
information technology use", *Information Technology and People*, Vol. 32 No. 1, pp.
94–117.

Malinga, R.B. and Maiga, G. (2020), "A model for mobile money services adoption by
traders in Uganda", *Electronic Journal of Information Systems in Developing Countries*,
Vol. 86 No. 2, pp. 1–14.

Mansoori, K.A. Al, Sarabdeen, J. and Tchantchane, A.L. (2018), "Investigating Emirati
citizens' adoption of e-government services in Abu Dhabi using modified UTAUT
model", *Information Technology and People*, Vol. 31 No. 2, pp. 455–481.

Mattern, M. (2018), "How Ghana Became One of Africa's Top Mobile Money Markets",
CGAP, available at: http://www.cgap.org/blog/how-ghana-became-one-africas-top-
mobile-money-markets (accessed 11 November 2019).

Misangyi, V.F. and Acharya, A.G. (2014), "Substitutes or complements? A configurational
examination of corporate governance mechanisms", *Academy of Management Journal*,
Vol. 57 No. 6, pp. 1681–1705.

Naranjo-Zolotov, M., Oliveira, T. and Casteleyn, S. (2019), "Citizens' intention to use and
recommend e-participation: Drawing upon UTAUT and citizen empowerment",
Information Technology and People, Vol. 32 No. 2, pp. 364–386.

Narteh, B., Mahmoud, M.A. and Amoh, S. (2017), "Customer behavioural intentions towards
mobile money services adoption in Ghana", *The Service Industries Journal*, Vol. 37 No.
7–8, pp. 426–447.

Oana, I.E. and Schneider, C.Q. (2018), "SetMethods: An add-on R package for advanced
QCA", *R Journal*, Vol. 10 No. 1, pp. 507–533.

Osei-Assibey, E. (2015), "What drives behavioral intention of mobile money adoption? The

case of ancient susu saving operations in Ghana", *International Journal of Social Economics*, Vol. 42 No. 11, pp. 962–979.

Patil, P., Tamilmani, K., Rana, N.P. and Raghavan, V. (2020), "Understanding consumer adoption of mobile payment in India: Extending Meta-UTAUT model with personal innovativeness, anxiety, trust, and grievance redressal", *International Journal of Information Management*, Elsevier, Vol. 54 No. February, p. 102144.

Ragin, C.C. (2008a), "Qualitative Comparative Analysis Using Fuzzy Sets (fsQCA)", *Configurational Comparative Analysis*, pp. 87–121.

Ragin, C.C. (2008b), *Redesigning Social Inquiry*, University of Chicago Press, available at:https://doi.org/10.7208/chicago/9780226702797.001.0001.

Rahman, S.A., Taghizadeh, S.K., Ramayah, T. and Alam, M.M.D. (2017), "Technology acceptance among micro-entrepreneurs in marginalized social strata: The case of social innovation in Bangladesh", *Technological Forecasting and Social Change*, Elsevier Inc., Vol. 118, pp. 236–245.

Schneider, C.Q. and Wagemann, C. (2012), *Set-Theoretic Methods for the Social Sciences: A Guide to Qualitative Comparative Analysis*, Cambridge University Press.

Senyo, P.K., Effah, J. and Addae, E. (2016), "Preliminary insight into cloud computing adoption in a developing country", *Journal of Enterprise Information Management*, Vol. 29 No. 4, pp. 505–524.

Senyo, P.K., Effah, J. and Osabutey, E.L.C. (2020), "Digital Platformisation as Public Sector Transformation Strategy: A Case of Ghana's Paperless Port", *Technological Forecasting & Social Change*.

Senyo, P.K. and Karanasios, S. (2020), "How do Fintech Firms Address Financial Inclusion?", *International Conference on Information Systems*.

Senyo, P.K., Liu, K. and Effah, J. (2019), "Digital business ecosystem: Literature review and a framework for future research", *International Journal of Information Management*, Elsevier, Vol. 47, pp. 52–64.

Senyo, P.K. and Osabutey, E.L.C. (2020), "Unearthing antecedents to financial inclusion through FinTech innovations", *Technovation*, Vol. 98, p. 102155.

Upadhyay, P. and Jahanyan, S. (2016), "Analyzing user perspective on the factors affecting use intention of mobile based transfer payment", *Internet Research*, Vol. 26 No. 1, pp. 38–56.

Venkatesh, V., Morris, M.G., Davis, G.B. and Davis, F.D. (2003), "User Acceptance of

Information Technology: Toward a Unified View", *MIS Quarterly*, Vol. 27 No. 3, pp. 425–478.

Venkatesh, V., Thong, J.Y.L. and Xu, X. (2012), "Consumer Acceptance and Use of Information Technology: Extending the Unified Theory of Acceptance and Use of Technology", *MIS Quarterly*, Vol. 36 No. 1, pp. 157–178.

Veríssimo, J.M.C. (2016), "Enablers and restrictors of mobile banking app use: A fuzzy set qualitative comparative analysis (fsQCA)", *Journal of Business Research*, Vol. 69 No. 11, pp. 5456–5460.

Woodside, A.G. (2013), "Moving beyond multiple regression analysis to algorithms: Calling for adoption of a paradigm shift from symmetric to asymmetric thinking in data analysis and crafting theory", *Journal of Business Research*, Elsevier Inc., Vol. 66 No. 4, pp. 463–472.

Woodside, A.G. (2014), "Embrace•perform•model: Complexity theory, contrarian case analysis, and multiple realities", *Journal of Business Research*, Elsevier Inc., Vol. 67 No. 12, pp. 2495–2503.

World Bank. (2018), "Financial Inclusion on the Rise, But Gaps Remain", *Press Release*, available at: https://www.worldbank.org/en/news/press-release/2018/04/19/financial-inclusion-on-the-rise-but-gaps-remain-global-findex-database-shows.

Ye, J., Zheng, J. and Yi, F. (2020), "A study on users' willingness to accept mobility as a service based on UTAUT model", *Technological Forecasting and Social Change*, Elsevier, Vol. 157 No. October 2019, p. 120066.

Yueh, H.-P., Lu, M.-H. and Lin, W. (2016), "Employees' acceptance of mobile technology in a workplace: An empirical study using SEM and fsQCA", *Journal of Business Research*, Vol. 69 No. 6, pp. 2318–2324.

Zadeh, L.A. (1975), "The concept of a linguistic variable and its application to approximate reasoning-I", *Information Sciences*, Vol. 8 No. 3, pp. 199–249.

Pathways to Improving Financial Inclusion through Mobile Money: A Fuzzy Set Qualitative Comparative Analysis

Abstract

Purpose—The purpose of this study is to investigate and explain pathways through which mobile money can improve financial inclusion.

Design/methodology/approach—The study used 294 survey responses from mobile money users in Ghana. The data was analysed using fuzzy set qualitative comparative analysis (fsQCA).

Findings—The findings reveal four pathways for improving financial inclusion through mobile money. In addition, the study identified three distinct user topologies as well as their associated pathways through which mobile money can be used to improve financial inclusion.

Practical implications—Managers and financial services organisations need to design products and services to align with different pathways and user topologies to improve financial inclusion through mobile money. Moreover, they need to take into account people's diverse social and economic backgrounds.

Originality/value—The study makes theoretical and empirical contributions by unpacking pathways through which mobile money can improve financial inclusion. In addition, this study reveals three distinct user topologies, being ease-of-use, behavioural intention and coverage-price-service driven, and associated pathways through which mobile money can improve financial inclusion. These pathways and user topologies are important to tailor mobile money services and financial inclusion policies. Lastly, this study is arguably the first to utilise UTAUT in fsQCA to extend the mobile money literature.

Keywords: Mobile Money; Financial Inclusion; fsQCA; FinTech; Technology Innovation

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60

1. Introduction

There is uneven access to financial services in the world and about 1.7 billion people are unbanked. While mobile money—a form of financial technology (fintech) has contributed to reducing financial exclusion, there is still a long way to achieving global financial inclusion (World Bank, 2018). Mobile money enables access to financial services such as cash deposits, savings, money transfer, micro-loans and payment for goods and services. In addition, mobile money offers a wide range of advantages such as convenience, rapid payment processes, accessibility and reduced transaction cost (Senyo and Osabutey, 2020). As a result, mobile money is touted as a technology that can transform economies due to its applicability across sectors such as health, commerce, agriculture and education (Senyo and Karanasios, 2020).

