Review of Behavioural Intention to use Mobile Financial Services

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ABSTRACT

Massive adoption of technology-driven financial services is key to successful financial inclusion agenda. This qualitative-empirical review examined the factors that influence users' behavioural intention to use mobile financial services. This empirical review was conducted by searching various database-resources including Google Scholar, and ProQuest; reviewing past meta-analytical studies, and snowballing. Citations were also collected from previous empirical reviews. Key words used in the various searches include "mobile financial services", "technology adoption"; "mobile banking", "mobile money", "mobile payments", "m-banking", "technology acceptance", "system adoption", "technology acceptance model", "user acceptance", "behavioural intentions", and "system user intentions". The searches generated results that were reviewed for relevance. The review established the three dimensions of mobile financial services: mobile banking, mobile payment, and mobile money services (with mobile banking being the most widely explored of the three). It is hoped that this empirical review would significantly contribute towards addressing some of the research gaps identified in previous empirical studies.

Keywords: Behavioural intention, mobile financial services, technology acceptance model

INTRODUCTION

Mobile money transactions in Africa have exhibited exponential growth over the past decade, with Sub-Saharan Africa (SSA) registering around 400 million mobile money accounts, the largest number globally (Akinyemi & Mushunje, 2020). Mobile money is widely used by governments across Africa to transfer cash to their citizens as a measure to address the COVID-19 pandemic (World Bank Group, 2021; Wahua, Mkombo, Okai & Acquah-Yalley, 2023). It is estimated that 70 percent of the USD 1 trillion global transactions conducted through mobile money platforms in 2021 were attributed to Sub-Saharan Africa (Tan, 2022). Similar to other countries in SSA, Tanzania has experienced adoption of mobile money, with mobile payments as the most preferred method of transferring funds (Koloseni & Mandari, 2017). In Tanzania, the number of mobile money subscribers for the three years from 2019 to 2021 increased at an average of 17 percent per annum. By end of September 2022, total mobile money subscription was 39.6 million accounts, being 64 percent of the country's population of 61.7 million as per August 2022 National Census, distributed among five telecoms: Vodacom, TiGo, Airtel, TTCL and Halotel (TCRA, 2022).

Attainment of financial inclusion strides is fundamental to economic growth and poverty reduction (Mhlanga & Denhere, 2020; Tsouli, 2022). However, the intended aspirations have been slow to achieve as the rate of deploying the technology-based financial services have lagged expectations (Abdinoor & Mbamba, 2017; Richard & Mandari, 2017; Wahua & Ahlijah, 2020). Mobile technology adoption has

greatly increased the onboarding of excluded segments of the populations into formal financial system ushering financial service providers, governments and international development institutions into their aspirations of taking every citizen (Wahua, Mkombo, Okai & Acquah-Yalley, 2023). Despite many notable COVID-19 pandemic induced mobile-financial-services of recent years, a significant proportion of Sub-Saharan population remains financially excluded (World Bank Group, 2021). This qualitatively-leaned study delves into highlighting appropriate empirically-backed factors for achieving effective financial service delivery through mobile technology.

This empirical review was conducted by searching various database resources including Google Scholar, and ProQuest; reviewing past meta-analytical studies particularly on the reviews undertaken by Souiden, Ladhari and Chaouali (2021), Hilal and Varela-Neira (2022); and Santini et al. (2019); Wahua, Kwode, Chukwuma and Attipoe (2023); and snowballing. Key words used in the various searches particularly in the ProQuest and Google Scholar databases include "mobile financial services", "technology adoption"; "mobile banking", "mobile money", "mobile payments", "m-banking", "technology acceptance", "system adoption", "technology acceptance model", "user acceptance", "behavioural intentions", and "system user intentions". The searches generated results that were reviewed for relevance. Santini et al. (2019) explored Google Scholar, Jstor, Emerald, PsycINFO, Taylor and Francis, Elsevier Science Direct, SCOPUS, Scielo and EBSCO and reviewed published papers presented at conferences and dissertations. Souiden et al. (2021) covered theories, frameworks and models related to adoption of mobile banking by searching databases of ABI/INFORM global, Web of Science and Business Source Premier. Hilal and Varela-Neira (2022) reviewed elements that influence user adoption of mobile banking based on searches in the Business Source Premier Database; and Scopus databases. The two articles generated valuable information in relation to mobile banking domain. Searches in other databases complemented the resource base with study articles in respect of the other domains of mobile financial services: mobile money; and mobile payments.

There are various approaches to conducting a systematic-empirical review (Wahua & Ezeilo, 2021). Shaikh, Alamoudi, Alharthi and Glavee-Geo (2022) identified several approaches covering the antecedents, decisions and outcome (ADO) proposed by Paul and Benito (2018); the theory, construct, characteristics and methodology (TCCM) used by Paul and Rosado-Serrano (2019); and the 6W Framework (who, when, where, how, what and why) used by Xie et al. (2017). A section on empirical review of the constructs sets in, examining the study designs and methods employed in previous studies as well as identifying frequently examined constructs and their significance. The empirical review considers the results of some relevant previous studies with their implications, followed by the identification of research gaps that highlights directions of future research. The review concludes with hypotheses development and summary of the review.

EMPIRICAL REVIEW

Construct Selection

Studies on adoption of new technologies particularly in respect of mobile financial services have investigated numerous factors for their influence on users' intention to adopt the technology. Depending on the theoretical model, the constructs have been assigned varying roles as independent variable, moderator or dependent variable.

Dependent Variables

The most commonly dependent variable measured in the adoption studies is the intention to adopt a given technology in this case mobile financial services as construed in the Technology Acceptance Model or related models such as the Unified Theory of Acceptance and Use of Technology (UTAUT). Behavioural intention is described as a phenomenon that explains whether a customer would proceed or retreat from a

relationship with a service provider (Shaikh et al., 2022). As opposed to actual usage, the construct measures the potential adoption of a new technology (Koul & Eydgahi, 2017). The construct uses various names including behavioural intention; use intention; intention to use; or use behavior (Shaikh et al. 2022). The genesis of the behavioural intention to use a technology is rooted in the basics of the theory of reasoned action (TRA), which asserts that the behavioural intention of an individual towards a given behaviour would ultimately lead to the actual behavior (Fishbein & Ajzen, 1975). Other models that study behavioural intention as a dependent variable include the Theory of Reasoned Action (TRA) and the Theory of Planned Behavior (TPB).

