**Gordon Institute
of Business Science**
University of Pretoria

Technology adoption, cultural values, and digital financial inclusion

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A research project submitted to the Gordon Institute of Business Science, University of Pretoria, in partial fulfilment of the requirements for the degree of Master of Business Administration.

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Abstract

Improving financial inclusion is a challenge policy makers and businesses face globally. The widespread and growing availability of mobile devices provides a possible technological solution to the issue of financial inclusion measured in this study as the frequency of use of mobile financial services. Since financial inclusion has been shown to vary globally across nations, the role of culture in moderating the adoption of mobile financial services is assessed quantitatively in the context of Zambia. Partial least squares structured equation modelling was applied to the extended unified theory of acceptance and use of technology (UTAUT2) with cultural moderators. An online questionnaire was used to collect data from 239 Zambian adults who use mobile financial services. While the overall model showed significant predictive relevance for behavioural intention and frequency of use of mobile financial services, none of the cultural moderators was found to have a statistically significant impact on the relationship between behavioural intention and frequency of use. Other findings that were supported and can provide a basis for useful intervention by government and business are the significant effects of habit and perceived support for use on frequency of use of mobile financial services.

Keywords

Financial inclusion, Technology adoption, UTAUT2, Cultural dimensions, Mobile financial services

Declaration

I declare that this research project is my own work. It is submitted in partial fulfilment of the requirements for the degree of Master of Business Administration at the Gordon Institute of Business Science, University of Pretoria. It has not been submitted before for any degree or examination in any other University. I further declare that I have obtained the necessary authorisation and consent to carry out this research.

1 November 2021

Contents

List of figures

List of tables

Chapter 1: Introduction to the research problem

1.1 Description of the problem

The main problem this research will address is an improvement of understanding of how the use and adoption of technology is moderated by cultural dimensions as it affects the behaviour intention (BI) and subsequent use behaviour (UB) of digital financial services. Understanding the strength and direction of the relationship between the constructs of technology adoption and the use of digital financial services in a national context with a potentially unique culture will form the basis of this study. The COVID-19 pandemic has added urgency to increasing our understanding of the digital financial inclusion problem. The pandemic restricted business activities and face-to-face financial services due to social distancing measures introduced to slow the spread of the virus causing the disease. Digital transformation has also been accelerated worldwide because of the critical need to continue providing essential services, including telework, online education, telemedicine and e-commerce (United Nations Conference on Trade and Development [UNCTAD], 2021). However, uneven access to digital solutions, particularly in the developing world as a result of the absence of proper infrastructure or adoption of the existing technologies represents a current digital divide that is likely to result in more significant socioeconomic inequalities (Demirgurc-Kunt et al., 2018).

1.2 Challenges of financial inclusion

Financial inclusion, measured by the access to formal financial services, is a subject of keen interest in public policy, within the financial services sector, and in the development community (Allen et al., 2016; Mader, 2018). Close to 40% of the world's population remains without access to formal financial services, and this issue is particularly significant in the developing world (Célerier & Matray, 2019). In Africa, the level of financial exclusion varies across countries and ranges from as high as 50% in some countries (Burkina Faso, Senegal and Tanzania are examples) to as low as 20% (Kenya and South Africa) (Demirguc-Kunt et al., 2018). The advent of digital financial services, especially mobile digital wallets, has and is expected to continue to improve access to formal financial services for the world's financially excluded. Digital platforms, where available, can provide low-cost, readily accessible financial services. If these digital platforms are widely adopted, they can responsibly meet the needs of those financially marginalised while contributing to economic growth (Global Partnership for Financial Inclusion [GPFI], 2014).

The benefits of access to financial services to those in developing and transitioning economies are particularly pronounced in the poverty alleviating effect it can have through the aspirational achievements and access to credit for investment (Li, 2018).

In solving for financial inclusion, the barriers to access, including individual preferences dimensioned through national culture, and technology adoption will be studied in answering the key research hypothesis in the context of Zambia. A broad definition of financial inclusion, including micro-credit, remittances, savings, and insurance products, should be considered, as these can now all be delivered via mobile devices (De Koker & Jentzsch, 2013).

A significant barrier to financial inclusion is the physical proximity to a financial institution (Célerier & Matray, 2019). This was quite an important factor just before the turn of the 21st century and the widespread availability of mobile and Internet technology. Governments and policymakers address exclusion through social banking policies and programs; however, unfortunately, at the cost of profitability of financial institutions and in some cases hurting specific groups which the policy was to help as the increased costs that get passed through disproportionately (Chakravarty & Pal, 2013).

1.3 Technology can make a difference

It would be challenging to provide broad access to digital financial services without adopting technology, which in this case, is mobile telephone technology (Ahmad, Green, & Jiang, 2020). A mobile telephone number is usually more memorable than a bank account number and can be readily shared to facilitate financial transactions. Even the most basic mobile telephone or so-called feature phones can be used for mobile money transactions or to access financial services from financial institutions via unstructured supplementary service data (USSD) (Hanouch, 2015). Alternatively, financial services can be accessed through a mobile application (App) of a financial services institution installed on an Internet-enabled Smartphone.

There is a strong link between the growth in mobile, internet use and financial inclusion over time (Farah, Hasni & Abbas, 2018; Khan, Hameed & Khan, 2017; Picoto & Pinto, 2021). The reasons for the adoption of the technology powering mobile banking as such definitive causality, remain the subject of a few studies (Baptista & Oliveira, 2016; Lenka & Barik, 2018). The COVID-19 pandemic could have served as an exogenous shock directing causality of adoption of mobile financial services above a baseline yet may not

address intrinsic motivators or drivers of use and adoption into the future and in all contexts.

1.4 National culture plays a role

Culture can be defined as "the collective programming of the mind that distinguishes the members of one group or category of people from others" (Hofstede, Hofstede & Minkov, 2010, p. 6). Culture is always a collective phenomenon and can be used to characterise groups and explain to some extent how individuals can be expected to behave in this group. Understanding the cultural contributions of a specific group to behaviour, as it relates to adoption and use of technology for a particular purpose, is relevant.

National cultural dimensions (Hofstede et al., 2010) have been applied in a variety of fields to explain the differences in behaviour, use and adoption of various technology tools, including financial services technology (Zhang et al., 2018). The findings from these studies have demonstrated significant direct and moderating relationships in several contexts and national cultures (Picoto & Pinto, 2021). However, generalisability in almost all cases is limited due to the sampling methodology (size or sampling frame). Thus, a rationale exists to study the moderating influence of national culture in more country settings with larger sample sizes to improve the overall understanding of the interactions and improve the predictive value of the model being advanced (Zhang et al., 2018).

1.5 Implications for academics and business

Quick and relatively uncomplicated access to financial services, particularly in the developing world, would rely heavily on the adoption of technology by the financially excluded (Allen et al., 2018). This is what makes understanding the role of national cultural dimensions on behavioural intention to use mobile banking technology and ultimately access to formal financial services critical. The disparity in the mobile penetration rates and mobile banking adoption rates in specific countries could indicate that wider adoption of technology could be moderated by national cultural dimensions (Demirguc-Kunt et al., 2018; Hofstede et al., 2010; Lenka & Barik, 2018). While some work has already been done on assessing the moderating role of national cultural dimensions on the adoption and use of technology in financial services, much of the research may have limited broader generalisability due to the following reasons: (1) sampling size and methodology used in the context's samples (Zhang et al., 2018), (2) limited set of antecedents on the relation between the intent to use mobile financial service and the actual usage (Picoto & Pinto,

2021), and (3) access to financial services through internet-enabled devices mainly have been considered without including mobile money services (Baptista & Oliveira, 2015).

The academic implications of further research into technology adoption in a new national cultural context and with a broader set of mobile financial services (mobile money) can aid the advancement of understanding the problem of improving financial inclusion through the use of digital financial tools. A deeper understanding of the phenomenon in more contexts can provide the basis for a robust policy and business response in addressing the financial inclusion challenge.

Specifically, for business, digital financial inclusion and e-commerce growth facilitated by technology adoption, would only continue to grow in relevance. COVID-19 has served as an accelerant for this trend, with estimates of usage previously thought to be in the distant future being pulled into the present and the near future (UNCTAD, 2021). The outcome of this study could be of relevance to traditional financial services institutions expanding their digital offering in response to falling profitability caused by high-cost physical service models, new financial technology companies (Fintechs) and e-commerce platforms (Lee, Trimi & Kim, 2013). From a policy perspective, there is a need to address broad economic growth facilitated by access to financial services: notably, for the most vulnerable and underserved populations, with a particular significance for women (Porter, Widjaja & Nowacka, 2015), where a persistent gender gap is present in accessing formal financial services particularly in the developing world (Aterido, Beck & Iacovone, 2013).

1.6 The purpose of this research

This study will examine how national cultural values moderate the relationships between determinants of use and acceptance of mobile technology and affect the intention and use behaviour of digital financial services in a developing country, Zambia. The research will employ an integrated technology use and acceptance model, using data from the Zambia country context to extend existing work in this area (Venkatesh, Thong & Xu, 2012; 2016).

This study will apply the extended unified theory of acceptance and use of technology (UTAUT2) (Venkatesh et al., 2012; 2016) and Hofstede's cultural dimensions (Hofstede et al., 2010) to further understand how individuals interact with financial services technology using data from Zambia (Baptista & Oliveira, 2015; Im, Hong & Kang, 2011; Picoto & Pinto, 2021; Zhang et al., 2018). The contribution this study is expected to make is in two main forms.

First, it would provide insights into the applicability of the UTAUT2 constructs in predicting the adoption of a broad range of mobile financial services in this new context. Research considering adoption of mobile financial services, including both internet and non-internet enabled devices (feature phones) among both formally banked and unbanked clients to the best of knowledge available at this moment, is limited (Picoto & Pinto, 2021; Zhang et al., 2018).

Second, it will explore the influence of national cultural dimensions on individuals' behaviour with technology adoption by either confirming previous studies or showing new previously uncovered relationships. A series of hypotheses will be tested to measure the effectiveness of this integrated model in explaining some of the proposed antecedents to digital financial inclusion. The outcomes of this study could be beneficial to businesses, policymakers and stimulate further research into factors that can extend digital financial inclusion in a developing market.

1.7 Conclusion

Improving financial inclusion is a challenge that governments, international development organisations and businesses are concerned about as it has multiple implications for inclusive economic growth. Digital financial services and access to it can play an essential part in addressing the digital divide affecting digital access across countries. To address this problem, this study focuses on the role of national cultural dimensions in moderating the adoption and use of technology as an antecedent for improving financial inclusion through the behaviour intention and ultimate use of digital financial services using data from Zambia. The study will combine an integrated model of technology acceptance with national cultural dimensions with a view to determine the moderating role culture could play in mobile technology use for financial services and ultimately inclusion.

The outcome of this research would be crucial for policymakers and a broad range of businesses from financial services to e-commerce companies relying on digital financial services as it could uncover different configurations, which could lead to higher adoption of mobile financial technology. Finally, the COVID-19 pandemic has played an accelerating role in driving more financial transactions online, with implications for countries and regions with higher mobile penetration. Globally, around two-thirds of unbanked adults have a mobile phone; the percentage in Africa varies across countries from around 25% in Zambia to around 50% in Botswana (Demirguc-Kunt et al., 2018). Mobile phone ownership thus presents a large opportunity to expand financial inclusion.

The implications of this study will be even more important with the COVID-19 backdrop encouraging non-physical interaction and social distancing.

Chapter 2: Theory and literature review

2.1 Introduction

This study spans three main domains: (1) digital financial inclusion, (2) technology adoption and use, and (3) cultural dimensions. As described in the introduction to the research problem, the study combines an integrated model of technology acceptance with national cultural dimensions with a view to determine the moderating role culture could play in mobile technology use for financial services, and ultimately, financial inclusion in a developing market context. The review of the applicable theory that follows will as such span these three areas covering what is known and what is evolving in each domain covered.

In the first section, financial inclusion will be covered in some detail with broad coverage of what it means, why it is important in sustainable development, and how it is being measured for the purpose of improvement. Digital financial inclusion, an area within the broad topic will also be discussed along with the implications it now has for increasing access to financial services. In the second section, technology acceptance models over time will be covered. The theory, as it has evolved in information systems study, will be covered along with the current application of the underlying constructs and variables within the area. The final section will cover culture and the cultural dimensions relevant to how a specific group of people behave. The elements of culture will be covered to describe ways it influences and interacts with how a society operates.

This literature review will conclude by drawing together the key points covered in each earlier section as it relates to the moderating role culture could play in the adoption and use of mobile financial services technology, leading to greater financial inclusion.

2.2 Financial Inclusion

The term financial inclusion has been defined in many ways, with the following being quite common: (1) as the access to and use of formal financial services (Allen et al., 2016), (2) as ensuring access to formal financial services at an affordable cost in a fair and transparent manner (De Koker & Jentzsch, 2013), (3) the opposite of financial exclusion by ensuring underserved groups such as low income, rural or undocumented individuals have access to regulated financial services (Wang & Guan, 2017), and (4) as an index constituted by measuring the consumer components of financial inclusion as the earlier definitions tend to be supply-side heavy. Consumer components in this index include an

awareness of different options of financial services available, the ability to choose among competing offerings and the availability of family or close contacts for financial support - either credit or savings (Morgan & Long, 2020).

2.2.1 Financial inclusion in sustainable development

In development research circles, financial inclusion has been presented as beneficial for individuals. It is associated with the ability to build wealth through savings primarily held in a bank account, access to investments and better access to debt (Célerier & Matray, 2019). Small businesses are also included in the literature on financial inclusion benefits, especially as they tend to be owned by sole proprietors – entrepreneurs who transfer many of their personal attributes and access to the business they own (Allen et al., 2016).

The drive for improving financial inclusion as an effective panacea for socioeconomic development, particularly in developing countries, is evidenced in access to financial services featuring in seven of the 17 Sustainable Development Goals (SDGs) set by the United Nations (Mader, 2018; GPFI, 2020). The importance of financial inclusion is further evidenced in the commitment of multilateral initiatives like the Global Partnership for Financial Inclusion (GPFI) created by the G20 and affiliated partners to advance financial inclusion globally through a Financial Inclusion Action Plan (FIAP) (GPFI, 2020). Financial inclusion is thus recognised in the development sector as an important avenue to ensure financial resilience for individuals and small businesses in promoting inclusive and sustainable growth.

According to the GPFI (2020), as it relates to sustainable development, greater inclusion is recognised as an enabler to eliminating extreme poverty (SDG 1) by providing economically marginalised people with access to savings and wealth-building solutions. In reducing hunger and promoting food security (SDG 2), farmers' access to credit and insurance can lead to more considerable investment in planting seasons as this can help improve overall production volumes. For achieving good health and well-being (SDG 3), access to financial services like health and medical coverage insurance can help mitigate the financial risk to wealth posed by unexpected medical expenses. Promoting gender equality (SDG 5) through financial inclusion is important, as a persistent gender gap already exists with women accounting for a higher percentage of the excluded across the world (Aterido et al., 2013; Swamy, 2014). Access to financial services can help women take control of their economic future. In promoting sustained, inclusive and economic

growth, full and productive employment and decent work (SDG 8), people and SMEs need access to financial services for savings, credit, payment and insurance to have a chance to make the most of their resources. Access to financial services like credit and investments, in particular, will allow more businesses to potentially start or the expansion of existing businesses, leading to inclusive and sustainable industrialisation and innovation (SGD 9). To reduce income inequality within and among countries (SDG10), access to financial services in a fair and transparent manner can lead to lower remittance costs across borders, cheaper credit, and better savings. All these can be channelled into education and investments, which ultimately can reduce inequality (Li, 2018).

The challenge of financial inclusion is not just limited to developing countries. Regardless of the country's level of development, income levels, appear to be a crucial factor in determining inclusion. In this way, low-income households in the United States may record the same levels of financial exclusion as many countries in the developing world (Celerier & Matray, 2019).

In making a case for the individual and socioeconomic benefits of financial inclusion, it is also important to consider some of the arguments put forward to promote the agenda that may need to have their premise validated extensively. The touted development and business outcomes may show more correlation than outright provable causation. A business case for driving financial inclusion, if compelling enough, should be self-sustaining and not demand the level of governmental and development support it garners today as a cure-all panacea (Mader, 2018). The findings for other financial services like insurance is more mixed as uptake is not as significant except in some limited studies, specifically in agricultural settings where farmers are able to cover insurable risks (Karlan et al., 2016)

2.2.2   Measurement of financial inclusion

Any study of financial inclusion must consider that there are various formal financial services available to individuals in the measurement of financial inclusion. Not all, perhaps, would have the same impact on the socioeconomic indicators. In fact, some may be associated with predatory and exploitative activities, especially towards the economically vulnerable in the form of high-interest-rate loans (Mader, 2018). Credit

access, as an example, while beneficial, can be exploited through predatory lending rates compared to access to deposits and payments which may be more benign and positively associated with higher savings and wealth accumulation (Allen et al., 2016). The next important factor to consider in measuring financial inclusion is the usage of the selected service. It is this measure that this study will focus on in some level of detail. Value to all parties involved in a financial service transaction is associated with usage of the financial service and not just access only, so any study of financial inclusion must consider the usage incidence and frequency of the service, also (Demirgurc-Kunt et al., 2018; Rinehart & Saunders, 2018). In measuring financial inclusion, three indicators are thus considered together to determine access and use: 1) ownership of a bank account or an activated mobile wallet – a relevant measure in Africa, 2) use of the account to save or store value, and 3) frequent use of the account, which is defined as three or more transactions per month (Allen et al., 2016; Demirgurc-Kunt et al., 2018).

2.2.3   Digital financial inclusion

Where financial inclusion is defined as the access to and use of formal financial services, digital financial inclusion measures the use of digital financial services; this includes payments, remittances, transfers, savings, credit and insurance through digital devices. The most important in the current context being the mobile phone (GPFI, 2020). Digital financial services offer basic savings products, eliminate account-opening costs, reduce friction in access, and make it possible to introduce commitment features to overcome behavioural biases while significantly increasing the use of formal financial services (Karlan et al., 2016).

Some of the benefits of digital financial inclusion are seen through the effectiveness of financial tools such as personal savings, insurance, credit or cash transfers from friends, or government helping overcome potentially crippling setbacks. Removing account opening costs increased account uptake, usage, savings and overall investment levels for disadvantaged households (Brune et al., 2016). This occurrence is associated with overall savings and investment levels improving among market vendors, women, and low-income households representing groups usually associated with the vulnerability financial inclusion programs try to address (Karlan et al., 2016). Access to short-term credit to smooth consumption in lean seasons has also been seen to lead to an increase in farm output for farmers and the ability to maintain jobs for those at risk of falling out of the labour market due to shocks (Fink, Jack & Masiye, 2014).

Digital payment systems, where developed, have a beneficial effect on wellbeing through enabling an ecosystem for commercial activity and risk-sharing by helping households manage short-term financial shocks using digital financial services (Jack & Suri, 2016). Social cash transfers by governments also show improvements in efficiency, reduced costs and better targeting when beneficiaries are digitally financially included (Aker et al., 2016). Corruption is also seen to be reduced overall when beneficiaries receive transfers through digital means; or put differently, lower corruption can be associated with higher levels of digital financial inclusion in communities (Berdibayev & Kwon, 2020).

The global availability of mobile telephones is a major driver of digital inclusion, especially in less developed countries (LDC). A mobile phone allows subscribers to access a mobile wallet linked to their mobile number provided by a telecommunications provider for use as a store of money hence the term – mobile money. In Sub-Saharan Africa, the number of adults using a mobile money account has almost doubled between 2014 and 2017. This grew from 12% to 21%, with nearly half of the respondents to the 2017 Global Financial Inclusion (Global Findex) database indicating they operated only a mobile money account, while the other half indicated they operated an account of some form with a traditional financial institution in addition to the mobile money account (Demirgurc-Kunt et al., 2018). In Zambia, where this study was conducted, the number of adults with mobile money accounts has increased four-fold between 2015 and 2020, contributing to almost doubling the number of formal financially-included adults in the country (Bank of Zambia, 2020). This demonstrates that a previously excluded group of individuals is included in financial services for the first time entirely through digital means, increasing the profile of this channel significantly.

In this study, financial inclusion will be assessed mainly from the point of view of the regular use of financial services. This is because most of the beneficial effects from financial inclusion for individuals come from the frequent use of accounts, and not just merely from having an account (Allen et al., 2016). Digital financial inclusion will be measured through the frequent use of financial services via mobile devices either through mobile internet banking applications or mobile money wallets provided by telecommunication providers.

