ACCEPTANCE OF MOBILE FINANCIAL SERVICES BY UNIVERSITY STUDENTS IN DAR ES SALAAM, TANZANIA

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Approval of the Thesis

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Doctor of Philosophy (PhD) in Business

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Abstract

ACCEPTANCE OF MOBILE FINANCIAL SERVICES BY UNIVERSITY STUDENTS IN DAR ES SALAM, TANZANIA

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Technological innovations, especially in mobile communication shape interactions, lifestyles, and financial services, with mobile communication exerting unparalleled influence on daily life. The study's main objective was to assess acceptance of mobile financial services by university students in Dar es salaam, Tanzania. It was undertaken in four universities. Anchored on the integration of the technology acceptance model and the united theory on usage and adoption of technology, the study leverages on the PLS-SEM to establish the most significant stimulus on users' intents for adopting mobile financial services as being utility perceptions, ease of usage perceptions, facilitative conditions, as well as attitude. The quantitative survey involving 449 students highlights remarkable diminution of fears and high utilization levels where 95.5 percent are extant users of mobile financial services. Similarly, the study has found that attitude partially mediated the interaction involving utility perceptions and ease of usage perceptions with use intentions. On contrast, social inspiration and risk perceptions had marginal impact on use intentions. While statistically insignificant, gender variations were evident with female subjects largely influenced by utility and simplicity features and males more responsive to facilitative conditions and customer attitude. Study findings accentuate the critical role of earmarked factors for effective interventions intended for raising financial inclusion. Future research focused on youths non students and emerging technologies including artificial intelligence, blockchain and other machine aided financial transactions would provide useful insights for broader application, policy interventions and contribute to the stock of scholarly theoretical knowledge.

Declaration

I declare that this thesis was composed by myself, that the work contained herein is my own except where explicitly stated otherwise in the text, and that this work has not been submitted for any other degree or professional qualification except as specified. Parts of this work have been published in Mkombo, A. & Wahua, L. (2024). Review of Behavioural Intention to undertake Mobile financial transactions. *International Journal of Research and Innovation in Social Science* 8(1).1520-1538. 10.47772/IJRISS.2024.801113.

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Dedication

This is work is dedicated to my beloved wife Joyce Joseph Ruritaliye who patiently endured my absence and encouraged me to forge ahead in times of my despair. Thank you for your prayers and availability for completion of the work.

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In accomplishing this work, I owe gratitude to many. A few of these include Dr. Lawrence Wahua my supervisor for his enduring guidance over the course of doing this research. I also thank Dr. Aloyce Hepelwa of Dar es Salaam University for his advice on how to proceed with the data collection process. Further appreciation is to the registrars of the four universities, Dar es Salaam University; Ardhi University; St. Joseph University in Tanzania; and Kampala International University in Tanzania for their permission to collect data from the students. A big thank you to all of you.

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List of Abbreviations

ANOVA	Analysis of Variance
ADO	Antecedents, Decisions and Outcomes
ARU	Ardhi University
AT	Attitude
AVE	Average Variance Extracted
BOT	Bank of Tanzania
CB-SEM	Covariance Based Structural Equation Modelling
CFA	Confirmatory Factor Analysis
COSTECH	Commission for Science and Technology
UTAUT	United Theory on Adoption and Usage of Technology
FC	Facilitative Conditions
GE	Gender
HM	Hedonic Motivation
HTMT	Heterotrait Monotrait
IDT	Innovation Diffusion Theory
IU	Intention to undertake
KIUT	Kampala International University in Tanzania
MB	Mobile Banking
MFT	Mobile Financial Transactions
MFS	Mobile Financial Services
MM	Mobile Money
MP	Mobile Payment
PBT	Planned Behaviour Theory
PE	Perceived Ease of usage (Ease of usage Perceptions)
PR	Perceived Risk (Risk Perceptions)
PU	Perceived Utility (Utility Perceptions)
RAT	Theory of Reasoned Action
SI	Social inspiration
SJUT	St. Joseph University in Tanzania
SMS	Short Message Services
SN	Subjective Norms
TAM	Technology Adoption Model
TCCM	Theory, Constructs, Characteristics and Methodology
TCMM	Theory, Constructs, Method and Moderators
TCRA	Tanzania Communication Regulatory Authority
TP	Trust Perceptions
TTF	Task Technology Fit
UDSM	University of Dar es Salaam
UREC	University Research Ethics Committee
WHO	World Health Organisation

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CHAPTER 1 : INTRODUCTION

1.1 Background

Technological innovations, driven by evolutionary advancements, have precipitated unprecedented transformations in the modes of interaction between corporate entities and individuals, thereby reshaping lifestyles and influencing patterns of choice. In the financial service sector, particular innovations include mobile communication, cloud computing, data analytics and artificial intelligence as among the most striking advancements (Abdullah et al., 2023). Of particular interest, the mobile communication technology that came into existence in the last couple of decades, brings with it, unapparelled influence in people's day-to-day livelihood. Manifested in the forms of internet, mobile phones and broadband networks, mobile communication technology has sparked a radical change in the sector of communication and information technology, with mobile phone standing out as a beacon among the triplet. This is due to the ability of the mobile phone to penetrate the life of an individual, giving it an edge to offer multiple ways of digitally transacting, not only between businesses and their customers, but also between individuals. The mobile phone has spurred generation of trillions of daily financial services across the globe, making it possible to reach individuals and communities that were previously considered financially excluded.

Mobile financial services (MFS) comprise an extensive range of digital product or service offered in the financial service industry and administered using portable devices such as a mobile phone or tablet (Shaikh & Karjaluotos, 2019). They constitute an expression of broad range of data services used to manage one's finances, which generally cover among others, request for bank balance, cash deposit, withdrawal, payment, transfer of funds, securities trade, insurance cover, money management apps, communication with suppliers and allied financial service providers as

well as users and reading financial information (Yeo & Fisher, 2017). For contextual clarity, it is essential to distinguish between Mobile financial services (MFS) and mobile financial transactions (MFT). Mobile financial services represent a broad category encompassing various financial activities conducted via mobile phones, while mobile financial transactions (MFT) specifically refer to the transfer or exchange of monetary value or benefits between two or more parties. The present study focused on mobile financial service which the study classified them into three segments: m (mobile)-banking services; m (mobile) payment services; and m (mobile) money services.

M-banking (MB) involves access to downloadable banking applications executable by means of portable devices (mobile phones, smartphone or tablet) through which financial and other transactions are conducted (Shaikh et al., 2022). Mobile payment (MP) refers to the transactions involving transfer of money (e-money) between two parties using a digital device account without a need for a formal relationship with a bank (Sleiman et al., 2022). They include payment such as those between customers; customer with a point-of-sale machine; and customer to business through mobile wallet and smart watches (Sharma et al, 2022). On the other hand, M- money (MM) as a third category of MFS, involves accessing, transferring, storing and using money via mobile devices (Lepoutre & Oguntoye, 2018). It also includes short-message services (SMS), agency services and mobile money transfers.

The arguments behind the attractiveness of mobile financial services were based on perceived advantages in terms of the fact that they are faster, cheaper and also convenient to the customers (Achieng & Ingari, 2015). Given the promising pros, the entry of mobile financial transactions created considerable anticipations about increasing utilisation of the technology especially in developing economies where the percentage of users of mobile phones is relatively

high but yet there is a substantial share of financially excluded people. One example would be that 85 out of 100 residents of Tanzania were using mobile phones by the end of 2020 (Statista, 2021). Right from its invention, the utilisation of mobile phones for undertaking financial services reached the eyes of many who believed that it to be a cornerstone to achieving the financial inclusion targets. Amused by the benefits of mobile financial transactions, financial service providers were equally optimistic in expanding the perimeter of their service footprint by offering services in a manner that would retain their existing customer and attract others into using their services.

On the contrary, the introduction of mobile wallets and M-Pesa have not been up to the expectation in most parts of the world and especially in the Tanzanian market. Research on adoption of mobile financial services in Tanzania showed lower adoption compared with expectations especially on mobile banking (Richard & Mandari, 2017). While notable strides were observed during the period of COVID 19 pandemic, yet attainment of financial inclusion objectives is substantially far from being met. High levels of financial exclusions are still evident in Tanzania and globally. For example, the Word Bank Group (2021) reports that by end of 2021 about 52 percent of the adult population in Tanzania was unbanked evidenced by lack of a bank account or an account with a mobile money provider. This is notwithstanding the deep mobile phone penetration that Tanzania and similar economies are enjoying. By 2022, Tanzania had 92 mobile phone subscribers for every 100 people (Statista, 2023).

While it was believed that certain population segments such as the university students were amenable to technology, yet the rate of adoption for mobile financial services was below the expectation (Ndekwa et al. 2018). University students especially at the introductory level had undisputable and considerable affinity for use of technology of varied kinds (Alsayed et al., 2020).

Nearly every student utilises a smartphone which directs academic activities such as academic work to and fro. Similarly, a university student is expected to have accounts which serve as outlets for flow of monthly allowances. Being the positive aspect, technology use united with high levels of literacy gives the students in the university the full capacity to undertake mobile money transactions. The apparent lag among university students in adopting mobile financial services was an inspiration behind this study.

Literature preview indicates that prior studies that explored adoption of technology were mostly conducted outside Africa, largely in Asian, Middle East and European Union countries (Souiden et al.,2020; Shaikh et al., 2022). Focus of the study on behavioral intents of university students to adopt mobile financial transactions also serves to partly address the gap related to study population earmarked by Dhingra and Gupta (2020) who pointed out to the need for a study that includes participants with no prior experience in mobile banking, whereby students were construed to likely have no prior experience on this kind of mobile financial transactions. In overall, the ultimate aim of the research is to derive and recommend for evidence based measures for promoting massive adoption of mobile financial transactions in Tanzania and other econommies facing similar challenges. The research therefore explored behavioral factors that have led low levels of financial services technology adoption. Understanding the key factors that motivate the youth population to use the mobile financial services is a strategy to unravel the barriers to financial inclusion amongst the innovators as well as the public.

1.2 Statement of the Problem

Governments and multinational organizations, such as the World Bank, implement numerous programs aimed at integrating financially excluded populations into the formal financial system, with the overarching objective of advancing poverty eradication. Such initiatives are

anchored on the affirmation that financial inclusion catalyses economic activities through efficient resource allocation and avoidance of redundancy. Meanwhile, the arrival of modern creative communication technologies staged in delivery of financial transactions using mobile devices heighten the optimism in attainment of financial inclusion targets through massive adoptions of financial services reflected in the form of increased mobile financial transactions, in lieu of the advantages they provide including saving time, money and convenience (Tsouli, 2022). Despite the commendable initiatives undertaken in recent years achieved even amid the challenges posed by the Covid-19 pandemic significant efforts are still required to fully realize the objectives of financial inclusion. Indeed, benefits are evident and milestones are achieved, yet, the adoption rate to the mobile financial services is lower than anticipated. Some populations do not have access to formal financial system. Reports indicate that the increased share of mobile money transactions by mobile subscribers which peaked at 61 percent of the total mobile subscriptions in Tanzania (BOT, 2021; TCRA, 2021) is attributed to mobile financial transactions within the m-payment segment. Such phenomenon can be mirrored to the situation prevalent in the context of Ghana, a peer economy to Tanzania, where the surge in m-money accounts has been observed to have concentrated heavily on remittances among friends (Amoah et al., 2020). An extension to the apparent lower than average uptake of mobile financial transactions is reported to prevail among university students. As evidence among youth in universities, the situation presents even more issues to be addressed by research as this is the population segment identified as the earliest adopters of technology (Alsayed et al., 2020). This study was therefore, undertaken to help in understanding use intentions in respect of mobile financial services among undergraduate university students. The existing body of evidence on this subject in Tanzania remains limited, with only a few investigations conducted, most of which have primarily focused on the general

population and/or communities outside Dar es Salaam. In light of this gap, the present study sought to examine the behavioral factors influencing undergraduate students' willingness to adopt mobile phone-based financial services within universities in Dar es Salaam, the country's central business district.

1.3 Purpose, Aims and Objectives of the Research

1.3.1 Research Purpose and Aims

Primary purpose underlying this research was to earmark and examine factors with significant influence in driving behavioural intentions to use mobile financial services among university undergraduate student communities in Dar es Salaam, Tanzania. It sought to derive insights for developing measures for promoting massive adoption of mobile financial services that would contribute towards addressing financial inclusion challenges. In-depth understanding of the behavioural traits of a consumer of mobile financial transactions helps to address key barriers to adoption and implement measures anchored on the drivers of mobile financial transactions adoption to increase levels of financial service usage, particularly among the lagging student communities. The study focused at students in universities given their central position in the society as they are not just short-term recipients of financial services but also long run managers of financial service providers and governments. As such, grasping the revelations from their perspectives concerning the instincts governing the uptake of mobile financial transactions plays a vital part when it comes to formulation of economic policy or development plans to augment ongoing efforts for promoting financial inclusion in the country and at a global space**.**

Besides, the study intended to offering an academic contribution in bridging research gaps identified in the context of prior studies related to adoption technology-based financial services including service delivery applications, digital devices and financial technologies (FinTech).

Drawing on the literature, several gaps were identified, including contextual and population-related limitations highlighted by Shaikh et al. (2022), as well as shortcomings in the theoretical model outlined by Elhajjar and Ouaida (2020). Again, by focusing on behavioral intents of university students, the study serves to partly address the gap related to study population discussed by Dhingra and Gupta (2020) who pointed out to the need for a study that includes participants with no prior experience in mobile banking. The present research was underscored by the understanding that students who are less likely have no prior experience on this kind of mobile financial transactions, particularly on mobile banking aspects. This study was situated in a developing country context, specifically Tanzania, thereby contributing to bridging the context-based research gap, as most studies on the adoption of technology-enabled financial transactions have been conducted outside Africa, predominantly in Asia, the Middle East, and the European Union. Ultimately, the overarching aim of the research is to generate evidence-based recommendations for promoting the large-scale adoption of mobile financial transactions in Tanzania and in other economies facing similar challenges.

In the previous studies, factors observed to significantly influence user adoption intentions by individuals in the financial service industry included Utility Perceptions (PU), Ease of usage Perceptions (PE), social inspiration (SI), Use intention (IU), Risk Perception (PR) and facilitative conditions (FC), attitude (AT), and Gender (GE). Utility Perceptions (PU) is a fundamental factor that any rational consumer is bound to consider before using any given product or service, in this aspect technology (Govender & Sihlali, 2014). The dimensions considered under the PU relates to the way an individual believes on the level to which envisaged mobile financial transactions are likely to enhance their productivity or rather enable them to accomplish the assignments they are supposed to undertake. Likewise, Ease of usage Perceptions (PE), describes the scope by which a

person considers that deployment of particular technological service would require little or no effort at all (Davis, 1989). Based on the context of the study at hand, the perceptions on ease of usage refers to a person's belief that the utilisation of mobile financial transactions would be easily understood and thus require little effort to use. Regarding social inspiration or influence (SI), this is described as the measure by which a person's adoption intentions are affected by the opinions of people around the person, particularly those that such person considers to be important. Such people may include family members and close friends (Singh et al.,2020).

The person's or unit acceptance, which stands for use intention (IU), is a model that marks individual readiness for a given innovation or technology. It is a type of perceived opinion of a particular person about the likelihood of him or her exhibiting a certain behavior (Lo Presti et al., 2021). Behavioural intention to undertake an action is a more colloquial term which may be understood as "an individual has the wish/desire to act in a certain manner although he/she is not guaranteed to take those actions." (Zaineldeen et al., 2020, p. 5062). Expected utility, unlike the expected benefits, mean the level by which people consider that a given technological device stands to cause improvements in the performance of their roles (Davis, 1989). It is a very high-level contribution to the perception of the target user of the product that leads to the adoption of the given new technology. Attitude (AT) on the other hand is to the extent that it is a proneness of a person about a certain subject or action, that is discussed by Giovanis et al. (2019).

Perception of risk (PR) refers to the subjective anticipation of uncertainty resulting from using a given technology or technology-driven service (Tan Lau,2016). Such uncertainty may include a belief or perception on financial or social loss, breach of security, encroachment of privacy as a result using a given product or service (Lema, 2017). Facilitative conditions (FC) on the other hand, refers to the individual's views on availability and adequacy of systems and

facilities to support adoption or usage of a technologically driven service or product (Giovannis et al., 2019). Such belief is the product of the view on the role of supportive environment in adopting or rejecting a given system. On its part, Attitude (AT) refers to an individual's viewpoint or orientation towards a given service or product. It expresses the willingness of a person toward a particular phenomenon, action or behaviour (Giovanis et al., 2019). In many occasions, AT has taken up the role of mediator between variable associations, so is the case with the study at hand. The study considers as well the moderating effects of Gender (GE). GE is a social dimension of the sex's characteristics. These are socially constructed characteristics of men, women, boys and girls, that are associated with norms, roles and behaviours and the inter-relationships (WHO). As a factor, GE is frequently examined in social studies, particularly considering its role as moderator, similar to age and education, and observed to have significant effects (Shaikh et al. 2022). GE is therefore explored in this study by gauging its moderating influence in the interactions involving exogenous and endogenous traits or variables.

The scanty number of investigations that explored the behavioural features of mobile technology adoption in Tanzania were mainly based on the usual population, while majority of the studies that looked at the university students were conducted outside Dar es Salaam. This study expanded the knowledge gathered from previous studies by specifically studying graduating students within universities in Dar es Salaam, which is regarded as the largest city and economic hub of the country.

1.3.2 Research Objectives

Specific objectives of study at hand are to empirically establish if:

RO1: The behavioural factors [utility perceptions (PU), ease of usage perception (PE), social inspiration (SI), risk perceptions (PR), facilitative conditions (FC) and attitude (AT)] have

a bearing in catalyzing or hindering students' intention (IU) to undertake mobile financial transactions in universities in Tanzania.

RO2: Attitude (AT) has a mediation role in the associations of exogenous factors of utility perception (PU) and ease of usage perceptions (PE) with the endogenous construct use intents (IU) in relation to mobile financial transaction among university students in Tanzania.

RO3: Gender-based variations exist, in terms of moderation, in the associations of the exogenous traits (utility perception, ease of usage perception, social inspiration, risk perception, facilitative conditions and attitude) with the endogenous attribute of usage intents for mobile financial transactions among university students in Dar es Salaam, Tanzania.

1.4 Research Questions and Hypotheses

1.4.1 Research Questions

In order to alleviate the low adoption rate of financial related technologies such as mobile financial transactions in university students, we need to investigate the behavioural factors that have been recognised to greatly dictate the intention of people to use such a service. The focal factors include PU, PE, AT, SI, PR and FC in a range of settings. Fundamental research questions that were needed to be addressed in the course of the study were:

RQ1: What kind of influence do behavioural factors [utility perceptions (PU), ease of usage perception (PE), social inspiration (SI), risk perceptions (PR), facilitative conditions (FC) and attitude (AT)] exert in catalyzing or hindering students' intention (IU) to undertake mobile financial services in universities in Tanzania?

RQ2: What role does attitude (AT) have in mediating the associations of exogenous factors of utility perception (PU) and ease of usage perceptions (PE) with the endogenous construct

use intents (IU) in relation to mobile financial services among university students in Tanzania?

RQ3: How would the associations of the exogenous traits (utility perception, ease of usage perception, social inspiration, risk perception, facilitative conditions and attitude) with the endogenous attribute of usage intents for mobile financial services among university students in Dar es Salaam, Tanzania be moderated by gender-based variations?

1.4.2 Hypotheses

In the endeavor to respond to the foregoing set of questions, formulation of hypotheses for testing based on quantitative methods is a necessary subsequent step. The set of hypothesis involves hypothesis related to direct relationships, mediation effect as well as moderation impact in line with the categories of highlighted research objectives.

One of the fundamental factors that have consistently been found to influence adoption intentions is the potential user's perception on its usefulness. The observation has also been true in relation to adoption of financial services as revealed by a number of studies including Elhajjar and Ouaida (2020) and Himel et al. (2021). Research has demonstrated strong positive relationship between utility perceptions and the intents for adoption of a particular technology-based service, hence a hypothesis formulation:

H_1: *Utility Perception (PU) influences behavioural intent for undertaking (IU) mobile financial* services *(MFS) by university students in Tanzania;*

In the line of thinking similar to that of utility perception, a twin factor that has proven influential in user intent determination is perception on ease of use. Difficulties in usage tends to scare away prospective users of a given technology. This observation was initially cemented by Davis (1989) and seconded by several other authors including Elhajjar and Ouaida (2020) and

Milly et al. (2021) who found significant statistical influence of easiness in usage on technology adoption intentions. Consequently, it considered useful to test the influence of ease of use perception in the folowing hypothesis.

H_2: *Ease of usage Perceptions (PE) is a determinant of behavioural Use Intents (IU) for MFS by university students in Tanzania*

Individuals have in many instances been driven into using a particular item or appliance based on suggestion or inspiration from colleagues, friends and relatives, most oftenly when such item is new to the user. Social inspiration has been one of the major drivers in consumption that has given rise to various network marketing models. In the technology space, social factors have also demonstrated strong effects in the technology adoption equation across multiple research findings such as Hong and Chung-Ang (2019). The assertion gave rise to the formulation of the hypothesis:

H_3: *Social inspiration (SI) bears effects on the behavioural usage intents (IU) for mobile financial services by university students in Tanzania.*

While some are inspired into adoption on account of their perception regarding utility and ease of use, others are scared away from adopting a particular item or service on the fears of some loss or uncertainties. Studies on technology adoption have recorded perceptions on riskiness of an item or service as one of fundamental barriers to adoption intents. Fears regarding security, loss of confidentiality and financial loss have featured among the threats in the adoption intentions of prospective users of technology and technolgoy-based services. For example Tiwari et al. (2021) found that customers' informedness, perception on risk and trust are critical to adoption for mobile-based banking. The obervation was also true with the study by Iskandar et al. (2020) who found that perception on risk to have significant negative impact on behavioural adoption intents for

technologically driven financial services. The expositions led to development of Hypothesis 4 presented as hereunder.