The Unified Theory of Acceptance and Usage of Technology (UTAUT) was an extension of the Technology Acceptance Model (TAM) by inclusion of an additional dependent variable beyond intention to use, whereby examination is made on the actual usage of technology. Studies have mainly considered the extent to which behavioural intention to use influences actual usage. In their literature review study on advances in mobile financial services, Shaikh et al. (2022) observed that 87 out of the 115 articles treated behavioral intention as a dependent variable. Similarly, 97 out of 127 articles analyzed in this review were related to behavioural intention to adopt an emerging technology including mobile financial services (mobile banking, mobile payments and mobile money) as a dependent variable. Some other dependent variables that Souiden et al. (2021) in their systematic review of mobile banking adoption observed albeit to a lesser frequency, include attitude, trust, satisfaction, behavior, perceived usefulness, perceived ease of use, risk and hedonic motivation.

Antecedent Variables

Studies on adoption of technology have attempted to examine a myriad of factors construed to influence behavioural intention of the user to adopt the technology, most of which emerged over time with the revolution taking place in the technology space. The original formulation of the Technology Acceptance Model (TAM) by Fred Davis in 1986 constituted of two main independent constructs namely, perceived ease of use; and perceived usefulness. The two constructs exert influence on attitude, which in turn determines behavioural intention to use a technology (Rahimi, Nadri, Lotfnezhad-Afshar & Timpka, 2018). Perceived ease of use on the other hand influences perceived usefulness, which makes perceived usefulness both an independent and mediating variable (Lai, 2017). Over time, the model was refined and variant models developed. This review made a compilation of studies on behavioural intention to adopt mobile financial services based on the Technology Acceptance Model (TAM); Unified Theory of Acceptance and Use of Technology (UTAUT) and their integration with other closely related theories. The review collected a total of 31 most relevant studies (15 TAM based studies; 18 UTAUT based studies; and 8 based on integrated models) for analysis of variables employed. The analyses are indicated in Appendices 1 – 3.

The most frequently used antecedent variables for the TAM and its extensions as per **Appendix 1** which indicates the number of occurrences out of 15 studies include perceived ease of use (14); perceived usefulness (13); perceived risk (7); self-efficacy (7); attitude (6); perceived security (6); perceived trust (6); and personal innovativeness (6). For the UTAUT and its extensions, the most common antecedents variables as per **Appendix 2** which indicates frequency of the variables out of 23 dependent variables include performance expectancy (19); social influence (18); effort expectancy (17); facilitating conditions (15); hedonic motivation (13), trust (11), price value (10); and habit (10). These variables constitute an extended set of variables from the original formulation of the UTAUT by which constituted of four variables namely performance expectancy; effort expectancy; social influence; and facilitating conditions; and four moderators of age, gender, experience, and voluntariness (Venkatesh, Thong & Xu, 2016). A set of integrated models under **Appendix 3** indicates a scenario of more dispersed antecedent variables, with most frequently used variables out of 23 dependent variables as were social influence (5); perceived trust (5); perceived experience (4); perceived ease of use (4); compatibility (4); perceived trust (4); and facilitating conditions (4). A combination of Appendixes 1, 2, and 3 produces the following as the most frequently

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explored constructs: social influence; performance expectancy; perceived trust; effort expectancy; facilitating conditions; perceived ease of use; hedonic motivations; perceived security; perceived risk; and habit. An investigation based on an integrated model involving these constructs would prove most useful.

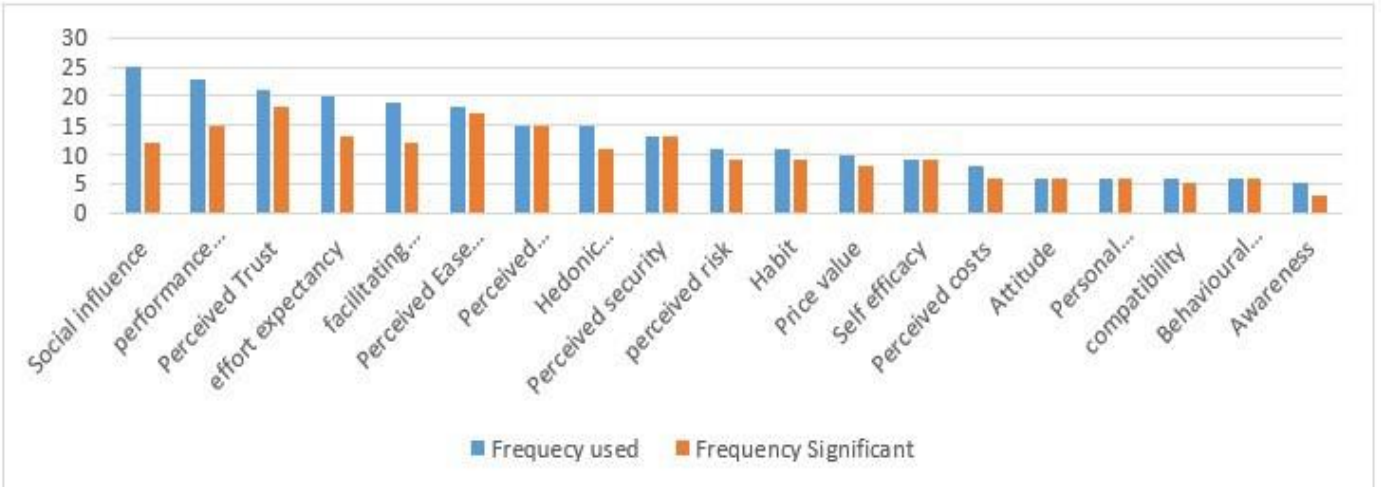

Figure 1: Frequently Used Antecedent Constructs Source: Author (2023)

From the graph, it is evident that while social influence is the most used variable for examining intention to adopt a new technology, the number of times it has been proved to be significant is much less 48%.

Moderator Constructs

A number of studies on adoption of mobile financial services have included examination of moderating variables. The essence for consideration of moderating variables lies in their potential to affect the strength or direction of the relationship between antecedent and consequent variables (Vij & Farooq, 2017). Variations in such relationships arises from demographical, cultural methodological, economic and contextual dimensions (Santini et al., 2019). From the set of studies considered under this review, moderating variables that have been examined include **age** (Kaplan & Gürbüz, 2021; Kwateng, Atiemo, Appiah, 2018; Trinh, Le & Nguyen, 2020; Sleiman et al., 2022; Gbongli, Xu & Amedjonekou, 2019; Alhassan, Li, Reddy & Duppati, 2020; Lin, Lin & Ding, 2020); **gender** (Kwateng et al., 2018; Sankaran & Chakraborty, 2022; Trinh, Le & Nguyen, 2020; Sleiman et al., 202l; Lin et al., 2020); **education** (Kwateng et al., 2018; Sleiman et al., 2022; Gbongli et al, 2019); **experience** (Kaplan & Gürbüz, 2021; Kwateng et al., 2018; Lin et al., 2020); **income** (Alhassan et al., 2020); **provider size** (Alhassan et al., 2020); **subjective norms** (Elhajjar & Ouaida, 2020); **personal innovativeness** (Elhajjar & Ouaida, 2020); and **marketing** (Alhassan et al., 2020).