While there is some research on mobile money use in general, some limitations still exist. First, prior mobile money studies (e.g., Lepoutre and Oguntoye, 2018; Malinga and Maiga, 2020; Rahman et al., 2017) have largely explored adoption of mobile money while there is a lack of research that explains pathways to improving financial inclusion. Consequently, the combination of conditions through which mobile money can be used to improve financial inclusion has not been fully established (Senyo and Osabutey, 2020). Moreover, there is limited understanding of the topology of users and their preferred pathways to using mobile money for financial inclusion. Given the diversity in user preferences, it is important to understand idiosyncrasies (Senyo et al., 2016) associated with user clusters that propel their use of mobile money for financial inclusion. Although mobile money is spearheading financial inclusion across developing countries, there is uneven uptake of the technology across countries (Lepoutre and Oguntoye, 2018). Thus, there is a need for research to investigate pathways through which mobile money can be deployed to improve financial inclusion. Second, majority of extant mobile money studies (e.g., Lashitew et al., 2019; Narteh et al., 2017; Osei-Assibey, 2015) have predominantly adopted quantitative methods such as regression analysis, limiting a configural understanding of conditions required to improve financial inclusion. As echoed by Veríssimo (2016) and Fiss (2007), the use of traditional quantitative methods like regression result in often treating factors individually with the effects of their combination arguably ignored. As human behaviour is complex and can be influenced by a combination of different factors, it is important to understand the configural effect of various constructs. Given that mobile money is a financial technology, it has inherent risk which makes it different from other innovations. As such, the effect of a single variable might

not adequately explain users' behaviours towards the technology. Therefore, there is a need for research into the combinatory effect of different constructs and how these affect the viability of using mobile money for improving financial inclusion.

To address these gaps, this study posits the research question: *what combination of conditions are sufficient pathways to improve financial inclusion through mobile money?* Based on the Unified theory of acceptance and use of technology (UTAUT), and the qualitative comparative analysis (QCA), this study unravels four pathways through which mobile money can improve financial inclusion. Through the findings, this study makes three critical contributions. First, the study offers an understanding of the pathways through which mobile money can improve financial inclusion. Second, this study reveals three distinct user topologies and associated pathways as mediums through which mobile money can improve financial inclusion. These pathways provide new knowledge on clusters among mobile money users. Moreover, this insight is critical in shaping the design of mobile money solutions as well as formulating financial inclusion policies. Lastly, this study demonstrates how the UTAUT can be applied in a configurational investigation (Fiss et al., 2013). This application of the UTAUT brings an alternative perspective to the usual application of the theory in traditional quantitative or qualitative research.

The rest of this study is organised as follows. Section 2 establishes the background and theoretical foundation. Section 3 discusses the research methodology, data collection, construct measurement, and the fsQCA method. Section 4 presents findings while Section 5 discusses the findings and presents theoretical, practical and policy implications. Finally, Section 6 concludes with limitations and future research directions.

2. Background and Theoretical Foundation

2.1 Financial inclusion through mobile money

Though several gains have been made, there are still a large number of people without access to financial services worldwide (Demirgüç-Kunt et al., 2018). Financial inclusion assesses the degree to which there is access to and use of financial services (Senyo and Karanasios, 2020; Senyo and Osabutey, 2020). In addition, it concerns delivery of banking services at an affordable cost to a wide range of people with low income. While financial inclusion is specifically targeted at enabling universal and affordable access to financial services, its benefits have far reaching economic and development impacts in many parts of the world. Thus, developing innovative solutions for financial inclusion is urgently needed.

Globally, it is estimated that two-thirds of the 1.7 billion unbanked adults own a mobile phone that could help them access financial services (World Bank, 2018). Hence, providing financial services through mobile money is a viable option for the poor. Mobile money innovation operates in an ecosystem with different actors (Senyo et al., 2019). These actors range from users, merchants, service providers, agents, banks and regulatory agencies. Users represent individuals and organisations who utilise mobile money services. Merchants are firms that accept mobile money payment for goods and services. Service providers are developers of mobile money services (David-West et al., 2018). Service providers include telecommunication network operators and fintech firms. Agents are intermediaries between users and mobile money service providers and offer services such as cash deposits, withdrawals, and registration. Banks are responsible for holding in trust monies used in mobile money transactions. Lastly, regulators are government organisations mandated by law to supervise activities in the mobile money ecosystem (Senyo and Osabutey, 2020). The mobile money ecosystem is relatively immature compared to the traditional financial sector (David-West et al., 2018). However, the ecosystem is witnessing a rapid development characterised by the number of fintech start-ups and mobile network operators offering mobile money services (Senyo and Karanasios, 2020). Indeed, significant efforts are being made to develop the ecosystem given the importance of mobile money in addressing economic and social issues such as financial inclusion. For instance, in Ghana, due to the potentials of the mobile money innovation, the central bank has opened up the ecosystem to private fintech firms, a situation previously inconceivable.

In spite of the increasing interest and the rapid development of mobile money ecosystem, there are aspects of the innovation that could benefit from further research attention. The needs for the financially excluded remain high as a large number of people in the world still do not have access to financial services (World Bank, 2018). Exclusion to such an extent can be partly attributed to a limited understanding of pathways through which mobile money can be positioned to improve financial inclusion (Senyo and Osabutey, 2020). We argue that for a better alignment and targeting of mobile money innovations, there is a need to thoroughly understand how to position the technology to drive optimum use. Though there is some research on mobile money (e.g., Cobla and Osei-Assibey, 2018; Lashitew et al., 2019; Lepoutre and Oguntoye, 2018; Rahman et al., 2017), prior studies (see Table 1) have largely explored adoption of mobile money while there is a lack of research that explains pathways to improving financial inclusion. Moreover, there is limited understanding of the topology of users and their

preferred pathways to using mobile money for financial inclusion. In response, this research

extends previous studies by adopting a combinatorial approach to evaluate pathways through

which mobile money can be used to improve financial inclusion.

Table 1 Summary of selected mobile money studies

Studies	Focus	Methodological orientation	Theoretical underpinning
Malinga and Maiga (2020)	Explore challenges traders face in using and adopting mobile money services	—Quantitative method —Regression analysis	UTAUT
Lashitew et al. (2019)	Examines factors that affect the development and diffusion of mobile money services	—Mixed method —Tobit regression analysis and case study	Technology innovation and Power-interest framework
Lepoutre and Oguntoye (2018)	Seeks to understand mechanisms that explain these differences in mobile money adoption rate across different countries through a comparative case study analysis of Kenya and Nigeria	—Comparative case study —Cross-case analysis	Sociotechnical transformation and innovation ecosystems
Rahman et al. (2017)	Examines the influence of optimism, innovativeness, discomfort and insecurity on bKash[1] entrepreneurs' perceived ease of use (PEOU) and perceived usefulness (PU) of bKash technology as well as effect of 'bKash' entrepreneurs' PEOU and PU on their well-being.	—Quantitative method —PLS-SEM	Technology readiness index and technology acceptance model (TAM)
Osei-Assibey (2015)	Investigates the behavioural intention or willingness of susu[2] collectors and users to adopt a mobile money platform as part of their savings practices.	—Quantitative method —Logistic regression analysis	Diffusion of innovation (DOI) and TAM
Narteh et al. (2017)	Examines the determinants of mobile money service adoption	—Quantitative method —Partial least square structural equation modelling (PLS-SEM)	TAM and DOI
Senyo and Osabutey (2020)	Examines technological and behavioural antecedents that influence users' behaviour toward financial technologies	—Quantitative method —PLS-SEM	UTAUT2 and Prospect Theory
Upadhyay and Jahanyan (2016)	Explores factors affecting usage intention of mobile-based payment services	—Quantitative method — CB-SEM data analysis	TAM, Task-technology fit, and Absorptive capacity
Chauhan (2015)	Seeks to understand the acceptance of mobile-money	— Quantitative method —PLS-SEM data analysis	TAM

---

[1] bKash is a mobile financial service in Bangladesh

[2] Susu is a traditional cooperative money pooling scheme

5

Studies	Focus	Methodological orientation	Theoretical underpinning
Cobla and Osei-Assibey (2018)	Examines how the use of the mobile money technology among students affects their spending behaviour	—Quantitative method —Ordinary least squares regression analysis	The modern theory of consumption

2.2 Unified theory of acceptance and use of technology (UTAUT)

The UTAUT is a theoretical lens that explains acceptance and use of a technology (Venkatesh et al., 2003) by exploring the relationships between performance expectancy, effort expectancy, facilitating conditions, social influence and behavioural intention. Venkatesh et al. (2012) extended the theory to UTAUT2 through the introduction of new constructs. In spite of the extension, there is limited differences in the variances explained by the original and the extended theory. Given that this study is arguably the first to utilise UTAUT in fsQCA within the context of mobile money, which is regarded as a new domain, it was deemed prudent to apply the original theory to ensure parsimony.