H_4: *In Tanzania, there is strong connection between the risk perception (PR) and the behavioural intention (IU) to take mobile financial services among university students***.**

Conditions surrounding a service offering is in many instances considered an important ingredient in an individual's decision whether or not to use the service. Provision of supportive facilities in terms of clear instructions, availability of support staff and appropriate infrastructure have been found to contribute in a person's adoption intentions. Several studies related to adoption of technology have made revelations on the positive relationship between facilitative conditions and user adoption intentions. Examples of studies include Alhassan et al.(2020); Islam et al. (2019) and Kaplan and Gürbüz (2021). The revelations points to the need for examining the influence of supportive conditions on use intentions in respect of mobile financial services among univesity students as in the following hypothesis:

H_5: *Facilitative conditions (FC) are influential in determining behavioural intents to undertake (IU)mobile financial services by university students in Tanzania*

Apart from the features related to the service offering and surrounding circumstances, a person's orientation in relation to a given technology or services is in multiple ocassions regarded as a fundamental driver of use intentions. Studies in relation to technology adoption (such as Hong (2019); Siyal et al. (2019), and Gbongli and Amedjonekou (2019)) cite attitude of an individual as a determininat to their adoption intention both as a primary driver and an mediating factor. Given the prior observations, the study stands to derive rich insights by examining the role of attitude in influencing use decisions by university students in relation to mobile financial transactions, hence hypothesis 6:

H_6: *Attitude (AT) bears an influence on behavioural intents to undertake (IU) mobile financial services by university students in Tanzania*

Having examined the direct impact of service-related features of utility and ease of usage on the adoption intents for mobile financial transactions, there arises a question on whether the magnitude of such impact would be influenced by the attitude of the prospective user. Literature such as Gbongli and Amedjonekou (2019), Giovanis et al. (2019) and Souiden et al. (2020) associate attitude with a mediation influence between various pairs of behavioural factors in the arena of financial service adoption. Hypothesis 7 is therefore formulated with a view to examining the role of attitude in mediating the association of utility perception and use intents for mobile financial services among university students. The hypothesis states that:

H_7: *Attitude (AT) generates mediation outcomes in the relationship that involves utility perceptions (PU) and behavioural usage intent (IU) for mobile financial services by university students in Dar es Salaam, Tanzania*

Similarly, attitude of a person is likely to mediate the association between ease of use perception and mobile financial transaction adoption intents. In this regard, to examine the mediation effects of attitude on the relationship governing ease of use perception and MFT use intents, hypothesis 8 hereunder was formulated.

H_8: *Attitude (AT) mediates the relationship that exists between ease of usage perceptions (PE) and behavioural Use Intent (IU) for mobile financial services by university students in Dar es Salaam, Tanzania*

Many a time, it is imporant to ascertain whether relationships established between exogenous and endogenous variables varies in reasonance with given factors, commonly known as moderating variables such as gender, education, and age. Similar to the observation by Shaikh

et al. (2022), one of a moderating factor that has exhibited significant influence in studies related to adoption of technology is gender. The observed phenomenon raises a quest for ascertaining the extent of influence that gender exerts in moderating the association involving utility perception and adoption intents for mobile financial transactions, hence hypothesis 9.

H_9: *Gender (GE) moderates the relationship construed to exist between Utility Perceptions (PU) and behavioural Use Intentions (IU) for mobile phone-perpetuated financial services by learners who are in universities situated within the locality of Dar es Salaam, Tanzania*

In the same vein, it was of interest to understand the moderation effects of gender on the association involving ease of use perceptions and MFT adoption intents, which leads to the formulation of hypothesis 10 that reads:

H_{10}: *Gender exerts moderation effect on the relationship construed to be present between Ease of usage Perceptions (PE) and behavioural intentions to undertake (IU) mobile financial services by students in Tanzanian universities based in Dar es Salaam.*

Similar to the quest for understanding moderation impact of gender on the association of the service features of utility and ease of use perceptions, it is quite appealing to be able to understand whether the strength of the association between social inspiration and MFT adoption intents vary significantly with gender category. The observation results in hypothesis 11, hereunder.

H_{11}: *Gender (GE) bears moderation effects on the relationship involving social inspiration (SI) and behavioural intents to undertake (IU) mobile phone-perpetuated financial services by students of Dar es Salaam-based universities in Tanzania.*

In the same line of thinking applied to moderation of other relationships, it was considered relevant to investigate whether the influence of risk perceptions on MFT adoption intentions vary with gender segmentation. The study by Sleiman et al.(2022) found that women tend to process aspects like security and privacy while men tend to focus in performance and utility of the products. The observation inspires for development of the 12th hypothesis:

H_{12}: *Gender (GE) does not moderate the association of Risk Perception (PR) and behavioural intents (IU) to undertake mobile financial services by Tanzanian university students.*

Based on the structure of the primary relationships in the study, another aspect on which moderating influence of gender has to be explored is on the association involving facilitative conditions and adoption intents for mobile financial transactions. Although facilitative conditions are primarily associated with influencing the intention to adopt technology-based financial services, it was also important to examine whether this influence differs by gender. This consideration led to hypothesis 13.

H_{13}: *Gender (GE) exerts moderation impact on the interaction between facilitative conditions (FC) and behavioural intentions to use (IU) mobile financial services by university students in Tanzania is not significant.*

Among the exogenous factors considered in the primary relationships was attitude. Attitude of the prospective adopter of the technology has in previous studies been found to hold a significant bearing on their decision intents, whether they would or would not adopt the given service. An interesting question arises on the extent to which gender dimesioins could lead to variations in the magnitude of the influence of attitude on adoption intents, hence formulation of hypothesis 14 below:

H_{14}: *Significant moderation stimulus is generated by Gender (GE) on the association of Attitude (AT) with behavioural use intent (IU) regarding deployment of mobile financial services by university students in Tanzania.*

Through quantitative testing of the hypothesis, the study should make possible to establish significant associations where the exogenous factors exert statistically substantial impact on the dependent variables. The research outcomes would also provide an indication on the strength by which Attitude mediates relationship between primary factors of PU and PE on the independent variable IU. The study should further highlight the magnitude of divergence in perception between gender dimensions of male and female by testing the moderation effects of GE on the primary relationships.

1.5 Significance of the Study

This empirical investigation envisions generation of vital information for use by financial service providers in devising marketing strategies to attract more customers thereby increasing the perimeter of financial service coverage which currently lies on the lower side. Through the benefits of expanded customer base and reduced operational costs, financial service providers stand to enhance their profitability. By leveraging on mobile communication technology, financial services will be offered in a more convenient and efficient manner, resulting in increased customer satisfaction rather than having to spend time in queues of banking halls. Financial services delivered through mobile devices provides an assurance of being available anywhere and on 24/7 basis. Application of mobile technology in the course of administration of financial services has a transformative potential in terms of peoples' life styles and how people conduct their financial affairs (Sharma 2029). The study was set to unearth insights on the extent of influence of a given set of factors toward mobile financial transactions adoption intention by university students. The

study was also an attempt to addressing construct-related gaps identified by Baabdullah et al. (2019), Merhi et al. (2019), Sharma (2019), Tiwari et al. (2021), and Singh and Srivastava (2018) through inclusion of mediating and moderating factors. In this way, the research was projected to reveal what encourages and disallows the use of mobile financial transactions.

The end result worthwhile is the setting of the stage for contributions by the policy makers, the range of technology domain and the economic growth through the growth of financial inclusion dimensions. As to the technology field, this experiment can be an additional feature for checking the concordance between the Extended Technology Adoption Model and the proposed issue. In summary, the results of this research would be deployed in production of policies driving the use of mobile financial transactions among university students and the youthful generation in aggregates. In terms of operation, organizations would gain profits, efficiency and sustainability by refining the lessons from the research-findings. The study gives us actual data needed for design of marketing strategy to use in promoting mobile financial transactions as one of the most important strategic elements of financial inclusion.

1.6 Summary

This chapter establishes the context of mobile financial transactions and services, both in Tanzania and globally. It reviews the evolutionary developments in technology and their impact on business practices and lifestyles, with particular emphasis on the rapid growth of mobile communication technologies and their role in transforming financial service delivery. Governments, international organizations, and other stakeholders have embraced mobile financial services as a powerful tool for expanding financial access, with the expectation that these innovations could accelerate progress toward financial inclusion. The need to understand the factors influencing behavioral intentions to adopt mobile financial transactions provides the foundation for this study. Accordingly, the chapter

highlights the key drivers of adoption that could inform strategies for encouraging widespread use of mobile financial services.

The focus on university students is motivated by their unique position in society. As future professionals and opinion leaders, their perceptions and behaviors exert significant influence on financial practices within their communities. Understanding their motivations and barriers to adopting mobile financial services not only sheds light on youth-related financial inclusion challenges but also offers insights applicable to the broader public. The chapter further presents the statement of the problem, followed by the development of fourteen hypotheses. Six hypotheses test the direct effects of independent variables—Perceived Usefulness (PU), Perceived Ease of Use (PE), Social Influence (SI), Perceived Risk (PR), and Facilitating Conditions (FC)—along with Attitude (AT), on the dependent variable, Intention to Use (IU) mobile financial services. Another set of hypotheses examines the mediating role of Attitude (AT) in the relationships between PU, PE, and IU. The final set tests the moderating effects of AT on the associations between the independent constructs (PU, FC, PE, SI, PR) and the dependent variable IU.

The chapter concludes by discussing the importance, relevance, and potential contributions of the study. It highlights the research gap being addressed, explains how the study advances knowledge on mobile financial services, and identifies the beneficiaries of its findings. In particular, it underscores the significance of exploring university students' readiness to adopt mobile financial services, both for academic discourse and for practical efforts toward enhancing financial inclusion in society.

CHAPTER 2 : LITERATURE REVIEW

2.1 Overview

The central focus of the study lied in exploring current circumstances in relation to the adoption of mobile financial transactions among university students, with a view to extracting insights to drive adoption and enhance financial inclusion drive. The inspiration behind the study was rooted in the under achievement of the daunting financial inclusion targets partly attributed to lower than anticipated rates of adoption of technology-delivered financial services (Abdinoor & Mbamba, 2017; Richard & Mandari, 2017). Despite notable developments amidst the COVID-19 pandemic, substantial strides are yet to be attained, supported by the revelation that by the 2021, about 52 percent of Tanzania's population had no access to such services (World Bank, 2021). Further to the phenomenon was the prevalence of the sluggish adoption of mobile financial transactions among university students, a supposedly technology-hungry community (Ndekwa et al., 2018; Alsayed et al., 2020).

An in-depth comprehension of the magnitude of the problem called for visitation to the work of prior scholars through the review of literature review. Literature review is a crucial part of the project as it offers the basis on which new developments in the aspects of adoption of technologically-delivered financial transactions can be gauged. Literature and theoretical models included in the study was those published between the 2018 and 2022 period, and which concerned technology adoption and technology-driven financial transactions, such as m-banking, m-payment and m-money transactions. Such a selection is aimed at the substitution of the outdated literature in library collections which retains the median citation rate of four years (Cunningham & Bocock, 1995).

The literature review was carried out through a Boolean search that explored databases including ProQuest and Google Scholar; and reviewed prior meta-analytical studies and systematic

literature reviews by Hilal and Varela-Neira (2022), Souiden et al. (2020), and Santini et al. (2019). The snowball method was also used. Searches conducted in the ProQuest and Google Scholar databases were mainly based on key terms including “mobile financial transactions”; “technology adoption”; “mobile banking”, “mobile money”, “mobile payments”, “m-banking”, “technology acceptance”, “system adoption”, “Technology Adoption Model”, “user acceptance”, “behavioural intentions”, as well as “system user intentions”. These inquiries produced voluminous outputs which was manually assessed for relevance.

From the search, valuable information and data was generated. For example, Souiden et al. (2020) systematically reviewed models and theoretical frameworks on the mobile banking adoption that involved searches in the databases of Web of Science, Business Source Premier, and ABI/INFORM global. On the same note, Hilal and Varela-Neira (2022) studied mobility banking by conducting searches in the databases of Scopus, and Business Source Premier. Searches that were made in other databases were complementary to this main resource repository. Such other searches included the big breakthrough work of by Santini et al. (2019) that extorted several databases including JSTOR, Google Scholar, Emerald, Elsevier Science Direct, PsycINFO, EBSCO, Taylor & Francis, SCOPUS, and Scielo that reviewed published based on dissertations and presentations.

In terms of approaches to literature review, out of a range of approaches, the study at hand adopted the TCMM approach amplified as theory, construct, method, and moderator. Some of the other approaches are those highlighted by Shaikh et al. (2022), including the 6W Framework employed by Xie et al. (2017) involving the who, when, where, how, what and why elements; the ADO (antecedents, decisions and outcomes) propagated from Paul and Benito (2018); the TCCM (theory, construct, characteristics and methodology) adapted from Paul and Rosado-Serrano

(2019);and the TCMM approach amplified as theory, construct, method, and moderator (ibid). The choice of the TCMM is based on its arguably, the most suitable logical structure for literature review. The approach consists of three phases such whereby, the theoretical framework being set first, the assessment of domain constructs and research methods next, and the last phase focusing on the moderators of the core domain. The fact that this process goes through a moderator gives the TCMM framework an edge over its distant cousin, TCCM. The moderator is a construct that is peculiar since it alters the latent connections between constructs in research (Shaikh et al., 2022).

The chapter on literature review begins with an exploration of the theoretical framework which considers the evolution of the various models related to adoption of technology and a subsequent selection of the most appropriate models for use in the study. The theoretical framework is then followed by a conceptual framework, which provides an analytical review of the constructs to be hosted in the model. The industry description follows the conceptual framework, which part is intended at enhancing clarity of the core subject through descriptions of the terms applied in the study. The fourth part of the literature review is the empirical review that articulates model constructs; research design and methods; results and implications of the previous research findings. The fifth part anchors on the outcomes generated from earlier study findings to illuminate implications and research gaps for consideration in future research. The final part of the literature is devoted to hypothesis development and a summary of main points.

2.2 Theoretical Framework

Theories involving adoption of new technology and systems have evolved along with developments in the modern communication technologies. However, much of the developments in theoretical framework has been witnessed over the last couple of years with the advent of numerous trailblazing technologies, where now information technology is on the fingertips of individuals including the technology linked to mobile devices such as smartphones as an integral

aspect in daily social and business life. Such development has attracted increasing research interest, with a notable segment focused on exploration of consumer behaviour in respect of various financial products and services, particularly those which have to do with the technology. One of the core fields whose research interest has shown extraordinary growth relates to the quest for understanding consumer behavioural intentions as regards to intents on undertaking of financial transactions delivered through mobile devices, commonly referred to as mobile financial transactions, including mobile -banking, payments and money services, now as applied to special population category -university students. To grasp extensive understanding of the role of behavioural features in driving intentions of college students to adopt mobile financial transactions in Tanzania calls for review of some established theories and models as they applied to this part of the field.

Many models and doctrines have been created to explain the interrelationship of consumers and their adoption of technological advancements. A foundational theoretical framework from a behavioural intention perspective and consequently technology and system adoption hinges around the Theory of Reasoned Action (TRA) proposed by Ajzen and Fishbein (1980). The TRA explains that a behaviour is an outcome of the intention of an individual to act the given behaviour and that this intention is the response of the attitude towards the behaviour and the environment nested in the social norms. Empirical studies which followed led to modifications of the TRA resulting in the emergence of its alternative revisions of the TRA including of Planned Behaviour Theory (PBT); Theory of Innovation Diffusion (TID); Theory of Task-Technology Fit (TTF); Technology Adoption Model (TAM) and its postscript variants TAM2 and TAM3; and later, the United Theory on Adoption and Usage of Technology (UTAUT) and its variant Extended United Theory on Adoption and Usage of Technology (UTAUT2). Needless, an articulate view of each

of the theory/model was thought to be important in viewing their contribution to the current understanding of the subject matter and in determining the ideal model suitable for the study.

2.2.1 Theory of Reasoned Action

The Theory of Reasoned Action (TRA) is viewed as a starting gear in the evolutionary development of a range of theories whose focus were centred on providing an understanding of the behavioural intentions behind a given innovation or technology adoption. To explain how human beings act, the theory of action reasoning was developed by Ajzen and Fishbein (1980). The stated theory suggests that, attitudes and subjective norms have an influence on behavior. It posits that whether the individual would show a certain behavior or not would depend on either the individual's behavioral attitude or the social norm. If the attitude of an individual, whether positive or negative, leads to behaving according to it, this will thus influence the action. Definition of attitude being a personal inclination of an individual about a certain behaviour, whereas social norm is individual's perception regarding views of the group members in respect of a particular behaviour (Giovanis et al., 2019). Applied to technological adoptions in this case technology driven financial services, the theory suggest that adoption of mobile financial transactions is principally influenced by a person's behavioural intent for adoption, which in turn would be the result of the person's attitude and social norms surrounding the adoption.

According to the theory, specific beliefs are developed each time a person encounters and appraises a certain phenomenon. The behavior model specifically reinforces the fact insomuch that each time an individual finds themselves in a given scenario, tries as much as possible to comprehend and focus on the different parameters of the phenomenon (Ajzen & Fishbein, 1972). While the target theory can be applied to specific circumstances, bias of the consumer in any specific situation makes the generalisation of the theory to other situations difficult (Ajzen &

Fishbein, 1972; Glassberg, 2000). Again, while the model counts on social norms as another main determinant of behavioural intentions, others faced limitations in proving social norms as a powerful determinant in this regard (Davis et al, 1989, Chau & Hu, 2002). On another note, the theory brings about inadequate explanation of the two different, yet generally used, concepts of culture i.e. attitude and norms (Alhassan et al., 2020). In the proceeding case, the model was therefore thought as less suited to the current study.

2.2.2 Planned Behavior Theory

The Planned Behaviour Theory (PBT) is an improved version of the Theory of Reasoned Action (TRA) put forward by Ajzen (1991) by incorporating, conditions that are beyond the behavioural control of the individual (Giovanis et al., 2019). The PBT posits that, apart from attitude and subjective norms, the intents that a person develops towards a certain action is also influenced by control constructs – both actual control and control as perceived by the individual. Meaning the actual control means the resources a person needs to be able to perform a particular behaviour whereas the behavioral control perception is more about that person's perception regarding availability of resources needed for the behaviour to occur (Ajzen & Madden, 1986).

Essentially, the PBT resembles the TRA as the two theories entail some major constructs that influence behavioural regulation. In consequence, regarding TBA, the TRA was similarly correlated. This TPB also considers some general work environment settings focused on those of the system instead of personal gadgets. Thus, TPB fails to include other factors which have greater influence on the situation at hand which is in relation to the adoption of the technologically delivered financial transactions as it just focuses on the intention of individual students.

2.2.3 New Product Diffusion (Bass) Model and the Innovation-Diffusion Model

Both Bass and Innovation Diffusion Model/Theory (IDT), try to bring to light the way innovations or new products diffuse into the community. The Bass model clarifies on how mass media or inter-personal conversation influences adoption of a new product by staging the adoption of the product or service as a flow of interactions between users who are considered as innovators and potential users, referred to as imitators (Bass, 1969). Similar to the Bass model, the IDT explains the adoption of a new innovation in terms of the rate and likelihood (Rogers, 1983). The model elucidates innovation as an item, behavior or concept that is taken as something unfamiliar by the adopter and that is diffused within an acquaintance by communicating it among members over a specified period (Rogers, 1983). The Innovation Decision-Making (IDT) model stipulates that the innovation adoption process involves a 5-stage journey -understanding, persuasion, decision, implementation, and confirmation. The step of awareness involves familiarization of targeted users with the innovation by exposing them to it. This is a crucial thing in the campaign because it equips users with basic knowledge as they get to know about it. While in the persuasion stage a highly recommended party gets an attitude towards the innovation. During the decision-making stage, the buyer either decides to integrate or reject the innovation that is presented to them. During implementation stage, the adopter acts out their plans into the innovation they've been given. The last step is confirmation. This is the point when the adopter verifies or rejects an innovation to complete the process (Chen, 2000).

The primary focus of the diffusion models is rather to deal with matters related to the field of communication and information technology rather than wider scope applications that include all kinds of contexts (Donnelley, 2004). Diffusion models such as the IDT have become core methods which are used for explaining actual adoption in connection with technology-based sales forecasts that concerns macro environment, thus making them less relevant for studying micro

factors which influence the individual's attitude regarding adoption of emerging technologies and associated applications (Kottonau et al., 2000; Sidorov et al., 2021). In consideration of these constraints, both Bass and Innovation Diffusion Models were determined not to be optimal in terms of being applied to the present project.

2.2.4 Task-Technology Fit (TTF) Model

Another complementing factor was the development of the Task -Technology Fitness (TTF) model promulgated by Goodhue (1995) who pointed out that adoption of a new tech is determined by the degree of fit of qualities of a particular technology in relation to the requirements of the task it is meant to perform. This theory suggests that the users would only adopt the technology if it aids their activities (Lo Presti et al., 2021). The model consists of five elements namely, characteristics of tasks, technology characteristics, match of technology and task, performance, and usage. The relationships among the elements are such that the former two that task features and technology attributes determine the third element, task-technology compatibility. In turn, the task-technology compatibility complemented with utilisation determine performance (Goodhue & Thompson, 1995; Dishaw & Strong, 1999; Gebauer et al., 2010 as presented by Lo Presti et al., 2021).

This model is quite suitable in revealing the exploitation and performance of technology, rather than determination of the intention of individual on using the technology (Yen et al., 2010; Yuan et al., 2010; Shih & Chen, 2013 referred to under Justino et al., 2022; Lai, 2017). This inability in addition to its tendency to appraise the entire IT system of an organization as a whole (Chen, 2000) make the TTF model incapable of being efficiently used in the present study.

2.2.5 Technology Adoption Model

The Technology Adoption Model abbreviated as TAM was developed by Fred Davis in 1986 based on principles that governed the two, Theory of Reasoned Action (TRA) and Planned

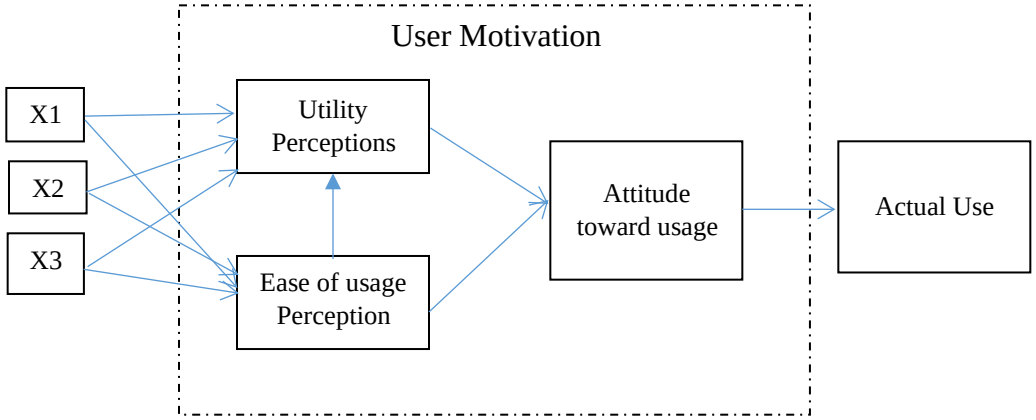
Behaviour (PBT) that explored influence of beliefs on attitudes and their impact on behaviour (Rahimi et al., 2018). The adaptation of the TRA and PBT models in TAM involved substitution of factors related to Attitude with two main factors – Utility Perceptions and Ease of usage Perceptions. In its original formulation, the TAM posited that a person's usage or adoption of a newly invented technology or innovation is highly inspired by their attitude towards usage of the technology and that in turn, attitude is dictated by the individual's perception regarding benefits and simplicity of that particular technology or system. The postulation went further by asserting that besides its impact on attitude, ease of usage perception bears consequences on utility perceptions as well.