RESEARCH DESIGNS AND METHODS

Research Designs

Studies on acceptance of technology have largely adopted quantitative approach (Lee, Ryu & Lee, 2019). Quantitative research involves collection and analysis of structured and quantifiable data as an attempt to answer 'the or how question' (Goertzen, 2017). The use of quantitative methods provides assurance on the potential for replication of the results by other researchers, thereby making possible their comparison, confirmation and critiquing. The approach also makes possible repeated measurement with certain levels of reliability thereby enhancing objectivity through various procedures such as keeping participants at a distance (Gerrish & Lathlean, 2015, Ed.). Key objectives of the studies on acceptance of technology have thus been the testing of association or influence of given set of constructs on the behavioural intention to

adopt some technology or system based on the Technology Acceptance Model (TAM); TAM extensions followed by TAM derivative models such as the Unified Technology Acceptance and Use of Technology (UTAUT). The apparent preference of the TAM is largely attributed to its proven long-standing characteristics of reliability; versatility; ubiquity; and parsimony (Vogelsang, Steinhueser & Hoppe, 2013).

The studies have mainly been cross sectional in design, with the few longitudinal studies hardly mentioning their durations (Yousafzai, Foxall, & Pallister, 2007), and when they do, the focus would largely be on the initial interaction between user and the technology followed by a short period of observation (Vogelsang et al., 2013). The vast use of cross-sectional studies is arguably the result of avoidance of costs associated with longitudinal and panel designed studies (Souiden et al., 2021). The study on students' acceptance of mobile banking would similarly assume a cross sectional designs with appropriate safeguards.

Research Methods

As is the norm with most of the quantitative researches, it has been observed data in most of the studies reviewed were collected using survey structured questionnaires, which were administered to conveniently selected samples of participants, mostly online. The use of non-probability convenient sampling technique is considered as one of the limitations of the studies as they would not warrant an equal chance of participants, hence limiting the degree of reliability (Sankaran & Chakraborty, 2022). It is also evident that the studies have largely deployed the Structural Equation Modelling (SEM) in the analysis of data, reflecting its superiority over other methods as far as analysis of relationships among latent variables is concerned (Alhassan et al., 2020). Furthermore, SEM is a robust data analytical method in empirical estimation of multiple indicators of latent variables; and when the data are subject to measurement errors and multicollinearity (Alhassan et al., 2020). In a systematic review of main theories, conceptual frameworks and models used to explain consumer's adoption of mobile banking, Souiden et al. (2021) found that the main tools of analysis used in the studies were structural equation modelling (SEM), partial-least square (PLS), and path analysis. The study further noted that regression analyses, fuzzy analysis, ANOVA, logit binary, and t-tests were used in relatively fewer cases. A summary of studies on adoption of mobile financial services conducted from 2018 – 2022 is shown under **Appendix 4**.

Previous Study Results and Implications

Studies on adoption of new technologies such as mobile financial services have largely aimed at examining factors that exert significant influence on consumer's behavioural intention to adopt the technology and occasionally on the actual usage behaviour. The outcomes such studies are construed to play part in the advancement of knowledge and empirical validation of theories (Singh & Srivastava, 2020); policy formulation; improvement of customer service quality; customer satisfaction and loyalty (Baabdallah Rana, Alalwan, Islam, Patil & Dwivedi, 2019) and designing managerial recommendations for influencing much wider adoption of the technology for attainment of desired financial inclusion aspirations (Gbongli & Amedjonekou, 2019). To provide better understanding of the outcomes of previous studies on adoption of mobile financial services and their implications, this review has adopted the five-perspective method of antecedent classification used by Souiden et al. (2021) namely; technology-based perspective; customer-based perspective; social-based perspective; trust-based perspective; and barrier-based perspective.

Technology / Service Based Perspective

The technology-based perspective in this case mobile financial service perspective, considers study outcomes in respect of the antecedents related to the technological aspects of the service offering. Constructs considered under this perspective include perceived usefulness (PU) including performance expectancy; perceived ease of use (PEOU) including effort expectancy; facilitating conditions (FC); hedonic motivation (HM); and price value (PV). From the reviewed set of studies, the most commonly studied

constructs with significant influence are PU; PEOU; FC; HM and PV. The studies that have covered these concepts in detail include Lin et al. (2020); Elhajjar and Ouaida (2020); Souiden et al. (2021); Luyao, Al-Mamun, Hayat, Yang, Hoqueand and Zainol (2022); Rehman, Omar, Zabri and Lohana (2019); Farah, Hasni and Abbas (2018); Dhingra and Gupta (2020); Iskandar, Hartoyo and Hermadi (2020); Shaikh et al (2022); Kaplan and Gürbüz (2021); Sankaran and Chakraborty (2022); and Marpaung, Dewi, Grace, Sudirman and Sugiat (2022).

Customer Based Perspective

The most frequent antecedents under customer-based perspective include self-efficacy (SE), attitude (ATT), digital literacy (DL), and personal innovativeness (PI). Shaikh, Alamoudi, Alharthi and Glavee-Geo (2022) describe self-efficacy, as an individual's belief in his or her ability to succeed in specific situations or accomplish a certain task. Singh and Srivastava (2018) established significant influence of computer self-efficacy on intention to use mobile banking which signified the consumers' expectation for assistance in using the new technology. SE received a relatively lower scholar attention as the review indicated that it was included in a total of 9 studies, all of which were significant.