As presented in Table 2, in recent times, UTAUT has been used to investigate different phenomena. For instance, Naranjo-Zolotov et al. (2019) combined UTAUT with empowerment theory to investigate how citizens' perception of empowerment influence intention to use and intention to recommend e-participation. Similarly, Mansoori et al. (2018) utilised UTAUT to explore factors that motivate citizens to adopt e-government public services. In other instances, the UTAUT was utilised to investigate acceptance of mobility as a service in transportation (Ye et al., 2020), normative behaviour (Maity et al., 2019) and mobile payment (Patil et al., 2020). Though UTAUT has been widely used in prior studies, there is limited knowledge on how it can be applied in a configural context. As this study seeks to understand a configuration of pathways through which mobile money can improve financial inclusion, we deemed the UTAUT suitable as the overarching theoretical foundation.

Table 2 Summary of selected UTAUT inspired studies

Studies	Application of the UTAUT
Naranjo-Zolotov et al. (2019)	Combined UTAUT with empowerment theory to investigate how citizens' perception of empowerment influence the intention to use and recommend e-participation
Mansoori et al. (2018)	Utilised UTAUT to explore factors that motivate citizens to adopt e-government public services
Ye et al. (2020)	Used UTAUT to investigate acceptance of mobility as a service in transportation
Maity et al. (2019)	Employed UTUAT to explain normative behaviour in information technology use

6

Studies	Application of the UTAUT
Patil et al. (2020)	Extended UTAUT with personal innovativeness, anxiety, trust, and grievance redressal to examine consumer use behaviour towards mobile payment
Malinga and Maiga (2020)	Extended UTAUT with security and sensitization to investigate mobile money adoption among traders

Based on the UTAUT, this study presents a model (see Figure 1) to address the research question. Following a combinatorial approach, we represent the five conditions in a Venn diagram to signify various pathways through which mobile money can be used to improve financial inclusion. We discuss hereafter each of these five conditions.
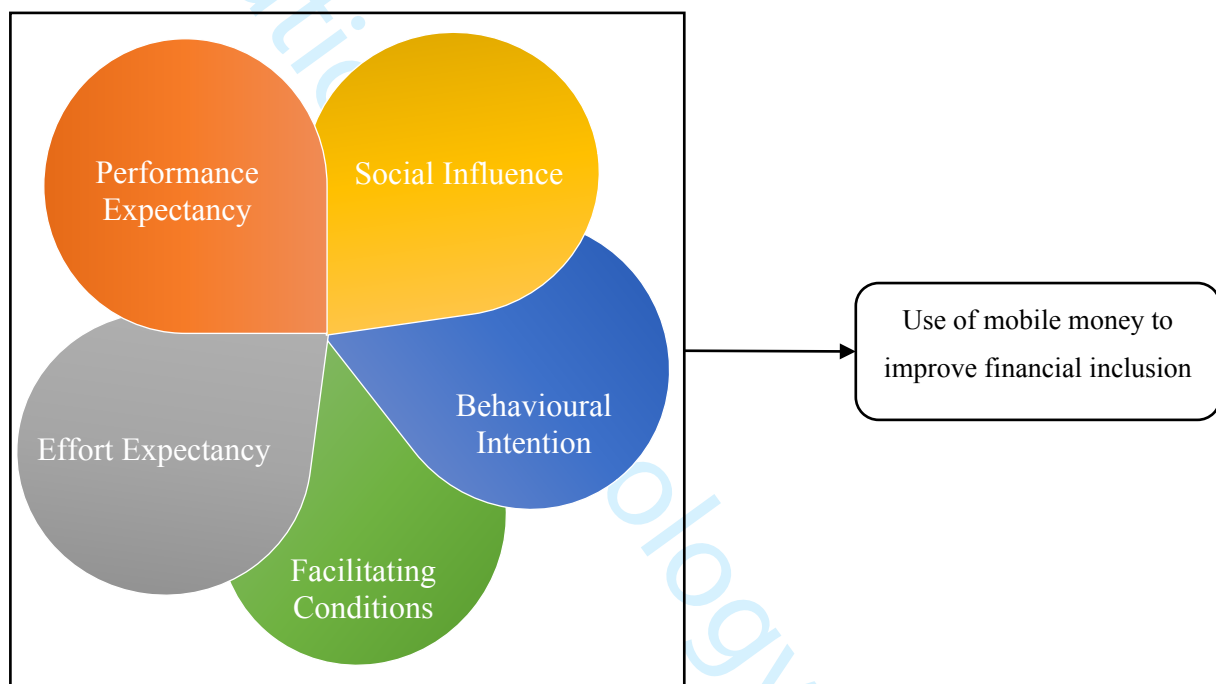

Figure 1 Research Model

2.2.1 Performance expectancy

According to Venkatesh et al. (2003), performance expectancy describes users' perception of a technology to support in the achievement of intended goals. For instance, in the context of this study, performance expectancy is the perception that mobile money offers access, convenience and low cost financial transactions compared to existing services (David-West et al., 2018). Although the effect of performance expectancy has been documented in several studies (e.g., Macedo, 2017; Yueh et al., 2016), there is a limitation in the mobile money literature. Rationally, people will use a technology that support the attainment of their goals and avoid others that are considered not useful. Arguably, there is limited knowledge on the effect of performance expectancy in the use of mobile money, hence the need to investigate

7

this construct. It makes theoretical sense to expect that high-performance expectancy of mobile money relates to higher financial inclusion. This establishes a relationship between performance expectancy of mobile money and improving financial inclusion.

2.2.2 Effort expectancy

Effort expectancy concerns users' perception of ease in using a technology (Venkatesh et al., 2003). Simply, effort expectancy examines how easy users find it to use a technology. For a technology to attain wide usage, it has to be easy to use. Irrespective of the benefits a technology offers, without it being easy to use, there is bound to be low usage (Kim et al., 2016). The impact of effort expectancy has been established in several studies (e.g., Duarte & Pinho, 2019; Veríssimo, 2016). However, in the context of mobile money, the effect of effort expectancy in improving financial inclusion is arguably underexplored. Given that prior studies have articulated the importance of effort expectancy, this study deems it appropriate to investigate this condition. Following the literature, we contend that low effort expectancy in the use of mobile money will improve financial inclusion. Therefore, we propose a relationship between effort expectance in the use of mobile money and improving financial inclusion.

2.2.3 Facilitating conditions

Sometimes the use of a technology is dependent on the availability of other resources and support. Therefore, to determine users' decision to use a technology, it is important to assess the effect of facilitating conditions—the availability of technical infrastructure and support in the use of an innovation (Venkatesh et al., 2003). In the context of mobile money services, facilitating conditions pertain to availability of resources such as mobile network coverage, affordability of mobile devices and support from service providers (David-West et al., 2018). In the extant literature, facilitating condition is identified as a useful predictor of technology use. Hence, the availability of more facilitating conditions can lead to a favourable decision to use a technology. Based on this assertion, this study seeks to determine the effect of facilitating conditions in the use of mobile money to improve financial inclusion. Precisely, we expect that high facilitating conditions can improve the use of mobile money services for financial inclusion. Consequently, we propose a relationship between facilitating conditions of mobile money and improving financial inclusion.

2.2.4 Social influence

Social influence is defined as the extent to which the opinion of important others such as families and friends affect a user's decision to use a technology (Venkatesh et al., 2003). According to Macedo (2017), people are likely to form favourable behavioural intention to use a technology if important and influential people have positive perceptions about the technology. In prior studies, inconclusive results have been attributed to social influence due to its complex nature. In some instances (e.g., Magsamen-Conrad, Upadhyaya, Joa, & Dowd, 2015) social influence is identified as insignificant in technology use. On the other hand, other studies (e.g., Yueh et al., 2016) found a significant effect of social influence. Within the mobile money literature, there is a knowledge gap on the effect of social influence. Thus, there is a need for further studies to establish the effect of social influence on mobile money use. Following this inconclusive result in the literature, we propose a relationship between social influence in the use of mobile money and improving financial inclusion.

2.2.5 Behavioural intention

According to Ajzen (2002), behavioural intention refers to the propensity of users' to engage in a behaviour. Thus, behavioural intention is manifested through people's action. The effect on behavioural intention on the use of a technology is well established in the literature (Venkatesh et al., 2012). For instance, in investigating the use of mobile apps, Chopdar et al. (2018) show that behavioural intention has a significant effect on actual use. However, in the context of mobile money services, extant studies (e.g., Chauhan, 2015; Narteh et al., 2017; Upadhyay & Jahanyan, 2016) have largely focused on behavioural intention without establishing its effect on actual use of the innovation. Although there is a significant difference between behavioural intention and actual use of a technology (Venkatesh et al., 2012) there is limited understanding of the relationship between behavioural intention and actual use of mobile money services. We propose a relationship between behavioural intention in the use of mobile money services and improving financial inclusion.