The TAM model elucidates that adoption of a new technology and technological applications is the product of an individual user's attitude in relation to the act of adopting that particular technology, and attitude is in turn an outcome of two major beliefs – perceptions of simplicity of usage; and perceptions related to its utility, with simplicity or ease of usage perceptions directly influencing utility or utility perceptions concurrently (Chuttur, 2009; Lai, 2017). One of the key features of the model is that it considers attitude of a user toward a given system as a key determinant of usage of the system. The model also took onboard the impetus of external factors or stimuli such as features and performance qualities of the technology that influence the two variables – utility perceptions and ease of usage perceptions, which represented by X1, X2 and X3 in the model under Figure 2.1. Utility perception refers to the extent with which a person feels that the use of a given technology is likely to improve their action; whereas ease of usage perceptions is degree with which the individual believes that using the technology would not necessitate application of much efforts (Davis, 1989).

Immediately following its original formulation, the TAM was modified by eliminating the

Figure 2.1

The Original TAM as proposed by Davis (1985)



Note: sourced from Davis (1985)

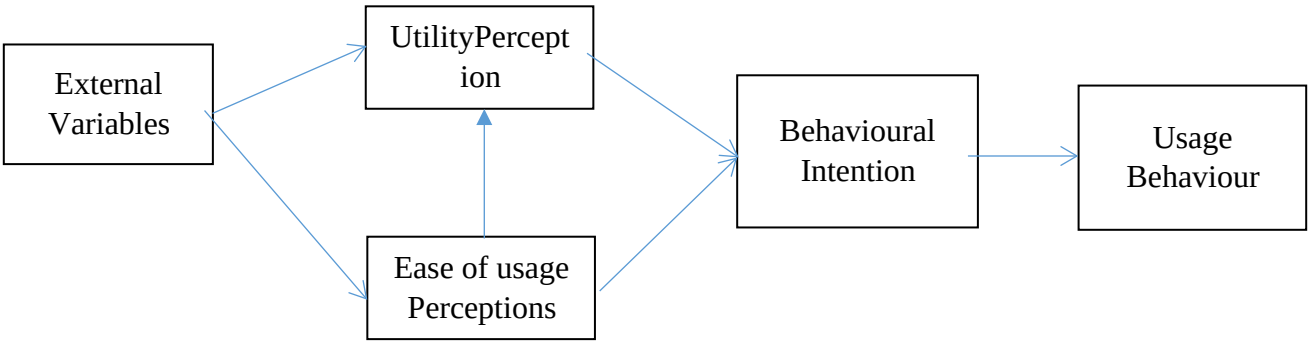
Attitude construct thereby creating a direct interaction between the construct of Behavioral Intention to undertake the system with its predecessor constructs, Ease of usage Perceptions and Utility Perceptions. Revision of the model equally involved the introduction of external elements besides Ease of usage Perceptions and Utility Perceptions examples of which include system characteristics, social demographic characteristics, marketing efforts, training and user participation in the design (Venkatesh and Davis, 1996 in Vuković et al., 2019).

The TAM is considered as one of the most robust theories explaining individual user's behaviour towards adoption of innovative technology (Alhassan et al., 2020). It is applied in predicting a person's likely intent to use an emerging technology particularly computer use motivation. The model is also an extensively applied theoretical extension of the theory of reasoned action and planned behaviour theory (Pavlou, 2003).

It is also the most extensively applied model in the study of antecedents that drive adoption of technologies including studies on financial service technologies (Chuttur, 2009; Gbongli et al., 2019; Alhassan et al., 2020). Such attributes make the TAM a suitable candidate for deployment in the current project.

Figure 2.2

The Technology Adoption Mode l



Note: Sourced from Venkatesh and Davis (1996)

2.2.6 The Extended Technology Adoption Model (TAM 2)

Inspired by the need to enhance its prediction ability, Venkatesh and Davis (2000) stretched the TAM giving birth to what became to be known as TAM2. This extension sought to further explore determinants of the constructs of simplicity of usage perceptions as well as utility perceptions and the way such determinants are impacted by lapse of time, as well as increased experience in system usage (Venkatesh & Davis, 2000). The revised model provides for determinants of Utility Perceptions in terms of social inspiration and system characteristics whereby determinants related to social inspiration are subjective norms, image while those related to the system characteristics include relevance of the job, quality of output, demonstrability of results, and perceptions of simplicity of usage. Factors that were additionally considered to be moderated by factors of *experience* and *voluntariness.* The proposition propagated by TAM2 is that Utility Perceptions is positively influenced by the subjectivity factors including norms as well as image. Under the factors of subjective norms and image, a person performs a given behaviour on the belief that the performance would uplift their status because some individual that such person considers to be important, are of the opinion that the behaviour needs to be performed.

Voluntariness was also incorporated among the moderating variables to address effects of situations where an individual is compelled to use a given system in an attempt to comply with a given direction associated with a rewards or punishment (Miniard & Cohen, 1979 cited in Venkantesh & Bala, 2008).

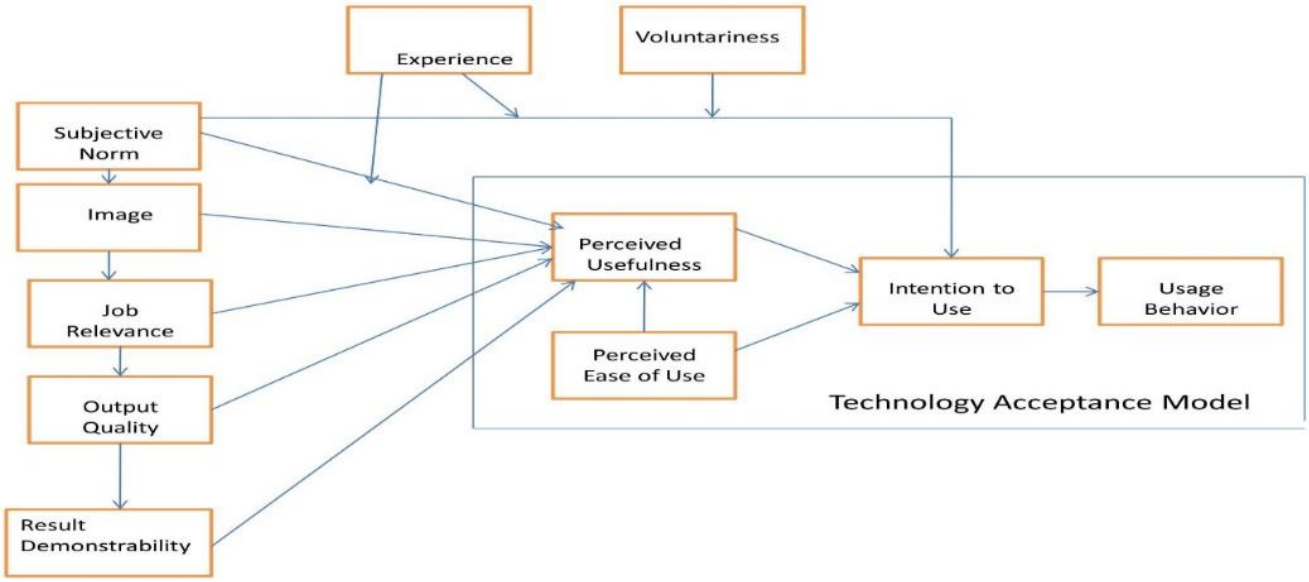
Regarding the system-related antecedents namely, ease of usage perception, demonstrability of results, relevance of the job, quality of output, TAM2 posits that perception on the utility of a given system is anchored on the mental comparative evaluation of the tasks and objectives to be performed relative to what the system is able to accomplish (Venkatesh & Davis, 2000). The model was designed based on observed strong positive consequence of simplicity of usage perceptions and demonstrability of result on utility perceptions. It was further hypothesized that output quality exerts a moderation effect such that it strengthens the relationship between job relevance and utility perceptions. In line with the hypothesis, through longitudinal studies, Venkatesh and Davis found substantial moderating effects of time and use experience in the relationship involving determinants and utility perceptions.

2.2.7 The Third Technology Adoption Model (TAM 3)

Besides the work performed by Venkatesh and Davis (2000) that constituted TAM2, Venkatesh (2000) also delved into exploring the nature of determinants of perceptions of easiness in usage. Anchored in usage of computer applications, Venkatesh identified determinants of Ease of usage Perceptions to be system self-efficacy, system anxiety, system playfulness, and facilitative conditions or external control. The first three determinants relate to the perceptions of a user regarding the system and the impact of using the system whereas the facilitative conditions relate to the control at the individual's disposal including availability of resources and support that would enhance usage of the system.

Figure 2.3

The Extended Technology Adoption Model (TAM2)



Note: Sourced from Venkatesh and Davis (2000)

Deploying the combination of TAM2 and Venkatesh (2000), Venkatesh and Bala (2008) were able to formulate the third edition of the TAM, the TAM3. In likeness of the TAM2, this model incorporated moderation outcomes generated by time and usage experience in respect of the association of determinant attributes and the construct Ease of usage Perceptions. However, the model contains some new factors in the domain of both Ease of usage Perceptions and Utility Perceptions besides those contained in TAM2. TAM3 came to be considered as the most comprehensive model, taking onboard determinants in relation to the unique traits of each individual, system features, the level of social inspiration, and enabling or moderating factors (Venkatesh & Bala, 2008).

2.2.8 Comparative view of the TAM Versions

Despite the revisions of the TAM with emergent TAM2 and TAM3, the original version of TAM is more used in the practical sense, (Chan & Chong, 2013; Ghazali et al., 2018; Pipitwanichakarn & Wongtada, 2019). A challenge for TAM2 and TAM3 that has not been recognized is that the models do not investigate direct effects and therefore stand a chance for the cropping of other effects also and several new relationships (Himel et al., 2021). Consequently, a TAM, Venkatesh and Davis (1996) model was believed to be the most suitable to the study being carried out. This model is considered to be the most robust, parsimonious and effective in persuasion among all the models that explain the individual users behaviour when adopting a new technology (Davis et al., 1989; Pavlou, 2003). Further, it is also a parsimonious model of technology adoption used for the exploration of the causes why the technology is adopted, examples include financial services (Chuttur, 2009; Gbongli et al., 2019; Alhassan et al., 2020). The TAM provides room for additional variables and attributes to be included in the model through consideration of social norms and beliefs that inspire the behavioral intent to undertake technology-driven financial transactions. The TAM has received unprecedented acceptance among research community (Alhassan et al., 2020) and is considered as one of the most robust theories in describing the attitude of an individual and their behaviour regarding the intent to adopt a particular technology (Alhassan et al., 2020).

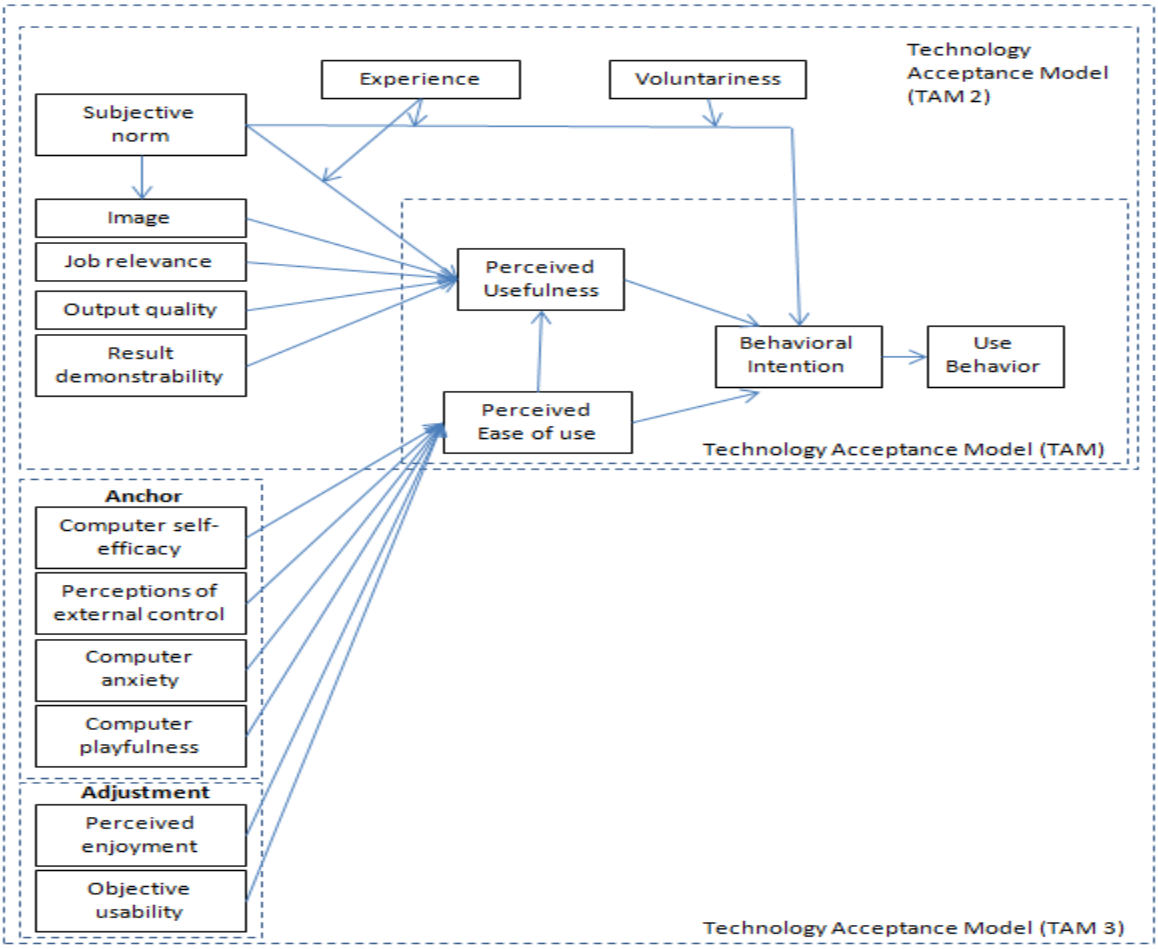
2.2.9 Criticisms of the Technology Adoption Model

Despite its popularity as well as the ubiquitous use, the TAM received several critiques. Some researchers regard the model as capable of carrying only certain purposes. Some authors considered the model as incomplete for it did not consider the moderator factors of age, gender, education, experience as well as willingness (Venkatesh, et al., 2003). Another point is that TAM

do not manage the changes of the users in time concerning their views and intentions because it was founded on a primary stage in order to cover a particular technology and task and at a specific time (Legris et al., 2003 as cited in Foued, 2021). Thirdly, the model has been criticized for its overspecialization in the level of the micro-unit, such as the individual adoption of technology, thus bypassing the macro-dimension of the organizational and communal perception of technology adoption (Foued, 2021). But it happens so that it is also the specific characteristic that makes this

Figure 2.4

Third Version of the Technology Adoption Model (TAM3)



Note: Sourced from Venkatesh and Bala (2008)

technology useful in the framework of the research conducted in universities which aims to study the level of users' interest in mobile technology-based financial service delivery.

2.2.10 United Theory on Adoption and Usage of Technology

Efforts for refinement of technology-based theories continued beyond the invention of the TAM and its variants. The route of evolution regarding theories on adoption of technologies led to refinement of earlier theories to Integrated Model of Adoption and Usage of Technology (UTAUT) introduced by Venkatesh et al. (2003). Additional constituents to UTAUT addressed both behavioural use intention for technology and the real usage of the technology in consideration. The UTAUT advocates that the use intent of an individual is the result of four predictors consisting expectancy on performance, facilitative conditions, expectancy on effort, and social inspiration.

Performance expectancy in this context refers to an individual's view or belief that usage of a technology application or system would enable attainment of their job goals (Venkatesh et al., 2003). A number of researchers including Venkatesh et al. (2016) and Zhou et al. (2010) found that expectancy of performance as the most significant predictor of usage intentions (Marikyan & Papagiannidis, 2023). Effort expectancy on another vein describes the degree of easiness or complexity is relation to usage of a system (Venkatesh et al., 2003). The construct effort expectancy construct was observed to fade out with extended usage of the system (Chauhan & Jaiswal, 2016). The third construct of social inspiration refers to the perception of an individual user that persons they consider to be important are of the opinion that the system should or should not be used (Venkatesh et al., 2003). Social inspiration construct stands for the subjective norms, image and social factor constructs contained in the TRA, TAM2, PBT models. The fourth construct of facilitative conditions describes the degree by which an individual user is of the

opinion that the organisation or environment has adequate technical infrastructure for supporting usage of a given technological system (Venkatesh et al., 2003). Facilitative conditions construct is composed of several factors including compatibility, perceived behavioural control and facilitative conditions. It was theorized that facilitative conditions influence positively and directly use intention and that the influence diminishes with extended use. Besides the four main constructs, the UTAUT model explores the effects of moderating variables. There are four major moderators involved in this process that include gender, age, voluntariness and experience.

The above theory proposes the fact that Performance expectancy is the one influencing constructs of social inspiration and effort expectancy as far as behavioral intent to undertake technology whereas behavioral adoption intent is the next determining factor in the use of technology. These (two) factors along with facilitative conditions are in a state of flux where each prior factor determines the next one (Venkatesh et al., 2016). Some of the following research proposed the multi-variable extension of the model, which includes two other variables: Trust and Perceived Enjoyment (Nur & Panggabean, 2021). However, the UTAUT has been used very often in research about behavioural intention for the adoption of the front-face technology with extended or integrated versions of other models (Venkatesh et al., 2016).

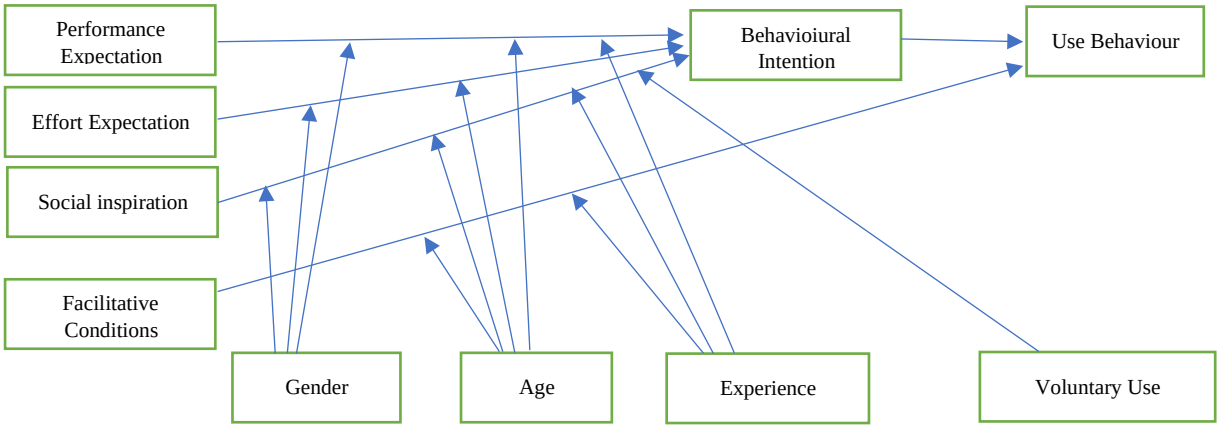
Strengths of UTAUT model are viewed in terms of its comprehensive approach to explaining the acceptance of technology as it took a comparative view of the various theories on technology acceptance and usage. The model was also demonstrated to have relatively higher predictive power compared to other models, with variance accounted for metric as high as 70 percent on use intentions (Marikyan & Papagiannidis, 2023).

The UTAUT model is occasionally criticised due to its complexity in explaining the technology adoption process based on gender, experience and age of an individual (Venkatesh et

al., 2003). It was also argued that the model was designed to describe behaviour on adoption emerging technologies by employees mainly in organizational settings rather than consumers of technology in general.

Figure 2.5

The United Theory on Adoption and Usage of Technology (UTAUT)



Note: Sourced from Venkatesh et al. (2003)

2.2.11 Revised United Theory on Adoption and Usage of Technology

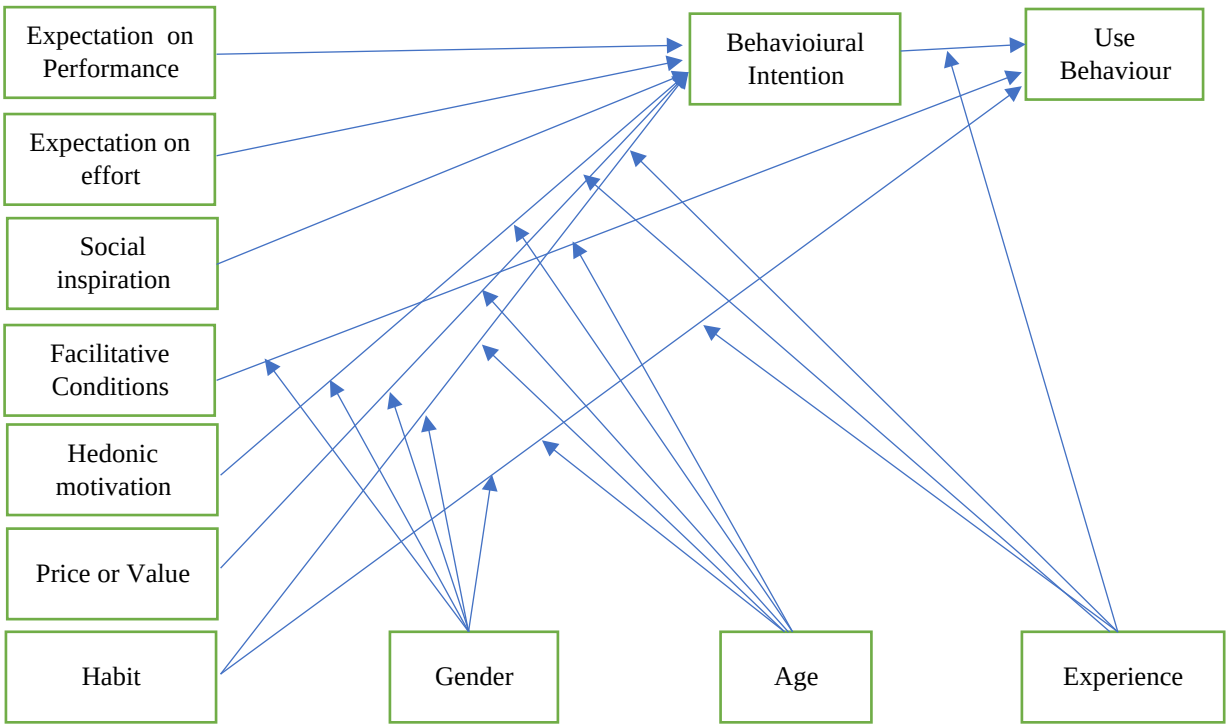
In the wake of limitations associated with the UTAUT particularly confinement of the model in organizational settings and the need for extension of the model to other forms of technology-mediated services, Venkatesh et al. (2012) introduced some modifications to produce UTAUT2. The new model (UTAUT2) was designed as a generic framework to be used in examining acceptance of technology rather than a specific system or technology. The modification was also meant to include capability for examining universal acceptance of technology rather than examining technology acceptance only in organisational settings. In this regard, the UTAUT was extended with three new constructs and eliminating the construct of voluntariness. In view of the

modifications, the UTAUT2 came to be regarded as the most generic model that considers private usage of technology (Marikyan & Papagiannidis, 2023).