Attitude is one of the fundamental variables in technology adoption studies. It is described as a predisposition of an individual towards a certain phenomenon or behaviour (Giovanis, Assimakopoulos & Sarmaniotis, 2019). For example, the systematic review by Souiden, Ladhari and Chaouali (2021) established that 32 studies considered direct influence of PU on BI while 15 of the studies involved mediation of attitude. Likewise, 18 studies assessed direct relationship between PU and BI whereas 15 studies involved mediation of the Attitude construct. Surprisingly, most of the studies involving mediation of Attitude towards BI were found to be significant. Souiden, Ladhari and Chaouali (2021) also observed that all the 13 studies that examined the influence of attitude on intention to adopt a new technology were significant. This observation points out to the need for consideration of attitude as an important aspect in the determination of factors that significantly influence adoption new technology or technology-based service such as mobile financial service. Elhajjar and Ouaida (2020) found digital literacy (DL) to be one of the main variables which influence attitude for adoption of mobile banking in Lebanon, implying that the user's attitude towards adoption of mobile banking depends, to some extent, on their knowledge necessary to enable them navigate the mobile device to find, create and communicate relevant information to others.

Personal innovativeness (PI) is another construct under customer perspective. PI refers to the willingness of an individual to try out any new information technology or system (Shaikh, Alamoudi, Alharthi & Glavee-Geo, 2022). It is studied to a relatively lower frequency, with the majority of the occasions regarded as a moderating factor. For example, the studies by Elhajjar and Ouaida (2020) personal innovativeness significantly moderated the relationship between Usefulness and Ease of use.

Social Perspective

The most common construct under the social perspective are social influence (SI) and Subjective norms (SN). Shaikh, Alamoudi, Alharthi and Glavee-Geo (2022) describe SI as the change in thoughts, feelings or decision of an individual depending on the thoughts, feeling or decision of other people. Social influence is closely related to subjective norms; and subjective norm (SN) is defined as an individual's perception as regards the opinion of other important persons to his or her accepting a given behaviour (Fishbein & Ajzen, 1975).

Studies that have examined the impact of SI and BI found mixed results, some of which showed significant influence and others insignificant influence. A sample of studies reviewed indicate that 12 out of the 25 studies (about 48 percent) found SI to be significant. Some of the studies where SI exerted significant influence on BI to adopt mobile financial service include Dhingra and Gupta (2020); Kaplan and Gürbüz

(2021); Lin, Lin and Ding (2020); Ndekwa, Ochumbo, Ndekwa and John (2018); Nur and Panggabean (2021); Rachmawati, Bukhori, Majidah, Hidayatullah and Waris (2020); and Kaplan and Gürbüz (2021). Studies that found contrary results included Raza, Shah and Ali (2019), and Singh and Srivastava (2018). A possible explanation for the insignificant influence is customers' preference for making their own decisions rather than consulting relatives and friends (Singh & Srivastava, 2018). Conversely, Elhajjar and Ouaida (2020) linked the significant positive influence of SI on BI to consumers' inclination to avoid uncertainty associated with the technology, thereby leading to their seeking the opinions of their social groups, families and relatives. This argument is supported by Singh and Srivastava (2020) and Farah, Hasni and Abbas (2018).

Trust Perspective

Constructs considered by Souiden et al. (2021) under the trust perspective include 'trust' (TR), perceived security (PS) and perceived privacy (PP). TR is the most predominant of all constructs under this perspective, having been examined 12 times to BI all of which were significant while PS and PP were each examined 3 times, all of which were also significant (Souiden, Ladhari & Chaouali, 2021). Shaikh, Alamoudi, Alharthi and Glavee-Geo (2022) define trust (in terms of perceived trust) as a person's confidence that other persons or systems will behave in a given predictable manner. Shaikh et al. (2022) discusses the results of prior studies, most of which found TR to have significant influence in the intention of consumers to adopt mobile banking and online transactions; and such studies include: Dhingra and Gupta (2020), Elhajjar and Ouaida (2020); Gong, Zhang, Chen, Cheung and Lee (2019); Nur and Panggabean (2021); Patil, Tamilmani, Rana and Raghavan (2020); and Singh and Sinha (2020). The arguments advanced in support of the importance of TR on the BI, according to Dhingra and Gupta (2020), are in respect of sensitivity of the information to be shared including personal access information such as bank account details, phone numbers and financial transactions.

Trust factor has occasionally been found to exert insignificant influence on behavioural intention towards adoption of mobile financial services. Farah, Hasni and Abbas (2018) found that TR has insignificant impact on BI. Farah et al. posited that perceived credibility, a construct that encompasses consumer's perception regarding security, trust and privacy features of an application, produces more accurate results and has thus replaced TR and PR in the studies. On their part, Singh and Srivastava (2018) attributed the insignificant influence of the TR construct, to the confidence that consumers have on banks as the most trustworthy institutions. The observations notwithstanding, the TR construct has generally been considered a critical factor that calls for the service providers to dedicate their resources to provide the expected assurance to potential customers as regards to threats on security and privacy (Elhajjar & Ouaida, 2020).

Barrier Based Perspective

All the factors that hinder or lower a person's intention to adopt a given technology fall under barrier-based perspective; and the most common of them are perceived risk (PR) and resistance to change (RC). Perceived risk or simply risk is defined as the outcome of the combination of uncertainty and the impact of the outcome involved (Shaikh et al., 2022). PR is further described as an expression of potential for loss consequences resulting from customers' activities in pursuit of a given goal (Siyal, Donghong, Umrani, Siyal & Bhand, 2022). Perceived risk has been observed to influence negatively customer intention to adopt mobile financial services (Rehman, Omar, Zabri & Lohana, 2019; Siyal et al., 2022; Tiwari, Tiwari & Gupta., 2021; Elhajjar & Ouaida, 2020). The empirical review by Souiden, Ladhari & Chaouali (2021) indicated that the influence of perceived risk on behavioural intention was conducted in 11 studies, all of which found significant influence. The main explanation for the phenomenon is the consumer's fear of suffering loss resulting from using the mobile financial service due to security issues or compromise in privacy capabilities (Rehman, Omar, Zabri & Lohana, 2019). Resistance to change (RC) comprises of psychological factors that negatively influence consumer to refrain from using technology based financial

services (Siyal, Donghong, Umrani, Siyal & Bhand, 2019). Elhajjar and Ouaida (2020) enumerated some studies that investigated resistance to change and found significant negative influence. Resistance to change is not a common barrier to behavioural intention to use mobile financial services and consumer awareness programs plays important role in overcoming it. .

Passage of Time

Empirical review based on passage of time assesses the currency of the topic within the last five years, in order to identify salient missing links. Sankaran and Chakraborty (2022) examined the usage of mobile banking by consumers in India using extended UTAUT2 model with perceived value and trust. Data was collected with online and offline survey questionnaire from four hundred and fifty seven (457) customers using mobile banking applications in India. Structural equation modeling (SEM) analytical technique was used to test the hypotheses. The study established that effort expectancy (EE), monetary value (MV), emotional value (EV), quality value (QV), and trust (TR) have significant effect on behavioural intent (BI), whereas performance expectancy (PE) and social value (SV) did not have significant effect on behavioural intent (BI).