2.3 Technology adoption models

Individual use and acceptance of technology is a well-researched area of information systems with several theories and models synthesized and unified over the years (Baptista

11

& Oliveira, 2016; Malaquias & Hwang, 2019; Oliveira et al.,2016; Venkatesh et al., 2016). The technology acceptance model (TAM) is one of the earliest in this group of information system theories and it primarily models how users make decisions on adopting new technology. TAM is an extension of the theory of reasoned action (TRA), which is an earlier theory seeking to explain how consumers make purchase decisions (Folkinshteyn & Lennon, 2016). The main position put forward by the TAM is that users adopt technology based on two major considerations – the technology's perceived usefulness and its perceived ease of use which in turn could be influenced by other external variables (Folkinshteyn & Lennon, 2016). *Perceived usefulness* and *perceived ease of use* were both assessed as being directly related to an individual's attitude towards using a specific technology and their behavioural intention to use the technology (Davis, 1989).
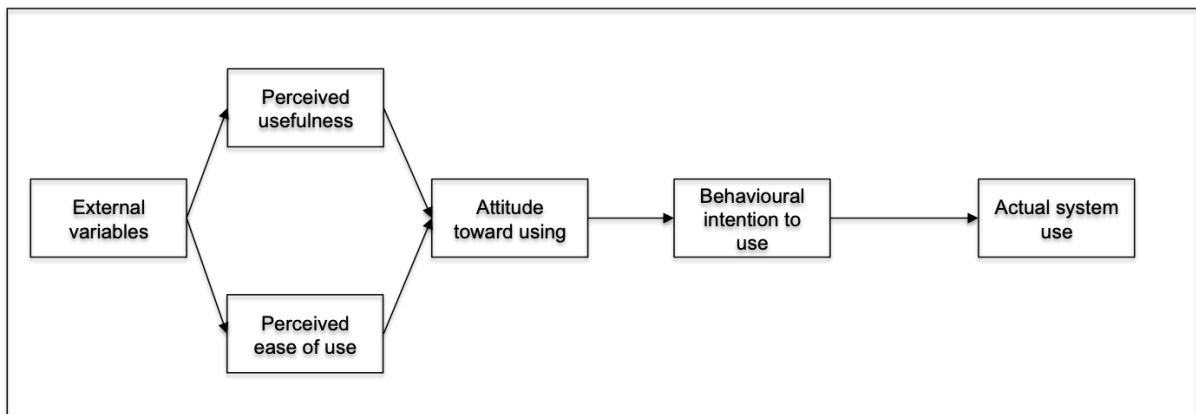
Figure 1. Original technology acceptance model (TAM) by Davis (1989)

Source: Adapted by author from Folkinshteyn and Lennon (2016)

Technology acceptance models are applicable to understanding the use and adoption of digital financial services as an innovation, especially in the context of driving financial inclusion in societies where the mobile phone would perhaps qualify as the most sophisticated technology handled in recent times by individuals (Baptista & Oliveira, 2015). On the road to arriving at a technology acceptance model, which linked an individual's actual use of a new technology with the tasks one wanted to accomplish, several models evolved into what is now considered in this study. There are four broad groups of competing models or theoretical frameworks proposed and tested in past studies on digital financial adoption (Hoehle, Scornavacca & Huff, 2012).

The first belongs to the diffusion of innovation (DoI) theories, which focused on the social system through which a particular innovation was transmitted and the degree of willingness of a member of the social system to adopt the innovation. The second and third groups of theories are closely linked. The theory of reason action (TRA) and theory of planned behaviour (TPB) focused on the behaviour of the individual as influenced by opinions of people considered important to the individual an important cultural dimension. The fourth and final theory, the technology acceptance model (TAM); this is perhaps also the most influential as it incorporates two practical aspects of why users adopt new technologies based on the perceived ease of use and usefulness, both of which are usually studied as direct predictors to behaviour intention and then actual use (Hoehle et al.,2012).

The DoI theory has been used extensively alone or in combination with TAM in studies explaining the adoption of smartphones in the medical and logistics industries and in conceptual frameworks proposed in studying the adoption of mobile banking technology moderated by age (Choudrie et al., 2018). The main factors determining the adoption of new technologies identified by DoI include the relative advantage, compatibility, trialability, observability and complexity (Hoehle et al., 2012). Each one of these factors can contribute to understanding how individuals decide to adopt mobile financial technology and as such DoI has been used extensively in research to explain adoption of mobile and online banking. However, on its own, the DoI theory has a few gaps with respect to environmental factors like risk, trust and security, which for example, are shown to influence the decision to adopt and use new technology so it is usually combined with other theoretical models in practice (Choudrie et al., 2018).

The TRA and its extension TPB have their origins in social psychology research. In its focus on predicting behavioural intentions, TRA has been used widely in models of adoption and use of technologies (Hoehle et al., 2012). TBP, as an extension, includes an element of behavioural control. Behavioural intention, as is posited in the extension, can only find an expression if the behaviour in question is under volitional control (Madden, Ellen & Ajzen, 1992). These theories - alone, together, or with other theoretical constructs have been used in predicting adoption in use and adoption studies (Paul, Modi & Patel, 2016).
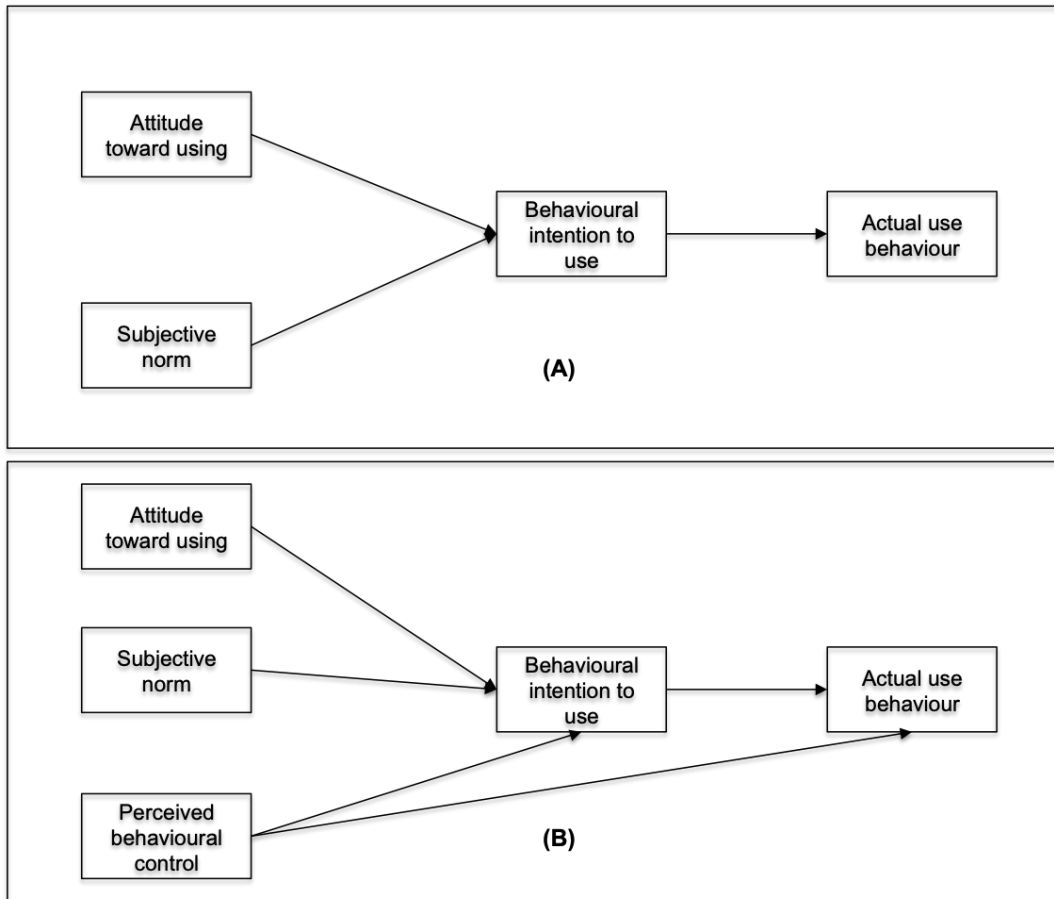
Figure 2: Path models for the theories of reasoned action (A) and planned behaviour (B).

Source: Adapted by author from Madden et al. (1992)

A common thread through the four theories relevant to this study is their amenability to cultural influences as an external variable. A further review and synthesis of the four broad groups indicated above and their subsequent extensions led to the development of the unified theory of acceptance and use of technology (UTAUT) and its subsequent extension (UTAUT2) by Venkatesh et al. (2012). UTAUT identifies four key elements and four moderators that can predict behavioural intention leading to actual use of a new technology. The key elements are performance expectancy (PE), effort expectancy (EE), social influence (SI) and facilitating conditions (FC), while the moderators are age, gender, experience and voluntariness (Venkatesh et al., 2016). In the extension of UTAUT, additional factors like hedonic motivation (HM), price value (PV) and habit (H) were included to improve the applicability of the original model in what is now known as UTAUT2 (Figure 3).
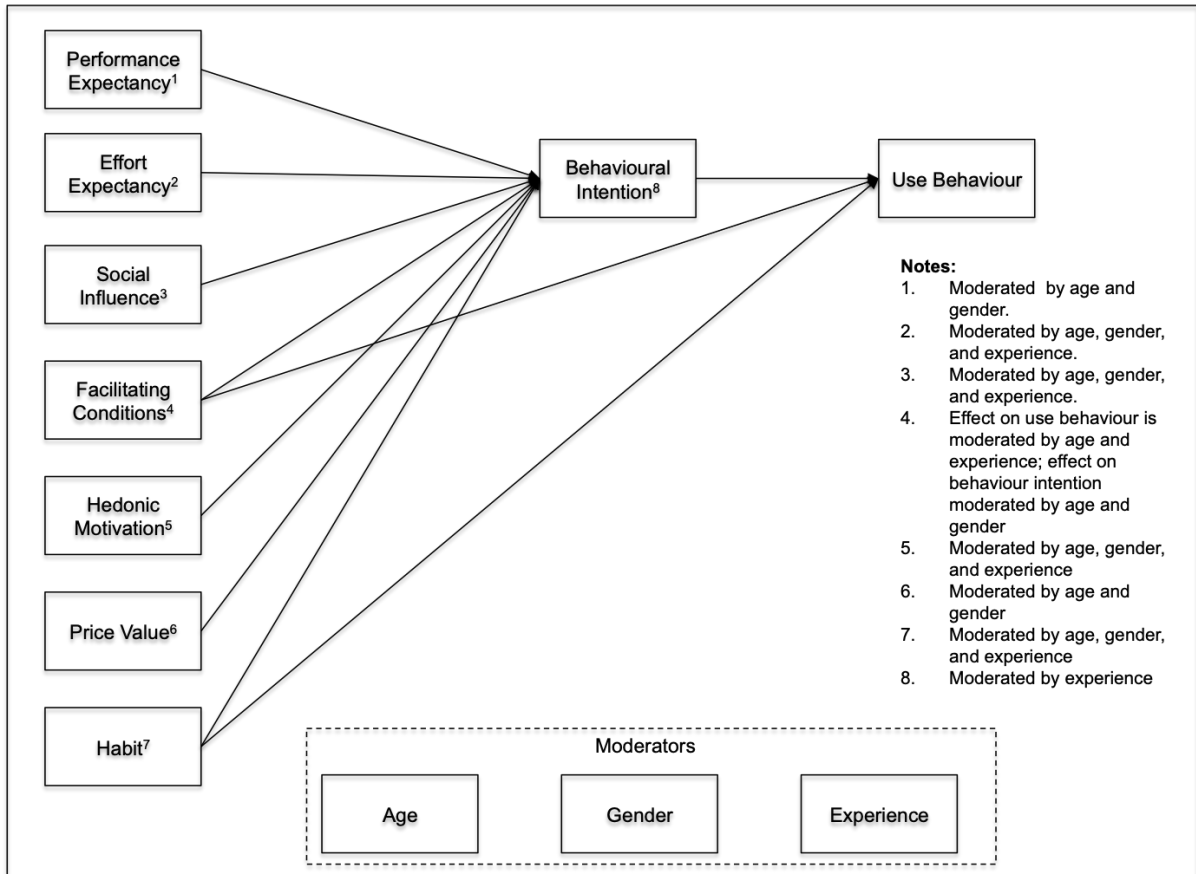
Figure 3: Unified theory of acceptance and utilisation of technology model extension (UTAUT2)

Source: Venkatesh et al. (2012)

The definition of the constructs that make up UTAUT2, according to Venkatesh et al. (2012), is important in developing a full understanding of the application of the model to this study. *Performance expectancy* is defined as the degree to which using a technology will provide benefits to the user in performing certain activities and it is synonymous with the perceived usefulness construct in TAM. *Effort expectancy* is the degree of ease users associate with the use of a specific technology, and it is synonymous with the perceived ease of use construct in TAM. *Social influence* is associated with the extent to which the user of a (particular) technology considers the opinion of important people in their lives in relation to using that technology. This dimension of social influence is synonymous with the subjective norms construct within TRA. *Facilitating conditions* refer to the user's perceptions of the resources and support they have at their disposal to perform a specific behaviour, and it was found to directly determine the actual use of the technology. In a consumer context, facilitating conditions could be considered to be synonymous with

perceived behavioural control in the TBP. *Hedonic motivation* relates to actual enjoyment and pleasure derived from using technology and was found to be complementary to extrinsic motivators of PE and EE as a form of intrinsic motivation. *Price value* is an important addition to the adoption model as it relates to individual affordability of the technology, improving the applicability of this theory to consumer contexts where the monetary cost is solely incident on the consumer. *Habit,* as the final element added in the extended form or UTAUT2, is conceptualised as the degree to which behaviour is performed automatically due to learning.

UTAUT2, in prior studies (Alalwan, Dwivedi & Rana, 2017; Baptista & Oliveira, 2015), explained between 60-70% of the variance in behavioural intent to use new mobile financial technologies. Hence, making it an appropriate model to adapt to the study of use and adoption of mobile financial services in financial inclusion. The UTAUT2 as a model provides a robust technology acceptance framework appropriate for this study in the multiplicity of paths it provides for assessing the driving factors behind an individual's decision to adopt a specific technology, especially where broad-based adoption is still a challenge (Duarte & Pinho, 2019). UTAUT2 as it includes culturally relevant constructs like social influence, facilitating conditions, and hedonic motivation (Venkatesh et al., 2012) could improve the predictive ability of an overall acceptance model in a study like this considering cultural dimensions moderating influences on established directional relationships where a group is considered.

Some of the drawbacks to the technology adoption models include their focus on some but not all the factors that influence adoption of specific technologies. For instance, the inclusion of factors like trust, which were not present in the original model, improved the predictive value of the model in determining mobile or internet banking use by up to 6 percentage points (Alalwan et al.*,* 2017). The inclusion of a factor like perceived risk improved the predictive value of the model by up to 4 percentage points in determining mobile use in another study (Martins, Oliveira & Popovič, 2014). Some researchers have indicated the limitation of UTAUT in its inability to fully capture the range of factors that may be present and directly affecting or moderating the adoption and use of technologies by individuals (Duarte & Pinho, 2019).

2.4 Cultural dimensions

Applying cultural dimensions to research in technology use and acceptance has both advocates (Chen & Zahedi, 2016; Sheldon et al., 2017) and those who urge caution

(Gunkel, Schlaegel & Taras, 2016; Srite & Karahanna, 2006; Zhang et al., 2018) in applying national cultural attributes at the individual level including Hofstede (1980) whose seminal work on national cultural dimensions provide the core theoretical standing for the key constructs that form part of the research model. Recent research findings indicate that cultural moderators provide analytically superior explanations for the adoption of mobile technology. These also validate previous research findings both in terms of strength and direction of model relationships within UTAUT2 (Baptista & Oliveira, 2015; Picoto & Pinto, 2021; Zhang et al., 2018;). It also uncovered counterintuitive findings that further validate how national culture characteristics are not always aligned with the individual sample characteristics.

Culture has been defined in several ways in literature, with two predominant approaches to the study of culture being cited the most in all cultural research articles (Beugelsdijk & Welzel, 2018). The main streams of work on academic research on culture follow either a stable orientation view across different nations (Hofstede's cultural dimensions), a dynamic intergenerational change theory viewing culture as evolving (Inglehart, 1990), and a values-based approach to understanding (Schwartz, 1999). Accordingly, the main definitions are (1) as the common experiences a people share and have learned to successfully apply in solving internal and external problems (Schein, 2010); (2) the mental software people are programmed with that produces or directs behaviour (Hofstede et al., 2010); (3) as "a system of attitudes, values and knowledge that is widely shared within a society and transmitted from generation to generation (Inglehart, 1990, p.18); (4) " the collective programming of the mind that distinguishes the members of one group or category of people from others" (Hofstede et al., 2010, p.6); and (5) implicitly or explicitly shared ideas about what is good, acceptable and desirable in a society (Schwartz, 1999). A critical aspect of culture is how it is usually collective and descriptive of society at a point in time. Culture is programmed, and while it cannot describe how every individual in a group or a society will behave, it does provide some replicable findings at group level. Cultural dimensions further group aspects of culture that can be measured for a specific group relative to other groups with a score that has been determined empirically (Hofstede et al., 2010). Prior studies have nonetheless found cultural dimensions useful in moderating relationships in use and adoption of technology, making its inclusion potentially beneficial in studies such as these for both practical and business applications (Baptista & Oliveira, 2015; Picoto & Pinto, 2021; Zhang et al., 2018).

2.4.1 Dynamic theory of cultural change

Inglehart's (1990) contribution to the understanding of culture comes in the study and description of culture enduring in a group particularly the adult population, and is resistant to change as it is closely held and melded to an individual's identities. The key element of the dynamic theory relates to how intergenerational change is the vehicle through which parts of culture may be changed (Inglehart, 1990). The main contribution of this line of theory is related to the culture being the lens through which people "process experience into action through general cognitive, affective, and evaluative predispositions" (Inglehart, 1990, p19). In addition, cultural dispositions are learned at an early age in socialisation and subsequently difficult to change in a particular age cohort. However, younger cohorts appear more amenable to change and usually champion this change as they may lack the early socialisation, often resisting the drive for cultural change. Evidence for this intergenerational change is found in how societies transition more readily from collectivist societies to individualistic societies over time. This usually happens from one generational cohort to another, leading to statements like "it was not like this in my time" in nostalgic reflections of older members of the society (Beugelsdijk & Welzel, 2018; Welzel, 2014).

The relevance of the dynamic theory of cultural change will apply in research on technology adoption because technological advancement is considered to be an important driver of cultural change in this theory (Beugelsdijk & Welzel, 2018). Technological change is a driver of modernisation, and along with modernisation, leads to a potential change in values as wealth and freedom increase and improve (Welzel, 2014). The age and generation cohort approach to understanding cultural value changes will also clarify the degrees to which various cultural dimensions eventually moderate the relationships in constructs on adoption of technology. Younger generations generally could be considered to have a more individualistic approach to engagement, and as such, embrace new technologies more readily than older generations with more entrenched attitudes (Choudrie et al., 2018).

2.4.2 Schwartz cultural value dimensions

Schwartz, in the course of his research, identified seven cultural values in studying respondents' answers to questionnaires on how they rated the importance of around 56 single values (Schwartz, 1999; 2006). The main values are, (1) affective autonomy: pursuit of emotionally positive experiences and pleasure; (2) intellectual autonomy: pursuit of

independent thought and intellectual ideas; (3) conservatism: emphasis on maintaining the status quo and not disrupting the traditional order of thing; (4) hierarchy: acceptance of the unequal distribution of power in a group; (5) egalitarianism: commitment to equality of access and opportunity for all members of a group; (6) mastery: emphasis on asserting oneself in order to get ahead; and (7) harmony: emphasis on fitting in and accepting the environment the way it is rather than attempting to change it.

These seven value types are further grouped into three dimensions, based on the response to the issues the value types evolved to manage. So accordingly, the cultural dimensions emerging with each value type sitting at opposite poles are: (1) autonomy versus conservatism; (2) hierarchy versus egalitarianism; and (3) mastery versus harmony. Cultures differ based on the value dimension predominantly expressed and have evolved these values over time based on the types of issues they have had to address to survive (Schwartz, 1999). In relation to studies categorising different countries or societies into how they respond to issues and social phenomena, the cultural dimensions developed by Schwartz shows usefulness, and it aligns with the other vital dimensional studies by Hofstede and Inglehart in how they all arrive at a similar conclusion of the natural cultural inclinations of different nations (Schwartz, 2006)

2.4.3   Hofstede cultural dimensions

Hofstede's work (Hofstede et al., 2010) on cultural dimensions contained five main classifications: (1) power distance (from weak to strong) describes the extent to which less powerful individuals within a group expect and accept that power is distributed unequally; (2) individualism/collectivism – the extent to which individuals in a group are expected to care for themselves and be self-sufficient in comparison to being cared for or being dependent on an in-group, in exchange for unquestioned loyalty; (3) uncertainty avoidance (from high to low) describes the extent to which groups feel threatened by uncertain and ambiguous situations and try to avoid them; (4) masculinity/femininity describes the extent to which group gender roles are clearly distinct - how masculine societies value assertiveness, toughness and are focused on outward appearance of material success, while feminine societies value quality of life, tenderness and modesty. The fifth and final dimension is also the most recent and was not included in the original four dimensions (Hofstede, 1980). It is named long/short term orientation and describes

the fostering of virtues oriented toward long term rewards such as perseverance and thrift versus virtues related to the past and present, for example, fulfilling social obligations and respect for tradition (Hofstede & Bond, 1988).