The UTAUT2 incorporated three new constructs in order to explain the adoption behaviour in respect of technology by an individual. These were price or value, hedonic motives, and habit. Price value was used as a construct that represents the perceived balance between benefits and financial costs

Figure 2.6

The Extended United Theory on Adoption and Usage of Technology (UTAUT2)



Note: Sourced from Venkatesh et al. (2012)

associated with usage of the technology. UTAUT2 postulated that price or value bears a positive influence on technology use intentions suggesting that an individual is likely to adopt usage of a technology if they are of the opinion that benefits of using a new technology outweigh the related

costs. The inspiration for the inclusion of the price value construct was the result of the shift from modelling technology adoption based on work settings to a general consideration of technology adoption by an individual in non-work environment. An employee in an organization would not be as concerned about the cost of the application as would be in case of own technology. Hedonic motive is explained as the extent to which an individual derives pleasure or fun as a result of using the new technology (Venkatesh et al., 2012). Inclusion of hedonic motivation as one of the constructs was inspired by the results of prior studies that had shown the construct to have significant influence on technology use intentions (Marikyan & Papagiannidis, 2023). The third additional variable in the UTAUT2 was the Habit construct which was described in terms of the extent by which an individual would tend to act a certain behaviour in an automatic manner (Venkatesh et al. 2012). The inspiration for inclusion of the construct was also generated from results of prior studies established automaticity be have substantial influence in intentions for use of technology. The UTAUT2 managed to explain 74 percent of variations in behavioural technology use intents and 52 percent of variations in the usage of technology use. Such results suggest that the model exhibit significantly high predictive power.

The moderators were also revised such that the moderator of voluntariness was eliminated. The model examined the consequences of the remaining moderating factors of gender, experience and age, on the association of the variables namely, hedonic motives, price or value and habit with the dependent construct specified as behavioural intent and usage of new technology.

2.3 Conceptual Framework

The multitude of theories and models which are aimed at describing user's intention to adopt technologies and technology-based services empowers a designer to develop an effective framework that will assist in the development and implementation of this particular study.

Deriving from the examination of the positive and negative traits of the different models and perspectives, it was considered most appropriate that the study on adoption intentions regarding mobile financial transactions among students in universities can be best articulated by the integration of Technology Adoption Model (TAM) and United Theory on Adoption and Usage of Technology (UTAUT). The decision to integrate the two models is based on the relative merits of each of the models as regards to adoption of new technology in this respect, Mobile financial transactions.

On one hand, the TAM is the most frequently used model owing to its capacity to capture consumer intensions for different IT systems as well as with the IT based services, through the consumers according to Singh & Srivastava (2020). Previous empirical research has demonstrated the strengths of the model's primary constituent constructs Utility Perceptions (PU); and Ease of usage Perceptions (PE) have demonstrated substantial contribution when considered as exogeneous variable; with behavioural intent to undertake (IU) as endogenous variable; and Attitude (AT) as a mediating variable. Established relationships within the model are based on the fundamental criterion of the model consists mainly of the assumed influence of attitude of the user regarding system usage and ultimately Attitude in turn, is determined by the utility perceptions and ease of using the system (Spector, 1992). As with the study at hand, scholars have over time, suggested including unique subject and model specific constructs into the model and using the theoretical framework as a guide with the purpose of extending it to other academic fields for the sake of prediction (Govender & Sihlali, 2014; Mishra & Singh, 2021; Popy & Bappy, 2020 the works of which are referenced in Himel et al., 2021).

On the other hand, the option to include the UTAUT model particularly the extended UTAUT (UTAUT2) was based on its relative strengths in terms of its comprehensive view of

technology adoption, which is associated with high explanatory power (Marikyan & Papagiannidis, 2023). The UTAUT seconds the TAM in terms of extensive application within the scope of determination of user intent to undertake mobile financial transactions (Shaikh et al., 2022). It also complements well with the TAM in the study students' adoption intentions, in which use constructs drawn from the UTAUT are considered appropriate extensions of the TAM constructs. In its formulation, the UTAUT contained four main predictor variables namely effort expectation, performance expectation, social inspiration and facilitative conditions; each of these predictors correspond to a specific behavioral aspect. In addition, the model expounded four moderators namely, age, experience, gender, and voluntariness that improve or weaken the relationships governing constructs in the model, both endogenously and exogenously attributed factors (Venkatesh et al, 2003). Examination into dimensions of the constructs suggests a match between Expectations on Performance; and Expectation on Effort and Utility Perceptions; and Ease of usage Perceptions respectively (Shaikh et al., 2022). Consequently, the main variables that stand out for complementing the TAM are Social inspiration (SI) and Facilitative conditions.

Elimination of expectation on performance and expectation on effort in the revised UTAUT as a complementary model to the TAM, the remaining pool of consolidated dependent variables from the TAM and the UTAUT had a total of eight independent constructs and three moderating variables. The independent constructs include ease of usage perceptions, utility perceptions, attitude, social inspiration, facilitative conditions, hedonic motivations, habit, and price or value. Moderation factors included age experience, and gender. A further, in-depth review of the variables suggest that some of the variables have most frequently been associated with insignificant effects or influence on technology adoption intentions. A typical example in this aspect includes the constructs of price value, and habit which therefore accordingly excluded.

Further exploration of literature revealed that the other most frequently examined exogenous variables under the TAM included risk perception and security perception (Giovanis et al., 2019). Despite the occasional association of risk-perception with Trust Perception (PT) through inverse relationship, the two variables have many times been examined in isolation (Belsoska et al., 2020). In view of this regard, the study was to examine include constructs of Trust Perception (TP) and Enjoyment Perception or Hedonic Motivation (HM) as they were subsequently added in the attempts to improve the UTAUT model (Al-Saedi et al., 2020; Sobti, 2019 as cited in Nur & Panggabean, 2021). In view of the analysis, the exogenous constructs taken for further investigation include utility perceptions; ease of usage perceptions; social inspiration; facilitative conditions; risk perception; trust perception; hedonic motivation; and attitude. The dependent variables under consideration were attitude and use intention to undertake technology.

Regarding moderation effects, the TAM and UTAUT models considered the influence of four variables namely: gender, age, voluntariness and experience. However, prior studies have considered a wider range of moderating variables depending on specific circumstance of the matter. For example, the literature review by Shaikh et al. (2022) identified 27 moderating variables, among which gender, age and experience had the highest frequency in that order. Based on the homogeneity within university students who are the subjects of this study, in terms of age, education and experience, a consideration would only be made on the moderating impact of the construct of gender. Taking roll of the constructs, we briefly examined each of the construct and its relevance to progression of the study at hand.

2.3.1 Behavioural Intent to undertake Mobile Financial Transactions

Behavioural intent for undertaking (IU) or user acceptance reflects the interpretation of the chances that the individual will adopt or accept a particular behavior (Davis, 1986 as cited in Lo Presti et al., 2021). This is a hypothetical construct that is built to estimate and predict the real

usage of the technology or system at hand. As Zaineldeen et al., (2020, p.5062) in the meta-analysis study on TAM define behavioral intention as “an individual intends to act in a manner without guarantees of actually doing so.” Behavioral intention is thus not the same as actual behavior but is the main determinant of such behavior as the expression of the intention to do a certain thing is a sure performance. In relation to the study subject, use intentions referred to an individual willingness to adopt usage of Mobile financial transactions if given the opportunity to do so.

2.3.2 Utility Perceptions

Utility Perceptions denotes one of the two essential factors in the original work by Davis (1989) on the concept related to intent for adopting new technology in accordance with the TAM. Those duo factors are Ease of usage Perceptions (PE) and Utility Perceptions (PU). By this term is meant the degree of a person’s belief that using a given technology boost their productivity (Davis, 1989). Utility Perceptions abbreviated as UP is considered as the bottom factor to calculate whether a user is willing to adopt a particular new technology (Govender & Sihlali, 2014). In case at hand regarding mobile financial transactions, one considered the personal perceptions regarding the level by which undertaking mobile financial transactions enhance their productivity or accomplish the tasks they are required to perform.

2.3.3 Ease of usage Perceptions

Ease of usage Perceptions (PE), based on the formulation by Davis (1989) refers to a person’s belief that engaging a particular technology would involve minimal to no effort at all. End users believe that usability and utility of a technology are two main factors of the initial and actual adoption of a technological system. In the case of mobile financial transactions usage, the perception on ease of usage refers to the belief in which a person considers that usage of mobile financial transactions would be clearly understood and its application would require no additional

effort to be able to use it. While the influence of PE is evident in extending the behavioral intention for adoption of Mobile financial transactions, some studies have shown that it either facilitates this intention or mediates through other constructs like attitude or Utility Perceptions (Himel et al., 2021; Makanyeza, 2016; Elhajjar & Ouaida, 2020; Hanafizadeet al., 2014). PE plays an important role in making people avail services through their mobile devices provided they believe the service is user friendly (Rehman et al., 2019).

2.3.4 Social Inspiration

Social inspiration (SI) represents how much a person is influenced by the opinions of his/her associates as well as friends regarding acting a certain behaviour such as adoption of a system (Singh, Srivastava & Srivastava, 2020). Social motivation always has “subjective norms” as a part of it, which means, “the perceived social pressure to act in a certain” way (Ajzen 1991 as cited in Hong 2019, p.189). Venkatesh and Davis (1996) clarify it more. According to them, social inspiration takes a central part during the early stage of innovation when people are often clueless on what the technology portends. In this case, the student at the university is exposed to the peers who are using the product or service and thus by copying the opinion of these peers they are able to either use it (the product or service) or reject it.

2.3.5 Facilitative Conditions

Among the primary four constituent constructs of the UTAUT2 (United Theory on Adoption and Usage of Technology) designed by Venkatesh et al (2016) are the facilitative conditions (FC). This construct is understood as being “the degree to which an individual believes that an organizational and technical infrastructure exists to support use of the system” (Giovanis et al., 2019, p. 1170). It is a demonstration of the extent to which available environmental factors are considered as promoting or hindering deployment of a given system (Venkatesh et al., 2003). Several studies have directly focused on effects of FC on actual adoption of mobile money

services. The study at hand was centred on examination of the impact of dependent constructs on IU regarding mobile financial transactions, along with the work of San Martín and Herrero (2012), referenced in Giovanis et al. (2019).

2.3.6 Hedonic Motives

The Hedonic Motive (HM) or perceived enjoyment derived from application of a specific technology as a stimulant (Venkatesh et al., 2012 as cited in Shaikh et al., 2022) means that an individual gets fun and pleasure from what they do with a given technology. There have been a lot of research projects about the impact which the HM has on the intent for adopting mobile financial transactions, but they end up with mixed results. According to the comparative analysis of Merhi et al. (2019), HM had no influence on mobile banking deployment in both Lebanon and England. Such results support the findings by Oliveira et al. (2016); as well as Escobar-Rodríguez and Carvajal-Trujillo (2013). Merhi and his team suggested a few reasons partly being that financial services in this case mobile banking were perceived in business terms rather than a fun activity. In addition, it has been established that HM in a way subsides with time as the initial acceptability that is brought about by the new innovation tends to fade after use (Kaplan & Gürbüz, 2021). Mobile devices have been in circulation for a number of years. Thus, using mobile services as a form of revel may not be funny anymore and thus, the interest in this construct as part of the study items declined.

2.3.7 Trust Perception (TP)

Perceived or Common Trust, which is also referred to as Trust, is the degree of confidence that a person has that another person or system is predictable in their behavior (Luhmann, 1979 as cited in Shaikh et al., 2022). Consequently, it could also be the case of a belief that an expected positive outcome will follow the act (Kabir et al., 2020). The PT dimension includes a comprehensive hierarchy consisting of many related albeit sometimes separately measured

constructs such as perceived safety, perceived privacy, and the negative element of risk perception. PT is based on various studies that have been conducted so far and, as such, it is widely believed that the nature of mobile financial transactions, which are particularly at risk of various fraudulent activities (Shaikh et al., 2022). The risk of data breach has gone to the next level as the information processed through the mobile financial devices such as personal account details and transaction information is confidential (Dhingra & Gupta, 2020).

2.3.8 Risk Perception (PR)

According to Tan and Lau (2016) in Farah et al. (2018), subjective uncertainty (PR) is an individual's perception about the risk which can arise from using a given technology. It is a symbol of you facing what it means to lose an element of digital comfort, privacy or an economical risk of using that gadget (Lema, 2017). Giovanis et al (2019) categorize projection risk in digital services which is broken down into five categories namely, financial risks; risk related to performance; risk related to privacy; time risk as well as psychological risks. Financial dimension of risks is said to arise from users' perceptions of loss implied by the application, while the privacy dimension relates to users fear of losing privacy and control over information as a result of using the system. Performance risk is the possibility of having the system not work at optimum level whereas psychological risk relates to unfavorable psychological state like loss of peace-of-mind or low self-esteem which is due to the frustration caused by the usage of the system. Besides, time risk manifests when users believe that there is loss in time during the installation, functionality tutorials, and learning of the system. Risk -perception is one of the factors that relate to trust perception (TP). TP is associated with decrease in perceived dangers and bringing up positive influence on technology adoption intentions among users (Le-Hoan, 2021). In this way, outcomes of one measure can be deduced from the results of another, making interchange possible (Luo et

al., 2010 as cited by Belsoska et al., 2020). Hence, this study looked directly at PR and if PT's relationships exists, can be inferred from the results of PR by implications.

2.3.9 Attitude

Attitude (AT) is an expression on the readiness of a person towards a given phenomenon or a particular type of behavior (Giovanis et al., 2019). In many articles on the subject of technology adoption, the AT construct acts as moderator among other independent factors and dependent value behavioural adoption intent. The meta-synthesis carried out by Souiden et al. (2020), reported that 32 studies take the impact of PU on IU into direct consideration while the remaining 15 studies use the Attitude construct as a mediator. Similarly, 18 of the studies found the correlation between PU and IU to be direct while 15 among such studies dealt with the mediating impact of the Attitude construct. It is interesting to note that the vast majority of these works were found to have a strong statistical significance. For example, Souiden et al. (2020) revealed that all the13 studies on this topic found statistically significant evidence with regard regarding impetus of the factor Attitude on Use Intent for an emerging technology. The phenomenon shows that the recognition of Attitude as a critical variable in analysing factors that exert substantial influence the intent to employ new technologies or technology-based products and services including Mobile financial transactions.

2.3.10 Gender as the Moderating Variable

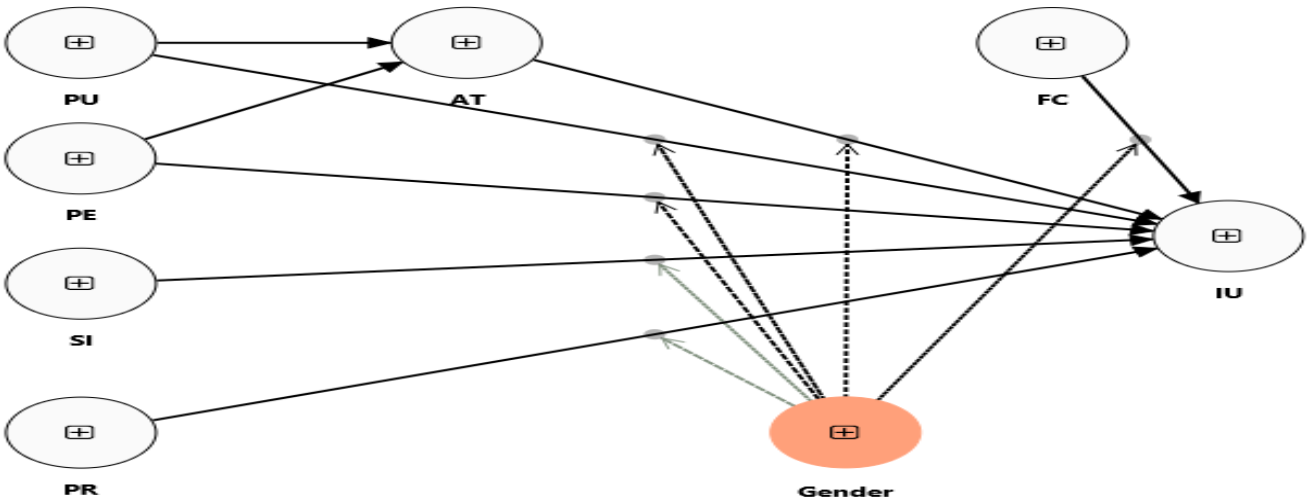
Gender (GE) is formed by socially constructed characteristics, and include norms, behavior, functions and relations of men and women to each other (WHO). Gender belongs to the three frequently occurring moderating factors alongside with age and education (Shaikh et al. 2022). What is worth mentioning is the fact that males and females have occasionally behaved differently under certain similar circumstances. The analysis of technology adoption where gender is the independent variable and dependent variable illustrated that girls were more minded toward

privacy and security issues in contrast to boys who were interested in the outcome, so they made decisions based on utility and performance (Sleiman et al., 2022). Then the study is designed to look at the impact of gender on learners' behavioral intention regarding the use mobile financial transactions.

In view of the foregoing analysis and in consideration of the integration of the constructs in the TAM and the UTAUT2, the conceptual framework considered under this study, took on board consideration of the influence of exogenous constructs AT, PU, SI, PE, FC, HM, and PR on students' user acceptance or Behavioural Intention to undertake (IU) mobile financial transactions. However, through further review of literature as described hereunder, the variable HM was later on dropped, leaving out six exogenous constructs which are AT, PU, PE, SI, FC, and PR. The

Figure 2.7

Conceptual Framework for TAM/UTAUT Integrated Model



Note: conceptualised by the Author (2023)

influence of the variable AT on the relationship between PU, PE and dependent construct IU would also be examined. Furthermore, the moderating effects the variable GE on relationships encompassing exogenous variables and the endogenous variable was also worth looking at. Some

of the previous studies that applied the integration of the TAM and UTAUT models include Singh and Srivastava (2018), as well as Le et al. (2020).

2.4 Industry Descriptions

Technological innovations in the global space have not spared the financial service industry. The world has witnessed successive inventions in the many facets of the financial service industry resulting in new technology-based ways of financial service delivery generally regarded as financial technology (Almomani & Alomari,2021). The fundamental to the inventions have been the new technologies in the fields of mobile communications, cloud computing, data analytics and artificial intelligence advanced analytics, robotics, the cloud and blockchain, to enable new services and capabilities. These technologies have revolutionised the way businesses interact with their customers and how customers interact to each other. One of the fields that has had massive impact is the mobile communication, following an enormous level of investments that providers of financial services made in terms of information communication technology systems and infrastructure with the expectation of reaping substantial returns from their investments, largely generated by increased number of customers and service usage attracted by the innovations in the industry. One of fields that was tremendously impacted in the recent past by persistent boom in mobile technologies is the financial service industry. Some of the revolutionary outputs have been the emergence of concepts such as digital finance, financial technology, m-payments, m-banking, m-money, internet banking, mobile financial transactions and so on.

Collective partnerships by financial institutions and mobile network operators have become a pathway in which financial services are rendered, through something as simple as a mobile phone and mobile applications popularly known as mobile financial transactions, MFT (Gbongli et al., 2020). MFT is a common word for the basket of financial and payment services

offered to retail customers from both segments, individual and business, using the mobile devices (Shaikh et al. 2020). The key point of traction for mobile financial transactions has been attributed to speed, cost savings and convenience (Gupta & Dhingra, 2022). The MFT has been known for its benefits as a way of extending financial service outreach in the most convenient and ubiquitous manner, leading to the transformation of the financial service industry, including breaking the usual financial service boundaries thus referring it to as microfinance, transformational banking or financial services to un-banked or underbanked segments (Dorfleitner et al., 2019 as cited in Shaikh et al, 2022).This study confined itself to the generally known definition of MFT that is the transaction perceived to be made by using a mobile phone.

2.4.1 Mobile Financial Transactions

MFT can be classified into three categories: mobile banking services (MBS) whose subgroup includes downloadable mobile banking apps; mobile payment services (MPS) that include mobile wallets and smartwatches as leading subcategories; and mobile money services (MMS) with the subcategories such as SMS banking services, agent-based banking services, and mobile money transfers (Gbongli, 2019; Shaikh et al, 2022). Other researchers designate mobile financial transactions in two main types which are mobile (m) banking, and mobile (m) payments (Sharma et al., 2022). This study adopted three-way system of classification of the MFT.

2.4.2 Mobile Banking Transactions

Mobile (m) banking (MB) is a term associated with the banking transactions conducted through mobile phone and other mobile devices. This facet involves banking activities which are being carried out by either the bank customer or the third party, with the bank manager acting as a mediator (Gbongli et al., 2019). Unlike conventional banking that makes use of the laptop or personal computer for banking considered as online banking (Shaikh et al, 2022), MB does not incorporate the use of such IT tools. Bank mobile customer has options of using SMS, browser-

based systems (WAP) or multifunctional smartphone app. Along with the smartphone's use surging in the market, downloadable applications start to be the trendiest accessible means of mobile banking (Sharma et al, 2022).

2.4.3 Mobile Payment Transactions

MP stands for mobile payment and it involves a business or personal transaction with a mobile device account that does not involve a bank account (Sleiman et al., 2022). This section also covers a transaction done via applications provided by a third party to meet the purpose of executing payments via mobile devices. In mobile banking, a consumer must have a formal banking relationship. However, with mobile payment, establishing a relationship with a bank is no longer necessary. Mobile payment method transacts through mobile wallets payment to the merchants and other recipients, and these can be done in multiple ways: between customers; customer with a point of sale machine; and between customer and business (Shin, 2009 as cited in Sharma et al, 2022).