Coffie, Tetteh, Emuron, and Darkwah (2022) researched on the relationship between mobile payment services (MPS) diffusion and technological factors, non-technological factors, and environmental factors during COVID-19 pandemic in Ghana. The study anchored on technology acceptance model (TAM) / theory of reasoned actions (TRA) /theory of planned behavior (TPB). Data were collected from 3,539 social media users using social media administered survey; and analysed with structural equation model (SEM). The research established that mobile payment services (MPS) diffusion increased globally with the highest diffusion rate; and that technological, non-technological, and environmental factors contributed positively to the high rate of MPS diffusion.

Hilal and Varela-Neira (2022) investigated the elements affecting mobile banking adoption in Lebanon by applying unified theory of acceptance and use of technology two (UTAUT2) model. Data was collected via self-administered questionnaires to three hundred and fifteen (315) Lebanese banks' customers who are current non-users of mobile banking applications. The study's results show that proactive personality (PP) has significant effect on consumer intention to adopt mobile banking; and that some UTAUT2 drivers fully mediate the effect.

Justino, Tengeh, and Twum-Darko (2022) examined the primary determinants of retail personnel's use of mobile commerce (n-commerce) in Angola; and it adopted theoretical lens of task-technology fit (TTF) theoretical underpin. Structured questionnaire was used to collect data from two hundred and twenty nine (229) retail business personnel and actual users of m-commerce in the country. Structural equation modeling (SEM) analysis technique was used to test the hypotheses developed for the study. The study established a strong correlation between the four dimensions of task characteristics (time criticality, mobility, non-routineness, and interdependence) and the task-technology fit dimensions. Additionally, it was determined that there is a strong correlation between the functionalities of m-commerce systems (mobile notification, mobile information exchange, mobile information search, and mobile data processing) and the TTF dimensions. In comparison, the study discovered a minimal correlation between task-technology fit as correspondence and m-commerce use.

Kamboj, Sharma and Sarmah (2022) investigated the impact of mobile banking failure on Indian banks' customers' usage behaviour and the mediating role of user satisfaction using survey questionnaires administered to three and thirty eight (338) participants; and analysed with structural equation model (SEM). The study which anchored on the integration of Tan's mobile bank failure model (MBFM) and DeLone and Mclean's information success model observed that mobile banking failure dimensions (functional, system, information and service) affect the use of mobile banking, which in turn affects user

satisfaction towards mobile banking and customer engagement. The study also found that user satisfaction towards mobile banking has partial mediating effect on the relationship between the use of mobile banking and customer engagement.

Koi-Akrofi (2022) investigated the determinants of mobile money banking and financial services adoption in Sub-Saharan Africa (SSA). It underpinned on technology acceptance model (TAM) and unified theory of acceptance and use of technology (UTAUT) and adopted systematic empirical review methodology of current twenty (20) articles. The work revealed that external factors outnumber the internal ones; but, that internal factors have significant impacts on mobile money service in SSA.

Luyao, Al-Mamun, Hayat, Yang, Hoque and Zainol (2022) investigated the effects of performance expectancy (PE), effort expectancy (EE), social influence (SI), facilitating conditions (FC), hedonic motivation (HM), perceived trust (PT), and lifestyle compatibility (LC) on intention to adopt wearable payment devices (WPD) among Chinese consumers by expanding unified theory of acceptance and use of technology with two impelling determinants (which are perceived trust and lifestyle compatibility). Data was collected from two hundred and ninety eight (298) participants using online survey while the hypotheses were tested with partial least squares structural equation modelling (PLS-SEM), and artificial neural networks (ANN). The research found out that PE, SI, FC, HM, LC, and PT had significant positive impacts on adoption intention whilst EE had no significant impact on adoption intention among Chinese consumers. The artificial neural networks analysis proved higher prediction accuracy of data fitness with ANN findings highlighting the importance of PT, FC, and PE on the intention to adopt wearable payment devices (WPD).

Marpaung, Dewi, Grace, Sudirman and Sugiat (2022) sought to establish the determinants behavioral intention to use Mestika bank's mobile banking services in Indonesia based on UTAUT2/UTAUT2 extensions models. Data was collected from two hundred and forty (240) online survey participants; and analysed with partial least square structural equation model (PLS-SEM) and the smart partial least square. The critical findings of the research are: effort expectancy, performance expectancy and social influence hedonic motivation have significant influences on behavioural intention of using Mestika bank's mobile banking while facilitating conditions and habits have no significant effect on behavioural intentions to use Mestika bank's mobile banking application in in Indonesia.

Shaikh, Alamoudi, Alharthi, and Glavee-Geo (2022) critically reviewed mobile financial services (MFSs) across the globe using detailed synthesis and analysis of one hundred and fifteen (115) most relevant mainstream empirical research published in various scientific journals within the period 2009 – 2020. The empirical review adopted three-step structured approach suggested by Webster and Watson (2002). The research identified three major domains within the MFSs; developed and presented a comprehensive framework of MFS domains; and explicitly identified fourteen (14) different research themes in MFSs for future investigations.

Sharma, Sharma and Kaur (2022) investigated if significant differences exist across continents in the adoption of mobile financial services using seven bivariate relationships. The study adopted a meta-analysis approach based on TAM/TAM extensions model. The research found out that location has significant impact in the adoption of mobile financial services across the globe.

Sleiman, Jin, Juanli, Lei, Cheng, Ouyang, and Rong (2022) explored the factors responsible for continuous intention to use mobile payments in Sudan based on integration of the expectation confirmation model (ECM) and the UTAUT2. Data was collected with survey questionnaire from four hundred and fifty three (453) participants; and analysed with structural equation model. The critical findings of the study are that satisfaction has the most significant impact in the intention to use mobile payment; and Hedonic motivation and price value have negative influence on the intention to use mobile payment in Sudan.

Foued (2021) investigated the determining factors in the adoption of mobile technologies in the accounting profession in Tunisia based on technology acceptance model (TAM) and the unified theory of acceptance and use of technology (UTAUT) models. Closed ended questionnaires completed by one hundred (100) accountants were used to collect the research data, which were analysed with multiple regression. The study established that the use of mobile technologies by accountants in Tunisia is mostly dependent on the expected performance; followed by facilitating conditions, and the variety of the tasks performed by the mobile technologies.