In the academic literature on the subject, a significant amount of research on national culture and its measurement relies on Hofstede's cultural dimensions (Hofstede, 1980; Hofstede & Bond, 1988; Hofstede et al., 2010), and these will also form the theoretical basis of this research. The five main dimensions of national culture will be presented in more detail with a description of how they have evolved in time and with further empirical assessment of how they influence the behaviour of individuals in relation to adopting new technologies and in determining their choices.

2.4.3.1 Power Distance

Power distance belief (PDB) is the first of the five cultural dimensions studied by Hofstede (Hofstede et al. 2010). Inequality as a phenomenon occurs all over the world. In different societies, the degree or extent of PDB captures how different societies accept that power will be distributed unequally (Hofstede, 1980; Hofstede & Bond, 1988; Hofstede et al., 2010). Power is already distributed unequally by virtue of organisational position, wealth, education, birth, or intelligence, among other status values. PDB relates to how those who hold power accept, value, and apply the power they have and conversely, those who are considered subordinate accept this situation and reinforce it in a form of equilibrium (Daniels & Greguras, 2014). Power distance belief does not focus on the actual power individuals have within a society but instead focuses on the degree to which a society accepts the nature of power distribution as necessary for it to function (Wang et al., 2018). The PDB dynamic present in a society can as such permeate every aspect of how people live and interact with their environment, to whom they listen and how they adopt specific behaviours, as shown in Table 1 (Hofstede, 2011). Generally, people with more power could be considered superior and those with lower power defer judgement to them and are generally more willing to accept autocratic, non-participative decisions being made about them (Daniels & Greguras, 2014). On this basis, high PDB societies may be more inclined to direct behaviours which are considered beneficial for the greater good as defined by those in authority and more likely to be accepted. Government policies and a large role of government are more likely, as such, to be accepted where PDB is high with attendant beneficial outcome in driving policies supporting financial inclusion.

Table 1: Some differences between small and large power distance societies

Small power distance	Large power distance
Older people are neither respected nor feared	Older people are both respected and feared
Hierarchy means inequality of roles established for convenience	Hierarchy means existential inequality
Subordinates expect to be consulted	Subordinates expect to be told what to do
Use of power should be legitimate and is subject to criteria of good and evil	Power is a basic fact of society antedating good or evil; Its legitimacy is irrelevant
Education is student-centred	Education is teacher-centred

Source: Author's adaptation from Hofstede (2011).

2.4.3.2 Individualism-collectivism

The degree of integration of people in society into a group is what is captured on the individualism-collectivism spectrum. Hofstede et al. (2010, p.92) captured it this way, "Individualism on the one side versus its opposite, Collectivism, as a societal, not an individual characteristic, is the degree to which people in a society are integrated into groups. On the individualist side, we find cultures in which the ties between individuals are loose: everyone is expected to look after him/herself and his/her immediate family. On the collectivist side, we find cultures in which people from birth onwards are integrated into strong, cohesive in-groups, often extended families (with uncles, aunts and grandparents) that continue protecting them in exchange for unquestioning loyalty and oppose other in-groups". The main differences seen in societies closer to opposing ends of the spectrum are captured in Table 2. The original studies on which this was based have since come under criticism for relatively weak internal reliability on this particular dimension, with newer studies aimed at correcting some of the perceived flaws of the seminal study by Hofstede (Minkov et al., 2017). Using new data from around 56 countries covering every inhabited continent in the world, Minkov et al. (2017) studied both at the individual and national level more elements of the individualist-collectivist spectrum. They put forward two independent dimensions – conformism and social ascendancy – which provide a more recent, reliable, and better predictive model for individualistic versus collectivist societies. The model they applied, however, does not negate the initial findings from Hofstede but does provide stronger evidence and richer meaning of what this cultural dimension can show about the societies it characterises at either end of the spectrum. This dimension's usefulness to this study is in the observation on how collectivist societies have a higher

preference for group and in-person activities which newer self-service technologies deemphasise (Hofstede et al. 2010). However, it could also be said that in collectivist societies, where the adoption of a particular technology is already high, the group conformity characteristic would promote its adoption over any individual preferences.

Table 2: Some differences between collectivist and individualist societies

Individualism	Collectivism
Task prevail over relationship	Relationship prevails over task
Personal opinion is expected; one person one vote	Opinions and votes are pre-determined by the in-group
Everyone is supposed to take care of themselves and immediate family only	People are born into extended families or clans which protect them in exchange for loyalty
"I" consciousness	"We" consciousness
Speaking one's mind is healthy	Harmony should always be maintained

Source: Author's adaptation from Hofstede (2011).

2.4.3.3 Uncertainty avoidance

According to Hofstede (2011), uncertainty avoidance deals with a society's tolerance for ambiguity or ambiguous situations. It is a measure of how comfortable members of a society feel either comfortable or uncomfortable in situations that are "off script" or unstructured. The range for uncertainty avoidance is from high uncertainty avoidance cultures where people are programmed to generally avoid novel of ambiguous situations by adopting strict standards, rules and regulations to low uncertainty avoidance cultures where members are more willing to accept uncertainty and do not require too many regulations (Gunkel et al., 2016). Some key differences at both ends of the spectrum of uncertainty avoidance are captured in Table 3. Uncertainty avoidance has been found to moderate the relationship between subjective norms and behavioural intentions (Srite & Karahanna, 2006). Culture influences the perceived usefulness, perceived ease of trust, trust, and behavioural intention in technology acceptance model-based studies, with uncertainty avoidance particularly affecting the trust and risk aspects of adoption (Hwang & Lee, 2012). Uncertainty avoidance remains a strong predictor of an individual's intent to purchase or use a specific tool, system or device for the certainty proven systems can provide. Problem-solving using structured and established processes are shown to be preferred in high uncertainty avoiding cultures (Gunkel et al., 2016). Conversely, where uncertainty avoidance is low then issues of trust from using a new technology or

technology overall for financial transactions may be higher, though no conclusive evidence from existing research was found for this position, and this is what this study aims to assess.

Table 3: Some differences between high and low uncertainty avoidance societies

Low uncertainty avoidance	High uncertainty avoidance
The uncertainty inherent in life is accepted and each day is taken as it comes	The uncertainty inherent in life is felt as a continuous threat that must be fought
Comfortable with ambiguity and chaos	Need for clarity and structure
Ease, lower stress, self-control, low anxiety	Higher stress, emotionality, anxiety, neuroticism
Changing jobs, no problem	Staying in jobs, even if disliked
Dislike of rules – written or unwritten	Emotional need for rules – even if not obeyed

Source: Author's adaptation from Hofstede (2011).

2.4.3.4 Masculinity-femininity

Masculinity is contrived to be the opposite of femininity as a national cultural dimension, according to Hofstede. Masculine cultures tend to have achievement-driven, assertive, and competitive values compared to feminine cultures, where values like modesty, care, and concern for quality of life predominate (Hofstede et al. 2010). Men and women in different societies will usually demonstrate the predominant masculine or feminine values. Therefore, women in masculine cultures would be more assertive than women in feminine cultures but generally not as assertive as even the men in feminine cultures. The main differences are highlighted in Table 4.

The Masculinity-femininity dimension has received a lot criticism in literature (Beugelsdijk & Welzel, 2018; Minkov & Kaasa, 2020). Minkov and Kaasa (2020), provided the most recent and perhaps, the most successful critical assessment of this dimension in an attempt to replicate its findings using a similar sample across nearly the same number of countries covered by Hofstede in the original study. The key issues found were on masculinity and femininity being opposites, with goals underlying both constructs when tested empirically being positively correlated. Also, as it is not a good predictor of any of its presumed main correlates at national levels: achievement and competition orientation, help and compassion, preference for a workplace with likeable people, work orientation, religiousness, gender egalitarianism, foreign aid (Minkov, 2018). However, in the study being conducted, masculinity and femininity as a broad construct may still have some

value as national cultural dimensions tested on individuals may have some value within the broad acceptance and use models (Srite & Karahanna, 2006; Zhang et al., 2018). The task-oriented and competitive nature of technological advancements facilitating inclusion may be positively influenced in more masculine societies. Thus, there is some value in maintaining the original cultural dimension in a study like this.

Table 4: Some differences between masculine and feminine societies

Masculinity	Femininity
Work prevails over family	Balance between family and work
Admiration for the strong	Sympathy for the weak
Fathers deal with facts, mothers with feelings	Both fathers and mothers deal with facts and feelings
Few women in elected positions	Many women in elected political positions
Religion focuses on God or gods	Religion focuses on fellow human beings

Source: Author's adaptation from Hofstede (2011).

2.4.3.5 Long/short term orientation

This cultural dimension is the most recently identified of the five main cultural dimensions from Hofstede (Hofstede & Bond, 1988). The long term orientation is associated with perserverance, thrift, ordering relationships by status, and having a sense of shame. On the other pole, short-term orientation is associated with reciprocating social obligations, respect for tradition, and protecting one's reputation (Hofstede, 2011). What was striking about this cultural dimension is how it clearly distinguished East Asian cultures at the long end from most of the rest of the world, with Latin America, the Middle East and Africa, at the short end of pole. Some of the difference between long-term and short-term orientation is shown in Table 5.

This dimension has also come under scrutiny and revision with new data sets available for replication and validation studies. The most important of these studies by Minkov have successfully recast this dimension under a new heading of flexibility versus monumentalism (Minkov, 2018). It reflects national differences in low versus high self-regard and self-confidence, being flexible and adaptable versus staying the same person, and being a helpful person versus reluctance to be helpful (Minkov, 2018). These new poles within this dimension remain a reconceptualisation of the original long term/short term orientation. Long term orientation is analogous with being flexible while, in more

recent research, the short term orientation follows being monumentalist. In relation to studies on technology use and adoption, a flexible cultural orientation would possibly be more aligned to positively influence adoption (Picoto & Pinto, 2021)

Table 5: Some differences between short-term and long-term oriented societies

Short-term orientation	Long-term orientation
Most important events in life occurred in the past or are taking place now	Most important events in life will occur in the future
Personal steadiness and stability: a good person is always the same	A good person adapts to the circumstances
Traditions are sacrosanct	Traditions are adaptable to changed circumstances
Supposed to be proud about one's country	Try to learn from other countries
Service to others is an important goal	Thrift and perseverance are important goals

Source: Author's adaptation from Hofstede (2011).

2.5 National culture dimensions in Zambia

In the original study conducted by Hofstede using data collected from IBM staff who responded to various items in a survey (Hofstede et al., 2010), scores were assigned to different countries and regions of the world based on how they answered groups of questions. These scores were then used to create an index of relative prevalence of specific behaviour with regards to a cultural dimension with a range from 0-100. A country scoring 100 or near 100 will thus represent the archetype for one pole of a cultural dimension, while a country scoring zero or near zero represents the opposite pole. In the case of Zambia, the estimates presented in Table 6 below indicate Zambia is an intermediate to high power distance, collectivist, feminine, short-term oriented society, with no particular preference on uncertainty avoidance (Hofstede insights, n.d.)

Table 6: Zambia relative score on Hofstede cultural dimensions

Culture dimension	Score	Comment
Power distance	60	Intermediate-high score. Hierarchical society
Individualism-collectivism	35	Low score. Collectivist society
Uncertainty avoidance	50	Intermediate score. No predicted preference

Masculinity-femininity	40	Low score. Feminine society
Long-term/short-term	30	Low score. Short term and monumentalist society

Source: Author's adaptation from Hofstede insights (n.d.).

2.6 Technology adoption, cultural values, and digital financial inclusion

The application of technology use and acceptance theories to adoption of digital financial services moderated by other constructs like culture, trust and innovation have been studied with the proliferation of financial technologies in developing markets (Baptista & Oliveira, 2015; Farah et al., 2018; Im et al., 2011; Malaquias & Hwang, 2016). The link between technology use and financial inclusion is also known to be positive and significant (Demirguc-Kunt et al., 2018; Wang & Guan, 2017). What is not well known is how diverse cultural value levels across different country contexts may affect the strength or direction of relationships between the main construct elements of the technology acceptance models that have been studied extensively (Baptista & Oliveira, 2015), and by extension how this can affect financial inclusion in new country contexts. Certain relationships in the technology acceptance models used are also not always validated, and so, extending the contexts of study (Picoto & Pinto, 2021) could provide future research support for the role culture truly plays and provide more support for business managers and policymakers looking to increase digital financial access and inclusion.

A point the researcher is aware of is that even with well-taken samples, inferences about national culture require caution. National populations differ in their demographic composition (e.g. distributions of age, education, occupation), and these different distributions affect average value priorities (Schwartz, 1999). Countries, especially those with many ethnic groupings, are rarely homogeneous societies with a unified culture. Inferences about a national culture may depend on which subgroups are studied (Schwartz, 2006). While it can be argued that culture, by very definition, is a group phenomenon and not readily reducible to an individual level of analysis, culture can really only be manifested by an individual for measurement purposes and then aggregated to the collective (Hwang & Lee, 2012).

2.7 Conclusion

Traditional definitions of financial inclusion usually focus on the supply side perspective looking at the availability and proximity of bank branches, Automated Teller Machines (ATMs), cost of access, access to credit for individuals or small businesses with less

emphasis on the consumers perspective with regards to active consumption measured by either variety of holdings or frequency of use (Morgan & Long, 2020). The benefits of financial inclusion are viewed better from the consumers' perspective, where more frequent use, as an example, provides the utility associated with the social and economic benefits highlighted in existing research (Karlan et al., 2016). Broader definitions of financial inclusion must include the elements of not just accessibility but of cost of transactions, variety of services accessed, and frequency of use (Wang & Guan, 2017).

Research into the drivers of financial inclusion continues to increase in importance, especially with the association improved access to financial service is proposed to have with socio-economic development and economic growth, particularly in less developed countries. The global availability of mobile telephones is a major driver of digital inclusion, especially in less developed countries (LDC) (Demirguc-Kunt et al., 2018). Digital financial inclusion brings with it several benefits, which cannot be ignored (Brune et al., 2016; Fink et al., 2014; Jack & Suri, 2014). Financial inclusion is now considered so important that access to financial services features in seven of the 17 Sustainable Development Goals (SDGs) set by the United Nations. The power of financial technology to expand the access to and use of accounts globally has been demonstrated persuasively across many regions, but perhaps most importantly in part of sub-Saharan Africa and South Asia, where the use of mobile money accounts is the greatest contributor to improved financial inclusion (Demirguc-Kunt et al., 2018).

For financial inclusion success in one region to be transferred to or be better understood in another context, there is a compelling reason to empirically examine drivers of technology adoption and use as antecedents to behaviour intentions and usage. Since cultural contexts of technology application vary with research showing culture plays a critical role in how different groups interact with new technologies, the role of cultural dimensions in moderating the relationship between financial technology adoption and use forms the basis for the key research hypotheses to be tested (Alalwan et al., 2017; Baptista & Oliveira, 2015; Martins et al., 2014; Oliveira et al., 2016; Picoto & Pinto, 2021). The main contribution this study aims to deliver will be a replication, validation and potential extension of the available body of knowledge on how cultural dimensions moderate the adoption and use of technology leading to the intention to use and actual use of digital financial services in the context of Zambia.

Chapter 3: Research hypothesis

3.1 Introduction

Digital financial inclusion should not be viewed in terms of being merely the opposite of exclusion from cited studies across many different contexts and nations (Karlan et al., 2016). This makes the cultural dimensions valuable in understanding how people interact with the technology underpinning digital financial services delivery depending on how they are programmed as a group and share experiences. In this section, the proposed external variables from cultural dimensions are hypothesised to moderate the traditional UTAUT2 constructs in the context of Zambia. It is proposed that each of the five cultural dimensions classifications identified by Hofstede's work influence the variables of behavioural intention (BI) and use behaviour (UB) of mobile financial services. These two model variables from the UTAUT2 are considered significant antecedents to digital financial inclusion. Research hypotheses are thus developed on the influence the five cultural dimensions would have on the relation between BI and UB in the context of Zambian mobile financial service users. In addition to the moderating effects of cultural dimensions, three other relationship paths from the UTAUT2 model, which have been shown to have direct predictive value on UB, are also hypothesised to be relevant in the context of Zambia and are also assessed in this study. Hence, the direct effects of facilitating conditions (FC), habit (H) and BI on UB are also assessed for replication. The relationships are illustrated in Figure 4.

3.2 Behavioural intention

At the core of the UTAUT2 and the preceding technology adoption theories, on which it is based, is the relationship between intention to use a technology and the subsequent use of the technology (Venkatesh, Morris, Davis et al.,2003; Venkatesh et al., 2012). The direct effect of behavioural intention on actual use behaviour is the path on which cultural dimension moderation will be tested in this study (Baptista & Oliveira, 2015). Hence, it is hypothesized that this relationship will be present in the context of Zambia.

H1: The effect of behavioural intention (BI) on use behaviour (UB) will be positive and significant.

3.3 Habit

Habit as a construct was introduced in UTAUT2 and is unique as a predictor of technology use and adoption as it has both direct effects on use behaviour and intention (Venkatesh et al., 2012). Habit, in this context, is defined as the extent to which individuals perform a behaviour automatically or store an intention to perform a certain behaviour, thus explaining the direct effects that may be observable on both behavioural intention and use behaviour (Yen & Wu, 2016). Confirming these relationships in the context of Zambia will be valuable in extending the applicability of the model.

H2a: Habit (H) will have a positive and significant effect on behavioural intention (BI)

H2b: Habit will have a positive and significant effect on use behaviour (UB)

3.4 Facilitating conditions

Facilitating conditions refer to the degree to which an individual believes there is the infrastructure to support their use and adoption of a specific technology (Venkatesh, Morris, Davis et al., 2003). Facilitating conditions as a construct is unique among the constructs within UTAUT2 in that it has been shown to have direct effects on use behaviour (UB) and indirect effects mediated by behaviour intention (BI) (Baptista & Oliveira, 2015; Venkatesh et al., 2012). Confirming the presence of these two relationships in this study would also be valuable in extending the research on the applicability of this model.

H3a: The effect of facilitating conditions (FC) on behavioural intention (BI) will be positive and significant.

H3b: The effect of facilitiating conditions (FC) on use behaviour (UB) will be positive and significant.

3.5 Power distance

In societies where power distance (PD) is high, individuals are more likely to have more respect for authority and as such are more likely to accept the direction of authority figures or government (Daniels & Greguras, 2014; Picoto & Pinto, 2021). It is thus, hypothesised that in high PD societies like Zambia with a score of 60 on this dimension (Hofstede, n.d) and is thus considered a hierarchical society, government policies promoting digital financial inclusion will positively moderate the relationship between BI and UB.

H4: Power distance positively moderates the relationship between the intention to use mobile financial services and the use behaviour of mobile financial services.

3.6 Individualism-collectivism

In collectivist (COL) societies, there is a preference for face-to-face interactions over remote forms of communication as members of these societies value the collective (Baptista & Oliveira, 2015). The use of information and communication technology is considered less appealing compared to individualistic societies (Hofstede et al., 2010; Lee et al., 2013). It is thus, hypothesised that in a collectivist society like Zambia with a relatively low score of 35 (Hofstede, n.d) on this dimension, a negative moderating effect on the relationship between BI and UB will be present.

H5: Collectivism negatively moderates the relationship between the behavioural intention to use mobile financial services and the use behaviour of mobile financial services.

3.7 Uncertainty avoidance

High levels of uncertainty avoidance (UA) in groups is associated with discomfort in ambiguous, novel, or unknown situations, which could be presented by digital interactions involving monetary value at least until the risk is mitigated sufficiently (Lee et al., 2013; Picoto & Pinto, 2021). Individuals in societies with high levels of uncertainty avoidance could be less likely to adopt and use mobile financial services as the outcomes associated with it could be considered more uncertain than face-to-face interactions. It is thus, hypothesised that uncertainty avoidance will negatively moderate the relationship between BI and UB.

H6: Uncertainty avoidance will moderate the relationship between the intention to use mobile financial services and the actual use behaviour negatively.

3.8 Masculinity-femininity

In cultures with high Masculine (MAS) scores, Hofstede cultural dimension research found that individuals, regardless of gender, favour occupations that value high technical skills (Hofstede et al., 2010). In this way, it is hypothesised that MAS would positively moderate the relationship between BI and UB to the extent that UB depends on being technically proficient as a favoured attribute in a particular society.

H7: Masculinity will moderate the relationship between the intention to use mobile financial services and the actual use behaviour positively.