2.4.4 Mobile Money Transactions

Mobile Money (MM) services are a solution that enables transfer of customers' money (e-money) from a customer's mobile device account to another mobile device account in absence of bank account (Sleiman et al., 2022). Included in this part are transactions done through tools provided by a third party for making wallets and used to conduct payments via mobile devices. The distinction however is that in mobile banking, one has to be a client of a bank first while in mobile money service, they do not need to have a formal relationship with a bank. Mobile payments on the other hand, are the process of use of mobile wallets for payment to merchants and other receivers who may include – person to another person; person to a machine at a point of sale or business payments done using mobile devices (Shin, 2009 as cited by Arya et al, 2022).

2.4.5 Consolidated Study of MFT Domains

The present academic literature on MFS, which can be considered the overall component of digital financial services, is less developed as most of the previous studies are concentrated on certain components of MFS, that incorporates mobile (m-) banking, mobile (m-) payments or mobile (m-) money (Shaikh et al, 2022). Delving in the literature-based study about the m-financial services (MFSs) using a set of journals researches published within a period of 2009–2020, Shaikh et al (2022) determined 115 applicable articles that mostly discussed at least one MFT segment. Also, among the existing domains possible overlaps can be expected due to the interdependence of the platforms that allow users to conduct aggregated transactions, for instance, mobile payments which is further connected to their bank account as the source of money. The literature review was conducted also in consideration of the overlapping and interconnectedness of the disciplines, so that the study adopted a holistic approach, regardless of their specific areas.

2.4.6 Evolutionary Developments in Models on Mobile Financial Transactions

Between 2007 and the present, mobile internet usage has grown tremendously, and the smartphone has become a fixture in people's lives. These technological changes took MFT to a whole new level and saw the emergence of FinTech companies with a high potential of filling the financial inclusion gap, reducing poverty and boosting economic growth (Chen et al., 2017; Jagtiani & Lemieux, 2018 Kim, 2020; Lashitew et al., 2019 as cited in Coffie et al., 2022). Nevertheless, embracing mobile payment services (MPS) in pre-COVID-19 up took place below the anticipated height (Jagtiani &Lemieux, 2018; Yermack, 2018). This means the outbreak of COVID-19 pandemic boosted substantial increase in mobile payment services adoption with their growing rates up to of 2% during the first quarter of 2021 (Coffie et al., 2022). To date, MFT has become a major alternative financial service delivery method that works alongside the existing traditional ones like ATM, POS and SMS banking (Shaikh et al, 2022). As the use of smartphones

is becoming extensive in most aspects of our lives and the steps that MFT take in the areas of authorities, business and conceptual hypothesis, the MFT research is in no doubt, developing very fast, mostly in recent years (Chawla and Joshi, 2017as cited in Shaikh et al, 2022). The present scenario is that in 2020, the number of people who had smart phones had hit 4.78 billion which was 61.5 percent of the world's population out of whom 3.5 billion were smartphone users, thereby making them 45.0 percent of the world's population (Turner, 2020 as cited in Nwankwo et al.,2021).

The cases of mobile-phone-based monetary transactions in Sub-Saharan Africa have not only demonstrated exponential trajectory but also registered the largest number of mobile money accounts globally, recording about 400 million accounts over the recent couple of years. Mobile banking has gained wide acceptance by governments in Africa where the channels are used in transferring cash to notable segments of the people, most importantly observed during the COVID-19 pandemic as a policy to combat poverty (World Bank, 2020 as cited in Akinyemi and Mushunje, 2020). According to Tan (2022), nearly 70 percent of the value of global m-money movements in 2021 were generated in SAA (Sub-Saharan Africa). Like in other SSA countries, Tanzania has witnessed an evolutionary surge in m-money usage with most preference on mobile-mediated payments being the way of sending and receiving funds among individuals and across small businesses (DiCastri & Gidvan, 2014 as cited in Koloesni & Mandari, 2017). The users' headcount in respect of mobile based transactions in Tanzania during a three-year period between 2019 and 2021 has been averaging annual rate of growth of 17 percent. By the month of September, 2022, the total mobile money accounts reached 39.6 million subscriptions of which 64 percent or a population of about 61.7 million people according to a national census performed in

August 2022 were accounted for among the five telecommunication companies specifically Airtel, Vodacom, TTCL, TiGo, and Halotel (TCRA, 2022).

2.5 Empirical Review: Construct Selection

Nowadays, the aftermath of studies regarding the adoption of the different kinds of new technologies with some focus given to the mobile financial transactions are well-researched. Some of the factors that are investigated include the influence of the technology adoption on the user intention. The role of each of the constructs is modified based on the theory chosen. They can act either as a predisposing factor, moderator or an outcome/goal.

2.5.1 Dependent Variables

The major endogenous factor in studies related to adoption or use of technology-based application is considered to be the intent to undertake a technology under investigation, as in the case at hand where the core subject of the investigation is the intents to undertake mobile financial transactions. The investigation is taken within the context of the renown pillar model for adoption of technology related applications, the TAM (Technology Adoption Model) integrated with its closely related model, the UTAUT (United Theory on Adoption and Usage of Technology). Behavioural intention is refers to the phenomenon that expresses anticipation on whether or otherwise, a potential user would go ahead to carry out a business transaction with a provider of financial services (Zeithaml et al., 1996 cited in Shaikh et al., 2022). Unlike the actual conduct of the transaction, behavioural intent factor gauges the prospects of adopting a particular unfamiliar technology (Koul & Eydgahi, 2017). Such attribute or construct occasionally assumes different terms such as intent to undertake, intention for use, and behavioral intent (Shaikh et al. 2022). The seed of the behavioral intentions to adopt an innovation at Technology Adoption Model is grounded in the theorem of reasoned-action, which affirmed that, behavioral intentions of

individuals to a given behavior have high possibility for leading into actual behavioral action (Fishbein & Ajzen, 1975). Besides the TAM and UTAUT, additional models which explored behavioural intent treating it as a dependent construct were Theory of Reasoned Action (TRA) as well as the Planned Behavior Theory (PBT).

While the majority of studies on adoption of new technologies have largely explored the extent of influence that behavioural factors exert on usage intentions, the United Theory on Adoption and Usage of Technology (UTAUT) extended the Technology Adoption Model (TAM) by the including actual usage, an additional dependent construct beyond behavioural intention to undertake technology. The systematic literature review by Shaikh et al. (2022) that focused on progresses in mobile-based financial transactions, established that 87 out of the total 115 reports, considered behavioral prediction as a behavioral intent rather than actual usage. In the same vein, 97 out of 127 articles under this literature review were deployed as dependent constructs, behavioural intention rather than actual usage of new technology including domains of MFT (m-banking, m-money and m-payments). Other constructs observed in the systematic review by Souiden et al. (2020) that focused on m-banking were such as behavior, attitude, satisfaction, utility perceptions, risk perception, trust, hedonic motivation and simplicity of usage perceptions.

2.5.2 Antecedent Variables

Research related to adoption of emergent technologies has endeavoured to explore multiple scenario attributes believed to have inspire on behavioural intents by prospective consumers in adopting the technologies, and a majority of such investigations have been constantly evolving in alignment with emerging technologies. The exact phase of Technology Adoption Model (TAM) which was first presented by Prof. Davis in the year 1986 was comprised of mainly two major exogeneous factors, namely, Ease of usage Perceptions and Utility Perceptions. By then, Attitude was considered an effect of both – acceptance of the technology and innovation of the same which

ultimately, shape the response of the person whether to use such an innovation/technology (Rahimi et al., 2018). On its side, Ease of usage Perception is supposed to be a catalyst that either extends or shortens utility, in a way that positions it as playing a mediating role as well (Lai, 2017). Subsequently, the model began to undergo gradual improvements and the model in the original version was modified and even the operations of the variant models were reviewed. Later versions of the models, both the TAM and UTAUT are considered and deployed in the study at hand, following a thorough review of their relative merits that suggested for adopting a resultant of their combination. The study explored and integrated 31 most relevant studies (from 15 directly based on the TAM; and another 18 on the model of UTAUT; and finally, 8 based on integrated models) as demonstrated under Tables 2.1, 2.2 and 2.3 below.

Antecedent variables that occur most often in the TAM and its extensions are listed in the Table 2.1, where occurrences are reflected among the list of 15 study articles. These include Ease of usage Perceptions (14); Utility Perceptions (13); Riskiness Perception (7); Self-efficacy (7), Trust Perception (6), Attitude (6), Security Perception (6), and Personal Innovative Traits (6).

The main preceding variables of UTAUT and its extensions, listed in Table 2.2 as frequency of the dependent variables, which are as follows: performance expectation (19); social inspiration (18); effort expectation (17); facilitative environments (15); hedonic motives (13); social interaction (11); price/value (10); as well as habit (10). Recently, the widened set of the original UTAUT variables came into question. The described variables are: effort expectation; performance expectation; facilitative conditions; and social inspiration. Moreover, there were brought into question the following moderators: experience, gender, age and voluntary traits (Venkatesh et al. 2016).

Table 2.1

Constructs used in Empirical Studies based on TAM

	Author	Place of Stu	Endogenous Variable	Exogeneous Variables																																										
				Attitude	Perceived Usefulness	Perceived Ease of Use	Perceived behaviral contro	self service techn.service quali	Perceived Trust	Privvacy risk	Perceived security	Digital literacy	Resistance to change	perceived risk	compatibility	Awareness	Self efficacy	Perceived behavioural contro	Utility benefit	Social benefit	Behavioural benefi	Functionality	Enjoyment	Design	Assurance	Convenience	Customisation	Controlled motivation	Autonomous motivation	Social influence	Perceived benefits	Customer Support	Rural dwelling	costs	Ubiquity/powe	Regulation	Education	Gender	Technology anxiety	Barriers	Subjective norms	Personal Innovativenes	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						⊛										⊛	⊛	⊛					⊛																				
6	Naruetharad hol et al. (2021)	Thailand	sustainable intention to use mobile banking		⊛	⊛																																								
			Perception (PU & PEU)					⊛																																						
			self service technology service quality								⊛											⊛	⊛	⊛	⊛	⊛	⊛																			
7	Sharma (2019)	Oman	Behavioural intention		⊛	⊛			⊛																			⊛	⊛																	
8	Singh and Srivastava (2018)	India	Behavioural intention to adopt mobile banking						O		⊛						⊛													O																
			Perceived Ease of Use														⊛																													
			Trust								⊛																																			
9	Singh and Srivastava (2020)	India	Behavioural intention to use mobile banking		⊛	⊛					⊛						⊛													⊛		O		⊛												
			Perceived ease of use														⊛																													
			Perceived security																													⊛														
10	Siyal et al. (2019)	China	Intention	⊛																											⊛															
			Attitude		⊛	⊛																																								
			Perceived Usefulness										⊛	⊛		O															⊛															
			Perceived ease of use										⊛	⊛		⊛															⊛															
11	Tiwari et al. (2021)	India	Behavioural intention		⊛	⊛			⊛					⊛		⊛																														
12	Alhassan et al. (2020)	New Zealan	attitude towards adoption of mobile money		⊛	⊛																																					O	O	⊛	⊛
			perceived usefulness																														⊛	⊛												
			perceived ease of use																																⊛	⊛	⊛	⊛								
13	Gbongli & Amedjoneko u (2019)	Togo	Intention to use mobile money	⊛																																						⊛				
			Attitude towards mobile money		⊛	⊛																																						⊛				
			perceived usefulness			⊛											⊛																						O							
			perceived ease of use														⊛																						O							
14	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:	⊛ Siginficant						O Not Significant																																				

Note: Compilation by the Author (2024)

An outline of models that involved integrated variables in Table 2.3 suggests a scenario with diverse set of antecedent factors, suggesting that the most frequent dependent factors were social inspiration (5); trust perception (5); experience perception (4); Ease of usage Perceptions (4); compatibility (4); Observed conditions (4); and facilitative conditions (4).

Table 2.2

Constructs used in Empirical Studies involving the UTAUT

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	Technical culture	Economics issue	Behavioural intention	Confirmation
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)	Banglades h	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	1	4	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	1	1	4	1

Key: ✓ Siginficant | O Not Significant

Note: Compilation by the Author (2024)

Combining the three tables, generates the following resultant outline of the frequently investigated factors: social inspiration, performance expectation, trust perception, effort expectation, facilitative conditions, Ease of usage Perceptions, hedonic motives, security perception, habit, and riskiness perceptions. A study exploring the interplay of these factors within an integrated model was thought to be the most effective approach.

Table 2.3

Constructs used in Empirical Studies Involving Integrated Models

SN	Author	Place of Stud	Theoretical framework/ model	Dependent Variable	Determinant variables																																		
					Attitude	Behavioural Intention	Perceived usefuness	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	Observability	Disposition Trust	Technology Trust	Vendor Trust	Perceived time risk	computer self efficacy	subjective experience	Objective experience
1	Albashrawi et al. (2019)	USA	Integration of UTAUT and IS Success Model	Mobile banking actual use		⊛													⊛																			⊛	O
				Behavioural Intention												⊛	⊛	⊛	O																				
2	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									⊛																										
3	Baabdullah et al. (2019)	Saudi Arabia	Integration of UTAUT2 and D&M IS Success Model	Loyalty										⊛	⊛																								
				Satisfaction											⊛																								
				Use												⊛	O	O	⊛	⊛	⊛	⊛	⊛	⊛	⊛														
4	Le et al. (2020)	Vietnam	Integration of UTAUT and TAM	Level of use		⊛																																	
				Behavioural Intention				⊛								⊛		⊛								⊛	⊛	⊛											
5	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																										⊛									
6	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																								⊛				⊛							
7	Gbongli et al. (2020)	Togo	TRA, DOI, TAM, TPB, UTAUT.	Adoption of mobile financial services																						⊛					⊛								
				General Trust																													⊛	⊛	⊛				
				Aggregate Perceived Risk					⊛	⊛																⊛	⊛									⊛			
8	Singh and Srivastava (2018)	India	TAM, UTAUT	Intention to use mobile banking				⊛	⊛									O								O	⊛										⊛		
				Perceived ease of use																																	⊛		
				Security																						⊛													
9	Ndekwa et al (2018)	Tanzania	Extended Theory of Planned Behaviour (TPB)	Adoption of mobile money s	⊛													⊛	⊛																				
	Frequency of the construct				1	2	2	4	3	2	2	2	1	1	2	4	3	6	5	2	2	1	1	1	1	5	4	4	3	3	2	3	1	1	1	1	2	1	1
	Frequency significant				1	2	2	3	3	2	2	2	1	1	2	3	1	4	3	2	1	1	1	1	1	4	3	4	1	2	1	3	1	1	1	1	2	0	1

Key: ⊛ Siginficant O Not Significant

Note: Compilation by the Author (2024)

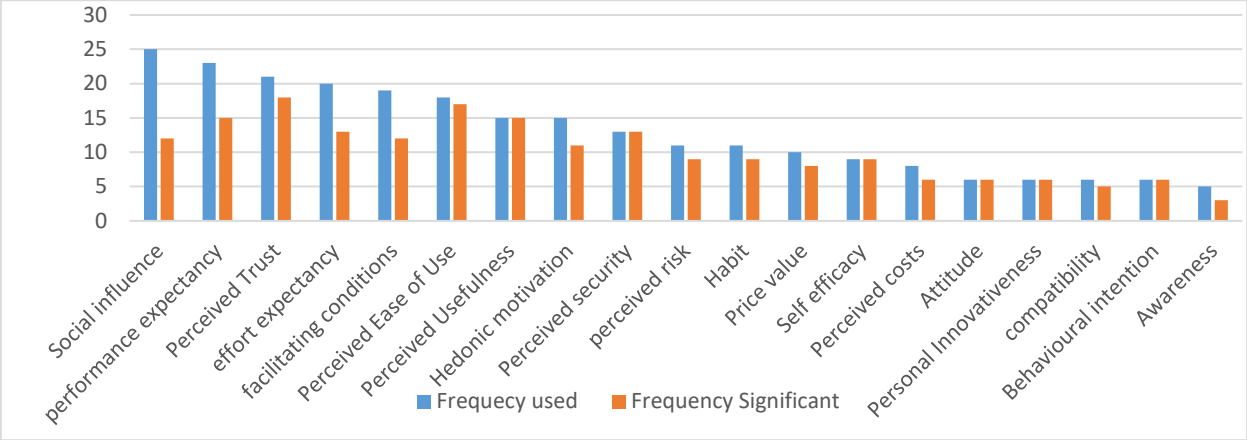
From Figure 2.2, we can see that for all the factors numerous times were found with substantial influence, but the variable social inspiration (social influence) for studying intention the volume of time it was proved to be significant was relatively smaller - 48%.

2.5.3 Moderator Constructs

Mobile financial transactions using the mobile phone have been the topic of many studies which have also considered of interaction of these moderators. It is in the nature of intermediary functioning to determine the extent it can influence the association and the degree between the antecedent and consequent variables (Vij & Farooq, 2017). These differences come though the demographical, cultural, methodological, economic and contextual dimensions which are altered mainly by societal composition and historical traditions of a country (Santini et al., 2019). The review of past literature established a number of moderators have previously which include gender (Kwateng et al., 2018; Sankaran & Chakraborty, 2022; Trinh & Nguyen, 2020; Sleiman et al., 202l; Lin et al., 2020); experience (Kaplan & Gürbüz, 2021; Kwateng et al., 2018; Lin et al., 2020); income (Alhassan et al., 2020); age (Kaplan & Gürbüz, 2021; Kwateng et al, 2018; Trinh & Nguyen, 2020; Sleiman et al., 2022; Gbongli et al, 2019; Alhassan et al., 2020; Lin et al., 2020); marketing (Alhassan et al., 2020); education (Kwateng et al., 2018; Sleiman et al., 2022; Gbongli et al, 2019); provider size (Alhassan et al., 2020); personal innovativeness (Elhajjar & Ouaida, 2020); and subjective norms (Elhajjar & Ouaida, 2020). One of the remarkable studies which focused on the moderator role of age is the Hauk et al. (2018), which show how age affects the decision/ adoption of new technology. Worthwhile mentioning that adoption of m-money technology with different ages, the younger generation having higher ability of mobile money services than the old ones (Kwateng et al., 2018; Trinh & Nguyen, 2020; Sleiman, et al., 2022;). This testimony is also attested to by Gbongli et al. (2019) which cites a study carried out by Fox et al. (2016) that found that 82 percent of the ager group of users of 35 years and below was higher

Figure 2.8

Frequently Used Antecedents for Studies in Behavioural Intention to undertake MFT



Note: Compiled by the Author (2023)

than the general population of 79 percent. When we talk about the study among students of the university, we may not require this variable, because the students are generally assumed to be quite a homogeneous group in the context of their age. The other extensive moderating variable is definitely gender. A general conclusion which is shared by many of the social cognitive theories seems to be the different initial reactions of women and men to specific situations. In a study, which analysed the impact inspired by gender dimensions, found that the associations of independent with dependent variables revealed significant effect on gender, with females more goal-directed considering the security and privacy and males more performance oriented, paying attention to the utility and results (Sleiman et al., 2022). A sizeable number of studies considered during the review observed the role of education in altering the levels of mobile money adoption. It has been a matter of significance in enhancing the uptake of mobile financial transactions (Kwateng et al., 2018; Gbongli et al., 2019; Sleiman et al., 2022;). Users with higher education levels display a tendency to utilize mobile financial transactions more often than those with low education levels. As indicated by Kwateng et al. (2018), various studies (Krueger, 1993; Wozniak,

1984, 1987; Welch, 1970; Lleras-Muney and Lichtenberg, 2002) brought forth a credible relationship between educational attainment and new technology adoption. It is the students of the university that we considered to be the distinct group academically, so the feature carries almost no relevance.

Moreover, the other moderating variables that less commonly treated in the selected studies are experience, subjective norms, personal innovativeness, income, provider size, and marketing. Some of these, such as subjective norms and marketing make the independent variables that would be treated as determinants. In a similar way, Elhajjar and Ouaida (2020) identify subjective norms and social inspiration which are drawn from the works of Fishbein and Ajzen (1975) as: the perception of a user about what others who consider to be significant regard on whether or not the user should engage in a behaviour. Despite the lower frequency, the variables have been seen to be a significant in some cases (Alhassan et al, 2020).

2.6 Empirical Review: Research Designs and Methods

The careful consideration of the research designs and methods that had been utilized before was of great importance in developing the foundation for the current study.

2.6.1 Research Designs

Research on technology acceptance is usually based on the quantitative approach (Lee & Baskerville, 2003 according to Vogelsang et al., 2013). Quantitative research involves gathering and processing of numerical information to respond to the ‘how or ‘why question'(Goertzen, 2017). Using such quantitative methods one can have an attitude of replication of the data by any other researchers; hence, those data can be compared, confirmed and criticized. This approach facilitates re-measurements at some levels of reliability, and this objectivity can be maintained through different processes, including keeping the participants at a distance (Gerrish & Lathlean,

2015, Ed.). The fundamental objective of the studies on acceptance of technology has thus been the exploration of the relationship between or impact of some constructs as a basis of intention to undertake some technology or system based on the Technology Adoption Model (TAM) and TAM extensions then followed by the derivatives of TAM model known as UTAUT. The rank of the TAM as the most preferred theoretical model can be largely attributed to its proven longevity; dynamism; omnipresence; and parsimony (Vogelsang et al., 2013). The studies are mostly of cross-sectional design, rarely the few ones done are longitudinal in nature and when they are the focus would be initially on the interaction between the user and the technology then a simple period of observation will follow (Yousafzai, 2007). (Lee and Baskerville 2012 as cited in Vogelsang et al., 2013). Large scale utilization of cross-sectional surveys is most probably a result of longitudinal and panel studies which are expensive (Souiden et al., 2020). There will also be a study on the students' acceptance of mobile banking which will have a similar design as the survey and other safety measures.

2.6.2 Research Methods

Data, as is seen in most of the quantitative researches, are collected in the reviewed studies using structured questionnaires administered to the sample of participants who are only conveniently selected which is mostly online. One of the root causes that contributed to the restricted reliability of the studies was the selection of non-probability convenient sampling technique which is known to decrease the chance of individuals having the chance to participate in the study (Himel et al., 2021; Sankaran & Chakraborty, 2022).

It clearly shows that the studies have for major part applied the Structural Equation Modelling (SEM) in the analysis of data, which is a well-established method that is superior than other methods when it comes to analyzing relationships among latent variables (Schierz et al. 2010 cited in Alhassan et al. 2020). Besides, SEM method is a powerful procedure for the empirical

analysis of multiple indicators of latent variables; and particularly measurement errors and multicollinearity occur in the data (Alhassan et al., 2020). A systematic review of the main theories, conceptual frameworks and models used to explain the consumer adoption of mobile banking found by Souiden et al. (2020) revealed that Partial Least Square (PLS) and path analysis are the most frequently applied tools in the studies. Moreover, the research showed that regression analyses, fuzzy analysis, ANOVA, logit binary, and t-tests were generally used in lesser number as well. The table below is an overview of findings after conducting the Mobile financial transactions adoption studies that were conducted in 2018 –2022. A quantitative research method/approach would be used in studying the transactional acceptance of Mobile financial transactions among university students in Tanzania through the use of SEM.