Jebarajakirthy and Shankar (2021) investigated the effect of online convenience dimensions on mobile banking (m-banking) adoption intention in India using a comprehensive moderated mediation framework. The study anchored on stimulus-organism-response (SOR) model; collected data from four and forty six (446) participants with questionnaire; and analysed the data with covariance-based structural equation modelling and process macro. The outcomes of the study are: access convenience, transaction convenience, benefit convenience, and post-benefit convenience have critical positive impacts on m-banking adoption intention; and the perceived hedonic values and perceived utilitarian values mediate the effects of convenience dimensions on m-banking adoption intention.

Milly, Xun, Meena and Cobbinah (2021) studied the effects of perceived usefulness, perceived ease of use, and perceived risk on actual usage of mobile banking by Ugandan citizens with intention to use as a mediating variable. Technology acceptance model (TAM/TAM extensions) underpinned the study which collected data from two hundred and seventy five (275) respondents via survey questionnaire. The data were analysed with factor analysis test, multiple linear regression analysis, Pearson's correlation, ANOVA table, and process analysis. The study established that perceived usefulness and perceived ease of use were significantly correlated to actual usage (where intention positively mediates the relationship). Perceived risk had a negative relationship with actual usage of mobile banking (where intention to use negatively mediates the relationship)

Museba, Ranganai and Gianfrate (2021) investigated the impact of financial technology (FinTech), mobile money, and digital financial services as well as the factors impacting their adoption in Uganda. Four hundred (400) participants from Kampala Region of Uganda completed the questionnaire designed for the study which was analysed with Microsoft Excel. The study established that mobile money adoption was based on two key variables: social network and social interactions of the customer and a segment of customers who can be described as mobile technology leaders (early adopters).

Albashrawi and Motiwall (2020) studied the integrative framework on mobile banking success in the United States of America using unified theory of acceptance and usage of technology. Four hundred and seventy two (472) mobile banks' customers were sampled. Data were analysed using structural equation modeling (SEM), and Bayesian neural networks-based universal structural modeling (USM). The study established that effort expectancy is positively (but nonlinearly) related with behavioral intention and is also ranked as the most important driving factor in UTAUT.

Identified Research Gaps

The research gaps guide the researcher in focusing the research to the most effective direction (Savi´c & Pešterac, 2020). Despite the extensive contribution to knowledge, empirical studies on mobile financial services have not been free of gaps. Similarities in models and methodology help in grouping the limitations into some measurable factors such as research context; population under study; research design; studied constructs; and sampling strategy. To counterpoise some of the earmarked limitations, the study makes propositions for consideration in future research.

Context Based Research Gaps

Majority of the reviewed works originated from specific geographical areas or specific populations where differences in social cultural factors may limit the generalizability of their results to some other areas or populations. Furthermore, differences in the economic status of a country may contribute to disparities in the results (Elhajjar & Ouaida, 2020). Some of the other scholars who pointed out to the study limitations in terms of research area include Islam Karia, Khaleel, Fauzi, Soliman, Khalid and Mamun (2019); (Luyao, Al-Mamun, Hayat, Yang, Hoque and Zainol (2022); Naruetharadhol, Ketkaew, Hongkanchanapong, Thaniswannasri, Uengkusolmongkol, Prasomthong and Gebsombut (2021); Rehman, Omar, Zabri and Lohana (2019); Sharma (2019); and Trinh, Le and Nguyen (2020). They recommend for studies to consider various geographical, cultural and economic settings such as developed and developing country, urban and rural areas for more representative results.

Population Related Gaps

Some authors identified potential study limitations arising from the nature of the population they studied. Dhingra and Gupta (2020) covered a population of Indian individuals experienced in the use of mobile banking noted the possibility for different results if the population under study involved individuals with no prior mobile-banking experience. Luyao, Al-Mamun, Hayat, Yang, Hoque and Zainol (2022) highlighted the need for future consideration of a study involving individuals from socio-economic and demographic backgrounds. This is because their current study centred on a population of young and financially stable people in China. Population related gaps also include the self-reporting bias which some scholars have noted to be prone to weaknesses in human perceptions. Albashrawi and Motiwalla (2020) found that self-reported values on usage of mobile were different from what was observed in system generated values. They therefore recommend the need to consider the self-reporting bias in perception-based studies.

Gaps Related to Study Designs

Majority of the reviewed studies on the adoption of new technology are quantitative and cross-sectional in design (meaning that the assessment is made at a point in time). This makes it possible to establish association rather than causality between variables studied (Albashrawi & Motiwalla, 2020). This view is supported by Luyao, Al-Mamun, Hayat, Yang, Hoque and Zainol (2022) who argue that cross-sectional designs make it hard to control latent heterogeneity (thereby limiting the ability to establish causality). To overcome the limitations, most studies have recommended for longitudinal studies, which would establish the relationship between variables over a period of time. Examples of cross-sectional studies whose authors recommended for further longitudinal studies include Dhingra and Gupta (2020); Farah, Hasni and Abbas (2018); Sankaran and Chakraborty (2022); Milly, Xun, Meena and Cobbinah (2021); Islam Karia, Khaleel, Fauzi, Soliman, Khalid and Mamun (2019); and Sharma (2019). Cost implication is considered as the major constraint of faced by authors for their inability to conduct longitudinal studies.

Construct Related Gaps

Complexity in modelling real life situation makes it hard to take onboard all the relevant construct in the study. As a result, most of the studies made use of a given set of constructs leaving out others. For example, most authors have highlighted the inability to include moderating factors such as age, gender, and education as part of their study limitations (Baabdullah, Alalwan, Rana, Kizgin & Patil, 2019; Merhi, Hone. & Tarhini, 2019; Sharma & Sharma, 2019; Tiwari et al., 2021; Singh & Srivastava, 2018). Some other authors recommended for the use of additional independent variables as a means of enhancing their explanatory power. In a TAM – based study, Elhajjar and Ouaida (2020) suggested the use of more than one theory in order to obtain better results.

Gaps Related to Sampling Strategy

Sampling has also been identified as one of the sources of limitations noted in behavioural intention to use technology. Review established that most of the studies used purposeful convenience sampling. Non-probability sampling such as convenience sampling does not provide study units equal chance of being included; and therefore produces biased results (Himel, Ashraf, Bappy, Abir, Morshed & Hossain, 2021). This limits the representativeness of the sample, and the ability of replication and generalizability of the study (Baabdullah Alalwan, Rana, Kizgin & Patil, 2019; Sankaran & Chakraborty, 2022). Such limitations call for exercising high level of caution when interpreting and generalizing results (Singh & Srivastava, 2018).