3.9 Long-short term orientation

Long-short term orientation has been shown in literature to significantly moderate the relationship between usage intention and actual use in both directions (Baptista & Oliveira, 2015; Picoto & Pinto, 2021). Long-term orientation is associated with a value for the future and innovation, making this dimensional trait favourable to technology adoption, while on the other hand, a short-term orientation has also been considered to favour immediate gratification or achieving quick results, which technology offers (Hofstede et al., 2010). As a result, it is hypothesised that long-short term orientation will significantly moderate the relationship between BI and UB, but no direction is predicted.

H8: Long-short term orientation moderates the relationship between the intention to use mobile financial service and actual use behaviour of mobile financial services.

3.10   Conclusion

The theoretical model this study will apply is thus represented in Figure 4. In addition to the five relationship paths that will be validated in this study, it adapts the UTAUT2 model with the five Hofstede cultural dimensions proposed to moderate the relationship between behavioural intention and actual frequent use of mobile financial services leading to potentially higher financial inclusion.
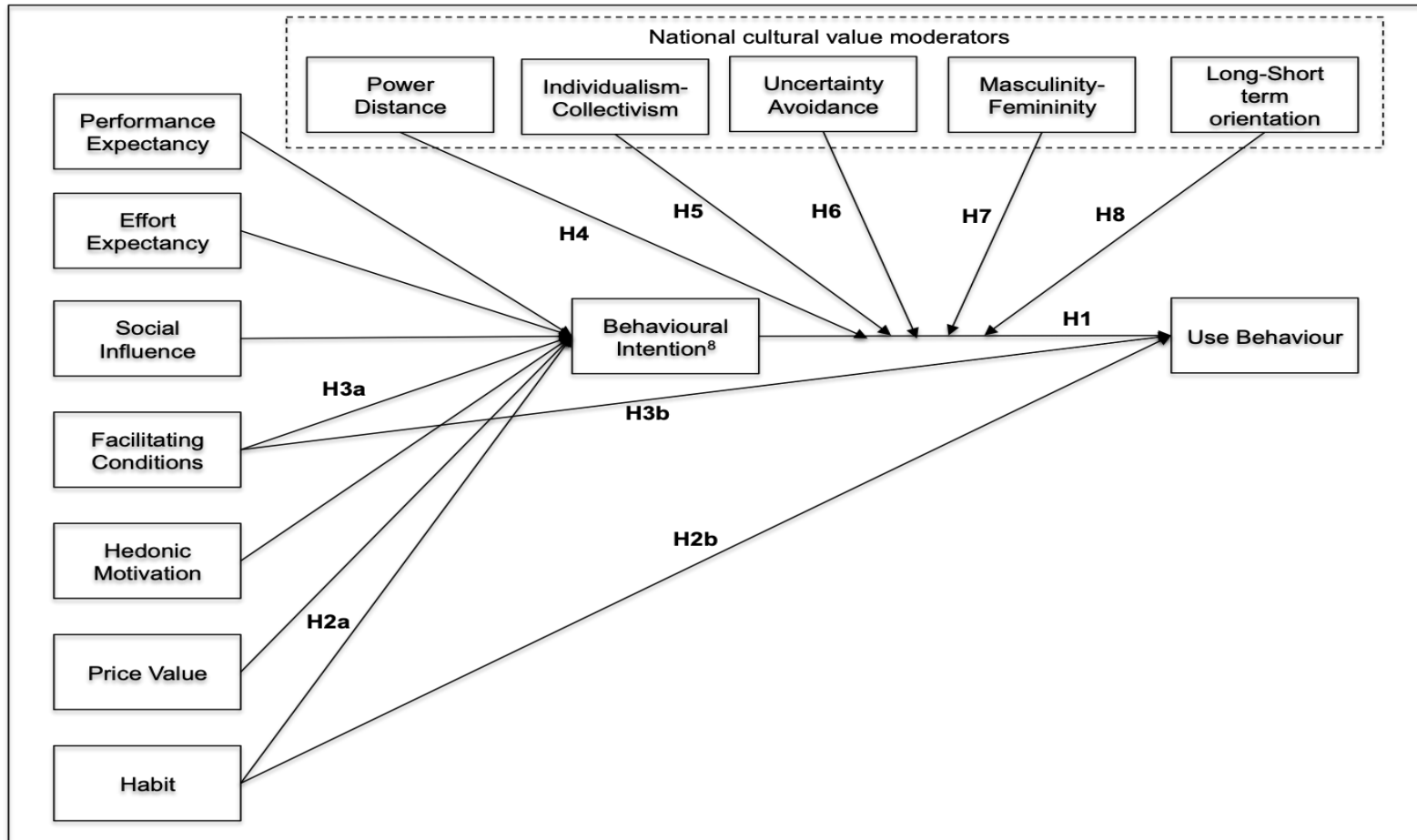
Figure 4. Theoretical research model adapted by author from Srite and Karahanna(2006), Venkatesh, Thong and Xu (2012) and Baptista and Oliveira (2015).

Chapter 4: Research methodology

4.1 Choice of methodology

The objective of the study was to empirically assess how the relationship between technology adoption and digital financial inclusion is moderated by culture. The purpose of the research design employed as such was explanatory. The main aim was to explain the relationships between the various construct elements of technology use and acceptance theories and financial inclusion moderated by cultural values in a selected developing market context. The study was intended to establish causal relationships, if significant, in the context being researched by analysing quantitative data on financial technology use (Saunders, Lewis & Thornhill, 2016).

This study was guided by a positivist philosophy as the starting point for the study was the existing UTAUT2 theory moderated by cultural dimensions on which hypothesis will be built and then tested (Saunders & Lewis, 2012). The data collected was subjected to statistical analysis, solely to prove applicability of existing theory to the chosen research problem and where possible, used to extend the existing models by applying the principles of formal logic and deduction (Lee, 1991). The relationship between the use and acceptance of technology and various other constructs has an extensive existing theoretical foundation (Duarte & Pinho, 2019; Khan et al., 2017; Martins et al., 2014; Oliveira et al., 2016). The choice of the research methodology was to build further on existing theory in a new context by testing several hypotheses and exploring the roles of moderators on the strength and direction of relationships.

To test hypothetical relationships within a defined model, based on existing theory, a deductive approach was the most appropriate path to follow. Explaining the hypothesised causal relationships between the use and acceptance of technology and access to digital financial services required the collection of data to either support or disprove the theoretical model being applied (Saunders & Lewis, 2012). This path followed was supported by the positivist philosophy already alluded to, allowing for the objective reality to be determined via logical approach (Burton-Jones & Lee, 2017).

Mono-method research using quantitative techniques was deemed the most appropriate to test the significance of hypothesised explanatory relationships being proposed (Saunders et al., 2016). The other factor that was considered was the amount of time available to complete the study. A short time was available, and the scope of the study made this method appropriate. Furthermore, the relationships between the variables within the selected technology use and acceptance models leading to intention and use of digital financial services moderated by cultural values will be best studied through a quantitative analytical procedure (Saunders et al, 2016). This single method choice is aligned to the overall research philosophy and approach for this study.

To produce quantitative aspects of the elements in the constructs to be statistically analysed, the survey research strategy was used as it is most appropriate to collect data in the form of answers to structured questions (Pinsonneault & Kraemer, 1993). To determine whether the causal relationships being hypothesised and tested in the study's context, the survey strategy allowed for cost effective measurements to be completed (Saunders & Lewis, 2012). This strategy also allowed the findings from a representative sample to be possibly generalised to the population, if done correctly.

Data was collected from the participants sampled from the population in a survey that was conducted at only one period in a cross-sectional study (Saunders & Lewis, 2012). The data was then analysed using both descriptive and inferential statistic procedures to test the hypothesis proposed at that specific point in time due to time constraints.

4.2 Population

The population targeted for data collection consisted of the entire adult population in Zambia who: (1) are 18 years and older (the rationale here being, this is the age where a bank account can be legally opened), (2) own at least one mobile device such as a mobile phone or a smartphone with or without mobile internet access, and (3) own a mobile number. This description and demographic will represent the complete set of group members that can potentially use or adopt technology to access financial

services – a completely voluntary activity (Saunders & Lewis, 2012; Baptista & Oliveira, 2015).

In Zambia, the total adult population is numbered at approximately 9.5million people aged over 18 years (Bank of Zambia, 2020). With a mobile penetration rate in Zambia of around 107 per 100 inhabitants (Zambia Information and Communication Technology Agency [ZICTA], 2021), it would be safe to say that at least every single one of the 9.5million adults in the country has an active mobile telephone subscription. Mobile internet penetration is lower at 55.9 per 100 inhabitants (ZICTA, 2021). What this meant for the study was literally any adult in Zambia could be included in the sample for the study.

4.3 Unit of analysis

The unit of analysis was the 18-years and older individual with a mobile device who can access digital financial services in Zambia. Data was collected from this individual, who is the maker of the voluntary decision to use or adopt the appropriate digital financial technology (Zikmund et al., 2013).

4.4 Sampling method and size

The target population of this study was every adult in Zambia who has a mobile device with or without Internet connectivity and a mobile number. Since access is limited to a sampling frame, which can capture every member of this population such that there is a non-zero probability of each member of the population being selected, simple non-probability sampling was used to select the sample (Zikmund et al., 2013; Saunders et al., 2016). This method ensured the selected sample represented a number, if not all the key characteristics found in the target population being studied. A database of volunteers who were part of a panel used for marketing and online research in Zambia was sampled for data collection. Access to the panel was granted by the marketing research agency that owned this database. They shared a link to the questionnaire with respondents on behalf of the researcher. This method may have raised some

concerns on whether the results can be projected beyond the sample (Zikmund et al., 2013). The overall accuracy of non-probability samples due to bias (either of the researcher or respondent) was also an area of concern. There are, however, conflicting findings on the superiority of probability sampling to non-probability sampling. These usually centre around the nature of data being collected and the purpose for which it is being used (Macinnis et al., 2018). Similar studies of technology use and acceptance in different contexts have relied on nonprobability sampling methods to provide valid data used in testing the proposed hypothesis (Baptista & Oliveira, 2015; Farah et al., 2018; Malaquias & Hwang, 2016; Venkatesh et al., 2012).

The size of the sample that was selected could have influenced the probability of uncovering a significant relationship between the construct variables where one existed (Tabachnick, Fiddell & Ullman, 2007). A large enough sample size to elicit meaningful difference in the case of this study was considered after assessing the time allotted for data collection, expected response rate for the measurement instrument and sample sizes used in similar studies on technology use and acceptance (Zikmund et al., 2013). In this study, the sample size of at least 200 valid responses was what was aimed for, to be considered appropriate based on convenience, expected response rates, sample sizes used in similar previous studies considered in the literature review, and the type of statistical analysis that was used. In particular, for partial least squares – structural equation modelling (PLS-SEM) analysis, the minimum sample size should be equal to the larger of 10 times the number of formative indicators used to measure a construct or 10 times the largest number of structural paths directed at a particular latent construct (Hair, Ringle & Sarstedt, 2011). At the end of the collection period, a total of 239 responses were received, of which 229 complete responses were included in the sample for analysis.

4.5 Measurement instrument

A survey questionnaire included in appendix A was used to collect data from the sample. The questionnaire was developed and adapted from the three main areas being researched: Technology acceptance and use theory, cultural value models and

financial inclusion (Allen et al., 2016; Hassan, Shiu & Walsh, 2011; Hofstede, 1980, 2011; Hofstede & Bond, 1988; Srite & Karahanna, 2006; Venkatesh et al., 2012). A unique model (Figure 4) integrating these three elements was built, showing the relationships between different variables of the constructs on technology use and acceptance and the moderating influences of national culture on financial inclusion measured by frequency of use of mobile financial services (Baptista & Oliveira, 2015). The questionnaire with multiple items or indicators of reflective measures to compute an overall score of latent variables was used (Hair, Sarstedt, Ringle & Mena, 2012).

The questionnaire was administered in English. It contained two screening questions and four distinct sections. The screening questions were used to determine if the respondents met the minimum criteria to participate in the survey. Respondents were first asked if they lived in Zambia and if they currently used mobile banking or mobile money services. A negative response to either question then excluded that respondent from the survey as they were informed that they could stop the survey at that point. The remaining four sections are as follow:

Firstly, an introduction section including the reason for the survey, time taken to complete the survey, participants' voluntary participation, anonymity and confidentiality of the information provided. This section was included to ensure participants were informed about their rights in compliance with applicable laws protecting data privacy, to seek their informed consent to proceed with collecting data and provide an idea upfront of the effort that would be required to complete the survey.

In the second section, basic demographic information, including age, gender, education level and employment status, were collected. The purpose for collecting demographic data is to facilitate the preparation of descriptive statistics and provide an image of the diversity of the sample primarily, and in addition, highlight any potential sample bias. The demographic data could also be included in the model analysis as modifiers, moderators, or controls.

In the third section, the key technology use and acceptance constructs, seven in total (Venkatesh, Morris, Davis et al., 2003; Venkatesh et al., 2012) and financial inclusion,

one construct (Allen et al., 2016; Baptista & Oliveira, 2015) were included. The survey questions in this section were wholly adapted for mobile banking technology use from existing studies with the base UTAUT2 model (Figure 3). UTAUT2's key constructs namely, *performance expectancy, effort expectancy, social influence, facilitating conditions, hedonic motivation, price value* and *habit,* have been shown to be valuable drivers in a comprehensive model on technology use and adoption, and as such, these constructs and their items were adapted in this section for the survey instrument. *Use behaviour*, the dependent variable directly predicted by the key model constructs or mediated by *behavioural intentions,* was also included in this section (Venkatesh et al., 2012). For this study, some of the constructs were reconceptualised for clarity based on the target of the study. Perceived usefulness (PU) is analogous to *performance expectancy* and was measured with four items. Perceived ease of use (PEU) is analogous to *effort expectancy* and was measured with four items. Perceived influence of others (PIO) is analogous to *social influence* and was measured with three items. Perceived support of use (PSU) is analogous to *facilitating conditions* and was measured with four items. Perceived enjoyment (PE) is analogous to *hedonic motivation* and was measured with three items. Perceived value (PV) is analogous to *price value* and was measured with four items. Habit (H) was measured with four items. Behavioural intention (BI) was measured with three items. The final item in this section was a single question measuring financial inclusion as a function of frequency of use (FOU) of mobile banking/mobile money. This final item is analogous to *use behaviour* from UTAUT2. All items in this section were adapted from the original survey from Venkatesh et al. (2012) with a modification to reference mobile banking services/mobile money.

In the fourth section, five cultural values parameters were measured using constructs and scales derived from Srite and Karahanna (2006) and Hassan et al. (2011). Masculinity/Femininity (MF) was measured with four items. Power distance (PD) was measured with four items. Individualism/Collectivism (IC) was measured with four items. Uncertainty avoidance (UA) was measured with four items. Long/Short term orientation (LS) was measured with four items adapted from Hassan et al. (2011).

All item measurements were conducted using a seven-point Likert scale ranging from "strongly disagree" (1) to "strongly agree" (7). This scale was chosen as appropriate for all but one of the items on the survey in accordance with scales used in cited research from which the items were adapted. Financial inclusion was measured on a selection scale from 1 (have not used) to 11 (use of digital financial services several times a day) to capture a broader and more nuanced description of use behaviour leading to digital financial inclusion (Allen et al., 2016; Martins et al., 2014).

The completed survey instrument was then used to create a Google form, a popular online survey-hosting platform. Google forms provided the flexibility to capture the full range of question types included in this survey, allowed for ease of transmission to survey respondents, and for easy download of results on a spreadsheet. Appendix A shows all the items used in this study in the questionnaire.

4.6 Data gathering process

4.6.1 Pre-testing

The questionnaire to be used was first shared for evaluation by a graduate-level research supervisor to check its appropriateness (Malaquias & Hwang, 2016). It was then pilot tested with about 18 Zambian adults with mobile phones and internet access to check that the survey could be viewed properly on a mobile phone. Instructions were clear; questions were error-free, easy to understand, the answers could be recorded correctly, and also to assess how long it would take to complete the survey (Saunders & Lewis, 2012; Zikmund et al., 2013). The survey was sent as a link to different online forums the researcher was a part of on social media, and the responses received did not form part of the final data used in the research result evaluation.

Feedback received by text messages mainly highlighted two key issues which were taken into consideration in finalising the survey instrument before gathering data for the study. (1) The range of responses on the Likert scale did not all appear on the screen of the mobile devices being used to complete the survey. The key issue here

was that participants would have had to scroll from right to left to reveal response options 5 to 7 on the scales; otherwise, some thought only options 1 to 4 were available. This was remedied by including an instruction in all sections to view the survey in landscape mode. (2) The transition from technology acceptance and use construct questions to those on cultural values was abrupt and unexpected. This issue was remedied by expanding on the purpose and components of the survey in the introduction section at the start.

4.6.2 Data collection

The final questionnaire was distributed by including a link in emails and text messages inviting participants to respond to the survey hosted on Google forms. The link was shared by the marketing research agency, HN Conseil, contracted for this purpose. HN Conseil maintains a research database for the purposes of marketing and consumer sentiment research in Zambia and agreed to share the survey directly with registered panel members (consent letter included in appendix B). HN Conseil contacted potential respondents to the survey in advance before emailing or texting the actual message with the link to the survey to prepare them to participate. Collecting data using an internet survey is a method usually associated with lower cost and greater reach, and this informed the researcher's selection of this method (Brick, 2011).

A total of 1000 invitations were sent out to panellists on HN Conseil's database using either their mobile number or email address with a link to complete this self-administered web-based survey. The survey was kept open for a total of six weeks (from 17 August to 30 September 2021). Two reminder messages were sent to invited participants at two-weekly intervals after the initial message was sent to encourage responses to reach the minimum anticipated sample threshold. There were 239 responses received during this six-week period. The data were exported into Microsoft Excel for coding and further statistical analysis.

4.7 Analysis approach

The data collected using the survey questionnaire as the measurement instrument produced both nominal descriptive and ordinal ranked categorical data that was then subjected to statistical analysis (Saunders & Lewis, 2012). The data collected was prepared for analysis by first coding the data in Microsoft Excel. Data were coded by converting all descriptive responses received into numeric data with the coding convention captured in appendix A. This step was facilitated by the fact that the survey instrument already used ranking order numbers in the Likert scales, so respondents selected a number between "1" and "7". In the next step, the data was checked for blank responses. A total of 10 responses received either had some data blank or had to be excluded as they had a negative screening question response leaving an eventual sample total of 229 with complete responses, which were then progressed to statistical analysis.

There were two types of analysis completed on the data collected: (1) Description of the data collected using descriptive statistics shown in tables, (2) inferential statistical analysis to assess and show the nature of interdependences and relationships of the constructs in the model being used to test the hypotheses (Saunders et al., 2016). The descriptive statistics were largely completed using the functions in Microsoft Excel and done alongside the coding process before entering the data into the statistical analysis software package used. Inferential statistical analysis followed after coding the data as described next.

4.7.1   PLS- SEM analysis

To evaluate the validity of the theoretical model being tested empirically, structured equation modelling (SEM) method was used, and this was completed using Smart PLS 3.3.3 software. This method is particularly useful in research where the assessment of latent variables of the type being measured in technology use and acceptance are studied using reflective indicators (Chin, 1998; Hair, Ringle, Sarstedt & Mena, 2012).

There are two types of methods to consider when using SEM: covariance-based techniques (CB-SEM) and variance-based partial least squares method (PLS-SEM). The PLS-SEM methods were applied here for three main reasons: (1) they are considered better suited for studying complex models with numerous constructs (Hair, Ringle & Sarstedt, 2011), (2) PLS-SEM is considered useful as it has minimum demands regarding sample size when compared to CB-SEM and is generally able to achieve high levels of statistical power (Hair, Ringle & Sarstedt, 2011), (3) PLS-SEM can handle both reflective and formative measures with few restrictions in complex models (Hair, Ringle, Sarstedt & Mena, 2012) and (4) PLS-SEM is non-parametric and works well with non-normal distributions and has few restrictions on the use of ordinal and binary scales when coded properly, making it quite useful for social science research such as the current study (Hair, Sarstedt, Ringle & Gudergan, 2017).

Analysis of the data was completed in two steps following the guidelines put forward by Anderson and Gerbing (1988) and Hair, Ringle and Sarstedt, (2011). In the first step, the measurement model is assessed for reliability and validity.

4.7.2   Reliability

Reliability was assessed using two measures: (1) construct reliability and (2) indicator reliability. Construct reliability was measured as an estimation of the internal consistency reliability of the constructs and was measured using Cronbach's alpha and composite reliability. The accepted standard here is for an alpha above 0.70 (Hair, Ringle, Sarstedt & Mena, 2012; Mackenzie et al., 2011). Indicator reliability is an assessment of whether the relationships between indicators and their latent constructs are statistically significant. Indicator reliability was assessed by the loading factor (the unique proportion of variance in the indicator accounted for by the latent construct). While a value above 0.70 is desirable, values between 0.40 and 0.70 could be considered for removal if a removal leads to an increase in the composite reliability score (Hair, Ringle, Sarstedt et al., 2012). However, a value greater than 0.5 can still be considered a good indicator of reliability (Mackenzie et al., 2011).