Table 2.4

Methods on mobile banking adopted by studies from 2018-2022

SN	Author(s)	Place of Study	Theoretical framework/ model	Method of Analysis
1	Akhtar et al. (2019)	Pakistan, China	Technology Adoption Model (TAM)/TAM extensions	Multiple and hierarchical regression analyses
2	Albashrawi and Motiwalla (2019)	USA	Technology Adoption Model (TAM)	Structural equation modeling (SEM)
3	Albashrawi et al. (2019)	USA	United Theory of Acceptance and Usage of Technology (UTAUT) /UTAUT extensions	Structural equation modeling (SEM), Bayesian neural networks-based universal structural modeling (USM).
4	Albashrawi and Motiwalla (2019)	USA	Technology Adoption Model—TAM/TAM extensions	Structural equation modeling (SEM)
5	Albashrawi and Motiwalla (2020)	USA/Saudi Arabia	Integration of UTAUT and IS Success Model	Structural equation modeling (SEM)
6	Albashrawi (2021)	USA	Extended expectation-confirmation model in IT domain (ECM-IT), developed from TAM and ECM	Regression Analysis
7	Al-Otaibi et al. (2018)	UK, Saudi Arabia	DeLone and McLean Model of Information Systems Success	t-test, multiple linear regression
8	Baabdullah et al. (2019)	Saudi Arabia	Integration of TAM and TTF	Structural equation modeling (SEM)
9	Baabdullah et al. (2019)	Saudi Arabia	Integration of UTAUT2 and D&M IS Success Model	Structural equation modeling (SEM)

Table 2.5

Methods on mobile banking adopted by studies from 2018-2022…

SN	Author(s)	Place of Study	Theoretical framework/ model	Method of Analysis
10	Baabdullah et al. (2019)	Jordan	Technology Adoption Model (TAM)/TAM extensions	Confirmatory Factor Analysis (CFA), Structural equation modeling (SEM)`
11	Banerjee and Sreejesh (2021)	India	Self-determination Theory	Structural equation modeling (SEM)
12	Bermeo Giraldo et al. (2021)	Colombia	Technology Adoption Model (TAM)/TAM extensions	confirmatory factor analysis
13	Bustami et al. (2021)	Indonesia	Technology Adoption Model (TAM)/TAM extensions	Path Analysis
14	Changchit et al. (2018)	Thailand, USA	Technology Adoption Model (TAM)	Multiple regression analysis
15	Chaouali et al. (2019a)	Tunisia	Technology Adoption Model (TAM), S-O-R	PROCESS Macro
16	Chaouali et al. (2019)	Tunisia	Integration of TAM and Stimulus-organism-response—S-O-R	PROCESS Macro
17	Chaouali et al. (2019a)	Tunisia	Stimulus-organism-response—S-O-R	Smart Partial Least Squares PLS
16	Chaouali et al. (2019)	Tunisia	Integration of TAM and Stimulus-organism-response—S-O-R	PROCESS Macro
17	Chaouali et al. (2019a)	Tunisia	Stimulus-organism-response—S-O-R	Smart Partial Least Squares PLS
18	Chaouali and El Hedhli (2019)	France	Theory of Reasoned Actions - TRA	Covariance Based SEM (CB-SEM)
19	Chaouali & Souiden (2019)	France	Innovation Resistance Model	Smart PLS
20	Danyali (2018)	Iran	Decomposed Theory of Planned Behaviour -DTPB	N. A
21	Dhingra and Gupta (2020)	India	UTAUT2/UTAUT2 extensions	Structural equation modeling (SEM)
22	Elhajjar and Ouaida (2020)	Lebanon	Technology Adoption Model—TAM/TAM extensions	SEM and path analysis
23	Farah et al. (2018)	Pakistan	UTAUT 2	Structural equation modeling (SEM)
24	Foroughi et al. (2019)	Malaysia	Technology Continuance Theory	Partial Least Squares PLS
25	Giovanis et al. (2019)	Greece	TAM, TPB, UTAUT, DTPB	Structural equation modeling (SEM)
26	Giovanis et al. (2019)	Greece	UTAUT/UTAUT extensions	Partial least squares path methodology
27	Goularte and Zilber (2019)	Brazil	UTAUT2/UTAUT2 extensions	Partial Least Squares PLS

Table 2.4

Methods on mobile banking adopted by studies from 2018-2022…

SN	Author(s)	Place of Study	Theoretical framework/ model	Method of Analysis
28	Hassan and Wood (2020)	USA, Egypt	Technology Adoption Model—TAM/TAM extensions	Structural equation modeling (SEM)
29	Ho et al. (2020)	Taiwan & Vietnam	Integration of TAM, DOI, and Decomposed Theory of Planned Behavior (DTPB) model	exploratory factor analysis (EFA) and confirmatory factor analysis (CFA), SEM
30	Hong (2019)	South Korea	Integration of TAM, Social inspiration Theory, and Social Cognitive Theory and Innovation Diffusion Theory (IDT)	exploratory factor analysis, path coefficient analysis
31	Hong and Chung-Ang (2019)	South Korea	TAM, TPB, IDT, SCT, UTAUT	Structural equation modeling (SEM)
32	Iskandar et al (2020)	Indonesia	UTAUT2/UTAUT2 extensions	Structural equation modeling (SEM)
33	Islam et al. (2019)	Bangladesh	UTAUT/UTAUT extensions	Partial least square (PLS) and structural equation modeling (SEM)
34	Jebarajakirthy and Shankar (2021)	India	Stimulus-organism-response—S-O-R	covariance-based structural equation modelling and PROCESS macro
35	Kamboj et al. (2022)	India	Integration of Tan's Failure Model (MBFM) and DeLone and Mclean's Information Success model	Structural equation modeling (SEM)
36	Kaplan and Gürbüz (2021)	Turkey	UTAUT2/UTAUT2 extensions	Confirmatory Factor Analysis (CFA) and Structural Equation Modelling (SEM)
37	Karjaluoto et al. (2021)	Mauritius	Theory of Consumption Values	Partial Least Squares PLS SEM
38	Kwateng et al. (2019)	Ghana	UTAUT2/UTAUT2 extensions	Smart Partial Least Squares PLS
39	Lee et al. (2019)	South Korea	Technology Adoption Model—TAM/TAM extensions	Structural equation modeling (SEM)
40	Le et al. (2020)	Vietnam	Integration of UTAUT and TAM	Exploratory and Confirmatory factor analysis, SEM
41	Malaquias and Hwang (2019)	Brazil and USA	TAM	Structural equation modeling (SEM)
42	Malaquias and Silva (2020)	Brazil	Technology Adoption Model—TAM/TAM extensions	Structural equation modeling (SEM)
43	Marpaung et al. (2022)	Indonesia	UTAUT2/UTAUT2 extensions	Partial Least Square (PLS) SEM and the Smart PLS
44	Merhi et al. (2019)	Lebanon and England	UTAUT2/UTAUT2 extensions	Structural equation modeling (SEM)
45	Milly et al. (2021)	Uganda	Technology Adoption Model—TAM/TAM extensions	Factor analysis test, multiple linear regression analysis, Pearson's correlation, ANOVA table, and process analysis

Table 2.4

Methods on mobile banking adopted by studies from 2018-2022…

SN	Author(s)	Place of Study	Theoretical framework/ model	Method of Analysis
46	Mishra, A., & Singh, A. (2021)	India	Literature Review	Factor analysis and regression analysis
47	Motiwalla et al. (2019)	USA	D&M IS Success Model - (DeLone and McLean IS Success model)	Path analysis
48	Naruetharadhol et al. (2021)	Thailand	Technology Adoption Model—TAM/TAM extensions	Structural equation modeling (SEM)
49	Ndekwa et al (2018)	Tanzania	Technology Adoption Model—TAM/TAM extensions	Multiple regression analysis
50	Nguyen and Nguyen (2020)	Vietnam/South Korea	TAM/TAM extensions	Structural equation modeling (SEM)
51	Osman and Leng (2020)	Malaysia	UTAUT2/UTAUT2 extensions	Descriptive analysis, Pearson's correlation analysis, and multiple regression analysis
52	Owusu et al. (2021)	Ghana	Integration of TAM and Diffusion of Innovations (DOI)—Innovation Diffusion Theory (IDT)	Structural equation modeling (SEM)
53	OwusuKwateng et al. (2019)	Ghana	UTAUT 2	Smart Partial Least Squares PLS
54	Prodanova et al. (2019)	Macedonia	Technology Adoption Model - TAM	PLS- Structural equation modeling (SEM)
55	Rachmawati et al. (2020)	Indonesia	UTAUT/UTAUT extensions	Descriptive Statistical Analysis, Path Analysis
56	Raza et al. (2019)	Pakistan	UTAUT2/UTAUT2 extensions	confirmatory factor analysis and partial least square structure equation modeling
57	Rehman et al. (2019)	Malaysia	Technology Adoption Model—TAM/TAM extensions	SEM through Smart-PLS3
58	Sankaran and Chakraborty (2022)	India	UTAUT2/UTAUT2 extensions	Structural equation modeling (SEM)
59	Santini et al. (2019)	Brazil	Technology Adoption Model—TAM/TAM extensions	Structural equation modeling (SEM)
60	Savi´c and Pešterac (2020)	Serbia	UTAUT/UTAUT extensions	Multiple regression analysis
61	Sharma and Sharma (2019)	Oman	D&M IS Success Model - (DeLone and McLean IS Success model)	structural equation modeling and neural network
62	Sharma (2019)	Oman	Integration of TAM and cognitive antecedents	A SEM-neural network modeling
63	Shankar et al. (2020)	India	Elaboration Likelihood Model	confirmatory factor analysis (CFA)

Table 2.4

Methods on mobile banking adopted by studies from 2018-2022…

SN	Author(s)	Place of Study	Theoretical framework/ model	Method of Analysis
64	Shareef et al. (2018)	Bangladesh	GAM (e-Government Adoption Model)	Structural equation modeling (SEM)
65	Sharma (2019)	Oman	TAM	Structural equation modeling (SEM), Neural Network
66	Singh and Srivastava (2018)	India	TAM, UTAUT	Structural equation modeling (SEM)
67	Siyal et al. (2019)	China	Technology Adoption Model—TAM/TAM extensions	Partial least square structural equation modeling (PLS-SEM)
68	Tam & Oliveira (2019)	Portugal	TTF	PLS- Structural equation modeling (SEM)
69	Tiwari et al. (2021)	India	Technology Adoption Model—TAM/TAM extensions	Regression analysis
70	Trinh et al. (2020)	Vietnam	UTAUT2/UTAUT2 extensions	Explore factor analysis (EFA), SEM linear structure model

***Source**: Compilation by the Author (2024)*

2.7 Empirical Review: Study Results and Implications

Research in the middle of new technology adoption like Mobile financial transactions has majorly considered looking at factors that have a great influence on the intention of consumers to adopt the technology and on occasion on actual usage behaviour. The findings from such studies play part in the advancement of knowledge, applying theory in real life, policy formulation, improving the quality of customer service, customers satisfaction and loyalty (Singh & Srivastava, 2018). Also, the technological adoption of mobile money promotes financial inclusion recognized by the authors in (Gbongli & Amedjonekou, 2019). In order to understand the results of previous research on the adoption of Mobile financial transactions and their implications, this review used the five perspectives of antecedent classification that is suggested by Souiden et al. (2020) which include; technology-based perspective; consumer-based perspective; social-based perspective; trust-based perspective, and barrier-based perspective.

2.7.1 Technology or Service Based Perspective

Technology-oriented perspective means mobile financial transactions from the technological aspects of the service delivery. Constructs that are viewed from the above perspective are: Utility Perceptions-PU (comprising Performance Expectation), Ease of usage Perceptions-PE (including Effort Expectancy), Facilitative conditions-FC, Hedonic Motivation-HM, and Price Value-PV. Based on the studies reviewed, the constructs that have been most frequently and significantly associated with them are PU, PE, FC, HM, and PV. The fundamental components of PU and PE as represented by Davis (1989) are the most widely used ones and they are, generally, the most influential ones. A few studies have shown that these beliefs affect intention towards Mobile financial transactions by mostly mediating the attitude construct (Himel et al., 2021, Makanyeza, 2016, Elhajjar & Ouaida, 2020, Hanafizadeh et al., 2014). Therefore, these people are more likely to use the given technology which is Mobile financial transactions if they think that it is effective and efficient to use (Rehman et al., 2019). In the practical sense, the role of PU and PE is important for Mobile financial transactions providers like banks and application developers to create simple and user-friendly technology. They should also take on account of customer awareness programs on the applicability of the Mobile financial transactions technology so as to encourage their use (Elhajjar & Ouaida, 2020). Yet, there were some cases where the impact of one or both concepts was found to be insignificant. As in case of Souiden et al (2020) where 27 out of 32 studies on PU and 19 out of 25 studies on PE have found the constructs to be insignificant. It is evident that these dimensions are crucial and are usually found in studies which are based on the Technology Adoption Model.

Facilitative conditions (FC) is recognized as one of the four core conditions of the United Theory on Adoption and Usage of Technology (Venkatesh et al. 2016). The term refers to the extent to which users are confident that both technical and organizational measures are in place.

According to Venkatesh et al. (2003, p. 453). This evaluation of the FC attribute in relation to the customer's adoption of Mobile financial transactions United both positive and negative results, the former being more evident than the latter. The Farah et al. (2018) research, which focused on mobile-banking adoption in Pakistan, found that all factors of the model, except for FC, are significant. The authors explaining as Venkatesh et al. (2003) argued that the non-significance may be attributed to the existence of performance expectancy and effort expectancy as factors in the study. The Farah et al. theory suggested a possible cultural influence causing the non-existent effect, and this was further supported by Mbrokoh (2016). However, Farah and colleagues' area of focus was said to be on yet more confirmatory studies with other cultures. There are different factors being introduced to increase consumer involvement such as educational programs; smartphones and strong internet connection as the necessary equipment to strengthen their acceptance and adoption of mobile banking services (Dhingra & Gupta, 2020; Sinha et al., 2018). As to this element, FC is the key variable to keep in mind when intending to handle the technology adoption studies.

Entertainment along with enjoyment of a particular technology is preferred over the utilities it provides is one of the motivational components according to UTAUT2 (Venkatesh et al., 2012 as cited in Shaikh et al. 2022). The study of Farah et al. (2018) have an HM positive and strong link to the intention to adopt mobile banking in Pakistan. Mobile devices are now associated with fun and entertainment, the effect is being amplified by amazing pictures and sometimes appealing fonts and designs of the applications and devices which look awesome and offers stress reliever in comparison to traditional banking services and hence pleasure feeling is being stimulated (Malaquias & Hwang, 2017 cited in Shaikh et al. 2022). The impacts of HM on the intention to undertake mobile money services have been outlined by various scholars. For instance,

Iskandar et al. (2020); Lin et al. (2020); Luyao et al. (2022); and Marpaung et al. (2022) have shared their views related to this subject. On the other hand, Merhi et al. (2019), Oliveira et al. (2016), and Escobar-Rodríguez and Carvajal-Trujillo (2013) who also studied the influence of Health Motivation on behavioral intention towards mobile banking but found the hypotheses inconclusive. This statement from Merhi et al. (2019) about the inconclusive association of TF with mobile banking adoption intention appears to be affirmed by the views that the technology is seen more as a beneficial service and as a habit due to simply being in the daily routine. Besides, the psychological fading capacities of HM is posited by Kaplan and Gürbüz (2021) as the reason behind arriving at this conclusion as the initial astonishment and freshness with the usage of technology wears off with time and experience. Being the same, the young people may find a new technology intriguing by default and if they like technological innovations. On the other hand, this coolness may be lost as finding the belief drops with age. As far as HM construct is concerned, the university students stand to gain from being more culturally and morally sensitive unlike the older generation.

Scholars have also studied price value (PV) probably within the scope of the UTAUT framework, as an additional construct, and its link to the adoption of new technology. Huang and Kao (2015, p.6) cite Viethaml (1988) as the person who provides the Price Value concept seeing it as a ‘trade-off between benefits and sacrifices’ which emerging technologies such as smartphones and the internet of things are long-studied and its productivity-related value is a critical factor in strengthening consumer interest. Sankaran’s and Chakraborty’s (2022) research focused on the dimension MV, EV, and QV except factor SV. Their study indicated that all these factors had the highest influence on the behaviour intention regarding the mobile banking service

adoption. Nevertheless, increasing focus may also lead to more updates of terminologies as well as new highly available in the same subject area.

2.7.2 Customer based perspective

The main antecedents from a customer-based perspective may become the factors of Self efficacy (SE), Attitude (AT), Digital Literacy (DL), and Personal Innovativeness (PI). In the article of Shaikh et al. (2022) Bandura (1997) and Ma et al. (2021) who defined self-efficacy, a person's belief in his or her ability to succeed in specific situations or complete some tasks. Singh and Srivastava (2018) revealed that the functionality of the mobile banking was largely enabler of the intention to undertake mobile banking by consumers' anticipation for receipt of assistance the unfamiliar technology. The SE appears to be slighted, as per the review; it had only been included in 9 studies, all of which turned out to be significantly impactful.

Attitude has emerged as one of significant determinants of technology adoption intents leading to its being considered among the key influential factors in the relevant technology usage studies conducted over the recent past. The concept summarizes the attribute that characterizes a person for a specific concept or behaviour (Giovanis et al., 2019). Nevertheless, Attitude as an independent variable still enjoys much prominence in the technology-adoption study, where it is commonly used to bridge the gaps between other variables like Complexity, Performance, Relative Advantage, Socio-cultural Aspects and Behavioral Intent for adopting a given technological application. Consider the example of the systematic review by Souiden et al. (2020) which piece together 32 studies dealing with a direct influence of PU on IU and 15 others in which attention is paid to the mediating impact generated by attitude. On another hand, 10 out of 18 studies identified the positive relationship between PU and BI, although Attitude factor was mediator of 15 out of the 52 studies. It is an unexpected news that almost all the studies on conducting use of Attitude towards BI, which were among attributes being significant. For instance, Ndekwa et al. (2018)

have analysed the attitude factor and found that it is one of the vital factors that the university students take into consideration while adopting mobile money services in Tanzania. Ndekwa et al. results were in line with Ajzen (1991) who justified his theory of planned behavior by pointing that Attitude is viewed as a psychological orientation of a person over the inclination whether the given behaviour is satisfactory or not. In addition, Souiden et al. (2020) had 13 studies examining attitude effect on adoption intent for technology that exerted significant impact. The above finding highlights that apart from consideration of Attitude, the other vital aspects are necessity, such that they make possible to establish most influential factors on intents for adoption of emergent technologies and their related applications/services including mobile financial transactions.

One of the early researches to study the relation between digital literacy (DL) and mobile banking has been conducted by Elhajjar and Ouaida (2020). In this context (ibid), Van Deursen and van Dijk (2014) refer to the aforementioned American Library Association to define DL as an individual's skill of using information and communication technologies in order to find, evaluate, create, and communicate the information required both the technical and the cognitive skills. Knowledge of DL is one of the significant factors which affect Attitude in relation to acceptance of m-banking transactions in Lebanon denoting that customer's approach in adopting mobile banking depends heavily on their understanding that is necessary to enable them navigate the phone gadget and obtain, create and transmit the needed instruction message to service providers or other users. This aspect, which changes with education status, would likely have a lower impact on the DL construct among students with a high level of education such as university students.

The other feature under the scrutiny for the customer point of view is the Personal innovation (PI). According to Williams, PI consists of the readiness of a person to adopt any IT innovation or system (Agarwal and Prasad, 1998 p. 206 quoted by Shaikh et al., 2022). It is studied

instead at a low frequency, which is primarily treated in the role of moderation. Example of an instance where individual's innovativeness was treated as a moderating construct is in the work of Elhajjar and Ouaida (2020) in which personal innovativeness served as a moderator between Utility and Ease of usage. Other factors that act as confounding variables are such as gender, experience, age, education, and income. Merhi et al. (2019) concluded that GE exerts contradictory moderating effect on the UTAUT based behaviors: it is significant for effort expectation, facilitative conditions, security perceptions, price value and insignificant for social inspiration, hedonic motives, habit, trust, and privacy perception. Additionally, GE was found to have the greatest impact on social and cultural factors by disrupting the normative beliefs associated with gender (ibid); therefore, the moderating effects of gender which were observed among the European sample were absent in the Lebanese sample. While investigating this variation, Merhi el al. pointed out that the subject of gender imbalances in England has been terribly eliminated compared to Lebanon. This finding demonstrates that the role of gender should be considered in such studies conducted in more underdeveloped countries than the rest of the world.

2.7.3 Social Perspective

The widely accepted elements within the social perspective include social inspiration (SI) as well as subjective norms (SN). Citing Kim and Hollingshead (2015), Shaikh et al. (2022) illustrated that SI is the change of thought, emotion or decision of a person based on the thoughts, emotions or decision of the other individuals. SI is based on the SN put forth in Fishbein and Ajzen (1975) which is part of the Theory of Reasoned Action (TRA) which defines SN in terms of an individual's perception about whether people regarded to be important have an opinion about them performing a specific behaviour.

Studies which investigated the effects of SI and IU generated results with mixed directions. While some of the outcomes of such studies associated the elements (SI and IU) with substantial

influence, others had contrary findings. A selection of 25 studies under review reviewed had 12 of the studies, equivalent to 48 percent showing SI as an element with significant influence. Examples of studies that indicated SI as associated with substantial influence on IU in adopting mobile financial transactions are such as Dhingra and Gupta (2020); Kaplan and Gürbüz (2021); Lin et al, (2020); Ndekwa et al (2018); Nur and Panggabean (2021); Rachmawati et al. (2020); and Kaplan and Gürbüz (2021). The other side of the coin, studies which contained contrasting findings were Raza et al. (2019) and Singh and Srivastava (2018). One of the possible explanations presented in defence of the insignificant influence is cited by Singh and Srivastava (2018) in Alawan et al. (2017) who pointed out to prospective users' preference for own decision as opposed to having to consult relatives and friends. Looking at it from another angle, the rationale for significantly positive influence of SI on BI is cited by Elhajjar and Ouaida (2020) in Gupta et al. (2019) attributing it to consumers' tendency to avoid uncertainties associated with the technological innovation compelling them to seek opinion of members from their social groups, family members and relatives. The later view is backed by Farah et al. (2018) who cite Bhatti (2007) attributing the phenomenon to the social nature of consumers that compel them to seek the acceptance and approval of the society surrounding them. Likewise, same insights are shared by Singh and Srivastava (2020) who attribute the significance of SI on the IU, to consumers' need for confidence when dealing with monetary transactions, which confidence is derived from friends and family members who use the technology. The apparent contrasting results of studies regarding the influence of social inspiration (SI) on intents towards adoption (IU) of mobile financial transactions is a point of research.