SUMMARY AND CONCLUSION

Inspired by the desire to understand factors that drive the behavioural intention for adoption of mobile financial services, the study dwelt on empirical review of related previous research on the subject. The review was undertaken in order to explore existing mobile financial services practices adopted different users across the world. The empirical review was conducted by searching various database resources including Google Scholar, and ProQuest; reviewing past meta-analytical studies particularly on the reviews undertaken by Souiden et al. (2021), Hilal and Varela-Neira (2022); and Santini et al. (2019); and snowballing. The review adopted the TCMM framework developed by Shaikh et al. (2022).

The review also established the three dimensions of mobile financial services as consisting of mobile banking, mobile payment, and mobile money services and that mobile banking is the most widely explored of the three. This study adopted a holistic approach assuming similarity in consumers' behaviour between either of the three components. It was evident that the majority of previous empirical studies on technology adoption were quantitative and cross sectional in design, employed questionnaires in data collection, and data analysis carried out was mainly the structural equation modelling (SEM). The methodologies led to the identification of factors that exert significant influence on behavioural intention for adoption of mobile financial services. The factors were further examined and refined based on the frequency of studies and significance to produce the final set of salient constructs. The constructs include Perceived Usefulness (PU), Perceived Ease of Use (PEOU), Social Influence (SI), Perceived Risk (PR), Facilitating Conditions (FC), Attitude (ATT) and the moderating factor Gender (GE).

The identified set of relevant constructs were reviewed in the light of the various research gaps and research objectives to provide a model involving an integration of the Technology Acceptance Modal (TAM), the Unified Theory for Acceptance and Use of Technology (UTAUT). It is hoped that this empirical review would significantly contribute towards addressing some of the research gaps identified in previous empirical studies (for example; geographical research context, model design, and construct limitations).

ETHICS AND CONFLICT OF INTEREST

This study is guided by Unicaf University's the research ethics; and the authors declare no conflicting interest.

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APPENDIX 1

Table 1: Constructs used in Emprical Studies that Employed the Technology Acceptance Model (TAM)

	Author	Place of Stu	Endogenous Variable	Exogeneous Variables																																										
				Attitude	Perceived Usefulness	Perceived Ease of Use	Perceived behavioral contro	self service techn.service quality	Perceived Trust	Privacy risk	Perceived security	Digital literacy	Resistance to change	perceived risk	compatibility	Awareness	Self efficacy	Perceived behavioural contro	Utility benefi	Social benefit	Behavioural benefi	Functionality	Enjoyment	Design	Assurance	Convenience	Customization	Controlled motivation	Autonomous motivation	Social influence	Perceived benefits	Customer Support	Rural dwelling	costs	Ubiquity/power	Regulation	Education	Gender	Technology anxiety	Barriers	Subjective norms	Personal Innovativeness	Age	income	Provider size	Marketing
1	Elhajjar and Ouaida (2020)	Lebanon	Intention for adoption	⊛	⊛																																									
			Perceived Usefulness			⊛						⊛	⊛	⊛	⊛	O																									⊛					
			Perceived Ease of use									⊛	⊛	⊛	O	⊛																										⊛				
			Attitude		⊛	⊛								⊛																											⊛					
2	Hong (2019)	South Korea	Intention to Adopt Mobile Banking	⊛			⊛											⊛																							O	⊛				
			Attitude		⊛	⊛					⊛																																			
			Subjective Norms																																							⊛				
			Perceived Behavioural control														⊛																									⊛				
3	Rehman et al. (2019)	Malaysia	intention to use m-banking	⊛	O																																									
			atttitude toards intention		⊛	⊛				⊛	⊛																																			
4	Milly et al. (2021)	Uganda	intention to use mobile banking		⊛	⊛								⊛																																
5	Mishra & Singh (2021)	India	intention to adopt mobile banking						⊛										⊛	⊛	⊛					⊛																				
5	Naruetharad hol et al. (2021)	Thailand	sustainable intention to use mobile banking		⊛	⊛																																								
			Perception (PU & PEU)					⊛																																						
			self service technology service quality								⊛											⊛	⊛	⊛	⊛	⊛	⊛																			
8	Sharma (2019)	Oman	Behavioural intention		⊛	⊛			⊛																			⊛	⊛																	
9	Singh and Srivastava (2018)	India	Behavioural intention to adopt mobile banking						O		⊛						⊛													O																
			Perceived Ease of Use														⊛																													
			Trust								⊛																																			
10	Singh and Srivastava (2020)	India	Behavioural intention to use mobile banking		⊛	⊛					⊛						⊛													⊛		O		⊛												
			Perceived ease of use														⊛																													
			Perceived security																													⊛														
11	Siyal et al. (2019)	China	Intention	⊛																											⊛															
			Attitude		⊛	⊛																																								
			Perceived Usefulness										⊛	⊛		O															⊛															
			Perceived ease of use										⊛	⊛		⊛															⊛															
12	Tiwari et al. (2021)	India	Behavioural intention		⊛	⊛			⊛					⊛		⊛																														
13	Alhassan et al. (2020)	New Zealan	attitude towards adoption of mobile money		⊛	⊛																																					O	O	⊛	⊛
			perceived usefulness																														⊛	⊛												
			perceived ease of use																																⊛	⊛	⊛	⊛								
14	Gbongli & Amedjoneko u (2019)	Togo	Intention to use mobile money	⊛																																						⊛				
			Attitude towards mobile money		⊛	⊛																																				⊛				
			perceived usefulness			⊛											⊛																						O							
			perceived ease of use														⊛																						O							
15	Himel et al. (2021).	Bngladesh	Intention to use mobile financial services	⊛																																				⊛						
			attitude towards using MFS		⊛	⊛			⊛																															⊛						
	Frequency of use			6	13	14	1	1	5	1	6	2	4	7	2	5	7	1	1	1	1	1	1	1	1	2	1	1	1	2	3	2	1	2	1	1	1	1	2	2	3	6	1	1	1	1
	Frequency significant			6	13	14	1	1	4	1	6	2	4	7	1	3	7	1	1	1	1	1	1	1	1	2	1	1	1	0	3	1	1	2	1	1	1	1	0	2	2	6	0	0	1	1
			Key:	⊛ Significant																																										
				O Not Significant																																										

APPENDIX 2

Table 2: Constructs used in empirical studies involving the Unified Theory of Acceptance and Use of Technology (UTAUT) Model