4.7.3 Validity

To assess validity, two measures of validity were tested to assure the quality of the factors: (1) convergence validity – the extent to which two measures capture a common construct. This needs to be higher than a specified measurement value (an average variance extracted-AVE greater than 0.50 was used in this case) for the model being assessed to produce meaningful result (Carlson & Herdman, 2012), and (2) discriminant validity – a measure of the empirical uniqueness of a construct within a structural equation model (Henseler, Ringle & Sarstedt, 2014). Discriminant validity needs to be established to be sure a result confirming hypothesized structural paths in SEM are real and not due to statistical anomalies. Discriminant validity was measured using (1) Fornell-Larcker criterion and (2) cross-loading criteria (Henseler et al., 2014). Fornell-Larcker measures the extent to which a latent construct shares more variance with its assigned indicators than with other latent variables in the structural model construct (Hair, Ringle & Sarstedt, 2011). Regarding cross-loadings, the AVE for each latent construct should be greater than the latent construct's highest squared correlation with any other latent construct (Hair, Ringle & Sarstedt, 2011).

4.7.4 Structural model evaluation

In the second step, the structural model (Figure 4) was tested along with the eight hypotheses put forward by examining the standardised paths to provide a confirmatory assessment of the nomological validity of the model (Anderson & Gerbing, 1988). This step was performed in Smart PLS 3.3.3 software. The path significance levels were estimated using the bootstrap resampling method, which allows the estimated coefficients in PLS-SEM to be tested for significance (Henseler, Ringle & Sinkovics, 2009). A total of 5000 bootstrap samples were used in analysing the data. PLS applies nonparametric bootstrapping to obtain standard errors for hypothesis testing. The method does not assume the sample is normally distributed (Hair, Ringle & Sarstedt, 2011). The structural model was assessed based on the R^2, Q^2, and significance of paths. There are two main evaluation criteria for the structural model. The first is the R^2 measure and the size and significance of the path beta coefficients for each hypothesised relationship in the model. R^2 is the coefficient of determination, and it

measures the structural model's in-sample predictive power (Hair, Sarstedt, Ringle & Gudergan, 2017). An R^2 value above 0.20 would be considered good enough for the purpose of determining use behaviour (Hair, Ringle & Sarstedt, 2011). The second assessment also considers the predictive capability of the model measured by the Stone-Geisser's Q^2 which checks the model's ability to predict the endogenous latent construct's indicators. Generally, a Q2 value larger than zero for a specific latent variable indicates predictive relevance (Hair, Ringle & Sarstedt, 2011). Finally, the individual path coefficients of the PLS-SEM structural model were interpreted as standardised beta coefficients of ordinary least square regressions. The bootstrapping applied in this method assessed each path's significance. Critical t-values applied were 1.96 with significance level of 5%. Significant paths coefficients different from zero confirmed the relevant hypothesis on the relationships between construct variables.

Chapter 5: Results

5.1 Introduction

In this chapter, a summary of the results of the completed surveys is presented together with the results of statistical data analysis of responses. In the first section, a description of the sample is presented along with a broad description of the responses to the survey with descriptive statistics prepared in Microsoft Excel. In the next section, inferential statistics generated with Smart PLS 3.3.3 are presented. An assessment of the measurement model is first presented with the reliability and validity measures. This is followed by the results of the structural model assessment. The final section presents the research model with updated path coefficients highlighting the significant paths.

5.2 Descriptive statistics

5.2.1 Screening questions

A total of 239 responses were received to the survey over the six-week period of data collection. This represented a 24% response rate as about 1000 invitations to participate in the survey were sent out. To restrict the context to Zambia, two screening questions were included in the questionnaire to confirm (1) the participants' residence in Zambia and (2) the respondents' use of a mobile financial service.

In responding to the screening questions, 100% of respondents (n=239) confirmed they were resident in Zambia, but only 99.6%(n=238) confirmed they currently use mobile money or a mobile banking application.

Do you live in Zambia?

239 responses
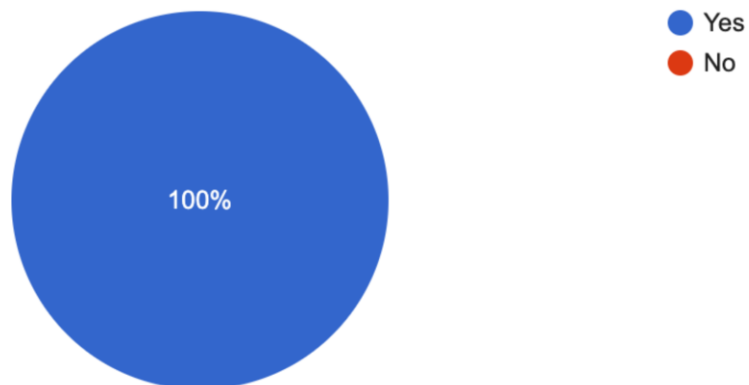
Figure 5: Residence of the sample

Do you currently use a mobile money or a mobile banking application?

239 responses
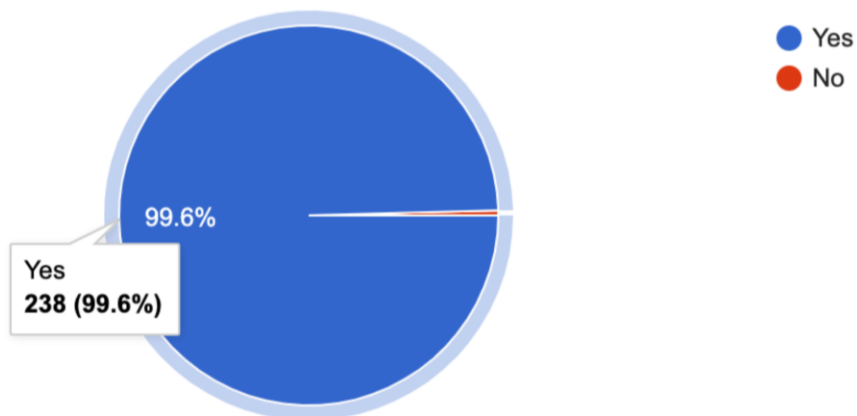
Figure 6: Use of mobile banking or mobile money

Based on the screening questions above, only 238 respondents proceeded to complete the demographic questions in the first section of the survey.

46

5.2.2 Sample demographics

Around 59% of respondents were women: about 70% between the ages of 26 and 45 years old, and about 60% in full-time employment. A significant majority of respondents (almost 80%) had a bachelor's degree or higher qualification. 75% of respondents used both a mobile banking application and mobile money. Detailed descriptive statistics are shown in Table 7.

The final sample used in the statistical analysis included 229 respondents however, as this was the number who completed all the items in the survey. Detailed descriptive statistics of excluded respondents is shown in Table 8.

Table 7: Demographics of respondents

Measure	Value	Frequency	%
Gender	Male	97	40.8
	Female	140	58.8
	Prefer not to say	1	0.4
Age	Between 18 and 25	39	16.4
	Between 26 and 35	81	34.0
	Between 36 and 45	84	35.3
	Between 46 and 55	33	13.9
	56 and older	1	0.4
Education	Lower than Bachelor's degree	53	22.3
	Bachelor's degree or equivalent	110	46.2
	Post-graduate	75	31.5
Employment status	Self-employed	39	16.4
	Part-time employed	23	9.7
	Full time employed	143	60.1
	Unemployed	14	5.9
	Student	19	8.0

Mobile financial service used			
	Mobile banking app only	11	4.6
	Mobile money only	46	19.3
	Mobile money and mobile banking app	179	75.2

n= 238

Table 8: Demographics of excluded respondents

Measure	Value	Frequency	%
Gender	Male	5	2.1%
	Female	4	1.7%
Age	Between 18 and 25	1	0.4%
	Between 26 and 35	4	1.7%
	Between 36 and 45	2	0.8%
	Between 46 and 55	2	0.8%
Education	Lower than Bachelor's degree	4	1.7%
	Bachelor's degree or equivalent	4	1.7%
	Post-graduate	1	0.4%
Employment status	Self-employed	5	2.1%
	Full time employed	3	1.3%
	Student	1	0.4%
Mobile financial service used	Mobile banking app only	2	0.8%
	Mobile money only	1	0.4%
	Mobile money and mobile banking app	6	2.5%

n=9

5.2.3 Test item analysis

There were a total of 41 items retained in the final data analysis after excluding nine items to improve the overall reliability and validity of the structural model being assessed (see full list in appendix A). The mean, median and ranges of responses to construct items used in the study are presented in Table 9. The full range of

responses, from strongly agree to strongly disagree, was used in all items except for frequency of use (FoU) where the first two responses on the scale of available responses indicated an absence of use. This was expected, as respondents who did not use mobile money or mobile banking were already excluded by screening questions at the beginning of the survey. The highest mean responses from the independent variables in the structural model were found for perceived ease of use (PEU), perceived support for use (PSU) and perceived usefulness (PU). Perceived enjoyment (PE) and price value (PV) had the lowest mean scores.

The cultural value constructs provided the following results. Power distance (PD) mean responses were low, reflecting a low power distance overall within the sample. Individualist-collectivist (IC) mean responses were at the centre of the scale, reflecting neither an individualist nor collectivist leaning within this sample. Uncertainty avoidance (UA) mean responses were higher, reflecting higher uncertainty avoidance within the sample. Long-term/short-term orientation (LS) mean responses were higher within this sample, reflecting a long-term orientation. Masculinity/femininity (MF) mean scores were quite low, reflecting a feminine leaning within this sample.

Behavioural intention (BI) mean responses indicated a high intention to use mobile financial services and FoU mean response (m= 7.99) also indicating a high overall frequency of use of mobile financial services.

Table 9: Descriptive statistics of construct items

Items	Mean	Median	Min	Max	Standard deviation	Number of observations used
PU1	5.729	7	1	7	1.83	229
PU2	5.354	6	1	7	1.916	229
PU3	5.651	7	1	7	1.881	229
PU4	5.341	6	1	7	1.875	229
PEU1	5.59	7	1	7	1.811	229
PEU2	5.563	6	1	7	1.841	229
PEU3	5.659	7	1	7	1.859	229
PEU4	5.585	7	1	7	1.876	229
PIO1	4.838	5	1	7	2.012	229
PIO2	4.729	5	1	7	2.019	229
PSU1	5.611	7	1	7	1.846	229
PSU2	5.672	7	1	7	1.853	229
PSU3	5.38	6	1	7	1.885	229

PE1	4.721	5	1	7	1.776	229
PE2	4.865	5	1	7	1.83	229
PE3	3.978	4	1	7	1.93	229
PV1	4.31	4	1	7	1.837	229
PV2	4.345	4	1	7	1.973	229
PV3	4.646	5	1	7	1.848	229
PV4	4.594	5	1	7	1.804	229
H1	5.175	6	1	7	1.979	229
H3	4.371	4	1	7	2.058	229
H4	5.192	6	1	7	1.931	229
BI1	5.611	7	1	7	1.913	229
BI2	5.188	6	1	7	1.981	229
BI3	5.415	6	1	7	1.89	229
FoU	7.996	8	3	10	1.488	229
PD1	1.83	1	1	7	1.361	229
PD2	1.493	1	1	7	1.177	229
PD3	1.983	1	1	7	1.53	229
PD4	1.502	1	1	7	1.08	229
IC2	4.507	4	1	7	1.914	229
IC3	4.328	4	1	7	1.996	229
UA1	5.524	6	1	7	1.799	229
UA2	5.568	7	1	7	1.851	229
UA3	4.288	4	1	7	1.952	229
LS2	5.402	7	1	7	1.898	229
LS4	5.314	6	1	7	1.811	229
MF1	2.066	1	1	7	1.7	229
MF3	1.773	1	1	7	1.481	229
MF4	1.769	1	1	7	1.482	229

Note: Behavioural Intention (BI), Frequency of Use (FoU), Habit (H), Individualism/collectivism (IC), Long/short term orientation (LS), Masculinity/Femininity (MF), Perceived Ease of Use (PEU), Perceived Enjoyment (PE), Perceived Influence of Others (PIO), Perceived Support of Use (PSU), Perceived Usefulness (PU), Perceived Value (PV), Power distance (PD), Uncertainty avoidance (UA)

5.3 Inferential statistics

5.3.1   Measurement model assessment

The measurement model was assessed to establish the reliability and validity of the constructs. The measurement model was assessed for (1) construct reliability, (2) indicator reliability, (3) convergence validity, and (4) discriminant validity. The following sections present the results for all analyses to evaluate the validity and reliability of the measurement model.

5.3.1.1   Reliability assessment

A measurement model is said to have internal consistent reliability when the factor loadings of all the items in the model are determined to have a value greater than the minimum acceptable value of 0.50 (Hair et al., 2010). Boßow-Thies and Albers (2010) also recommend that a value of 0.50 can be considered as an acceptable factor loading value, though a rating of over 0.7 is desirable. Table 10 below lists the average variances extracted (AVE), composite reliability (CR), Cronbach's alpha values and factor loadings generated using Smart PLS 3.3.3.

5.3.1.2   Reliability of indicators and loadings

Rather than automatically eliminating indicators with loadings below 0.700, the effects of the removal of the item on composite reliability was examined. Generally, items with outer loadings below 0.700 were considered for removal only if deletion resulted in an increase of composite reliability or average variance extracted (AVE) over the recommended value (Hair, Ringle, Sarstedt & Mena, 2012). As part of the measurement model evaluation, four (4) items (IC4; loading=0.399, LS1; loading=0.368, MF2; loading= 0.521 and UA4; loading= -0.518) were removed from the analysis because of low factor loadings (<0.500). The removal of these four items made a significant increase in the composite reliability and AVE, which both rose above the recommended threshold of (>0.700).

5.3.1.3 Reliability of the constructs

Construct reliability was assessed using Cronbach's alpha and composite reliability. Table 10 presents the Cronbach's alpha and composite reliability scores for all constructs retained in the study. A block is considered homogenous if these indices are larger than 0.700 for confirmatory studies (Boßow-Thies & Albers, 2010).

5.3.1.4 Convergent validity

Convergent validity refers to the extent to which responses on a test or instrument exhibit a strong relationship with responses on conceptually similar tests or instruments (Hair, Ringle, Sarstedt & Mena, 2012). Convergent validity was acceptable because the AVE was higher than 0.500, as seen in Table 10 (Carlson & Herdman, 2012).

Table 10: Factor loadings, reliability & validity analysis

Construct	Item	Loadings	Cronbach's alpha	Composite reliability	Average variance extracted (AVE)
Frequency of Use	FoU	1	1	1	1
Perceived Ease of Use (PEU)	PEU1	0.981	0.986	0.990	0.961
	PEU2	0.984			
	PEU3	0.988			
	PEU4	0.968			
Perceived Usefulness (PU)	PU1	0.969	0.975	0.982	0.930
	PU2	0.958			
	PU3	0.975			
	PU4	0.956			
Behavioural Intention (BI)	BI1	0.966	0.968	0.979	0.940
	BI2	0.963			
	BI3	0.979			
Perceived Support of Use (PSU)	PSU1	0.971	0.961	0.975	0.928
	PSU2	0.957			
	PSU3	0.936			
	PSU4	0.913			

Perceived Value (PV)	PV1	0.921	0.949	0.963	0.868
	PV2	0.915			
	PV3	0.940			
	PV4	0.949			
Perceived Enjoyment (PE)	PE1	0.971	0.926	0.953	0.871
	PE2	0.962			
	PE3	0.863			
Habit (H)	H1	0.919	0.898	0.937	0.832
	H2	0.810			
	H3	0.860			
	H4	0.928			
Power distance (PD)	PD1	0.820	0.849	0.896	0.685
	PD2	0.869			
	PD3	0.756			
	PD4	0.854			
Perceived Influence of Others (PIO)	PIO1	0.942	0.927	0.965	0.932
	PIO2	0.950			
	PIO3	0.655			
Masculinity/Femininity (MF)	MF1	0.806	0.802	0.874	0.701
	MF2	0.521			
	MF3	0.916			
	MF4	0.718			
Long/short term orientation (LS)	LS2	0.963	0.905	0.953	0.911
	LS3	0.565			
	LS4	0.930			
Individualism/collectivism (IC)	IC1	0.573	0.834	0.891	0.806
	IC2	0.984			
	IC3	0.797			
Uncertainty avoidance (UA)	UA1	0.910	0.860	0.915	0.782
	UA2	0.923			
	UA3	0.816			

5.3.1.5 Discriminant Validity

Comparing the correlations among the latent variables with the square root of AVE and cross-loadings criteria assessed discriminant validity.

Using the Fornell-Larcker criterion in Table 11, the AVE of each latent construct should be higher than the construct's highest squared correlation with any other latent construct (Hair, Ringle, Sarstedt & Mena, 2012). This condition was met from the test.

Table 11: Fornell-Larcker criterion: Square root of AVE (in bold on diagonal) and factor correlation coefficients

	Mean	SD	BI	FoU	H	IC	LS	MF	PEU	PE	PIO	PSU	PU	PV	PD	UA
BI	5.405	1.873	**0.969**													
FoU	7.996	1.491	0.198	**1**												
H	4.913	1.815	0.863	0.281	**0.88**											
IC	4.417	1.815	0.487	0.056	0.472	**0.802**										
LS	4.628	1.583	0.722	0.102	0.642	0.515	**0.857**									
MF	1.869	1.318	-0.07	0.05	-0.054	0.163	-0.105	**0.837**								
PEU	5.599	1.814	0.894	0.176	0.806	0.482	0.709	-0.062	**0.98**							
PE	4.521	1.724	0.729	0.158	0.772	0.514	0.606	-0.003	0.738	**0.933**						
PIO	4.784	1.950	0.741	0.191	0.715	0.501	0.584	0.018	0.703	0.684	**0.86**					
PSU	5.555	1.797	0.91	0.147	0.775	0.471	0.728	-0.071	0.931	0.715	0.723	**0.944**				
PU	5.519	1.813	0.912	0.233	0.817	0.497	0.73	-0.058	0.911	0.729	0.783	0.906	**0.965**			
PV	4.474	1.741	0.745	-0.005	0.691	0.377	0.566	-0.072	0.714	0.609	0.558	0.709	0.688	**0.931**		
PD	1.702	1.069	-0.104	-0.164	-0.076	0.029	-0.184	0.52	-0.122	-0.06	-0.051	-0.105	-0.121	0.033	**0.827**	
UA	5.127	1.650	0.751	0.074	0.66	0.615	0.772	-0.006	0.739	0.645	0.625	0.749	0.754	0.597	-0.121	**0.884**

Note: Behavioural Intention (BI), Frequency of Use (FoU), Habit (H), Individualism/collectivism (IC), Long/short term orientation (LS), Masculinity/Femininity (MF), Perceived Ease of Use (PEU), Perceived Enjoyment (PE), Perceived Influence of Others (PIO), Perceived Support of Use (PSU), Perceived Usefulness (PU), Perceived Value (PV), Power distance (PD), Uncertainty avoidance (UA)

In establishing a valid cross-loading, each item under the constructs must present a higher loading on its corresponding factor than the cross-loading on other factors (Hair, Ringle, Sarstedt & Mena, 2012). Table 12 below gives a summary of the cross loadings for each construct. The highlighted items under each construct must be higher than the non-highlighted items both horizontally and vertically. This criterion is used to detect any collinearity problems among the latent constructs (multi-collinearity). In other words, collinearity refers to the probability that some of the items of different constructs are measuring the same thing.

To ensure the cross-loading criterion was met, five items were further excluded, namely H2, IC1, LS3, PIO3 and PSU4.