3. Research Method

To obtain a holistic understanding of the configuration of pathways to improve financial inclusion through mobile money, we used QCA, a set-theoretic approach as the overarching methodology (Fiss, 2007). QCA is a research design method and analysis technique that bridges qualitative and qualitative research (Ragin, 2008; Schneider and Wagemann, 2012).

QCA enables analysis of complex causality and logical relations among combinations of conditions and an outcome (Chaparro-Peláez et al., 2016; Misangyi et al. 2017). With this approach, researchers can assess the necessary and sufficient conditions in relation to an outcome (Ragin, 2008a). While a typical quantitative method such as multiple regression examines correlation, QCA on the other hand assesses a set of relations to provide a closer link to theory (Woodside, 2013). QCA rests on set theory, which relies on Boolean algebra to examine set relations between conditions and effects. Based on our research model in Figure 1, we consider five conditions: performance expectancy, effort expectancy, facilitating conditions, social influence, and behavioural intention as well as an outcome—use of mobile money to improve financial inclusion.

3.1 Data collection

Data collection was conducted in Ghana, a middle-income Sub-Saharan African country (Senyo et al., 2020). We selected Ghana for the following two reasons. First, the country has recently emerged as one of the fast-growing mobile money environments (Mattern, 2018). Second, in spite of this growth, cash remains the dominant mode of financial transactions in Ghana (Cobla and Osei-Assibey, 2018). As such, many people are still unbanked (Senyo and Osabutey, 2020). In the light of these unique contrasting characteristics, this study deemed Ghana as a suitable empirical context to investigate the configuration of pathways that could improve financial inclusion through mobile money. Data was collected through an online questionnaire consisting of two parts, namely demographic characteristics and perception of respondents on each condition in the research model. The demographic characteristics assessed included age, gender, level of education and frequency of mobile money service use. The second aspect of the questionnaire assessed the degree to which respondents agree or disagree with statements on each condition based on a 7-point Likert-scale ranging from strongly disagree to strongly agree.

Before the main data collection, the questionnaire was pilot tested to ascertain the face value and conceptual validity. This resulted in the modification of some questions on social influence and facilitating conditions to improve clarity. Next, we collected an initial 46 responses to ascertain appropriateness of the questionnaire and the results indicated a good fit of the instrument. The study used the convenience non-probability sampling method for participant selection and data collection. The convenience sampling method was chosen because of its effectiveness in supporting the collection of a large sample for generalisation.

The main data collection spanned a period of 6 months from October 2017 to March 2018. In all, we obtained a total of 460 responses of which 294 were deemed suitable for use.

3.2 Construct measurement

As the study is based on the theoretical lens of the UTAUT, items measuring the constructs were adapted from Venkatesh et al. (2003). To assess the validity of the data collection instrument, we performed two construct measurement analysis using SPSS: (1) correlation analysis and (2) Cronbach's Alpha. Table 3 presents the results of these analysis. In terms of the correlation analysis, the result shows that there is limited relationship between the constructs except for only two which exceeded the 0.60 threshold. Given that these factors combine to measure use of mobile money to improve financial inclusion, there is bound to be some correlation. With regards to Cronbach's Alpha, the result shows that there is support for construct reliability as values are between 0.95 and 0.79. From these reliability analysis results, it is evident that the data collection instrument has a good fit and provides sufficient support for the research model.

Table 3 Descriptive statistics and correlation matrix

Constructs	Mean	SD	α	1	2	3	4	5	6
Effort Expectancy	6.28	0.95	0.91	1.000					
Behavioural Intention	5.93	1.09	0.85	.291	1.000				
Performance Expectancy	6.01	1.02	0.79	.395	.360	1.000			
Social Influence	4.71	1.60	0.95	.676	.320	.311	1.000		
Facilitating Conditions	6.17	0.99	0.81	.578	.518	.539	.556	1.000	
Use of Mobile Money	5.70	1.17	0.89	.558	.367	.554	.539	.703	1.000

3.3 Fuzzy-set qualitative comparative analysis (fsQCA)

A three-step procedure summarises the fsQCA analysis: data calibration, truth table building, and truth table minimisation. We employed the fuzzy set variant of QCA (fsQCA) in this study because our data was not binary. In contrast, with crisp set analysis which involve binary conditions to build theoretically and/or empirically informed membership in sets that take only two values ("0" for "fully out" and "1" for "fully in"), fsQCA allows a fine-tuned granularity in a score of set membership ranging from "0" to "1". Whatever the variant, data processing in QCA starts with data calibration, which refers to a conversion of raw data into scores of set memberships. Simply, calibration implies that researchers have to decide which

raw data variable values should correspond to a full membership in a given set, crossover point and full non-membership.

In this study, we defined six sets, one represents the outcome on interest (i.e., use of mobile money for improving financial inclusion) and five corresponding conditions: *high* performance expectancy, *low* effort expectancy, *high* facilitating conditions; *high* social influence and *high* behavioural intention. The adjectives high and low preceding the conditions are important qualifiers that help in the construction of the sets. This conceptualising is in line with what Zadeh (1975 p. 201) called "linguistic variables". From the above calibration scheme, we applied membership scores in the set of the outcome and the five sets of conditions which takes two values: "1" ("fully in") and "0" ("fully out"). Thresholds for the five conditions were decided from their corresponding raw data made of the sum of the value of the items composing the measured of the latent constructs. We ran our QCA considering one crisp set (the outcome) and five fuzzy sets (the conditions). Table 4 sums up our data calibrations decisions.

Table 4 Data calibration

	Linguistic qualifier	Full non-membership	Crossover point	Full membership
Use of Mobile Money Services	Frequency of use	If the frequency of usage is "once a week" it is coded "0"	N/A	If the frequency of usage is otherwise, it is coded "1"
Performance Expectancy	High	0.85	3.5	10.64
Effort Expectancy	Low	24	25	28
Facilitating Conditions	High	12	18	21
Social Influence	High	12	15	18
Behavioural Intention	High	22	24	26

Secondly, we used the *R* packages *QCA 3.3* (Dușa, 2019) and *SetMethods 2.4* (Oana and Schneider, 2018) to build the truth table using sets created during the calibration process. A truth table is a data matrix containing the empirical information encapsulated in the sets formed from the raw data (Schneider & Wagemann, 2012). The truth table is an essential tool in QCA because it allows unravelling "set relations" and view observations as "configurations" of conditions (Schneider and Wagemann, 2012, p. 91). We construct a truth table with the five defined conditions. We obtained a Boolean property space (Ragin, 2008b) of 25 logically possible combinations that can be associated with mobile money use for improving financial inclusion (i.e., our outcome of interest). The truth table was constructed on the basis of two decisions—a requirement of a minimum number of empirical instances associated with a

configuration being considered as leading to the outcome and the minimum level of consistency for a given pathway (Ragin, 2008b; Schneider & Wagemann, 2012). As presented in Table 5, we set the first criterion at "at least one empirical instance" (see rows # 27 in Table 5 with two empirical instances) and the second at 0.95 (see column "incl" in Table 5). Indeed, a low consistency (<0.75) indicates that a given configuration of conditions leads to an outcome of interest that is not reliable (Ragin, 2008a). Conversely, high consistency value (>0.75 or close to 1) means that a given configuration of conditions leads to an outcome under investigation which is reliable (Ragin, 2008a). In other words, a consistency closer to 1 indicates that a given configuration of conditions is almost always associated with the outcome of interest. This implies that a consistency value of 1 evidence a perfect association between a given configuration of conditions and an outcome.

Lastly, the Quine–McCluskey algorithm is used to logically reduce or minimise the truth table (Schneider & Wagemann, 2012). The minimisation of the truth table produces a complex, parsimonious and intermediate solutions based on counterfactual analysis. Core to the counterfactual analysis is the logical possible combinations of conditions for which no empirical instances are attached, the so-called logical remainders. In Table 5, they are marked with a question mark ("?") in the column "OUT". The complex solution does not take into consideration the logical remainders. The parsimonious and intermediate solutions consider logical remainders upon which simplifying assumptions are made. In parsimonious solutions, assumptions are made on logical remainders without any distinction between "easy" and "difficult" counterfactuals. The intermediate solution considers only the "easy" counterfactual. Combining both parsimonious and intermediate solutions helps to differentiate core conditions (i.e., central contributing conditions) from peripheral conditions (weak contributing conditions) (Fiss, 2011; Misangyi and Acharya, 2014; Ragin, 2008a). The decision of a researcher is pivotal in the counterfactual analysis. Indeed, a researcher has to make an assumption on which easy counterfactuals should be considered to generate the intermediate solution. Following, Misangyi and Acharya (2014), we make some assumptions only on conditions upon which the literature is conclusive on the fact that their presence lead to the use of mobile money: high performance expectancy, high behavioural intention, low effort expectancy and high facilitating conditions. For social influence, existing literature does not have a conclusive strong stand, so, we did not impose any simplifying assumptions on this condition.