SN	Author(s)	Place of Study	Dependent variable	performance expectancy	effort expectancy	social influence	facilitating conditions	Hedonic motivation	Price value	Habit	perceived security	Trust	Perceived privacy	Perceived risk	Observability	Experience	Perceived credibility	Social value	monetary value	Emotional value	Quality value	lifestyle compatibility	Infrastructure	Perceived convenience	Government Influence
1	Dhingra and Gupta (2020)	India	Behavioural intention to adopt mobile banking	O	O	✓	✓	✓	✓	O		✓													
2	Farah et al. (2018)	Pakistan	Use behaviour																						
			Mobile banking adoption intention	✓	✓	O	O	✓	✓	✓		O		O											
3	Iskandar et al (2020)	Indonesia	Use behaviour																						
			Behavioural Intention to adopt	✓	O	O	✓	✓	✓					✓	✓	✓									
4	Islam et al. (2019)	Bangladesh	Behavioural Intention to adopt	O	✓	✓	✓										✓								
5	Kaplan and Gürbüz (2021)	Turkey	Behavioural Intention to adopt MB	✓	O	✓	✓	O	✓	✓		✓													
6	Kwateng et al. (2019)	Ghana	Behavioural intention to adopt mobile banking	O	O	O	O	O	✓	✓		✓													
			Use behaviour			O						✓				✓									
7	Marpaung et al. (2022)	Indonesia	Behavioural intention to adopt mobile banking	✓	✓	✓	O	✓		O															
8	Merhi et al. (2019)	Lebanon	Behavioural intention to adopt mobile banking	✓	O	O		O	O	✓	✓	✓	✓												
9	Merhi et al. (2019)	England	Behavioural intention to adopt mobile banking	O		O		O	✓	✓	✓	✓	✓												
10	Osman and Leng (2020)	Malaysia	Behavioural intention to adopt mobile banking	O	✓	O		✓		✓							✓								
11	Rachmawati et al. (2020)	Indonesia	Behavioural intention to adopt mobile banking	✓	✓	O	O																		
			Behavioural usage				✓																		
12	Raza et al. (2019)	Pakistan	Behavioural intention to adopt mobile banking	✓	✓	O	✓	✓	✓	✓															
13	Sankaran and Chakraborty (2022)	India	behavioural intentin t adpt mbile banking	O	✓					✓		✓						O	✓	✓	✓				
14	Savi´c and Pešterac (2020)	Serbia	Behavioural intention to adopt mobile banking	✓	✓	✓	✓																		
15	Trinh et al. (2020)	Vietnam	Behavioural intention to adopt mobile banking	O	✓	✓	O	✓	O		✓	✓													
16	Luyao, et al. (2022)	China	Intention to adopt wearab	✓	✓	✓	✓	✓	✓			✓										✓			
17	Nur & Panggabean (2021)		intention to adopt mobile	✓	✓	✓	✓	✓				✓													
18	Sleimana et al, (2021)	Sudan	Satisfaction	✓																					
			Continuance Intention	✓	✓	✓	✓																O	✓	✓
	Frequency of Constructs			19	17	18	15	13	10	10	3	11	2	2	1	2	2	1	1	1	1	1	1	1	1
	Frequency Significant			12	12	9	10	9	8	8	3	10	2	1	1	2	2	0	1	1	1	1	0	1	1

Key: ✓ Siginficant
O Not Significant

APPENDIX3

Table 3: Constructs used in Empirical Studies Involving Integrated Models

SN	Author	Place of Stud	Theoretical framework/ model	Dependent Variable	Determinant variables																										
					Attitude	Behavioural Intention	Perceived usefulness	Perceived ease of use	perceived security	perceived privacy	Task-Technology Fit	Technology characteristics	Task Characteristics	Satisfaction	Use	Performance expectancy	Effort Expectacy	Social Influence	Facilitating conditions	Hedonic motivation	Price value	Habit	Information quality	System quality	Service quality	Perceived Trust	Perceived Transaction costs	Compatibility	Complexity	Relative Advantage	Perceived risk
1	Albashrawi et al. (2019)	USA	Integration of UTAUT and IS Success Model	Mobile banking actual use		✓													✓												
				Behavioural Intention												✓	✓	✓	O												
1	Baabdullah et al. (2019)	Saudi Arabia	Integration of TAM and TTF	Continued Intention to Use			✓	O	✓	✓	✓																				
				Perceived Ease of Use								✓																				
				Perceived Usefulness							✓	✓																			
				Task Technology Fit									✓																		
2	Baabdullah et al. (2019)	Saudi Arabia	Integration of UTAUT2 and D&M IS Success Model	Loyalty										✓	✓																
				Satisfaction											✓																
				Use												✓	O	O	✓	✓	✓	✓	✓	✓	✓	✓					
3	Le et al. (2020)	Vietnam	Integration of UTAUT and TAM	Level of use		✓																									
				Behavioural Intention				✓								✓		✓							✓	✓	✓				
4	Owusu et al. (2021)	Ghana	Integration of TAM and Diffusion of Innovations (DOI)—Innovation Diffusion Theory (IDT)	Behavioural Intention			✓	✓																		O		O	✓	O	
				Perceived Ease of Use																								✓			
				Perceived Usefulness																									✓		
5	Lin et al, (2020)	Taiwan	Extend Unified Theory of Acceptance and Use of Technology (UTAUT2) and Diffusion of	Behavioural Intention												O	O	✓	O	✓	O						✓	O	O		
				Performance expectancy																							✓				
				Effort Expectancy																							✓				
6	Gbongli et al. (2020)	Togo	TRA, DOI, TAM, TPB, UTAUT.	Adoption of mobile financial services																					✓					✓	
				General Trust																											
				Aggregate Perceived Risk					✓	✓															✓	✓					
7	Singh and Srivastava (2018)	India	TAM, UTAUT	Intention to use mobile banking				✓	✓									O							O	✓					
				Perceived ease of use																											
				Security																					✓						
8	Ndekwa et al. (2018)	Tanzania	Extended Theory of Planned Behaviour (TPB)	Adoption of mobile money	✓													✓	✓												
	Frequency of the construct				1	2	2	4	3	2	2	2	1	1	2	4	3	6	5	2	2	1	1	1	5	4	4	3	3	2
	Frequency significant				1	2	2	3	3	2	2	2	1	1	2	3	1	4	3	2	1	1	1	1	4	3	4	1	2	1

Key: ✓ Siginficant
O Not Significant