Table 12: Item cross-loading – Highlighted items have higher loadings than all corresponding factors

Constructs		BI	FoU	H	IC	LS	MF	PD	PE	PEU	PIO	PSU	PU	PV	UA
BI	BI1	0.966	0.122	0.8	0.451	0.737	-0.087	-0.121	0.69	0.899	0.712	0.922	0.905	0.728	0.765
	BI2	0.963	0.257	0.867	0.508	0.681	-0.021	-0.075	0.724	0.832	0.727	0.838	0.867	0.711	0.708
	BI3	0.979	0.198	0.843	0.458	0.682	-0.094	-0.107	0.705	0.869	0.715	0.885	0.88	0.728	0.711
FOU	FOU	0.198	1	0.281	0.056	0.102	0.05	-0.164	0.158	0.176	0.191	0.147	0.233	-0.005	0.074
H	H1	0.833	0.297	0.919	0.398	0.631	-0.09	-0.127	0.675	0.823	0.67	0.787	0.815	0.664	0.616
	H3	0.678	0.222	0.86	0.427	0.476	0.017	-0.022	0.657	0.602	0.592	0.583	0.626	0.547	0.557
	H4	0.903	0.236	0.928	0.476	0.703	-0.084	-0.096	0.756	0.855	0.689	0.829	0.84	0.715	0.68
IC	IC2	0.488	0.065	0.47	0.984	0.504	0.128	-0.015	0.512	0.49	0.497	0.471	0.499	0.365	0.61
	IC3	0.392	0.012	0.388	0.797	0.438	0.227	0.091	0.38	0.383	0.421	0.388	0.424	0.288	0.51
LS	LS2	0.686	0.107	0.605	0.473	0.970	-0.077	-0.179	0.565	0.661	0.549	0.68	0.684	0.529	0.73
	LS4	0.698	0.075	0.626	0.543	0.937	-0.111	-0.146	0.611	0.703	0.582	0.719	0.722	0.561	0.76
MF	MF1	-0.02	0.038	-0.009	0.108	-0.057	0.843	0.396	0.067	-0.01	0.068	-0.016	-0.001	-0.038	0.024
	MF3	-0.081	0.055	-0.056	0.178	-0.105	0.937	0.49	-0.035	-0.083	0.005	-0.096	-0.067	-0.068	-0.014
	MF4	-0.09	0.015	-0.109	0.095	-0.129	0.717	0.464	-0.061	-0.056	-0.074	-0.059	-0.114	-0.105	-0.045
PD	PD1	0.052	-0.158	0.057	0.01	-0.027	0.345	0.826	0.035	0.013	0.05	0.064	0.024	0.15	-0.013
	PD2	-0.147	-0.091	-0.09	0.033	-0.206	0.528	0.869	-0.039	-0.143	-0.062	-0.131	-0.154	0.003	-0.161
	PD3	-0.067	-0.086	-0.068	0.058	-0.095	0.463	0.756	-0.085	-0.067	-0.04	-0.075	-0.061	0.011	-0.018
	PD4	-0.194	-0.167	-0.159	0.015	-0.272	0.446	0.854	-0.118	-0.205	-0.119	-0.212	-0.209	-0.066	-0.193
PE	PE1	0.735	0.171	0.764	0.498	0.594	-0.03	-0.094	0.971	0.757	0.703	0.732	0.755	0.597	0.653
	PE2	0.752	0.136	0.763	0.483	0.61	-0.009	-0.041	0.962	0.764	0.66	0.742	0.733	0.616	0.642
	PE3	0.517	0.132	0.617	0.463	0.476	0.043	-0.026	0.863	0.503	0.535	0.486	0.517	0.476	0.487
PEU	PEU1	0.873	0.165	0.786	0.475	0.686	-0.06	-0.126	0.724	0.981	0.7	0.912	0.894	0.695	0.731
	PEU2	0.873	0.162	0.771	0.478	0.694	-0.075	-0.104	0.725	0.984	0.689	0.915	0.889	0.697	0.719
	PEU3	0.891	0.19	0.797	0.481	0.72	-0.059	-0.153	0.73	0.988	0.692	0.923	0.909	0.704	0.741
	PEU4	0.869	0.173	0.805	0.458	0.678	-0.047	-0.094	0.717	0.968	0.675	0.9	0.882	0.702	0.707

PIO	PIO1	0.734	0.147	0.654	0.47	0.595	0.047	-0.038	0.642	0.714	0.942	0.737	0.77	0.539	0.623
	PIO2	0.725	0.235	0.709	0.438	0.561	0.001	-0.074	0.639	0.682	0.95	0.691	0.773	0.538	0.602
PSU	PSU1	0.889	0.152	0.765	0.462	0.712	-0.074	-0.071	0.702	0.922	0.699	0.971	0.898	0.713	0.725
	PSU2	0.873	0.129	0.757	0.437	0.722	-0.077	-0.127	0.674	0.919	0.709	0.957	0.88	0.693	0.728
	PSU3	0.85	0.142	0.716	0.424	0.677	-0.072	-0.079	0.666	0.848	0.663	0.936	0.822	0.621	0.681
PU	PU1	0.9	0.195	0.781	0.468	0.721	-0.049	-0.086	0.7	0.92	0.73	0.909	0.969	0.693	0.763
	PU2	0.859	0.278	0.799	0.497	0.71	-0.038	-0.145	0.714	0.848	0.742	0.846	0.958	0.645	0.707
	PU3	0.89	0.212	0.784	0.474	0.703	-0.106	-0.15	0.694	0.91	0.745	0.891	0.975	0.665	0.736
	PU4	0.869	0.216	0.788	0.479	0.683	-0.028	-0.085	0.707	0.837	0.807	0.847	0.956	0.651	0.703
PV	PV1	0.667	-0.055	0.624	0.358	0.51	-0.076	-0.031	0.591	0.651	0.522	0.634	0.63	0.921	0.541
	PV2	0.62	-0.041	0.578	0.265	0.476	-0.095	0.072	0.5	0.601	0.445	0.584	0.563	0.915	0.502
	PV3	0.739	0.057	0.687	0.367	0.561	-0.061	0.047	0.57	0.709	0.56	0.714	0.69	0.94	0.583
	PV4	0.74	0.009	0.675	0.404	0.555	-0.041	0.036	0.602	0.688	0.544	0.699	0.67	0.949	0.59
UA	UA1	0.777	0.058	0.663	0.565	0.765	-0.08	-0.162	0.609	0.769	0.646	0.773	0.772	0.575	0.91
	UA2	0.766	0.063	0.65	0.566	0.801	-0.087	-0.143	0.609	0.758	0.6	0.768	0.768	0.599	0.923
	UA3	0.475	0.073	0.453	0.499	0.502	0.126	-0.03	0.496	0.46	0.428	0.471	0.484	0.42	0.816

Note: The following items were excluded to ensure the cross-loading criteria was met: H2, IC1, LS3, PIO3, and PSU4.

5.3.2 Structural model assessment

5.3.2.1 Predictive capability of model

The primary criteria used in determining the predictive capability of a structural model is the R^2 measure and the level of significance of the path coefficients in the model (Hair, Sarstedt, Ringle & Gudergan, 2017). Predictive value of the model in PLS-SEM will depend on a high R^2 value. The determination of a high R^2 value will depend on the research discipline, with a value of 0.20 considered high in disciplines such as consumer behaviour and a value of 0.75 perceived as substantial in marketing research studies (Hair, Ringle, Sarstedt & Mena, 2012). In this case, the path of interest is that between behavioural intention (BI) and frequency of use (FoU) upon which the moderators lie and should be significant. The results in Table 13 show an R^2 of 0.905 for BI and 0.14 for FoU in the structural model. The model thus explains a 14.0% of variation in frequency of use (FoU) and 90.5% in behavioural intention *(if the moderators are removed from the model, then R^2 dropped for FoU to 0.08).*

Further predictive relevance can be established by Stone-Geisser's cross-validated redundancy measure, Q^2 indicating the predictive relevance of the endogenous constructs (Sarstedt et al., 2016). The Q^2 value above 0 shows that the model has predictive relevance (Hair, Ringle, Sarstedt & Mena, 2012). The results from both tests are summarised in Table 13 at $p<0.01$ show that there is significance in the predictive capability of the constructs in the model.

Table 13: Predictive capability of structural model (R^2 and Q^2)

	Adjusted R^2	*Adjusted R^2	T Statistics	Q^2 (=1-SSE/SSO)	Comment
Behavioural Intention (BI)	0.905	-	55.211	0.844	Significant
Frequency of Use (FoU)	0.140	0.083	3.668	0.045	Significant

Note: * With cultural dimension moderators removed

5.4 Research hypotheses

Hypotheses were tested to ascertain the statistical significance of relationships between behavioural intention (BI) and frequency of use (FoU), habit (H) with frequency of use (FoU), perceived support of use (PSU) with frequency of use (FoU), and the moderating relationship of the five national cultural dimensions on the relationship between BI and FoU. The assessment of the significance and relevance of the structural model relationships are summarised in Table 14.

5.4.1   Hypothesis 1

H1 evaluates whether BI has positive significant impact on FoU. The result revealed that while the path coefficient between BI and FoU is positive, it is not significant (Beta coefficient=0.052, t=0.248| t >1.96, p=0.804|p<0.05). H1 is thus not supported.

5.4.2   Hypothesis 2a

H2a evaluates whether H has a positive significant impact on BI. The results revealed that the relationship path between H and BI is positive and very significant. (Beta coefficient=0.329, t=5.794|t >1.96, p=0.000|p<0.05). H2 is thus supported

5.4.3   Hypothesis 2b

H2b evaluates whether H has a positive significant impact on FoU. The results revealed that the relationship path between H and FoU is positive and significant. (Beta coefficient=0.494, t=2.972|t >1.96, p=0.003|p<0.05). H2 is thus supported.

5.4.4   Hypothesis 3a

H3 evaluates whether PSU has positive significant impact on BI. The results revealed that the relationship path between PSU and BI is positive and significant.

(Beta coefficient= 0.309, t=2.884|t>1.96, p=0.004|p<0.05). H3 is thus supported.

5.4.5 Hypothesis 3b

H3 evaluates whether PSU has positive significant impact on FoU. The results revealed that the relationship path between PSU and FoU is negative and not significant
(Beta coefficient= -0.113, t=0.734|t>1.96, p=0.463|p<0.05). H3 is thus not supported.

5.4.6 Hypothesis 4

H4 evaluates whether PD has a significant positive moderating effect on the relationship path between BI and FoU. The results revealed that PD has a negative moderating effect on the relationship between BI and FoU, but the effect is not significant. (Beta coefficient = -0.101, t=0.750|t>1.96, p=0.454|p<0.05). H4 is thus not supported.

5.4.7 Hypothesis 5

H5 evaluates whether IC has a significant negative moderating effect on the relationship path between BI and FoU. The results revealed that IC does have a small negative moderating effect on the relationship between BI and FoU, but the effect is not significant (Beta coefficient= -0.086, t=0.668|t>1.96, p=0.504|p<0.05). H5 is thus not supported.

5.4.8 Hypothesis 6

H6 evaluates whether UA has a significant negative moderating effect on the relationship path between BI and FoU. The results revealed that UA does have a small negative moderating effect on the relationship between BI and FoU, but the effect is not significant (Beta coefficient= -0.116, t=0.588|t>1.96, p=0.557|p<0.05). H6 is thus not supported.

5.4.9 Hypothesis 7

H7 evaluates whether MF has a significant positive moderating effect on the relationship path between BI and FoU. The results revealed that MF does have a small positive moderating effect on the relationship between BI and FoU, but the effect is not significant (Beta coefficient= 0.106, t=0.795|t>1.96, p=0.427|p<0.05). H7 is thus not supported.

5.4.10 Hypothesis 8

H8 evaluates whether LS has a significant moderating effect on the relationship between BI and FoU. The results revealed that LS does not have a significant moderating effect on the relationship between BI and FoU (Beta coefficient= 0.212|, t=1.163|t>1.96, p=0.103|p<0.05). H7 is thus not supported.

Table 14: Structural model relationships and level of significance

Structural relationship path	Hypothesis	Beta coefficient	Standard deviation	T-Stats	P Values	Comment(s)
BI -> FoU	H1	0.052	0.205	0.254	0.799	No Significant Impact; Reject H1
H -> BI	H2a	0.329	0.057	5.794	**0.000**	Significant Impact; Accept H2a
H -> FoU	H2b	0.494	0.161	3.063	**0.002**	Significant Impact; Accept H2b
PSU -> BI	H3a	0.309	0.107	2.884	**0.004**	Significant Impact; Accept H3a
PSU -> FoU	H3b	(0.113)	0.159	0.713	0.476	No Significant Impact; Reject H3b
Mod-Eff (PD)_BI ->FoU	H4	(0.101)	0.132	0.770	0.441	No Significant Impact; Reject H4
Mod-Eff (IC)_BI ->FoU	H5	(0.086)	0.130	0.666	0.505	No Significant Impact; Reject H5
Mod-Eff (UA)_BI ->FoU	H6	(0.116)	0.202	0.577	0.564	No Significant Impact; Reject H6
Mod-Eff (MF)_BI ->FoU	H7	0.106	0.133	0.800	0.424	No Significant Impact; Reject H7
Mod-Eff (LS)_BI ->FoU	H8	0.212	0.186	1.142	0.254	No Significant Impact; Reject H8

Overall, of the 10 hypotheses proposed in this study, only three were supported by the data collected and analysed. (1) The direct effect of H on BI, (2) the direct effect of H on FoU, and (3) the direct effect of PSU on BI. Two hypothesised paths with the constructs PSU and PD resulted in a sign that was not expected. PSU has a negative

relationship with FoU, and PD moderated the relationship between BI and FoU negatively. Neither PSU nor PD's relationship was significant, however. A summary of the structural model paths and significance is shown in Figure 7. Table showing full results with all path coefficients in Appendix C
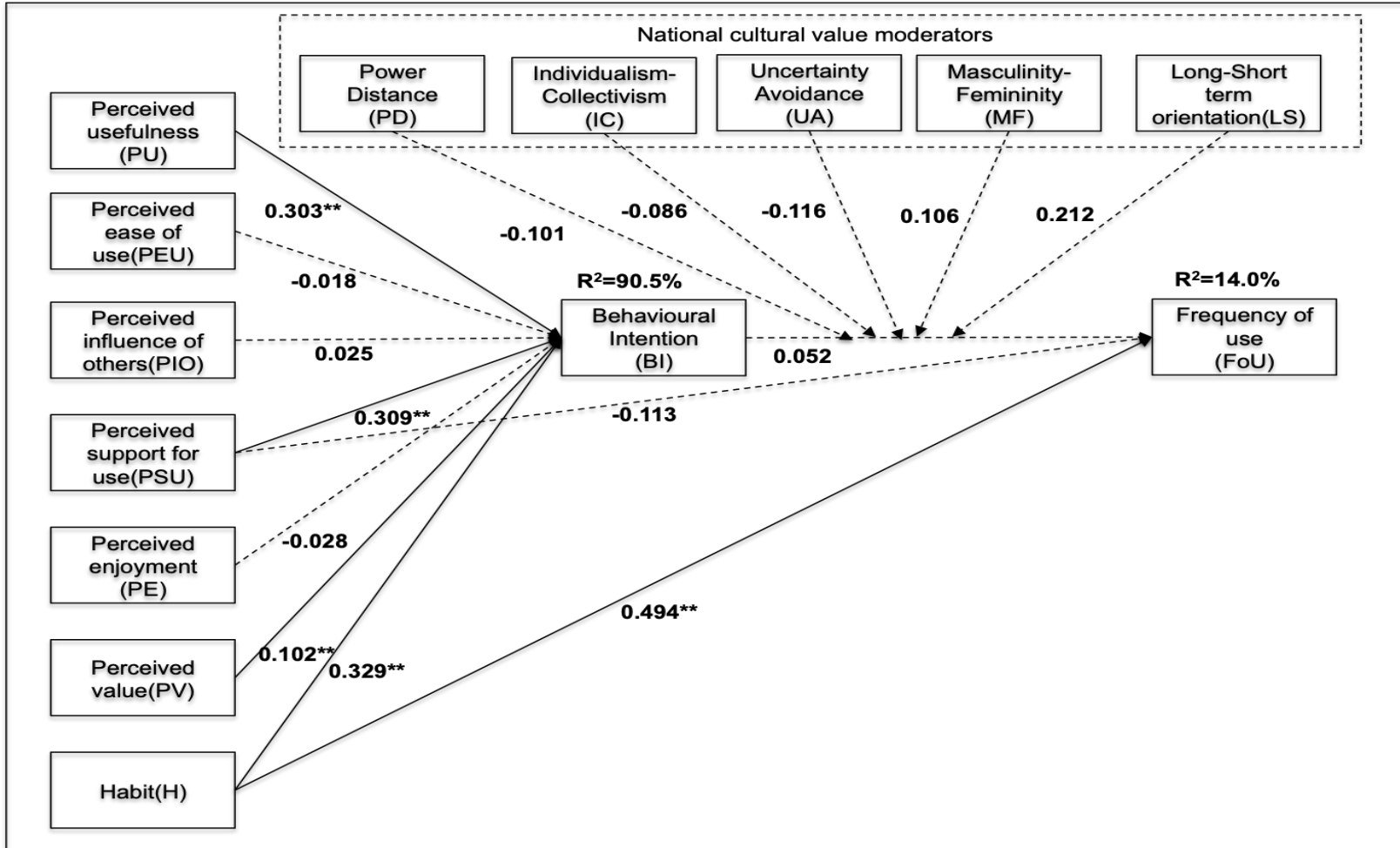
Note: Dashed lines (path coefficient not significant); **p<0.05.

Figure 7: Structural model results

Chapter 6: Discussion

6.1 Introduction

In this chapter, insights from the results outlined in chapter five will be presented and connected to the review of literature from chapter two and the research hypotheses in chapter three. The discussion will present the key research findings against the backdrop of the relevant theories presented in the literature review. The aim is to gain a better understanding of how the relevant constructs in technology adoption models interact with cultural dimensions to explain, confirm or extend the understanding of how individuals in Zambia adopt and use mobile financial technology leading to digital financial inclusion.

The discussion will be presented in the following order. (1) A discussion of the structural model constructs relating the theoretical model to the empirical model, (2) sample demographics and descriptive statistics, (3) results of the hypotheses tested, and (4) a conclusion leading to implications of the study in the next chapter.

6.2 Measurement model

This study focused on the role of national cultural dimensions in moderating the adoption and use of technology as an antecedent for improving financial inclusion through the behaviour intention and ultimate use of digital financial services using data from Zambia. The main theoretical model that was relied upon to explain how individuals decide to adopt and use technology was the UTAUT2 model (Venkatesh et al., 2012). In the original research model, Venkatesh et al., (2012) only assessed the moderating effects of age, gender, experience, and voluntariness in improving the overall predictive relevance of the model. The inclusion of cultural moderators, however, was found to improve the explanatory capacity of the model in a cross-cultural context (Baptista & Oliveira, 2015; Picoto & Pinto, 2021; Zhang et al., 2018). An empirical assessment of this model and its key constructs within a new context was thus applied to provide insights into how it could be used to expand financial inclusion.

In preparing the measurement model, the key constructs from UTAUT2 were all maintained, namely, performance expectancy (PE) (surveyed as perceived usefulness - PU), effort expectancy (EE) (surveyed as perceived ease of use - PEU), social influence (SI) (surveyed as perceived influence of others - PIO), facilitating conditions (FC) (surveyed as perceived support for use - PSU), hedonic motivation (HM)(surveyed as perceived enjoyment - PE), price value (PV), habit (H), behavioural intention (BI), and use behaviour (UB) (surveyed as frequency of use - FoU) (Venkatesh et al., 2012). All items measuring the constructs were maintained but adapted for the study on mobile financial services. Likewise, cultural value dimensions power distance (PD), Individualism/collectivism (IC), uncertainty avoidance (UA), masculinity/femininity (MF) and long-term/short-term orientation (LS) were maintained applying the constructs and items from existing research (Hassan et al.,2011; Srite & Karahanna, 2006).

The structural model explained 90.5% (adjusted R^2 =0.905) in the variation of behavioural intention (BI) to adopt mobile banking or mobile money. This is a higher outcome than previous studies without cultural moderators (Oliveira et al., 2016; Venkatesh, Morris, Davis et al., 2003; Venkatesh et al., 2012) and studies with cultural moderators (Baptista & Oliveira, 2015). The predictive capacity of the model for FoU was, however, much lower at 14% (adjusted R^2 =0.014) when compared to similar studies (Baptista & Oliveira, 2015). To better assess the impact of cultural moderators in the model and their impact on the variance in FoU, they were temporarily removed. The variation in FoU explained by the model dropped without moderators to 8.3% (adjusted R^2 =0.083). An R^2 of between 0.10 and 0.20 in consumer behaviour studies however is still considered to be good as judgement of an R^2 is discipline-specific (Hair, Ringle, & Sarstedt, 2011). An R^2 less than 0.10 generally does not provide good predictive relevance (Falk & Miller, 1992). When the R^2 and Q^2 measures are considered together, the structural model does provide a good predictive capacity and is relevant (Sarstedt et al., 2016) for both BI and FoU in the context of Zambia, confirming its usefulness. This lower R^2 for FoU may be indicating, however, that the addition of other constructs like initial trust and perceived risk(Baptista & Oliveira, 2016) to the model should be considered.

6.3 Sample demographics

The survey instrument used to measure the items within the constructs was an online questionnaire delivered via Google forms. An interesting point that was noted from

pretesting the survey instrument was that almost all participants accessed the survey via their mobile phones. This finding initially supports how widespread adoption of mobile internet-enabled devices can support broader financial inclusion by increasing the number of access points for digital financial services (Demirgurc-Kunt et al., 2018).

The invitation to complete the survey received 239 responses representing a 24% response rate. This response rate is comparable to similar studies in similar contexts measuring technology adoption (Baptista & Oliveira, 2015; Oliveira et al., 2016). 59% of respondents were women. Respondents' ages ranged from 18 to 56, with 70% of the total sample between the ages of 26 and 45 years old. Around 80% of respondents had a bachelor's degree or higher. 70% of the sample was either in part-time or full-time employment. About 75% of the sample indicated they already used mobile money and a mobile banking application, 19% used only mobile money and 5% used only a mobile banking application (Table 7).