Table 5 Truth table for the sufficient analysis

#	PE	EE	FC	SI	BI	OUT	n	incl	PRI	Case ID
30	1	1	1	0	1	1	36	0.996	0.996	4,7,20,29,38,61,62,75,76,80,81,94,96,99,110,111,121,123,134,144,152,166,187,216,232,237,247,253,261,275,277,279,282,317,345,419
32	1	1	1	1	1	1	75	0.995	0.995	2,10,23,27,28,33,35,41,51,52,55,64,71,73,77,85,86,88,91,97,100,105,106,107,108,119,120,122,127,130,132,133,150,151,156,161,163,164,170,171,179,181,195,196,202,204,206,209,210,213,229,231,233,234,235,236,238,239,241,248,250,260,266,269,271,272,273,278,289,328,331,407,409,414,439
26	1	1	0	0	1	1	8	0.993	0.993	12,125,136,142,145,146,353,453
22	1	0	1	0	1	1	13	0.991	0.991	15,17,37,102,143,155,158,208,227,267,281,445,448
18	1	0	0	0	1	1	9	0.99	0.99	6,65,92,168,174,203,257,276,429
28	1	1	0	1	1	1	6	0.99	0.99	13,79,113,177,217,291
25	1	1	0	0	0	1	5	0.987	0.987	50,98,141,169,344
27	1	1	0	1	0	1	2	0.978	0.978	148,153
21	1	0	1	0	0	1	30	0.975	0.975	139,19,21,25,40,45,53,59,69,82,83,93,104,114,131,154,159,165,182,184,207,215,226,243,252,287,308,330,412,416
24	1	0	1	1	1	1	34	0.968	0.968	149,199,14,22,30,49,70,72,74,84,87,89,90,115,116,117,118,129,140,147,160,162,180,197,205,214,220,222,224,242,246,262,263,438
20	1	0	0	1	1	1	6	0.959	0.959	5,39,109,251,274,290
23	1	0	1	1	0	0	12	0.949	0.949	42,54,68,124,137,157,167,255,270,283,349,444
17	1	0	0	0	0	0	21	0.949	0.949	201,315,8,9,18,24,31,36,44,78,95,126,200,230,240,245,259,268,356,408,437
29	1	1	1	0	0	0	23	0.939	0.939	47,223,3,16,26,46,48,58,66,67,135,175,178,183,188,212,218,219,225,244,249,314,391
31	1	1	1	1	0	0	17	0.935	0.935	1,221,11,32,34,43,63,101,103,138,194,211,228,256,258,362,368
19	1	0	0	1	0	0	8	0.911	0.911	254,265,280,57,176,198,394,428
1	0	0	0	0	0	?	0	-		
2	0	0	0	0	1	?	0	-		
3	0	0	0	1	0	?	0	-		
4	0	0	0	1	1	?	0	-		

14

5	0	0	1	0	0	?	0	-
6	0	0	1	0	1	?	0	-
7	0	0	1	1	0	?	0	-
8	0	0	1	1	1	?	0	-
9	0	1	0	0	0	?	0	-
10	0	1	0	0	1	?	0	-
11	0	1	0	1	0	?	0	-
12	0	1	0	1	1	?	0	-
13	0	1	1	0	0	?	0	-
14	0	1	1	0	1	?	0	-
15	0	1	1	1	0	?	0	-
16	0	1	1	1	1	?	0	-

PE= *high* performance expectancy; EE= *low* effort expectancy; FC= *high* facilitating conditions; SI= *high* social influence; BI= *high* behavioural intention. The first column indicates number of rows in the truth table. 'OUT' refers to the outcome under analysis (*frequent* use of mobile money services). 'n' indicates number of empirical instances (i.e. respondents/cases) associated to each logical combination of causal condition reflected in each row (those cases have a fuzzy membership score higher than 0.5 in the corresponding truth table rows). 'incl': sufficient consistency. In this analysis, we set up the threshold of sufficient consistency at 0.95. We choose to sort the truth rows by 'OUT' and 'incl', which explains why the first column that represents the rank of the rows is disordered. 'PRI' stands for proportional reduction in inconsistency. '?' refers to the logical remainders (combination of conditions without empirical instances, yet essential for counterfactual analysis). 'Case ID' refers to respondents/cases' identification in the raw data.

15

4. Findings

4.1 Demographic characteristics

The demographic characteristics examine the profile of respondents of this study as presented in Table 6. The findings show that the dominant age group is between 25–34 years (n=194, 66%). This is followed by users between the ages of 35–44 (n=69, 23.5%) and 18–24 (n=17, 5.8%). Given that these three age groups constitute the majority of respondents, we can infer that mobile money resonates with the youth as compared to older age groups of 44–55 (n=13, 4.4%) and 55-60 (n=1, 0.3%). Also, the analysis reveals that the sample is dominated by males (n=191, 65%) as compared to females (n=103, 35%).

In terms of highest level of education, the results show that a large number of respondents have masters (n=192, 65.3%) and first degrees (n=83, 28.2%). The rest of the respondents have professional certificates (n=11, 3.7%), doctorates (n=7, 2.4%) and high school (n=1, 0.3%) level of education respectively. With regards to the frequency of mobile money use, the majority of respondents suggest that they use the service 2–3 times a week (n=105, 35.7%) and once a week (n=84, 28.6%). The rest of the respondents use mobile money services once a month (n=49, 16.7%), 4–6 times a week (n=32, 10.9%) and daily (n=24, 8.2%) respectively.

Table 6 Demographic characteristics

Variables	Levels	Frequency (n)	Percentage (%)
Age	18-24	17	5.8
	25-34	194	66.0
	35-44	69	23.5
	45-54	13	4.4
	55-60	1	0.3
Gender	Male	191	65.0
	Female	103	35.0
Highest educational level	High School	1	0.3
	Professional Certificate	11	3.7
	First Degree (Bachelors)	83	28.2
	Master's Degree	192	65.3
	Doctorate Degree	7	2.4
Frequency of mobile money service use	Daily	24	8.2
	4-6 times a week	32	10.9
	2-3 times a week	105	35.7
	Once a week	84	28.6
	Once a month	49	16.7

16

4.2 fsQCA

Our fsQCA reveals four (4) empirically sufficient causal pathways to use mobile money to improve financial inclusion as presented in Table 7. Pathway 1 indicates that a combination of high-performance expectancy, high effort expectancy and low facilitating conditions would result in the use of mobile money to improve financial inclusion. The way facilitating conditions work in this first causal path contradicts the common wisdom which considers their effect in isolation. The set-theoretic approach helps introduce novel insights on how conditions might combine. Indeed, this first causal path could be explained as follows: high users' perception of the ease in using mobile money combined with high-performance expectancy within a context of minimum facilitating conditions leads to the use of mobile money to improve financial inclusion. Interestingly, in this pathway, high effort expectancy and low facilitating conditions appear to be core conditions (Fiss, 2011); which means that both conditions have a strong causal relationship with the outcome—use of mobile money to improve financial inclusion. Social influence and behavioural intention are redundant in this first pathway, meaning that their absence or presence has no effect on the outcome.

Pathway 2 indicates that a combination of high-performance expectancy, high facilitating conditions, and high behavioural intention leads to use of mobile money to improve financial inclusion. Similarly, pathway 3 shows that the use of mobile money to improve financial inclusion could be the result of a combination of high-performance expectancy, high effort expectancy, low social influence, and high behavioural intention. Both pathways 2 and 3 share the same core condition and reflect "neutral permutations" or "functional equivalence" (Schneider & Wagemann, 2012). A high effort expectancy and a minimum social influence (low social influence) (in Pathway 3) act jointly as functional equivalent to high facilitating conditions (in Pathway 3) in a situation of high-performance expectancy and high behavioural intention.

Lastly, pathway 4 combines high-performance expectancy with low effort expectancy (users' low perception of the ease in using the technology), high facilitating conditions, and low social influence to use mobile money to improve financial inclusion. Pathway 4 has low effort expectancy, high facilitating conditions, and low social influence as core conditions. However, high performance expectancy intervenes in all four pathways without being a core condition.