The evidence of studies, which studied the actual effect of SI and IU, proved variable. Factors like insignificant and significant influence were detected. The 25 studies reviewed had an

average of 12 out of 25 which is 48 percent who found that the content on SI was significant. The research that further upholds the SI in the transformation of IU towards the accessibility and functionality of e-money includes the works of Dhingra and Gupta (2020); Lin et al, (2020); Ndekwa et al (2018); Nur and Panggabean (2021); Kaplan and Gürbüz (2021); Works, which claimed there was no link, were Singh and Srivastava (2018); and Raza et al. (2019). It becomes more plausible as Singh and Srivastava (2018) Alawan et al. (2017) stated about the fact, people nowadays love their independence and they expect other people to make their own decisions just as they would do so, rather than consulting their relatives or friends. The pros of the research on the influence of SI on IU are indicated by Elhajjar and Ouaida (2020) stated in Gupta et al. (2019) that consumers to lean on social opinion of friends, family members and relatives to avoid uncertainties created by the new technology. Their argument gains further credit through the support of Farah et al. (2018) who use Bhatti's (2007) quote to corroborate the theory that consumers' proclivity toward peer-acceptance and admiration shape their decision-making processes. Furthermore, as noted by Singh and Srivastava (2020), this very rationale is the reason SI can have such a big impact on BI, for the sake of the confidence that people are provided with during their monetary transactions through suggestions from friends or relatives who are familiar with the technology. The contradiction between the outcomes of various research studies concerning the effect of SI on IU of e-banking is something of great significance and interest.

2.7.4 Trust Perspective

Indicators selected in the work of Souiden et al. (2020) for Trust based perspective involve Trust Element (TR), Security Perception (SP), and Privacy Perception (PP). The trust element (TR) construct has the greatest number of examinations under this view, being tested 12 - times against IU, the results of which were observed to be associated with significant influence. This was followed by the others subconstructs, namely peer support (PS) with 3 tests, all of which were

also significant and finally peer pressure (SI) with tests 2, all of which were significant (Souiden et al.,2020). Based on research conducted by Shaikh et al. (2022), Trust occasionally known at the moment as Trust Perception means the belief of a person that others or systems would behave in a certain way which a person recognizes. Shaikh et al. (2022) explained the outcomes of preceding studies. Among the results, the majority of the studies conducted over the recent past have validated that TR is indeed a strong element in influencing the consumer's adoptive intention for mobile banking and online transactions, as such consumer segments are more vulnerable to fraudulent activities. The studies that are cited and in which the role of TR appears to be influential when it comes to the acceptability of MFT services include Elhajjar and Ouaida (2020); Dhingra and Gupta (2020); Nur and Panggabean (2021); Gong et al. (2019); Patil et al. (2020), The reasons put forth to confirm the necessity of TR on the IU are all in respect of the classified information that can be shared on the platform, for instance, personal information for accessing financial particulars such as details of a bank account, number of phone, and financial transaction details (Dhingra and Gupta, 2020).

Like other constructs that have been studied, TR factor can sometimes prove not to be of any significance to use intentions for adoption of mobile financial transactions. An inquiry pursued by Farah et al. (2018) established a minimal effect of TR on IU as highlighted in the works of Koksal (2016) and Ahmed and Ali (2017) who had derived the same conclusions. Farah et al. argued that credibility, the comprehensive concept comprising features of an application in terms of its security capability, and its ability to instill trust, with an assurance on preservation of privacy, produces a more reliable result and superseded the old TR and PR measures for the majority of such studies. For their side, Singh and Srivastava (2018) view the minimal impact of TR variable as a result of heightened confidence which user place banks as highly trusted entities. Conversely,

the trust (TR) component of financial services is mostly treated as a vital element leading to allocating substantial resources of the providers with a view to mitigating threatened security and privacy for the prospective customers (Elhajjar & Ouaida, 2020).

2.7.5 Barrier Based Perspective

This barriers-based perspective covers every aspect that prevents, or lowers the readiness of a person to adopt a certain technology, whereas the most common barriers include risk perception (PR) and Resistance to change (RC). In simple words, through a combination of the uncertainties involved and the impact of the outcome, risk perception or simply risk is determined (Bauer, 1967 as cited in Shaikh et al., 2022). PR is also the prospect of any damages and losses that results from the attempts by customers in the pursuit of certain goals (Pavlou, 2003 as cited in Siyal et al., 2019). The negative role of PR about customers' intention towards the adoption of Mobile financial transactions is being noted (Rehman et al., 2019; Siyal et al., 2019; Tiwari et al., 2021; Elhajjar & Ouaida, 2020). Particularly, Souiden et al. (2020) revealed that PR was considered in 11 of studies with a discovery that all studies reported PR as having significant bearing on IU. A foremost cause for the observed phenomena lies in the consumers' fear of loss while using the m-financial application generated by security threats or breach of privacy capability (Rehman et al., 2019).

According to Wang et al. (2006) as referred to in Siyal et al. (2019), resistance to change (RC) one can define as a set of psychological factors that are causing individuals to resist the adoption of technology-based financial services. Comparatively fewer number of research works have focused on aspect of RC (as opposed to PR), thus it has not yet been established as one of the core elements of the conceptualised structure in Souden, et al. (2020). On the one hand, some pieces of the researches that showed negative influence of RC display on IU and Siyal et al. (2019); Hanafizadeh et al. (2014), and Claudy et al (2013) as cited in Elhajjar & Ouaida (2020). Even

though RC does not always constitute a constraint in attitudes to IU embodiment in mobile financial transactions, consumer education programs might be crucial to dismantle it.

2.7.6 Empirical Review: Passage of Time

The empirical study of the lapse of time is done in this line to ascertain the relevance as it relates to the past five years so as to earmark pertinent missing associations. One typical account of such scenario is articulated by Sankaran and Chakraborty (2022) who explored the issue of m-banking among financial service consumers in India, adopting the extended UTAUT2 model that accommodates perceived value and trust. The survey data was gathered using a simple online and offline questionnaire that was completed by 457 m-banking customers in country of India. The procedure applied the structural equation modeling (SEM) in testing of hypotheses through statistical tools. The research showed that effort expectation (EE), financial value (FV), trust (TR), qualitative value (QV), and emotion value (EV) have profound effect on behavioural use intention (IU), while performance expectation (PE) as well as social worth (SW) were not factors that significantly support usage intent (IU). The study done by Luyao et al. (2022) introduced two new concepts known as Trust Perception (TP) and lifestyle compatibility (LC) to expand United Theory on Adoption and Usage of Technology (which were TP and LC). Data were gathered with the aid of an online survey questionnaire that reached out to 298 participants whereby hypotheses were tested with the help of PLS-SEM, as well as with ANN. One important conclusion of this research was that PE, FC, SI, HM, PT and LC exhibited a strong and positive influence toward adoption intention, while EE did not attract consumers because of its shortfall in practical benefits. The analysis demonstrated a higher level of predictability of the fitness data with ANN and found that of the three dimensions of health education, physical training, food choices and physical education, all had substantial influence toward the willingness to utilise water pulverization device. Likewise, Hilal and Varela-Neira (2022) examined determining factors for adoption of m-banking among

Lebanese citizens aiming to see how they correlate with UTAUT2 model. Interviews were conducted from those people who are customers of 315 Lebanese banks, but they do not yet use the suggested m-banking apps. The outcomes of the inquiry provided the indication that PP displays a strong association with consumers' intentions of using mobile banking, and also some UTAUT2 drivers mediate the influence of PP on consumers' intentions. Sharma, Sharma and Kaur (2022b) assessed whether the binary relationships were observable between the mobile financial transactions adoption and the continents they come from. The study has resorted to a normalization approach built on TAM or its extension models. The research uncovered the role of location such that it had an undoubtedly great effect on people's willingness of using mobile financial transactions in the whole world.

Koi-Akrofi (2022) has conducted research on the determinants of m-money, m-banking as well as financial service origination Africa South of Sahara. The study embraced an amalgamation of the Technology Adoption Model (TAM) and the United Theory on Adoption and Usage of Technologies (UTAUT). An exploratory survey of 20 current published articles was conducted using systematic literature review methodology. The work comes to light, it became clear that external factors exert greater influence than the internal ones; however, the internal factors, though weighty, do produce effects on mobile money in SSA. In another setting, Coffie et al. (2022) examined the resonance of the m-payment services (MPS) diffusion with diverse set of factors including technological, non-technological, as well as environmental factors in terms of mobile money service use during the COVID 19 disease in Ghana. The investigation was designed based on the reasoned actions theory (RAT) or of theory of planned behavior (TPB) together with the Technology Adoption Model -TAM. The research was done by giving the social media survey to 3539 social media users and analysing the findings by using the structural-equation-modelling

(SEM) technique. Researchers showed that payment services perpetuated through mobile phones (MPS) went global and demonstrated deepest penetration (diffusion) ratio; and that the associated factors including technological and non-technological, as well as environmental factors enhanced the progress in MPS penetration.

Based on Indian banks, Kamboj et al. (2022) explored the influence of failures of m-banking on customer behaviour by using user satisfaction as a mediating role among customers through online questionnaires that were completed by 338 respondents and they applied SEM data analysis technique. This particular study was linked to the amalgamation of the model of mobile bank failure (MMBF) propounded by Tan with the information success model (ISM) developed by DeLone and Mclean. The investigation explored multiple dimensions mobile bank failure, that is how functionality, information delivery, system capabilities and services affected the usage behaviour in m-banking, which ultimately affected the kind of users who got satisfied with m-banking services and levels of customer engagements. Study came up with the finding that user satisfaction partially mediated relationship which that involves interplay of usage of m-banking with customer engagements.

Sleiman et al. (2022) have delved into the matter regarding intent to continue mobile payments in Sudan on the basis of integration of some concepts such as the ECM (Expectation Confirmation Model) and the UTAUT2. Data gained via a structural equation model from a 453 subjected survey questionnaire. The critical implication of the inquiry is the consequence of satisfaction towards the usage intention regarding mobile payments supersede all other motivations; and the antagonistic effects of hedonic motive as well as price/value on usage intents for mobile-channeled payments in the Sudan.

Leveraging on the perspective of the model of fit between technology and the task (TTF), Justino et al. (2022) explored the principal determining factors for usage of mobile-based commerce among retail users in Angola. They deployed a survey questionnaire and collected data based on 229 retail business people along with real mobile-phone-based commerce users in that country. Similar to the majority of the studies of this kind, the SEM (structural equation modeling) method was adopted in this study with a view to testing hypotheses developed in respect of specific relationships that are anticipated to exist. That particular study found that the level of intercorrelation among the four aspects of task features that include mobility, time pressure, interdependence and non-routineness, was high for all task-technology dimensions. Besides this, the influence generated by the interplay of the functions of mobile-based commerce system (notification, information search, data processing, and information exchange) and the stated TTF features of dimensions have been shown to be very strong. Contrary to the study, however, it showed a poor correlation about task-technology alignment and mobile commerce use.

The authors, namely, Shaikh et al. (2022), in their review of MFTs globally, compiled and made sense of 115 most relevant empirical studies drawn from reputable scientific journals, published between 2009 and 2020. The cited literature review was structured by means of methodology applied by Webster and Watson (2002). In this particular research, primary mobile financial transaction domains were earmarked, articulating in detail, a comprehensive framework of each of the domains; and, most importantly, suggested approximately 14 research picks in MFTs for further investigations.

Marpaung and his colleagues (2022) aimed to delineate the influencing factors on behavioral intention to undertake mobile banking service of Mestika banks in Indonesia by using UTAUT2 &UTAUT2 extensions model. Data were collected through a 240-respondent survey

conducted through online channels; and analysed based on the PLS-SEM method, aided by Smart PLS softwae. Important discoveries made from the study established that effort expectation, social inspiration and performance expectation in relation to the Mestika bank's mobile banking exhibited strong influence on customer desire to use while the facilitative conditions and the habits did not count that much on behavioural intents for using bank's mobile banking application by the consumer in Indonesia.

Foued (2021) took into consideration determinants factors which had an influence on mobile technologies adopted by accounting professionals in Tunisia by mentioning the TAM (Technology Adoption Model) and the UTAUT (United Theory on Adoption and Usage of Technology). The closed-ended questionnaires were adopted and filled by exactly 100 accountants as a method of collection of data which were then analysed by multiple regressions. The findings of the study are: most accountants in Tunisia depend on their expectancy of mobile technologies performance; facilitative conditions are its second parameter and the other activities like those performed by mobile technology come third.

Focusing on the argument of mobile banking actual usage by Ugandan citizens Milly et al. (2021) ascertained that Utility Perceptions, Ease of usage Perceptions, and Risk Perception can also serve as mediating variables with intention to undertake being the variable of interest. Grounded on the Technology Adoption Model (TAM), they (ibid) incorporated the research which is a survey involving 275 people using questionnaire as a data collection tool. The study applied tests related to factor analysis; Pearson’s correlation coefficient; multiple linear regression analysis, PROCESS analysis; and ANOVA table to regress the gathered data and produce results. The findings obtained from the study added further evidence that users' Utility Perceptions, along with Ease-of-Usage Perceptions, are the core factors in imparting positive influence on actual

system usage and usage intention serves as mediator of the relationship. Perceptions on risk was demonstrably found to be negatively associated usage intentions regarding mobile-based banking, with usage intents still acting as a factor that mediates the association in a negative way.

In a study entitled “impact of financial technology (fintech), mobile money, and digital financial services on financial inclusion in Uganda”, Museba et al. (2021) undertook an enquiry into the contribution of these technologies in improving Uganda’s financial inclusion and the factors that affect their adoption. The study attracted 400 participants who filled out the questionnaires including Ugandans in Kampala region, the findings of which were evaluated using the MS Excel. From the study, it was discovered that the adoption of m-money relied heavily on two fundamental elements: the social- circle and social-interrelations of customers. The study was further able to identify consumer segments defined in terms of technology adoption stages that led to defining early adopters commonly known as technology leaders.

Jebarajakirthy and Shankar (2021) for instance have provided a moderated mediatorship framework which assessed the patterns of mobile (m) banking adoption intents generated as the consequences of online convenience dimensions arising from applying m-banking systems in India. The article was grounded in framework of the SOR (stimulus-organism-response) model; analysed survey data collected from 446 people who participated using survey questionnaire. Data was analysed using two methods namely the CB-SEM (covariance-based structural equation modelling) and the PROCESS macro. From the study it was recognized that convenience dimensions of m-banking (access convenience, benefit convenience; transaction convenience) affect favorably the intents for adoption of the technology-based application or service. Besides, post-benefit convenience or m-banking practical values were noted to exert mediating effects on the resonance between convenience dimensions and m-banking adoption intents.

Focused their research interest in m-banking, Albashrawi et al. (2020) applied the hybrid framework to study its success in the USA. They applied the UTAUT (united theory of adoption and use of technology) to examine data gathered from 472 mobile bank's customers who were involved in the research. Data were analysed based on two methods: the SEM (structural equation modeling), and then using Bayesian neural networks-based USM. From the findings, it was pointed that effort expectation is indeed favourably (non-linearly) influenced to behavioral usage intents and was first in UTAUT hierarchical ranking as the strongest factor in driving usage intentions.

2.8 Research Gaps from Literature

The gaps give the researcher a clear understanding of potential loopholes that need to be covered comprehensively before engaging in in-depth research (Eagly & Wood, 1994; Mueller-Bloch & Kranz, 2015). In spite of the fact that the Mobile financial transactions have a lot of scientific and technological evidence in it, empirical studies have never been without limitations. Resemblances in terms of theory, models, frameworks and methodologies shape confines into some patterns that enable us to group the limitations into factors related to: research context; population being studied; research design; the constructs studied; and participant selection. However, some of them are also illumined by the same scholars with a proposition for debate and anticipation of future researches.

2.8.1 Context Based Research Gaps

The majority of the studies were seen as having been staged in certain geographical locations or population groups giving rise to potential variation on social-cultural factors hampering applicability of the studies' outcomes to any other geographical jurisdictions or population segments. Likewise, divergences experienced in standard of living between various

jurisdictions could also contribute to divergences of study results (Elhajjar & Ouaida, 2020). The researcher's apparent limitations have been highlighted by some other scholars in the domain of this study. Some of such scholars include Islam et al. (2019); Sharma (2019); Rehman et al. (2019); Trinh et al. (2020); Naruetharadhol et al. (2021) and Luyao et al. (2022). To address the limitation, they encourage scholars to consider studies that cut across various geographical areas, multicultural settings; and wider economic spectrums like developed and developing countries; urban to rural areas.

2.8.2 Population Related Gaps

Some of the authors pointed out to the possible shortcomings of the population group examined, depending on the nature of participants that had been sampled. Dhingra and Gupta (2020) whose sample population comprised of people with prior banking mobile experience in India raised the need for contrasting results in a study with similar study involving people with no banking mobile experience before. The second factor identified by Luyao et al. (2022) for future studies is the need to examine income and demographic data of the population under study. Their study involved economically stable and predominantly young people in China. Beyond these knowledge gaps, there is a problem of self-reporting bias as well. The practitioners of this genre have noticed deviations of the self-reported data from the actual practice emanating from the natural weakness of human perception and their emotional impulses. For example, an article by Albashrawi et al. (2020) showed that the values people self-reported on the use of mobile phones differed from the system-generated values, citing Collopy (1996) and de Reuver and Bouwman (2015) to have observed similar findings. Hence, they put forth that the self-reporting bias should also be considered when dealing with studies founded in perceptions.

2.8.3 Gaps Related to Study Designs

Researches performed on new technology adoption have frequently used not only quantifiable approaches, but also cross-sectional designs which means the measurement is done at a specified single moment in time. Such a design helps in establishing association between variables but fall short in establishing causality as well as the effect of time when the relationships between variables happen (Albashrawi et al., 2020). Luyao et al. (2022), support this view wherein their opinion, emphasize that cross sectional design prevents the control of latent heterogeneity which in turn hinders the causal inference establishment. To overcome the difficulties, most of the studies suggested the longitudinal studies which can help in determining the changes of variables over a span of time. Some of the researchers who, in their cross-sectional studies, recommended carrying out longitudinally designed studies are such as Sankaran and Chakraborty (2022); Dhingra and Gupta (2020); Farah et al. (2018); Milly et al. (2021); Islam et al. (2019); and Sharma (2019). The main reason for shying away from longitudinal research has been associated with cost considerations.

2.8.4 Construct-Related Gaps

Complexities encountered in trying to model real-life situations pose difficulties including introducing all the essential variables in the study. This consequently led to the application of a priori constructs with others being left out. In this regard, some of the researchers opted from their studies moderation elements for instance age, gender, and education (Tiwari et al., 2021; Baabdullah et al., 2019; Sharma, 2019; Merhi et al., 2019; Singh & Srivastava, 2018). Instances where certain scholars have suggested incorporating additional independent variables to make their explanatory power for the models even stronger are not rare. Elhajjar and Ouaida (2020) stated in their study involving the TAM that the use of more than one theory would yield considerably better results.

2.8.5 Gaps Related to Sampling Strategy

In many occasions, sampling has been associated with limitations encountered in research. Choice of an appropriate sampling strategy and its effective execution are important processes of good research. During the review, it was clearly observed that majority of studies have opted to deploy sampling methods that are orientated to purposefulness and/or convenience. Such methods are typical categories of non-probability sampling characterized by the limitation of not providing study elements equal likelihood of inclusion and ultimately leading to generation of biased results (Himel et al., 2021). The strategies are usually criticised as lacking representativeness of the population units in the sample, and in so doing compromises the ability of possible replication and generalisation of the research (Baabdullah et al., 2019; Sankaran & Chakraborty, 2022). Studies conducted under such circumstances call for the researcher to exercise substantial levels of caution in the interpretation and drawing of conclusion regarding a wider population (Singh & Srivastava, 2018).

2.8.6 Contribution in Bridging Research Gaps

The study is carried out partly as an endeavor to contribute towards bridging some of the research limitations illumined in the foregoing analysis. For instance, carrying out research in Tanzania, which is a developing country, not only helps to address a majority of the country-specific research gaps but also contribute to the available research on Mobile financial transactions which has largely been confined to Asian and Middle East countries (Souiden et al.,2020). A remark by Shaikh et al. (2022) is that we can have a deeper understanding of how Mobile financial transactions contribute economic welfare if some studies are carried out in countries outside the European Union (EU). A notable observation is that EU member countries however, have had prior studies on these issues so non-EU member countries studies will enhance our understating.

In this study, the behavioral intention of the university students concerning adoption of Mobile financial transactions was majorly considered and also to a certain extent, the researchers try to address the population related gap which Dhingra and Gupta (2020) one of the citations noted as one of the research areas to be focused on; that is, a survey that involves participants who have no prior experience with mobile banking. A great part of the student population, certainly would have no skills on Mobile financial transactions prior this contest. Furthermore, the research also provides one remedy in the light of the call of filling the practice gaps by employing an integration of theoretical models of Technology Adoption Model and the United Theory of Adoption and Usage of Technology (UTAUT) as a practice gap identified by Elhajjar and Ouaida (2020). Hence, it also responds to the question raised by the authors Merhi et al. (2019), Baabdullah et al. (2019), Sharma (2019), Tiwari et al. (2021) and Singh and Srivastava (2018), as regards to inclusion of moderating factors in their work. Within this scope, looking at the moderation potential of the factor of gender has been one of the essence of this inquiry.

2.9 Hypotheses Development

In conformity with correlational study designs, this research hinges around development and testing of hypotheses to establish adequacy of relationships among variables. The hypotheses are developed to support the study in probing the influential role of some of the psychosocial factors as determinants of the behavioural decision of university students to take mobile financial transactions in Tanzania. The process for formulation of the hypotheses is premised on empirical results observed in the existing research literature and the interest for bridging research gaps as one of the central objectives for the study. The hypotheses are developed in an attempt to respond to critical research questions that seek to understand the nature and the psychosocial dynamics surrounding consumer's perceptions regarding use of mobile financial transactions. According to the above review published literature regarding prior empirical investigation about adoption

intentions for mobile financial transactions brought forward to these essential constructs: Utility Perceptions (PU), Ease of Usage Perceptions (PE), Social inspiration (SI), Risk Perception (PR) and Facilitative Circumstances (FC) and their interactions. One of the main factors that could potentially have a moderating effect on the hypothesized relationships which is an aspect of gender (GE) is also considered. Clear understanding of the interactions underlying the constructs is secured by seeking to respond to research questions developed for each specific research objectives.