There are two features to note about the sample that could be relevant. (1) The sample is very well educated, an observation that could be of relevance in some of the individual cultural values expressed and the propensity to adopt new technologies (Malaquias & Hwang, 2019). The highly educated sample is also a feature noted in other similar studies measuring technology adoption (Baptista & Oliveira, 2015; Duarte & Pinho, 2019; Farah et al., 2018; Oliveira et al., 2016; Picoto & Pinto, 2021). Formal financial inclusion is also likely to be higher with post-secondary education (Allen et al., 2016; Lenka & Barik, 2018). (2) The sample is also predominantly in employment of some form. The likelihood overall of being financially included is higher for those in employment compared to the self-employed or unemployed (Allen et al., 2016).

The finding that 75% of the sample used both mobile money and a mobile banking application was not surprising when the antecedents above are considered. In addition, Zambia has a mobile penetration of 107% and mobile internet penetration of 56%. More than eight percentage points of this growth occurred in the past 18months (ZICTA, 2021). The opportunity to increase digital financial inclusion with the growth of mobile penetration thus remains significant (Demirgurc-Kunt et al., 2018).

6.4 Research hypotheses

6.4.1 Hypothesis 1

BI has a significant and positive effect on FoU.

This hypothesis was not supported, as the path coefficient, even though positive, was not significant. (Beta coefficient=0.052, t=0.248| t >1.96, p=0.804|p<0.05). This finding contradicts some of the earlier studies on technology use and acceptance on which this study is based. In both the UTAUT and its extension UTAUT2, the effect of BI on FoU was well established and significant (Baptista & Oliveira, 2016; Venkatesh, Morris, Davis et al., 2003; Venkatesh et al., 2012). The effect of BI on recommendation to adopt was also found to be positive and significant in another study (Oliveira et al., 2016). So, while this finding was not expected, especially as the BI to FoU path is the hypothesised path of moderation of cultural constructs, the lack of significance of this path has been reported in a prior study (Baptista & Oliveira, 2015). The indication here is that other constructs like attitude, perceived risk and trust could be added to the model to improve its predictive value (Baptista & Oliveira, 2015, 2016). In a subsequent study by Farah et al. (2018), trust and risk were added as endogenous variables and the path from BI to FoU was found to be indeed significant(Beta coefficient = 0.398; p<0.001) even though the effect of both variables on BI itself was not signficant.

6.4.2 Hypotheses 2a and 2b

H has a positive and significant effect on both BI and FoU.

Both hypotheses were supported with the path coefficients both being relatively large, positive, and significant at p<0.01. This observed effect matches the outcomes from prior research where H is shown to have significant direct effects on both BI and use of a technology (Baptista & Oliveira, 2015; Duarte & Pinho, 2019; Venkatesh et al., 2012; 2016; Yen & Wu, 2016). Habit, from a theoretical perspective, is facilitated by both the automatic response to cues leading to a reward or a stored intention to complete an action based on a belief (Venkatesh et al., 2016). The case of automatic responses to cues is postulated to trigger the causal pathway to behaviour; thus, specific cues in the environment and

sensitivity to these cues will lead to use of a specific technology. On the other hand, habits, once formed, may be harder to break and this potentially explains the negative and significant effects habit has on BI with regards to adoption of mobile banking in another study adoption (Farah et al., 2018). Venkatesh et al. (2016) conceptualise habit as *legacy system habit* hindering the intention to adopt a new system and propose transformational leadership intervention to negate its hindering effect on intention to adopt a new technology. So what may be clear is while habitual use of other non-formal financial services may negatively impact the behaviour intention to adopt formal mobile financial services, habituation with mobile money or mobile application use would thus be a strong predictor of actual use behaviour as was found in the current study in line with earlier research (Baptista & Oliveira, 2015; Yen & Wu, 2016). Habituation could affect both BI and FoU for self-declared users of mobile financial services and was shown to be the strongest and most significant antecedent factor for use behaviour (Baptista & Oliveira, 2015). The automatic pathway of habit would be at play in this instance. For instance, the use of mobile banking and mobile money in situations where temporary shocks are experienced for vulnerable households could be facilitated by risk-sharing habit (Jack & Suri, 2014).

6.4.3 Hypothesis 3a and 3b

PSU has a positive and significant effect on BI and FoU.

The hypothesis on the effect of PSU on BI (3a) was supported with the path coefficient significant at p<0.05. PSU is analogous to facilitating conditions (FC) and was introduced into information systems research with UTAUT (Venkatesh, Morris, Davis et al., 2003). PSU refers to the belief an individual has that the adoption of a particular technology will be supported by resources, knowledge, and help where required. In UTAUT, where the organisation context of technology adoption and use was studied, PSU was primarily hypothesised to influence FoU only directly since organisations would provide all support necessary to control behaviour with regards to use of specific technologies (Venkatesh, Morris, Davis et al., 2003).

The hypothesis on the direct effect of PSU on FoU (3b) was not supported, as the path was negative and not significant (Beta coefficient= -0.113, t=0.734|t>1.96, p=0.463|p<0.05). In UTAUT2, with a focus on the consumer context, PSU was extended

to also mediate its influence on usage behaviour through BI (Venkatesh et al, 2012). This extension of the influence of PSU on FoU mediated by BI is due to the expectation that consumers generally face different environments and varying levels of support and as such some of the influence on actual usage would be mediated by usage intention depending on the support perceived to be available (Madden et al., 1992). The effect of PSU on BI is thus an artefact within UTAUT2 from the theory of planned behaviour (TPB) captured as *perceived behavioural control* (Figure 2).

The result of H3a is thus in line with earlier studies that confirm a direct positive effect for PSU on BI (Venkatesh et al., 2012). However, other studies (Baptista & Oliveira, 2015; Farah et al., 2018; Oliveira et al., 2016) did not find any significant effect on BI, indicating it either is not truly an important factor in determining how consumers develop intentions as they are exposed to varying environments or it was not important in the context being studied. On the other hand, the result for H3b contradicted some prior studies, which indicate PSU will directly influence usage (Im et al., 2011; Venkatesh et al., 2012). The lack of significant effect was, however, in line with other studies (Baptista & Oliveira, 2015). It is proposed the absence of a significant effect on usage could be due to the absence of the perception of strong institutional support and possibly factors like trust in the Zambian context. The finding on the positive and significant influence of PSU on BI does present an opportunity overall to drive intention into action usage in the presence of other factors.

6.4.4 Hypothesis 4

PD has a significant positive moderating effect on the relationship between BI and FoU.

This hypothesis was not supported by the results from the structural model. PD had a negative path coefficient, which was not expected, and also not significant. (Beta coefficient = -0.101, t=0.750|t>1.96, p=0.454|p<0.05). PD in earlier studies showed positive and significant effects on usage behaviour for technology in high PD societies (Baptista & Oliveira, 2015; Picoto & Pinto, 2021). This expected sign and significance of moderation of use behaviour by PD is expected as the opinions of others, especially superiors or authority figures, is considered very important in high PD societies (Hofstede, 2011). Zambia's relative score on the PD dimension at 60 is high, meaning Zambia is a largely hierarchical country (Hofstede, n.d.) (see Table 6 in chapter 3 for Zambia relative Hofstede index). The mean PD scores (m = 1.702), however, from the survey, indicated

a low PD score for the sample studied (see mean construct scores in Table 11). A low PD score could explain the negative PD moderation sign observed on FoU. The finding from the sample of PD being low compared to the expected population score for this dimension confirms to an extent how imputing a national cultural dimension on individuals should be done with caution or how non-stable cultural dimensions can be over time (Beugelsdijk & Welzel, 2018). So, it is possible that a low PD within the sample studied could be different from the expected score in the Zambia population but representative of the current prevalent cultural values of the population (Inglehart, 1990). Another point to note is PD scores were influenced by education levels; so, in a sample with over 80% having a post-secondary qualification, a lower PD can be expected (Hofstede et al. 2010).

6.4.5   Hypothesis 5

IC has a significant negative moderating effect on the relationship between BI and FoU.

This hypothesis was not supported by the results from the structural model. IC did have a negative moderating effect on FoU as hypothesized but this effect was not significant (Beta coefficient= -0.086, t=0.668|t>1.96, p=0.504|p<0.05). The finding here is consistent with studies where the individualism is found to positively moderate the relationship between BI and FoU (Picoto & Pinto, 2021; Zhang et al., 2018). The moderating effect was hypothesised to be negative for a collectivist society like Zambia based on its relatively low score on this index (Hofstede, n.d.). The moderating effect in other studies was found to be positive for collectivist societies with the opinion of the in-group in those societies proving important in directing behaviour and adoption of new technologies (Baptista & Oliveira, 2015) or not significant in either direction in determining BI or FoU of new technologies (Srite & Karahanna, 2006). The IC score for the sample studied was intermediate (m = 4.417), thus, not conclusively indicating a collectivistic or individualistic leaning. For Zambia, with a collectivist leaning overall as a nation, in-groups adopting a technology could be influential in supporting broader adoption, but generally, a low score on this dimension would not be supportive for moderating FoU of mobile technology (Hofstede et al., 2010). Individualistic societies have scored higher on adoption of information and communication technologies either because these technologies originate in these societies originally or remote interactions are favoured in countries that are individualistic. A plausible explanation for the non-significance of moderation within the

sample could be the standalone nature of mobile financial technology. Collaborative technology use and acceptance could provide more significant use cases to examine empirically for the moderating effect of this dimension (Srite & Karahanna, 2006).

6.4.6 Hypothesis 6

UA has a significant negative moderating effect on the relationship path between BI and FoU.

This hypothesis was not supported by the results from the structural model. UA did have a negative moderating effect on FoU as hypothesized but this effect was not significant (Beta coefficient= -0.116, t=0.588|t>1.96, p=0.557|p<0.05). The result of this study contradicts earlier studies (Baptista & Oliveira, 2015; Picoto & Pinto, 2021), where a positive moderating effect on FoU was found. The finding from this study on UA is largely in line with the seminal study informing the items and constructs used to measure the cultural dimensions in this study (Srite & Karahanna, 2006). High UA is associated with discomfort with novel situations in which new technologies may present and thus may negatively affect the desire to adopt and use new technology (Lee et al., 2013). Zambia, on a national level, does not score highly in either direction relatively on the UA scale with a score of 50 (Hofstede, n.d.). The survey sample score (m= 5.127) would indicate a higher UA, and this could be a possible explanation for the negative moderation though insignificant in this study. A discomfort with taking risks with newer technology would negatively affect adoption of mobile financial technology use as concerns with uncertainty of the safety and reliability if the system would prevail until perceived risk is mitigated to a large extent (Lee et al., 2013). Hofstede et al. (2010), in updating the dimensions of culture, confirmed this finding from a review of studies in innovation with societies innovativeness being negatively correlated to their uncertainty avoidance scores. Low adoption of new technologies could be expected in less innovative societies.

6.4.7 Hypothesis 7

MF has a positive and significant moderating effect on the relationship path between BI and FoU.

This hypothesis was not supported by the results from the structural model. MF did have a small positive moderating effect on the relationship between BI and FoU, but the effect was not significant (Beta coefficient= 0.106, t=0.795|t>1.96, p=0.427|p<0.05). The directional finding on the role of MF in this study is supported by other studies where MF was found to also positively moderate relationship paths in technology adoption models (Srite & Karahanna, 2006; Zhang et al., 2018). Other studies, however, found no significant moderating effect of MF on usage of technology, providing a conflicting point of view (Baptista & Oliveira, 2015; Picoto & Pinto, 2021). A possible explanation for these conflicting findings could come from the problematic nature of the MF dimension itself. Recent research has detailed issues with applying masculinity and femininity as a cultural attribute on its own but rather a manifestation of other attributes better related to the level of emancipation or independence found in societies (Minkov & Kaasa, 2020). Replication challenges are quite common as such with the studies on the MF dimension. In the sample used for this study, MF scored near the lowest of all dimensions (m = 1.869), revealing a very feminine leaning in the sample, which is largely in line with most respondents being women. Zambia, on the national level, scores 40 on the relative index for MF indicating, a feminine society (Hofstede, n.d.). The expectation as such would have been for positive moderation to be present to the extent that the sample or society leans masculine, which was not the case for the sample in the study. The explanation for small positive moderation could come from the findings that the type of technology being adopted could be moderated differently depending on which end of the spectrum was predominant. To be specific, adoption of technology for use for work would be stronger in masculine societies, while adoption of technology for personal use would be stronger in feminine societies (Zhang et al., 2018).
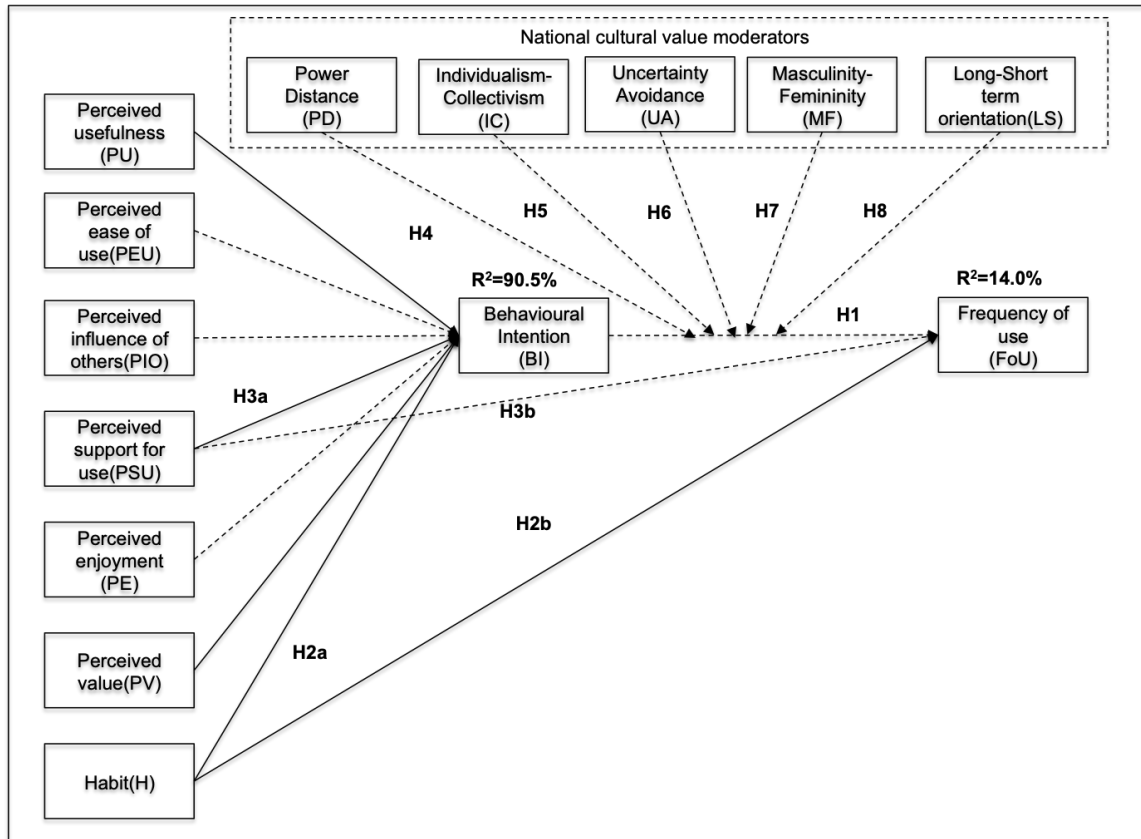
6.4.8 Hypothesis 8

LS moderates the relationship between BI and FoU, but no direction is specified.

This hypothesis was not supported by the results from the structural model. LS did have a small positive moderating effect on the relationship between BI and FoU, but the effect was not significant (Beta coefficient= 0.212|, t=1.163|t>1.96, p=0.103|p<0.05). The finding on the influence from prior studies is mixed. LS was found to negatively moderate the relationship between BI and usage of technology on the basis that those with a long term orientation are less likely to actively use mobile financial technology – a counterintuitive finding conceptually (Baptista & Oliveira, 2015; Zhang et al., 2018). A long-term orientation where the present is analogous to a flexible orientation characterised by being adaptable, a feature that would suggest greater adoption of useful technology (Minkov, 2018). LS in empirical testing includes items that assessed both the planning (LS2 and LS4) and traditions (LS1 and LS3) aspects of dimension across many countries and found significant evidence for the dimensions positive moderation of attitudes and use of technology (Hassan et al., 2011). Also, positive and significant moderation has been found in more recent studies where LS was found to have a positive and strong effect on the relationship between intention to use mobile technology and actual use (Picoto & Pinto, 2021). Zambia scores low on the LS scale with a score of 30, indicating a leaning towards being short term, traditionalist, and stable society (Hofstede, n.d.). With this score, a negative moderation could be expected in line with the prior research. The finding in the sample studied, however, presented different findings. Only two items (L2 and LS4) loaded appropriately and were maintained in the final model. The items were both related to the planning aspect of LS, and the sample score was high (m = 4.628). This score on planning could explain the positive moderating effect of LS on the relationship between BI and FoU even though it is not significant.

6.5 Additional findings

PU and PV were found to have a direct and significant effect on BI from the model. PU and its antecedents have consistently been shown to be a relevant and positive predictor of behaviour intentions from the earliest versions of the technology use and acceptance models studied in literature (Baptista & Oliveira, 2016; Davis, 1989; Folkinshteyn & Lennon, 2016; Venkatesh et al., 2016). PU score within the sample was also quite high, and all factors loaded appropriately and were maintained in the final measurement model.

PV had an intermediate score in the sample but nonetheless showed a significant effect on BI, finding both support in literature (Venkatesh et al., 2012) and a lack of support in meta-analytic studies (Baptista & Oliveira, 2016).

Note: Dashed lines (path coefficient not significant so hypothesis not supported)

Figure 8: Theoretical research model showing supported and non-supported hypothesis

6.6 Conclusion

The statistical analysis of the data collected in this study supported the usefulness of technology acceptance and use models in information systems literature in the context of Zambia. The model's predictive capability and relevance were shown to be significant with an R^2 of 90.5% for behavioural intention and R^2 of 14% for actual use behaviour. Both scores indicate the model overall could account for a significant enough variation in the key outcomes of interest in adoption of mobile financial technology, ultimately leading to inclusion.

In total, only three of the 10 hypotheses put forward to answer the key research question on the moderation of use behaviour leading to digital financial inclusion were supported. The structural model was found to be useful in explaining BI and FoU overall in the context of Zambia. The relationship path between BI and FoU was not found to be significant, however. This finding was not expected but similar findings had been seen in previous research indicating the need to explore the addition of other constructs around perceived risk and trust, which could be important in converting intentions into actual use of a platform involving finances(Baptista & Oliveira, 2016; Venkatesh et al., 2016).

The factors found to influence BI and FoU the most from the hypothesis tested with the model were H and PSU. Habit had both a significant and large positive effect on the intention to use and frequency of use of mobile financial services. This finding validates previous studies showing habit both as a function of stored intentions and automatic behaviour developed through experience is a good predictor of usage and adoption. PSU, on the other hand, only significantly influenced BI, a finding which finds support in existing research and could be further exploited in driving the intention to adopt as a mediator to FoU and ultimately financial inclusion.

The model did not support a moderating influence of cultural dimensions on the path between BI and FoU, the key research question that this study set out to answer. The reason for this lack of support at a cultural dimension level has been explored in some detail above and should remain the object of future research in more contexts with new information that is being added to the body on research on culture and its measurement. The original Hofstede dimension scores forming the basis of moderating direction hypothesised measured differences between country cultures and not culture in the absolute sense. As a result, some level of stability in the dimensions could be expected if culture was assumed to be shifting under the same set of global forces (Hofstede et al., 2010). The finding in the sample does demonstrate stability is not the case to be expected.

Chapter 7: Conclusion

7.1 Introduction

Digital financial service access and use can play an important part in addressing the divide resulting from differences in digital access across countries that is shown to exacerbate financial exclusion. Mobile devices and the broader access to financial services via mobile telephony present an opportunity to address this issue efficiently (Demirgurc-Kunt et al., 2018). This study set out to focus on the role of national cultural dimensions in moderating the adoption and use of technology as an antecedent for improving financial inclusion through the behaviour intention and ultimate use of digital financial services using data from Zambia. The moderated relationship paths studied were drawn from well-established structural technology use and adoption models from information systems research (Baptista & Oliveira, 2016; Picoto & Pinto, 2021; Venkatesh et al., 2012).

The concluding chapter of this study will be presented in the order of the sections as follows, (1) the principal conclusion of the study based on the results of the research hypotheses tested, (2) the theoretical contribution of the study to the body of knowledge on technology use and adoption, (3) the implications for policymakers, business and management, (4) limitations of the research, and finally (5) suggestions for future research.