Table 7 Sufficiency analysis of mobile money use for improving financial inclusion

Condition	Pathways			
	Pathway 1	Pathway 2	Pathway 3	Pathway 4
Performance Expectancy (PE)				
High ● / Low Ø	●	●	●	●
Effort Expectancy (EE)				
High ● / Low Ø	●			Ø
Facilitating Conditions (FC)				
High ● / Low Ø	Ø	●		●
Social Influence (SI)				
High ● / Low Ø			Ø	Ø
Behavioural Intention (BI)				
High ● / Low Ø		●	●	
Topology of users	Ease-of-use-driven users	Behavioural intention-driven users		Coverage-price-service-driven users
Consistency[3]	0.99	0.98	0.99	0.97
PRI[4]	0.99	0.98	0.99	0.97
Raw coverage[5]	0.155	0.429	0.245	0.19
Unique coverage[6]	0.02	0.19	0.03	0.07
Overall solution consistency			0.98	
Overall PRI			0.98	
Overall solution coverage			0.59	

Note: Black circles indicate the presence of a condition, and circles with "/" indicate its absence. The meaning of presence and absence is a function of the way conditions are constructed. For example (●) for effort expectancy (EE) refers to user's high perception of the ease in using mobile money whereas (Ø) means the opposite. Large circles represent core conditions and small circles peripheral conditions (see Fiss, 2011). Blank spaces indicate, "insignificant" which means that the condition is redundant in achieving the outcome.

Drawing from the fsQCA results, we uncover three topologies of mobile money users and their associated pathways to financial inclusion. These user topologies are: *ease-of-use-driven users* (Pathway 1), *behavioural intention-driven users* (Pathway 2 and 3), and *coverage-price-service driven users* (Pathway 4). As presented in Table 5, all the four pathways exhibit acceptable parameters of fit as consistency is close to 1 (the perfect consistency value) and PRI

---

[3] Consistency measures the reliability of the empirical claim that a given combination of conditions leads to the occurrence of an outcome.

[4] PRI stands for proportional reduction in consistency and measures a degree to which a configuration is sufficient only for the outcome and not its complement, that is its negation. While there is no standard for this parameter of fit, a high PRI, close to 1 is acceptable as it indicates that a configuration is only sufficient for the positive instance of the outcome.

[5] Coverage is a measure of empirical relevance where raw coverage refers to proportion of memberships in the set of the outcome that are accounted for each given configuration of conditions, including overlaps.

[6] Unique coverage is the empirical relevance attributable to a particular configuration of conditions.

is also close to 1. The four pathways have varying degrees of coverage but it is important to note that empirical coverage does not equate to theoretical importance (Ragin, 2008a). Indeed, Schneider and Wagemann (2012:139) argue that "the empirical importance expressed by coverage is not the same as the theoretical or substantive relevance of a sufficient condition." Thus, low-coverage paths might still be of great substantive interest.

4.3 Predictive validity and sensitivity analyses

We test for the predictive validity of the study by gauging how well the model predicts the outcome of interest in additional samples. We followed Woodside (2014) and Ali et al. (2016) procedure specific to fsQCA analysis by splitting the sample into a modelling and a holdout sample. Table 8 shows the patterns of combination of conditions that are consistent indicators of high scores in mobile money use based on the modelling sample of 152 cases. The findings from testing the overall solution predictions on the data in the holdout appear below in Figure 2. The findings indicate a highly consistent model (1.00). Additional predictive test results support the conclusion that the highly consistent models (models 1, 2, 3 in Table 8) for the modelling sample have high predictive ability for the holdout sample and vice versa.

Table 8 Pattern of combinations of condition associated with mobile money use for the modelling subsample

Solution from the modelling subsample	inclS	PRI	covS	covU
1. PE*EE*BI	0.994	0.994	0.36	0.157
2. PE*si*BI	0.993	0.993	0.274	0.07
3. PE*EE*fc*si	0.983	0.983	0.126	0.033
Overall solution		0.991	0.991	0.464

Note: PE: High Performance Expectancy, EE: Low Effort Expectancy, FC: High Facilitating Conditions, SI: High Social Influence, BI: High Behavioural Intention. Lowercase condition name: negation of the condition, inclS: consistency for sufficiency, PRI: proportional reduction in consistency, covS: raw coverage, covU: unique coverage

Following Greckhamer et al. (2018), we evaluated the robustness of our findings. First, we checked for sensitivity of our findings with regard to the cross-over point. In this study, pathways obtained from the sample of cases have the exact value of 0.5 and that of the added 0.01 constant were logically equivalent. In fact, it is advisable practice to avoid the exact value of 0.50 by adding a small constant to the scores to guarantee that no cases are dropped from our analyses (see Fiss, 2011). Yet, in this study, drops in the number of cases did not affect the substance of the sufficient effective pathways for mobile money use.

19

Second, we performed another sensitivity analysis to examine the robustness of our results considering alternative specifications of the two extreme bound scores of our sets formed by the five conditions ("full membership" and "full non-membership"). The outcome in this analysis is a crisp set for which we did have plausible alternative coding. We only performed the sensitivity test for the five conditions and observed minor changes that do not affect the substance of the interpretation of our findings.

Figure 2: Sensitivity test for the overall solution obtaining from the modelling subsample using data from holdout subsample

5. Discussion

The purpose of this study is to investigate the combination of sufficient conditions as pathways through which mobile money can improve financial inclusion. Our results show that not all our conditions (captured in Figure 1 and Table 5)—performance expectancy, effort expectancy, facilitating conditions, social influence and behavioural intention combine to predict mobile money use by all categories of users. Rather, our results emphasise that four distinct pathways explain how mobile money use can improve financial inclusion for three categories of users. In accordance with our research question, we now discuss and interpret our results referring to the above mentioned three categories of users as shown in Table 9.

20

Pathway 1 suggests that high performance expectancy, high effort expectancy and low facilitating conditions influence mobile money use for one category (ease-of-use-driven) of users. This means that even though effective financial transaction is perceived as important; it is considered peripheral to the ease-of-use of the technology which is a core condition. Ease-of-use is paramount and the low facilitating conditions suggest that minimum facilitating conditions are sufficient. Facilitating conditions and ease-of-use are crucial for this category of users (Kim et al., 2016). Therefore, basic mobile coverage, affordability of mobile devices and some level of supporting services in situations where performance expectancy and ease-of-use are high will encourage mobile money use to improve financial inclusion.

Pathway 2 shows that high performance expectancy, high facilitating conditions and high behavioural intention will lead to mobile money use by the behavioural intention-driven users. In this regard, behavioural intention is the core condition. This is significant because behavioural intention has a profound effect on actual use of a technology (Chopdar et al., 2018). Therefore, where performance expectancy and facilitating conditions are favourable, behavioural intention is most likely to actualise technology use. Existing literature shows that effort expectancy influences behavioural intention (Duarte & Pinho, 2019), however, our findings extend this to reveal that where performance expectancy and facilitating conditions are high core conditions, behavioural intention will lead to actual use of mobile money to improve financial inclusion for this category (behavioural intention-driven) of users.

Pathway 3 shows that high performance expectancy, low social influence and high behavioural intention will lead to the use of mobile money services for the same category of users (behavioural intention-driven). Here again, behavioural intention is the core condition. Following mixed results from earlier studies about social influence on behavioural intention with respect to technology use (Magsamen-Conrad et al, 2015; Yueh et al, 2016), our findings show that even when social influence is low, high performance expectancy and behavioural intention will lead to actual use of mobile money. This means that people's social circles may differ significantly from the circles within which the use of a technology (mobile money) is patronised. People's technology use may be dictated more by business circle influences than social circle influences. Financial inclusion by nature is transactional and therefore the driving force for mobile money service use.

Pathway 4 reveals that high performance expectancy, low effort expectancy, high facilitating conditions and low social influence will lead to the use of mobile money for yet another category of users (coverage-price-service-driven). This shows that even when effort

expectancy and social influence are low, but performance expectancy and facilitating conditions are high, mobile money will be used. Therefore, once it is perceived that mobile money offers access, convenience and low-cost financial transactions compared to existing services and there are facilitating conditions such as mobile coverage, affordable mobile devices and support services (David-West et al., 2018), mobile money will be used to improve financial inclusion. This could mean that there are situations where the use of the technology becomes a necessity because it can work and the alternative is either costly or non-existent. To this extent, as our findings show the core condition of facilitating conditions become the crucial driving force to mobile money use. It is also important to note that in pathway 4, social influence is again low. Indeed, for all four pathways, social influence is either low or non-existent leading us to conclude that social influence does not significantly influence mobile money use towards improving financial inclusion.