7.2 Principal conclusions

The structural model capturing the antecedents of technology use and adoption was tested with the inclusion of five cultural moderators (Figure 4); however, none of the cultural dimensions included in the model had a significant moderating role in the relationship between behavioural intention (BI) and frequency of usage (FoU). Nonetheless, with cultural moderators included in the structural model, 14.0% variation in FoU can be attributed to the research model. With cultural moderators removed, the variance dropped to 8.3% in explaining FoU in the model, confirming the inclusion of these moderators provides an analytically superior model. Despite the statistical insignificance of the moderators in the model on the path between BI and FoU, the result still shows that including cultural moderators improves the predictive power of a structural technology use and adoption model in studies like these.

Overall, of the 10 hypotheses formulated, only three, H2a, H2b and H3a, were supported by data collected, with the rest not providing statistical significance needed to validate them. Habit (H) and perceived support for use (PSU) had a positive significant effect on the intention to use mobile financial technology and on the frequency of use of mobile financial services either directly or via mediation. Behavioural intention did not have a significant effect on frequency of usage, an unexpected outcome. The lack of significance of this path has been reported in a prior study (Baptista & Oliveira, 2015). The indication here is that other constructs like attitude, perceived risk and trust could be added to the model to improve its predictive value (Baptista & Oliveira, 2015, 2016).

The observed effect of H matches the outcomes from prior research where habit is shown to have significant direct effects on both behaviour intentions (BI) and use of a technology (Baptista & Oliveira, 2015; Venkatesh et al., 2012; 2016). This leads to the conclusion that habitual use or lack of use could promote use or become a barrier to the adoption and use of a new technology. In the latter case specifically, use habit with a legacy system could inhibit the use of a new system (Venkatesh et al., 2016). In the sample surveyed, initial use of mobile financial technology was established by screening. H provided a strong and significant direct effect on both the subsequent intention to use and frequency of use of mobile financial services. This indicates that targeting habit-forming interventions could strengthen the use and adoption of mobile financial services in targeted groups in a bid to improve financial inclusion through the frequency of use of these services. The deliberate use of cues and rewards can be adopted to build these habits in targeted interventions(Yen & Wu, 2016).

The effect of PSU on BI is confirmed from prior studies, which show that facilitating conditions directly influence intention to use technology (Venkatesh et al., 2012; 2016). Support for use includes the presence of the necessary resources, including technical and social infrastructure (Venkatesh, Morris, Davis et al., 2003), The PSU items on the survey scored high, indicating a strong perception of support for use of mobile financial services leading to an intention to use the system. PSU's non-significant effect on usage could be due to the absence of the perception of strong institutional support and possibly factors like trust in the Zambian context (Baptista & Oliveira, 2015).

7.3 Theoretical contribution

This study aimed to make a theoretical contribution to a well-researched area in information systems (IS) on the drivers of technology use and adoption (Hoehle et al., 2012; Malaquias & Hwang, 2019; Martins et al., 2014; Venkatesh et al., 2016). The structural model applied in this study, the unified theory of acceptance and use of technology extension (UTAUT2), synthesises earlier models, including the technology acceptance model (TAM), theory of reasoned action (TRA) and theory of planned behaviour (TPB) together to produce a reliable model for explain technology acceptance and use in both industrial and commercial settings.

In recent times, researchers have expanded the original UTAUT2 structural model to include exogenous constructs and moderators to improve the predictive value of the model successfully (Baptista & Oliveira, 2016; Malaquias & Hwang, 2019; Oliveira et al.,2016; Venkatesh et al., 2016). The inclusion of cultural moderators in IS research is now more commonplace as the need to understand the impact of culture on the adoption of global technological systems is relevant (Martins et al., 2014; Picoto & Pinto, 2021; Srite & Karahanna, 2006). A cited challenge with research,including cultural factors, however, is the very nature of study into culture is difficult to replicate (Minkov, 2018). This is particularly so with the dimensions proposed by Hofstede, which were largely based on workplace archetypes and clearly omitted populations in the developing world, which the sampling frame did not cover (Hofstede, 1980; Hofstede & Bond, 1988). Therefore, a study such as this which replicated the application of UTAUT2, including cultural moderators in the context of Zambia, a developing country, provides further confirmation of the analytical superiority of UTAUT2 in a different cultural context. In addition, it confirmed the cited analytical superiority of technology adoption models that include cultural dimensions (Baptista & Oliveira, 2015). The change in variance of FoU (from 0.140 to 0.083) in the absence of cultural moderators in the model provides the confirmation of the usefulness of the extended model as a predictor of mobile financial service usage.

The supported hypothesis from this study includes the positive effect of H and PSU directly on FoU and mediated by BI (in the case of PSU where the direct effect on FoU was not significant). H as an antecedent of BI and FoU has been replicated quite well in UTAUT2 in several studies and now confirmed in this study (Venkatesh et al., 2016; Yen & Wu, 2016). H in this study provided the highest path coefficients for BI and FoU of all the paths within the model that were significant at $p<0.01$. Such a strong effect being confirmed

within the sample surveyed provides a theoretical grounding for focusing on habit in use and adoption of technology for digital financial services.

Other findings from the study include the significant positive effect of perceived usefulness (PU) and perceived value (PV) on BI. The positive effect of PU on BI is well established (Baptista & Oliveira, 2016; Hoehle et al., 2012) and is also confirmed in this study. PV influences BI positively in this study, a finding that finds both support and non-significance in prior studies (Baptista & Oliveira, 2015, 2016; Venkatesh et al., 2012). In the context of this study in Zambia, the high cost of mobile financial services was cited by only 1.2% of respondents on the Finscope 2020 survey as the main barrier to using mobile financial services products compared to 39.5% citing the lack of a mobile device (Bank of Zambia, 2020). PV being a relevant predictor or BI and FoU as such from the results of this study could be strongly context-dependent and stronger in regions where the cost is seen to be low and thus supportive of use.

7.4 Implications for policy makers, business, and management

The importance of the drivers of mobile financial technology has important implications for business. Digital financial inclusion and e-commerce growth facilitated by technology adoption would only continue to grow in relevance. COVID-19 has served as an accelerant for this trend, with estimates of digital financial usage previously thought to be in the distant future being achieved in the present (UNCTAD, 2021). The outcome of this study would be of relevance to traditional financial services institutions expanding their digital offering in response to falling profitability caused by high-cost physical service models, new financial technology companies (FinTech) and e-commerce platforms (Lee et al., 2013; Picoto & Pinto, 2021). Expanding consumer markets for both financial products and consumer goods would be linked to formal financial inclusion. Understanding the antecedents to financial inclusion measured as frequency of use would be important to design and implementation of proper marketing strategies for business to capture new customer segments who were previously excluded. Particularly the finding on habit being a strong influencer on the intention to use and frequency of use can be leveraged to insert cues and rewards in customer value propositions on mobile financial services. Furthermore, providing strong support for new users to overcome initial hesitance to using these platforms can take advantage of the positive effect of perceived support for use as another driver of intention to use mobile financial services.

For policymakers and governments, working on increasing equitable access to financial services for transfers, payments, credit, remittances, and job creation is a political imperative. This study provides a cultural lens through which technological adoption to support this imperative can be viewed. Globally, governments and multilateral institutions driving inclusion to combat tax evasion, money laundering and illicit financial flows as they believe these can be easily tracked and prevented if financial flows are driven mainly through formal institutions stand to benefit from improved understanding of the drivers for inclusion. The finding on perceived support for use can be leveraged through policies, which improve the resources required by regulation to be available to users of mobile financial service users. The direct effect on the intention to use mobile financial services can then mediate further adoption and use of mobile financial services leading to higher inclusion.

7.5 Limitations of the research

This study contributes to the body of research on the extension of technology use and adoption models with cultural constructs as moderators as valuable predictors of mobile financial services use; however, there are some limitations, which should be examined further. First, sampling using a nonprobability method limits the generalisability of findings beyond the sampled population even though the research findings maintain their validity within the research context (Zikmund et al., 2013). Respondents were also volunteers, self-reporting their perceptions, further limiting generalisability. Second, due to the methodology used to administer the survey instrument (questionnaire), which was done electronically through Google forms, the study did not capture respondents who do not have access to the internet. While the design of this study categorically excluded adults without internet access, it is acknowledged that they do form a significant population who may use mobile money without requiring internet access. Third, the theoretical model on technology use and acceptance being applied assumes almost universal access to mobile devices is available with the population being studied – an antecedent to digital financial inclusion. This is not necessarily the case, especially in poorer countries like Zambia, where lack of access to mobile devices is cited as the largest barrier to digital financial inclusion (Bank of Zambia, 2020). Fourth, cultural moderators alone are used in this study, but other moderators like age, gender, education, and residence area (rural versus urban) could also significantly affect the use and acceptance of mobile financial technology. For example, a significant proportion of respondents (77%) to the survey had either a post-

secondary or graduate degree, possibly introducing a sample bias by over-representing a highly educated demographic in this study. Finally, the data being used in this survey was collected with the backdrop of the COVID-19 pandemic that could naturally have increased baseline technology adoption due to the restrictions on face-to-face interactions (UNCTAD, 2021).

7.6 Suggestions for future research

To extend this study, it may need to be repeated in other contexts and with a larger sample to confirm the main findings. The non-significant impact of behavioural intention on frequency of use was particularly surprising and may be an artefact of the specific sample studied so a replication of this study could help in establishing if this is indeed the case. This will be important for both academic and practical reasons. The inclusion of other constructs measuring perceptions of risk and trust could be investigated as addition antecedents to mobile financial intention leading to usage. In this study, it was noted that all the five moderating cultural dimensions were insignificant in affecting behavioural intentions and frequency of use. This, however, is not the case in other regions across wider range of individuals cultural groups, and technologies. Thus, further research could be conducted, which should include a modified research model that includes new moderators such as gender, employment status, residence area (urban versus rural) or education. While some of this information was collected in the current study, their moderating effects were not assessed.

Second, Hofstede's cultural dimensions are recognised as one of the most comprehensive frameworks of national cultural values, but it has limitations that have been presented in recent research (Minkov, 2018; Minkov & Kaasa, 2020). Future research can apply other culture dimensions, for example, GLOBE's or Hall's culture dimensions in the empirical assessment of moderating influence (Zhang et al., 2018). Also, cultural dimensions may also have direct effects on behavioural intentions or other constructs within the technology adoption model, which provides subjects for future research.

Third, habit emerged in this study as the most significant influencer of behavioural intention and usage. From prior studies, habit has been shown to be moderated by other variables (Yen & Wu, 2016), and these findings could be investigated further while controlling for factors such as gender, age, experience and residence.

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Appendix 1: Survey instrument

Use of mobile money and/or mobile banking applications

I am Olusegun Omoniwa, a final year student at the Gordon Institute of Business Science, University of Pretoria, South Africa. I am conducting research as a part of my MBA studies in the area of *use and adoption of mobile financial services as a way to improve financial inclusion.* This survey is designed to obtain feedback regarding the factors that influence your behavioural intention to use mobile technology in accessing and using financial services.

Taking part in this survey is completely voluntary and you may withdraw at any time without penalty, however your valuable input is appreciated. Your participation is also anonymous and only aggregated data will be reported.

The survey consists of four sections. The survey should take not more than 10 minutes of your time. When evaluating a statement, please answer the statement from your own perspective. By completing the survey, you indicate that you voluntarily participate in this research. For any concerns or questions, please contact me or my supervisor using details provided below.

Researcher: Olusegun Omoniwa	Supervisor: Dr. Michele Ruiters
Email: 20802902@mygibs.co.za	Email: ruitersm@gibs.co.za

Screening questions

Do you currently use mobile money or a mobile banking application?

Yes	
No	

Do you live in Zambia?

Yes	
No	

If your answer is "Yes" to both questions, please proceed to complete the survey.

If your answer is "No" to either of the questions, you do not need to complete the survey.

SECTION 2- DEMOGRAPHIC INFORMATION

What year were you born?   Code: **AGE**

_ _ _ _

What is your highest level of education?

Code	HLE
Some high school	1
Grade 12 completed	2
Diploma	3
University degree (Bachelors or equivalent)	4
Postgraduate degree(Masters or Doctorate)	5

What is your gender?

Code	GENDER
Male	1
Female	2
Prefer not to say	3

Which ONE of the following options best describes your employment status?

Code	ES
Self-employed	1
Full-time employed by an organisation	2
Part-time employed by an organisation	3
Full-time student	4

Housewife or Househusband	5
Retired	6
Unemployed	7
Other, please specify:	8

What mobile financial service do you use?

Code	MFS
Mobile money	1
Mobile banking application (app)	2
Mobile money and mobile banking application (app)	3

SECTION 3- TECHNOLOGY ADOPTION AND USE

On a scale of 1 to 7 where 1 is "strongly disagree" and 7 is "strongly agree", please rate the importance of the following statements when you are engaging with mobile money/mobile banking services

	Statements	Strongly disagree to Strongly agree						
		1	2	3	4	5	6	7
Code	**Perceived usefulness**							
PU1	I find mobile money/mobile banking services useful in my daily life							
PU2	Using mobile money/mobile banking services increases my productivity							
PU3	Using mobile money/mobile banking services helps me accomplish things more quickly							

PU4	Using mobile money/mobile banking services increases my chances of achieving things that are important to me							
	Perceived ease of use							
PEU1	Learning how to use mobile money/mobile banking services is easy for me							
PEU2	My interaction with mobile money/mobile banking services is clear and understandable							
PEU3	I find mobile money/mobile banking services easy to use							
PEU4	It is easy for me to become skilful at using mobile money/mobile banking services							
	Perceived influence of others							
PIO1	People who are important to me think that I should use money/mobile banking services							
PIO2	People who influence my behaviour think that I should use mobile money/mobile banking services							
PIO3	Mobile money/mobile banking services use is a status symbol in my environment							
	Perceived support for use							
PSU1	I have the resources necessary to use mobile money/mobile banking services							
PSU2	I have the knowledge necessary to use mobile money/mobile banking services							
PSU3	Mobile money/mobile banking is compatible with other technologies I use							

PSU4	I can get help from others when I have difficulties using Mobile money/mobile banking services							
	Perceived enjoyment							
PE1	Using mobile money/mobile banking services is fun							
PE2	Using mobile money/mobile banking services is enjoyable							
PE3	Using mobile money/mobile banking services is entertaining							
	Perceived value							
PV1	Mobile money/mobile banking services are reasonably priced							
PV2	Mobile money/mobile banking services are reasonably priced comparing with other banking channels							
PV3	Mobile money/mobile banking services are a good value for the money							
PV4	At the current price, mobile money/mobile banking services provide a good value							
	Habit							
H1	The use of mobile money/mobile banking services has become a habit for me							
H2	I am addicted to using mobile money/mobile banking services							
H3	I must use mobile money/mobile banking services							
H4	Using mobile money/mobile banking has become natural to me							

	Behavioural intention									
BI1	I intend to continue using mobile money/mobile banking services in the future									
BI2	I will always try to use mobile money/mobile banking services in my daily life									
BI3	I plan to continue to use mobile money/mobile banking services frequently									

Author's adaptation from Venkatesh, Morris, Davis and Davis (2003), Venkatesh et al. (2012) and Baptista and Oliveira (2015)

What is your actual frequency of use of mobile money service or mobile banking applications? Select one item.

Code	FoU
Have not used	1
Once a year	2
Once in six months	3
Once in three months	4
Once a month	5
Once a week	6
Once in four to five days	7
Once in two to three days	8
Every day	9
Several times a day	10

Author's adaptation from Baptista and Oliveira (2015); Allen et al. (2016)

SECTION 4: CULTURAL VALUES

On a scale of 1 to 7 where 1 is "strongly disagree" and 7 is "strongly agree", please rate the importance of the following statements

	Statements	Strongly disagree to Strongly agree						
Code		1	2	3	4	5	6	7
	Masculinity/Femininity (MF)							
MF1	It is preferable to have a man in a high level position rather than a woman							
MF2	Solving organizational problems requires the active forcible approach which is typical of men							
MF3	It is more important for men to have a professional career than it is for women to have one							
MF4	Women do not value recognition and promotion in their work as much as men do							
	Power distance (PD)							
PD1	Managers should make most decisions without consulting subordinates							
PD2	Manager should not ask subordinates for advice, because they might appear less powerful							
PD3	Decision making power should stay with top management in the organization and not delegate to lower level employees							
PD4	Employees should not question their manager's decision							
	Long/short term orientation (LS)							
LS1	Respect for tradition is important for me							
LS2	I work hard for success in the future							

LS3	Traditional values are important for me							
LS4	I plan for the long term							
	Individualism/collectivism (IC)							
IC1	Being accepted as a member of a group is more important than having autonomy and independence							
IC2	Group success is more important than individual success							
IC3	Being loyal to a group is more important than individual gain							
IC4	Individual rewards are not as important as group welfare							
	Uncertainty avoidance (UA)							
UA1	Rules and regulations are important because they inform workers what the organization expects of them							
UA2	Order and structure are very important in a work environment							
UA3	It is better to have a bad situation that you know about, than to have an uncertain situation which might be better							
UA4	People should avoid making changes because things could get worse							

Adapted from Hassan, Shiu, and Walsh(2011); Srite and Karahanna(2006)

Appendix B: Data access letter

HN Conseil

HN CONSEIL LIMITED
Plot 394/378A Simon Mwapwepwe Street, Lusaka Zambia

14 July 2021

Olusegun Omoniwa
Plot 16924 Thabo Mbeki road,
Lusaka,
Zambia.

Dear Sir,

RE: REQUEST FOR ACCESS TO RESPONDENT DATABASE

We are writing to confirm we will be able to share the link to your research questionnaire with up to 1,000 panellist and volunteered individuals on our database of respondents used for marketing and other online research activities in Zambia.

As requested, the survey will be shared with only those who have previously indicated to participate in any of our research and are 18 years and above. These panellists are those who have a mobile number and an email address for the purpose of collecting the data.

Please note that our respondents provide information on a purely voluntary basis and are not remunerated as this may affect the response rate. To improve response rates, we will send up to a maximum of two reminders.

Please ensure your survey document does not collect any personal identifiable data. Personal identifiable data includes and is not limited to a person's name, mobile number, email address, physical address or national identity number (NRC).

We wish you all the best in your research and look forward to hearing of your overall findings.

Best Regards,
Tolu

Administrator
HN Conseil Limited

Appendix C: Structural model relationship paths

Structural relationship paths	Beta coefficient (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (|O/STDEV|)	P Values
Behavioural Intention (BI) -> Frequency of Use (FoU)	0.052	0.056	0.210	0.248	0.804
Habit (H) -> Behavioural Intention (BI)	0.329	0.328	0.057	5.794	**0.000**
Habit (H) -> Frequency of Use (FoU)	0.494	0.453	0.166	2.972	**0.003**
Individualism/collectivism (IC) -> Frequency of Use (FoU)	-0.055	-0.020	0.101	0.541	0.589
Long/short term orientation (LS) -> Frequency of Use (FoU)	-0.123	-0.084	0.134	0.913	0.361
Masculinity/Femininity (MF) -> Frequency of Use (FoU)	0.165	0.161	0.101	1.633	0.103
Moderating Effect (IC)_BI ->FoU -> Frequency of Use (FoU)	-0.086	-0.125	0.129	0.668	0.504
Moderating Effect (LS)_BI ->FoU -> Frequency of Use (FoU)	0.212	0.169	0.183	1.163	0.245
Moderating Effect (MF)_BI ->FoU -> Frequency of Use (FoU)	0.106	-0.007	0.134	0.795	0.427
Moderating Effect (PD)_BI ->FoU -> Frequency of Use (FoU)	-0.101	0.004	0.135	0.750	0.454
Moderating Effect (UA)_BI ->FoU -> Frequency of Use (FoU)	-0.116	-0.010	0.198	0.588	0.557
Perceived Ease of Use (PEU) -> Behavioural Intention (BI)	-0.018	-0.015	0.104	0.174	0.862
Perceived Enjoyment (PE) -> Behavioural Intention (BI)	-0.028	-0.026	0.038	0.737	0.461
Perceived Influence of Others (PIO) -> Behavioural Intention (BI)	0.025	0.023	0.044	0.582	0.560
Perceived Support of Use (PSU) -> Behavioural Intention (BI)	0.309	0.308	0.107	2.884	**0.004**
Perceived Support of Use (PSU) -> Frequency of Use (FoU)	-0.113	-0.093	0.154	0.734	0.463
Perceived Usefulness (PU) -> Behavioural Intention (BI)	0.303	0.306	0.102	2.954	**0.003**
Perceived Value (PV) -> Behavioural Intention (BI)	0.102	0.097	0.030	3.373	**0.001**
Power distance (PD) -> Frequency of Use (FoU)	-0.277	-0.263	0.097	2.858	**0.004**
Uncertainty avoidance (UA) -> Frequency of Use (FoU)	-0.096	-0.111	0.149	0.646	0.518