Table 9 Topology of mobile money users

Label	Definition	Key drivers for financial inclusion
Ease-of-use-driven users **(Pathway 1)**	High level of ease-of-use, but high achievement of intended goals, with a minimum support	Intrinsic value benefits provided by the financial inclusion technology device
Behavioural intention-driven users **(Pathways 2 and 3)**	(a) High achievement of intended goals, with high support and high behavioural intention	(a) Personal willingness to engage in financial inclusion
	(b) High achievement of intended goals, with high behavioural intention, but minimum social circles' influence	(b) Personal willingness accompanied with minimum social circles' positive perceptions of financial inclusion technology device
Coverage-price-service driven users **(Pathway 4)**	High achievement of intended goals, with high support and high behavioural intention, but minimum social circles' influence and low level of ease-of-use	Affordability and availability of financial inclusion technology device

Note: The three core conditions give rise to three categories of users—ease-of-use driven, behavioural intention-driven, and coverage-price-service driven users.

5.1 Theoretical implications

Our findings have significant theoretical implications. The use of fsQCA reveals new perspectives on the utilisation of new technologies. Our study reveals that there is no single exclusive pathway leading to the use of mobile money towards improving financial inclusion. The findings suggest that multiple pathways explain the phenomenon. First, combinations of conditions under which a technology will be used to improve financial inclusion vary and that

22

it is important for researchers to divide users into distinct categories as emphasised by Torugsa & Arunel (2017) and that the pathways depend on the context. This means that the circumstances and indeed the level of need for the technology also vary and these considerations cannot be ignored.

Second, the core conditions for each group also differ. The results clearly show that performance expectancy as supported in the literature (e.g., Macedo, 2017; Yueh et al., 2016) is generally high and social influence need not be high to facilitate mobile money use for improving financial inclusion. This perhaps explains the mixed results from previous studies with respect to social influences on the use of technologies. This is because it depends more on the primary use of the technology than the social circles within which users operate. Performance expectancy is a given, however, users are influenced differently whether they are ease-of-use-driven, behavioural intention-driven or coverage-price-driven users. Theoretically technology use should be examined according to what drives users because not all users are driven by the same issues irrespective of cultural idiosyncrasies (Senyo et al., 2016). In addition, our categorisation of the key mobile money users into ease-of-use, behavioural intention, coverage-price-service driven topology contribute a nuanced perspective to the mobile money literature. Our study is unique in the way we evaluate how different category of users interact with mobile money through different pathways towards improving financial inclusion.

5.2 Practical implications

Our findings are of value to financial services managers and organisations. The results reinforce that users are characterised by people from diverse social and economic backgrounds operating within a system where some have limited ability to access traditional banking services. Thus, managers would need to seriously consider the different combination of conditions favourable to groups of people who can use mobile money for financial inclusion. Moreover, managers will need to clearly recognise the categories of users and then match that with the combination of conditions that would lead them to use mobile money in particular or a given technology in general. Marketing communications experts will need to understand the different conditions that influence different categories of users to utilise mobile money for financial inclusion or, indeed, any other technologies. Certainly, being able to categorise users into ease-of-use, behavioural intention and coverage-price-service driven topologies would help in more efficient segmentation, targeting and positioning. Our findings give rise to key

23

considerations by both public and private social interventions and business opportunities that require financial inclusion of potential users or a product or service that can be supported by mobile money.

5.3 Policy implications

The first and foremost policy implication is the need to ensure that policy makers take cognisance of the category of users being ease-of-use-driven, behavioural intention-driven and coverage-price-service-driven. From a development perspective, concerns over mobile coverage in rural and remote areas need to be addressed by governments across the world with particular attention to policy makers in developing countries. Government policies need to encourage and support mobile network operators to have a reason to extend mobile phone coverage (Senyo and Osabutey, 2020). Our findings further emphasise the importance of facilitating conditions such as affordable mobile devices and support services (David-West et al., 2018). Policy makers need to ensure that beyond mobile coverage, steps should be taken to ensure affordability of mobile devices, whilst ensuring that there are good supporting services. For instance, Government can exempt taxation on the importation and sale of mobile devices to ensure affordability. Indeed, payments for some public sector services should be made through mobile money. For example, the recent COVID-19 pandemic has shown how mobile money was instrumental in government subsidy payment for lost wages and income. Again, mobile money payment was helpful during the lockdown and in helping people maintain social distancing guidelines. Therefore, there is a need for favourable policies to enable affordability, wide diffusion and use of mobile money. For such development initiatives to work, policy makers should examine the contexts and conditions before rolling out new technologies (Senyo et al., 2020). In addition, policy makers should consider making public services more widely available by using mobile money. In terms of introducing new technologies, policy makers should carefully study the conditions under which potential users are more likely to use the technology. They should also note that within the same country, the motivations and conditions that determine the use of a technology could vary from one category of users to the other and that wider use of that technology would need to take into consideration the needs of users.

6. Conclusion

Drawing on fsQCA and the theoretical lens of UTAUT, this study assesses the combination of conditions that are sufficient pathways to improving financial inclusion through

mobile money. We found four pathways and three categories of users and their individual pathways to financial inclusion. These findings advance empirical and practical understanding of the pathways through which mobile money can improve financial inclusion. To the best of our knowledge, this is the first study that empirically examines pathways to improving financial inclusion through mobile money. Thus, this study has addressed an important knowledge gap in the literature. In addition, this study extends research on mobile money and financial inclusion that have predominantly been aligned to traditional quantitative methods. By using QCA, this study offers an alternative perspective to the literature. Given the complexities in decision making to use or not use technological innovations, this knowledge is critically important to research, practice and policy. The new perspectives from this study should inspire future studies to examine the configuration of conditions to financial inclusion in other countries since context has been identified as important even in the same country.

In spite of the contributions, this study has a few limitations. First, the study utilised only the QCA methodology. Though the use of QCA brings new inspiration to mobile money research, it would be interesting for future studies to qualitatively examine this phenomenon. Second, the study is limited to constructs of the UTAUT, thus, future research can explore the configuration of other conditions that are not captured in this study. Lastly, the study was conducted in Ghana—a developing country. Given that there are differences in the development and idiosyncrasies between countries, a cross-country investigation between developed and developing countries could reveal further nuances as well as engender a broader understanding of how mobile money can improve financial inclusion.

References

Ajzen, I. (2002), "Residual effects of past on later behavior: Habituation and reasoned action perspectives", *Personality and Social Psychology Review*, Vol. 6 No. 2, pp. 102–107.

Ali, M., Seny Kan, K.A. and Sarstedt, M. (2016), "Direct and configurational paths of absorptive capacity and organizational innovation to successful organizational performance", *Journal of Business Research*, Elsevier Inc., Vol. 69 No. 11, pp. 5317–5323.

Chaparro-Peláez, J., Agudo-Peregrina, Á.F. and Pascual-Miguel, F.J. (2016), "Conjoint analysis of drivers and inhibitors of e-commerce adoption", *Journal of Business Research*, Elsevier Inc., Vol. 69 No. 4, pp. 1277–1282.

Chauhan, S. (2015), "Acceptance of mobile money by poor citizens of India: Integrating trust

into the technology acceptance model", *Info*, Vol. 17 No. 3, pp. 58–68.

Chopdar, P.K., Korfiatis, N., Sivakumar, V.J. and Lytras, M.D. (2018), "Mobile shopping apps adoption and perceived risks: A cross-country perspective utilizing the Unified Theory of Acceptance and Use of Technology", *Computers in Human Behavior*, Vol. 86, pp. 109–128.

Cobla, G.M. and Osei-Assibey, E. (2018), "Mobile money adoption and spending behaviour: The case of students in Ghana", *International Journal of Social Economics*, Vol. 45 No. 1, pp. 29–42.

David-West, O., Iheanachor, N. and Kelikume, I. (2018), "A resource-based view of digital financial services (DFS): An exploratory study of Nigerian providers", *Journal of Business Research*, Elsevier, Vol. 88 No. February, pp. 513–526.

Demirgüç-Kunt, A., Klapper, L., Singer, D., Ansar, S. and Hess, J. (2018), *The Global Findex Database 2017: Measuring Financial Inclusion and the Fintech Revolution*, World Bank, available at:https://doi.org/10.1596/978-1-4648-1259-0.

Duarte, P. and Pinho, J.C. (2019), "A mixed methods UTAUT2-based approach to assess mobile health adoption", *Journal of Business Research*, Elsevier, Vol. 102, pp. 140–150.

Fiss, P.C. (2007), "A Set-Theoretical Approach to Organizational Configurations", *Academy of Management Review*, Vol. 32 No. 4, pp. 1180–1198.

Fiss, P.C. (2011), "Building better causal theories: A fuzzy set approach to typologies in organization research", *Academy of Management Journal*, Vol. 54 No. 2, pp. 393–420.

Fiss, P.C., Marx, A. and Cambre, B. (2013), *Configurational Theory and Methods in Organizational Research: Introduction*, *Research in the Sociology of Organizations*, Vol. 38, Emerald Group Publishing Limited, available at:https://doi.org/10.1108/S0733-558X(2013)0000038005.

Greckhamer, T., Furnari, S., Fiss, P.C. and Aguilera, R. V. (2018), "Studying configurations with qualitative comparative analysis: Best practices in strategy and organization research", *Strategic Organization*, Vol. 16 No. 4, pp. 482–495.

Kim, S.C., Yoon, D. and Han, E.K. (2016), "Antecedents of mobile app usage among smartphone users", *Journal of Marketing Communications*, Routledge, Vol. 22 No. 6, pp. 653–670.

Lashitew, A.A., van Tulder, R. and Liasse, Y. (2019), "Mobile phones for financial inclusion: What explains the diffusion of mobile money innovations?", *Research Policy*, Elsevier, Vol. 48 No. 5, pp. 1201–1215.

Lepoutre, J. and Oguntoye, A. (2018), "The (non-)emergence of mobile money systems in Sub-Saharan Africa: A comparative multilevel perspective of Kenya and Nigeria", *Technological Forecasting and Social Change*, Elsevier, Vol. 131, pp. 262–275.

Macedo, I.M. (2017), "Predicting the acceptance and use of information and communication technology by older adults: An empirical examination of the revised UTAUT2", *Computers in Human Behavior*, Vol. 75, pp. 935–948.

Magsamen-Conrad, K., Upadhyaya, S., Joa, C.Y. and Dowd, J. (2015), "Bridging the divide: Using UTAUT to predict multigenerational tablet adoption practices", *Computers in Human Behavior*, Elsevier Ltd, Vol. 50, pp. 186–196.

Maity, M., Bagchi, K., Shah, A. and Misra, A. (2019), "Explaining normative behavior in information technology use", *Information Technology and People*, Vol. 32 No. 1, pp. 94–117.

Malinga, R.B. and Maiga, G. (2020), "A model for mobile money services adoption by traders in Uganda", *Electronic Journal of Information Systems in Developing Countries*, Vol. 86 No. 2, pp. 1–14.

Mansoori, K.A. Al, Sarabdeen, J. and Tchantchane, A.L. (2018), "Investigating Emirati citizens' adoption of e-government services in Abu Dhabi using modified UTAUT model", *Information Technology and People*, Vol. 31 No. 2, pp. 455–481.

Mattern, M. (2018), "How Ghana Became One of Africa's Top Mobile Money Markets", *CGAP*, available at: http://www.cgap.org/blog/how-ghana-became-one-africas-top-mobile-money-markets (accessed 11 November 2019).

Misangyi, V.F. and Acharya, A.G. (2014), "Substitutes or complements? A configurational examination of corporate governance mechanisms", *Academy of Management Journal*, Vol. 57 No. 6, pp. 1681–1705.

Naranjo-Zolotov, M., Oliveira, T. and Casteleyn, S. (2019), "Citizens' intention to use and recommend e-participation: Drawing upon UTAUT and citizen empowerment", *Information Technology and People*, Vol. 32 No. 2, pp. 364–386.

Narteh, B., Mahmoud, M.A. and Amoh, S. (2017), "Customer behavioural intentions towards mobile money services adoption in Ghana", *The Service Industries Journal*, Vol. 37 No. 7–8, pp. 426–447.

Oana, I.E. and Schneider, C.Q. (2018), "SetMethods: An add-on R package for advanced QCA", *R Journal*, Vol. 10 No. 1, pp. 507–533.

Osei-Assibey, E. (2015), "What drives behavioral intention of mobile money adoption? The

case of ancient susu saving operations in Ghana", *International Journal of Social Economics*, Vol. 42 No. 11, pp. 962–979.

Patil, P., Tamilmani, K., Rana, N.P. and Raghavan, V. (2020), "Understanding consumer adoption of mobile payment in India: Extending Meta-UTAUT model with personal innovativeness, anxiety, trust, and grievance redressal", *International Journal of Information Management*, Elsevier, Vol. 54 No. February, p. 102144.

Ragin, C.C. (2008a), "Qualitative Comparative Analysis Using Fuzzy Sets (fsQCA)", *Configurational Comparative Analysis*, pp. 87–121.

Ragin, C.C. (2008b), *Redesigning Social Inquiry*, University of Chicago Press, available at:https://doi.org/10.7208/chicago/9780226702797.001.0001.

Rahman, S.A., Taghizadeh, S.K., Ramayah, T. and Alam, M.M.D. (2017), "Technology acceptance among micro-entrepreneurs in marginalized social strata: The case of social innovation in Bangladesh", *Technological Forecasting and Social Change*, Elsevier Inc., Vol. 118, pp. 236–245.

Schneider, C.Q. and Wagemann, C. (2012), *Set-Theoretic Methods for the Social Sciences: A Guide to Qualitative Comparative Analysis*, Cambridge University Press.

Senyo, P.K., Effah, J. and Addae, E. (2016), "Preliminary insight into cloud computing adoption in a developing country", *Journal of Enterprise Information Management*, Vol. 29 No. 4, pp. 505–524.

Senyo, P.K., Effah, J. and Osabutey, E.L.C. (2020), "Digital Platformisation as Public Sector Transformation Strategy: A Case of Ghana's Paperless Port", *Technological Forecasting & Social Change*.

Senyo, P.K. and Karanasios, S. (2020), "How do Fintech Firms Address Financial Inclusion?", *International Conference on Information Systems*.

Senyo, P.K., Liu, K. and Effah, J. (2019), "Digital business ecosystem: Literature review and a framework for future research", *International Journal of Information Management*, Elsevier, Vol. 47, pp. 52–64.

Senyo, P.K. and Osabutey, E.L.C. (2020), "Unearthing antecedents to financial inclusion through FinTech innovations", *Technovation*, Vol. 98, p. 102155.

Upadhyay, P. and Jahanyan, S. (2016), "Analyzing user perspective on the factors affecting use intention of mobile based transfer payment", *Internet Research*, Vol. 26 No. 1, pp. 38–56.

Venkatesh, V., Morris, M.G., Davis, G.B. and Davis, F.D. (2003), "User Acceptance of

Information Technology: Toward a Unified View", *MIS Quarterly*, Vol. 27 No. 3, pp. 425–478.

Venkatesh, V., Thong, J.Y.L. and Xu, X. (2012), "Consumer Acceptance and Use of Information Technology: Extending the Unified Theory of Acceptance and Use of Technology", *MIS Quarterly*, Vol. 36 No. 1, pp. 157–178.

Veríssimo, J.M.C. (2016), "Enablers and restrictors of mobile banking app use: A fuzzy set qualitative comparative analysis (fsQCA)", *Journal of Business Research*, Vol. 69 No. 11, pp. 5456–5460.

Woodside, A.G. (2013), "Moving beyond multiple regression analysis to algorithms: Calling for adoption of a paradigm shift from symmetric to asymmetric thinking in data analysis and crafting theory", *Journal of Business Research*, Elsevier Inc., Vol. 66 No. 4, pp. 463–472.

Woodside, A.G. (2014), "Embrace•perform•model: Complexity theory, contrarian case analysis, and multiple realities", *Journal of Business Research*, Elsevier Inc., Vol. 67 No. 12, pp. 2495–2503.

World Bank. (2018), "Financial Inclusion on the Rise, But Gaps Remain", *Press Release*, available at: https://www.worldbank.org/en/news/press-release/2018/04/19/financial-inclusion-on-the-rise-but-gaps-remain-global-findex-database-shows.

Ye, J., Zheng, J. and Yi, F. (2020), "A study on users' willingness to accept mobility as a service based on UTAUT model", *Technological Forecasting and Social Change*, Elsevier, Vol. 157 No. October 2019, p. 120066.

Yueh, H.-P., Lu, M.-H. and Lin, W. (2016), "Employees' acceptance of mobile technology in a workplace: An empirical study using SEM and fsQCA", *Journal of Business Research*, Vol. 69 No. 6, pp. 2318–2324.

Zadeh, L.A. (1975), "The concept of a linguistic variable and its application to approximate reasoning-I", *Information Sciences*, Vol. 8 No. 3, pp. 199–249.