2.9.1 Research Questions

A conceptual framework developed on the basis of the anticipated construct relationships was developed. The conceptualized model is geared to respond on the following research questions:

RQ1: What kind of influence do behavioural factors [utility perceptions (PU), ease of usage perception (PE), social inspiration (SI), risk perceptions (PR), facilitative conditions (FC) and attitude (AT)] have in catalyzing or hindering students' intention (IU) to undertake mobile financial services in universities in Tanzania?

RQ2: What role does attitude (AT) have in mediating the associations of exogenous factors of utility perception (PU) and ease of usage perceptions (PE) with the endogenous construct use intents (IU) in relation to mobile financial services among university students in Tanzania?

RQ3: How would the associations of the exogenous traits (utility perception, ease of usage perception, social inspiration, risk perception, facilitative conditions and attitude) with the endogenous attribute of usage intents for mobile financial services among university students in Dar es Salaam, Tanzania be moderated by gender-based variations?

In undertaking this inquiry, a conceptualized research model was created for generating potential solution to outlined research questions. The model was tested using structural equation modelling as well as other available techniques.

2.9.2 Research Hypotheses

Responses for addressing research questions articulated within the foregoing section are set to be empirically derived from testing of corresponding hypotheses developed for that regard. In developing such hypotheses, consideration is made on observations and conclusions deduced in the course of review of the literature on adoption of new technologies as highlighted in the preceding sections.Core factors that have all along been found to fundamentally influence the tehcnology adoption decisive behaviours are Ease of Usage Perceptions as well as Utility Perceptions. An investigation carried out by Elhajjar and Ouaida (2020) in relation to mobile banking adoption in Lebanon, established through theTAM and its extensions that digital literacy, compatibility, risk perception, ease of usage perceptions, and utility perceptions had a major consequence in adopting m-banking,while the awareness and compatibility had little impact on adoption level. Several other scholars including the founder of the TAM Davis (1989), have consistently demonstrated strong relationship and influence of the twin exogenous factors of Utility Perceptions and Ease of usage Perceptions to user adoption intention in relation to financial transactions delivered through technological mobile devices. Some of these authors are researchers likeGovender and Sihlali (2014); Hanafizadeh et al. (2014);Makanyeza (2017); Himel et al. (2021); and Milly et al. (2021). The observations lead to formulation of the first two hypotheses:

H_1: *Utility Perception (PU) influences behavoural intent for undertaking (IU) mobile financial services (MFT) by university students in Tanzania;*

H_2: Ease of usage Perceptions (PE) is a determinant of behavioural Use Intents (IU) for MFS by university students in Tanzania

The TAM explored the role of subjective norms and individual innovativeness where Elhajjar and Ouaida (2020) found that they acted as obstacles to the users in the adoption intentions andmoderated the flow of relationship of attitude to both ease of usage- and utility perceptions. Moreover, there is abundance of evidence that social factors have demonstrated strong effects in the technology adoption equation across multiple research outcomes.This stance is supported by Hong and Chung-Ang (2019) who suggested that all the personal factors form a close positive association with use intention for mobile banking transactions among the population in South Korea. This study suggested that one of the factors namely social inspiration is decisive for the intention to adoptmobile banking, whereas to the contrary, subjective norms revealed an insignificant relationship to the intents. This leads us into formulating the hypothesis:

H_3: Social inspiration (SI) bears effects on the behavioural usage intents (IU) for mobile financial transactions by university students in Tanzania.

Forging ahead, a review on the work by Tiwari et al. (2021) was accomplished in the context of Technology Adoption Model found that customers' informedness, Risk Perception and trust were critical in the process of adoption of mobile-based banking in the jurisdication of India. A phenomenon was as well noted where customer awareness, the risk perception and trust also have some inputs on the adoption issue interacted positively with the user's behavioral intention of mobile-driven banking services. Complementig this view was the study by Milly et al. (2021) who deployed 275 participants' views in Uganda to analyse the role of a number of behavioural factors including Risk Perception in actual application of mobile banking transactions, mediated with usage intentions. The research established the retardation role of Risk Perception in

influencing actual adoption of mobilebanking, noting the negative mediating effects of intention to undertakethe services. Likewise, Iskandar et al. (2020) observed that observability,performance expectation, hedonic motivation, facilitative circumstances bears positive and significant effects on behavioural intents; whereas risk perception , and price value pose significant negative impact on behaviour intents; and that behavioral intention and experience has significantly positive to usage behavior for mobile banking apps. Based on these expositions, Hypothesis 4 is presented:

H_4: In Tanzania, there is strong connection between the risk perception (PR) and the behavioural intention (IU) to take mobile financial transactions among university students.

A study by Alhassan et al.(2020) titled “Consumer Acceptance and Continuance of Mobile Money: Empirical secondary data insights from Africa via the mobile money Technology Adoption Model” has shown us that electricity is a crucial factor in enabling mobile phone usability, as well as long-run continued utilisation of the service. Furthermore, intention to continue mobile money is also linked to the perception of regulations as enabling. Notwithstanding, the dearth of infrastructure in rural areas and the deficient mobile networks and national power grids in rural areas are the factors behind the negative impact of the rural population on the plans to use mobile money among the people (Alhassan et al., 2020). In another context, Islam et al. (2019) deployed the UTAUT/UTAUT extensions model in their study regarding the subject of adoption intents for mobile-banking in Bangladesh and realised the fact thata all identified factors exert high influence onconsumer’s behaviour with an exception of the factor of performance expectancy. A similar study by Kaplan and Gürbüz (2021) that examined determinants and effects within the interplay of individuals’ intents to undertake mobile banking with their originators within the context of Turkey based on UTAUT/UTAUT extensions model

noted significant influence of trust, social inspiration, price value, facilitative conditions, performance expectancy, and habit. Based on the relationships, it became possible to formulate the following hypothesis:

H_5: Facilitative conditions (FC) are influential in determining behavioural intents to undertake (IU)mobile financial transactions by university students in Tanzania

The TAM/TAM extension models were employed in examining factors that affect adoption and intentions to use mobilebanking among Chinese bank clients. It was learnt that risk perceptions, low service benefit awareness and resistance to change had a strong impact on the customers' usage intentions and loyalty to the utilisation of m-banking facilities (Siyal et al., 2019). Further investigation into aspects that affect individual's orientation and attitude regarding use intentionsformobile banking transactions conducted by Rehman et al. (2019) in Malaysiaon the basis of the TAM/TAM extensions model has found m-banking being influenced positively by such factors as ease of usage perceptions, utility and attitudinal stance towards utilisation of mobile phone-mediated banking transactions and influencednegatively by privacy risk, security risk and attitude towards usage of the service. The review established the frequent surfacing of the attitude and factors that shape an individual's attitude within the perimeter of investigations on behavioral use intention related to mobile banking transactions in Malaysia. Yet, the problem of data leakage and cyber security risks are negatively and statistically related to the attitude towards m-banking (Rehman et al., 2019). This takes us to hypothesis 6.

H_6: Attitude (AT) bears an influence on behavioural intents to undertake (IU) mobile financial transactions by university students in Tanzania

Examination of literature on mediation has frequently found the variable Attitude (AT) being increasingly utilized as a factor that mediates between variables - independent variables and

dependent variables. The current review of AT as a mediating variable noted a sizeable number of studies where behavioural adoption of technology is mediated through the AT and a large number of them were shown to be significant (Souiden et al., 2020). As predicted by Venkatesh and Davis (2000) several authors have examinedand affirmed the mediation effect of AT on relationships construed to exist between prevailing social norms and the individual (personal) users' behavioural intents to undertakethe technology. A selection of researchers who reported similar findings include Rao and Troshani (2007), Gbongli and Amedjonekou (2019), and Giovanis et al. (2019). Similar observation in respect of the strong mediating effect of Attitude on the association of ease of usage perceptions with use intention on mobile financial transactions was made by Hong (2019). Generally, the finding suggests that the participant's supportive or antagonistic inclination regarding significance of the specified services augments or decreases the strength of ease of usage perceptions effects on intentions of applying the services. It is for this assertion that AT is examined on its potential for amplifying or diminishing the effect of Utility Perceptions (PU) and Ease of usage Perceptions (PE) on students' use intentions (IU) for mobile financial transactions based on Hypotheses H_7 and H_8 below:

H_7: Attitude (AT) generates mediation outcomes in the relationship that involves utility perceptions (PU) and behavioural usage intent (IU) for mobile financial transactions by university students in Dar es Salaam, Tanzania

H_8: Attitude (AT) mediates the relationship that exists between ease of usage perceptions (PE) and behavioural Use Intent (IU) for mobile financial transactions by university students in Dar es Salaam, Tanzania

Numerous scholars have explored moderation effects within varying settings of variable relationships and gender is one of the three significant conditions that have been found to exert

some of the highest moderation effects, followed by age and education (Shaikh et al. 2022). Examination of the interaction between gender and the convergence of the technology adoption before and the results after, which shows that women tend to process aspects like security and privacy while men tend to focus in performance and utility of the product (Sleiman et al., 2022). Such findings are therefore suggestive of the need for other investigations such as the study at hand, to focus on uncovering the potential consequences of gender on the students' behavioural intention to take thetechnology driven financial services. Other factors whose moderation effects were x-rayed albeit to a lesser frequency include such aspects as hedonic motivation, convenience factors, price value and perceived utilitarian values. Sleiman et al. (2022) conducted an integrated study involving expectation confirmation model (ECM) and the UTAUT2 in Sudan and found that hedonic motives and price/value exert antagonistic impact on intents for adoption of mobile payments, with satisfaction demonstrated as the most significant influencial factor in the continuance usage intentions formobile payments. In their research, Shaikh et al. (2022) studied and examined 115 recent research publications carried out in reputable and peer-reviewed journals for purposes of creating a comprehensive view on Mobile financial transactions (MFT) between the years 2009 and 2020.Based on the Webster and Watson (2002)'s 3-stages approach, the material identified gender as one of the most explored moderating variable. In view of these observation, the study explores the moderation effects of variable of gender within the interaction assumed as present in the conceptual framework, resulting in hypotheses 9 to 14 as stipulated hereunder:

H_9: Gender (GE) moderates the relationship construed to exist between Utility Perceptions (PU) and behavioural Use Intentions (IU) for mobile phone-perpetuated

financial transactions by learners who are in universities situated within the locality of Dar es Salaam, Tanzania

H_{10}: Gender exerts moderation effect on the relationship construed to be present between Ease of usage Perceptions (PE) and behavioural intentions to undertake (IU) mobile financial transactions by students in Tanzanian universities based in Dar es Salaam.

H_{11}: Gender (GE) bears moderation effects on the relationship involving Social inspiration (SI) and behavioural intents to undertake (IU) mobile phone-perpetuated financial transactions by students of Dar es Salaam-based universities in Tanzania.

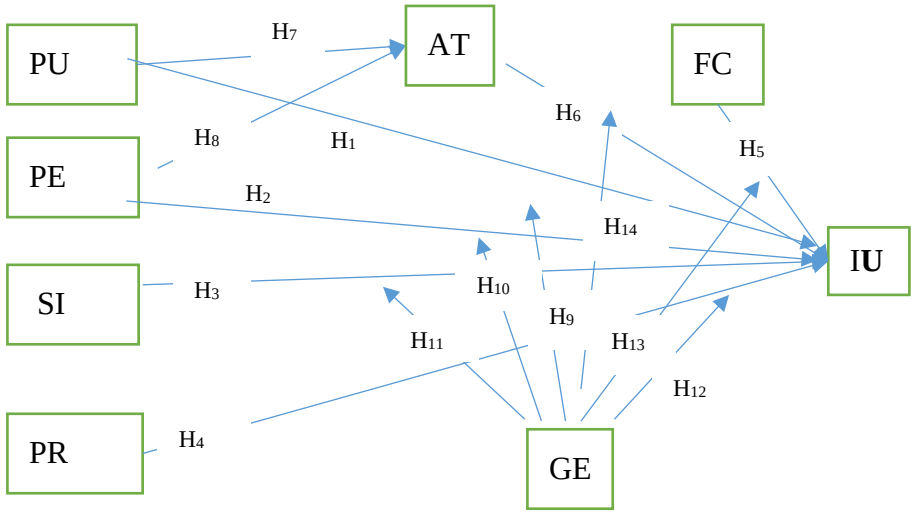
H_{12}: Gender (GE) does not moderate the association of Risk Perception (PR) and behavioural intents (IU) to undertake mobile financial transactions by Tanzanian university students.

H_{13}: Gender (GE) exerts moderation impact on the interaction between facilitative conditions (FC) and behavioural intentions to use (IU) mobile financial transactions by university students in Tanzania is not significant.

H_{14}: Significant moderation stimulus is generated by Gender (GE) on the association of Attitude (AT) with behavioural use intent (IU) regarding deployment of mobile financial transactions by university students in Tanzania.

Figure 2.9

Hypothesized Integrated Conceptual Model



Note: conceptual formulation by the Author (2024)

2.10 Summary

Following the aim to get the grip of the key determinants of young people's mobile financial transactions adoption behaviour in the country, the author focused on researching the selected literature. The main purpose for the literature review regarding existing knowledge practices on mobile financial transactions in the financial sector was to come up with methodologies and techniques that were relevant in the previous research; flagging glaring research gaps on similar settings; and designing appropriate conceptual framework on the basis of which empirical research would be drawn.

The review of literature started with the search of several information resource databases such as ProQuest and Google Scholar. It also involved review of meta-analytical article such as those of Santini et al. (2019); Souiden et al. (2020); and Hilal and Varela-Neira (2022). The process was then complemented by snowballing of the references within identified articles. The search

involved key words and concepts that constitute the industry descriptions and jargons. The review focused on the TCMM approach initially initiated by Shaikh et al. (2022) that includes a logically structured "subject matter" ranging from theories, model, methods and moderators. It was also made clear, according the scrutiny, the branches of mobile-based financial transactions involving three M's for banking, payment and money services have been extensively explored, with the m-banking taking the lead amongst the three. This research work has been undertaken with the cognizance that people may behave similarly regardless of the possible type of the product, whether it is technology, food or body care. Such a view led to the decision to consider a wholistic view of mobile financial transactions regardless of the specific segments of the MFT services.

A subsequent item of review was delving in the exploration of the literature based theoretical framework where it was seen that the technology acceptance theories were basically the offspring of the Theory of Reasoned Action (TRA) developed by Ajzen and Fishbein (1980) which highlighted the centrality of attitude and the social norms in shaping an individual's behavioural intention towards doing a given activity. Other vital models and theories that have been influential in the understanding of technology adoption were planned behaviour theory (PBT); theory of innovation diffusion (TID); model of the task-technology fit (TTF) and United Theory on Adoption and Usage of Technology (UTAUT) with its variants UTAUT 2 and UTAUT3 models. Of special note to the historical account of technology-oriented studies is Davis (1989) proposition that gave birth to the Technology Adoption Model (TAM) which stands out as a pillar in most commonly used models in relation to the subject of adoption of emerging technologies and related studies (Alhassan et al., 2020). The review established the framework which was theoretically applicable for the design of a conceptual model that amalgamated the

Technology Adoption Model (TAM) and the United Theory of Adoption and Usage of Technology (UTAUT).

Based on hypothetical foundations of the combination of the TAM and the UTAUT models, the conceptual framework has been developed comprised of a set of 11 key concepts or constructs that make up the model, including Utility Perceptions (PU), Ease of usage Perceptions (PE), Social inspiration (SI), Facilitative Circumstances (FC), Trust Perceptions (TP), Hedonic Motives (HM), Attitude (AT) as well as Gender (GE). Consequently, it was possible to discover key elements which had a major consequence on the decisions to utilise mobile finance among users. From reviewing the essential constructs and the different research gaps and objectives, those confirming the research hypothesis were identified. These were then integrated with the Technology Adoption Model (TAM) and a new additional construct was added from the United Theory for Adoption and Use of Technology (UTAUT) to provide a conceptual design of the adoption and usage of technology. The constructs were evaluated and filtered to generate a final core set of seven primary variables which include Utility Perceptions (PU), Ease of usage Perceptions (PE), social inspiration (SI), Risk Perception s (PR), facilitative conditions (FC), attitude (AT), and gender (GE) which assumes the position of moderation element. In deriving key factors and their influence in determining consumer's behavioural actions, the literature review identified five perspectives suggested by Souiden et al. (2020) including perspectives based on technology, social, customer, trust, and barriers as the most relevant classification approach. It was clear that these previous studies guided by empiricism were quantitative, cross sectional in design, and mainly used questionnaire instrument in data collection and data manipulation and scrutiny was carried out based on SEM techniques.

Deploying the developed conceptual framework into empirical study led to progression of intended design, then culminated into research questions, and ultimately hypotheses involving examination of six primary relationships that suggests existence of influence of exogenous variables Ease of usage Perceptions, Utility Perceptions, Social inspiration, Risk Perception, Facilitative Conditions, and Attitude on the endogenous variable behavioural intention to undertake (IU) mobile financial transactions (MFT) among students in Tanzanian universities. Besides, the model incorporates an investigation of the mediation effects of AT on the associations that engages exogenous variables PU and PE with the endogenous variable IU. Complementary to the tests, the review details the needs for an exposition of the moderating effects of the variable of gender (GE) on all relationships contained in the model, associating two sides of the constructs – independent constructs and the reliant construct of IU for mobile financial transactions by students in Tanzanian universities.

The research is generally designed with an objective of addressing some of research-related gaps seen in preceding empirical works such as geography context, design, model and construct limitations. By having already formulated the conceptual framework the researcher goes on to employ the quantitative analytical methods identified earlier in similar studies on MFS adoption as the main form of validation of posited assumptions as guided by the famous SEM technique. From the envisaged relationship, a total of 14 hypotheses are developed, geared towards responding to the 14 research questions formulated. Out of the 14 hypotheses, six hypotheses are designed to address direct relationships between variables; two hypotheses are meant for testing mediation effects of AT; and the remaining six hypotheses are targeted for investigating moderation consequence generated by the gender trait in all the envisaged relationships.

CHAPTER 3 : RESEARCH METHODS

3.1 Overview of Research Methods

Chapter three, delves into details about the methods and approaches that were considered in assessing adoption of mobile phone-driven financial transactions carried out by students in universities situated in Dar es Salaam. It is a strict guideline that entails a sequential process of the quantitative procedure that involves the discovery of variables both autonomous and non-autonomous variables involved the study. This section starts with scholarly lenses that depict the study's theoretical perspective. The second field is titled "Research Approach and Design" and it is followed by data presentation; information about demographic traits of the population; followed by sampling procedures; methods and instruments for collection of data; ethical considerations, and the last section is an outlay of the suitable analysis techniques.

The recent improvements in mobile communication technology for providing sophisticated payment platforms have been rendered less impactful as desired socio-economic transformations are yet to be realized. Benefits accruing to the use of new technology in the financial service promised massive embracement of the service the outcomes of which promote substantial growth in financial inclusion and ultimate economic development and eradication of poverty (Mhlanga & Denhere, 2020). Numerous benefits are perceived to have heightened the financial inclusion expectations from embracing financial technologies are among others speed, economy, and convenience (Achieng & Ingari, 2015; Tsouli, 2022). Generally, two decades later, after the inventions, the aligned visions have not lived up to expectations, with the rates of user adoption of mobile technology in financial services been abysmally low (Abdinoor & Mbamba, 2017; Richard & Mandari, 2017). Although the COVID-19 period has shown some unquestionable milestones, countries still remain very far from their financial inclusion aspirations. While various global efforts have been made to address the anomaly including in Tanzania, there is still a significant

portion of population that does not have the ability to access diverse variety of formal financial amenities. This apparent shortfall is substantiated by the statistics such as those that related to the country which showed that only 52 out of 100 adults in Tanzania were unbanked because they had no accounts in the bank or through mobile money services (World Bank Group, 2021). Similar scenarios are portrayed by other institutions and agencies. For example, a survey conducted by the Bank of Ghana, the country's central bank, revealed that most people primarily used mobile financial transactions for transferring money between individuals rather than for other available services (Amoah et al., 2020). A similar situation can be observed in Tanzania due to the comparable social and economic conditions of the two countries. In Tanzania, while levels of mobile money subscription have significantly grown to more than 61 percent of the total mobile phone subscription (TCRA, 2021), the same are simply used for inter personal transfer of money (BOT, 2021). It was further observed that the adoption gap which is equally a problem among university students, a generation segment the most open to new technologies, remains unsolved (Ndekwa et. al., 2018; Yu, 2012 cited in Alsayed et. al., 2020). This is also a segment which possess smartphones and most of the academic work is carried out through this channel. The largest percentage of the university students have their bank accounts registered as the means they use to receive payments monthly. Such attributes position a university student into a world where taking Mobile financial transactions is more likely.

In line with the epistemological perspective of positivism, this study adopted a numerical research design which hinges around testing the hypotheses concerning the investigated variables that are compatible with the relevant theories (Gelling, 2015). The method for data collection were through the application of rated questionnaires grounded on the Technology Adoption Model (TAM) and the United Theory on Adoption and Usage of Technology (UTAUT) model. This study

is an empirical research into how a certain given behavioural factors make students to be willing to use Mobile financial transactions with particular emphasis on students who study in universities based in Dar es Salaam, Tanzania. This study sought to explain the mystery on observed on increase in mobile phone penetration on one hand and the lagged adoption of Mobile financial transactions on the other. It specifically explored factors governing decisions made by university students, the most literate population and technologically active age group in adopting the Mobile financial transactions that explain the observed lagged adoption levels. Their adoption rates of mobile banking services seem to be slow even with the increase in literacy levels.

As a matter of fact, a good number of university students are intrigued by the prospect of driving a social impact using their own behavioral changes - introducing the idea that such technology can assist in financial services. The behaviour of university students upon graduation have sustainable impact on our society, general behaviours in society. Robb and Woodyard (2011) furthermore stated that graduates in responsible financial behaviour like savings and budgeting had a positive impact through impartation of discipline and behaviour change that could bring about financial stability and security to individuals and the community at large. On top of that, the university students are future owners and managers of corporations. Finally, becoming aware of the factors influencing students' attitudes toward Mobile financial transactions will contribute to ideation when making guidelines for efficient financial service delivery.

A research, for instance, should find out key enablers and inhibiting factors regarding decisions on using Mobile financial transactions. Anchored on the earmarked factors, measures of providing the required conditions for increased usage of the technology in finance should be then designed. In this way, financial inclusion will also increase. Taking into consideration the apparent benefits, which are connected with the application of technology in financial service delivery,

governments, global organizations and businesses are making it one of the most important enablers to reach financial inclusion goals (Tsouli, 2022). This therefore lead to a discovery of insights in relation to the disproportionately limited mobile financial transactions adoption in comparison with the profound scope of penetration of mobile networks in Tanzania and generally within developing countries (Abdinoor & Mbamba, 2017). A relatively small number of researches on adoption of new technology and technology based financial services with the majority of which were staged focused on the general population. A couple of studies centred on adoption of Mobile financial transactions within the university student community were staged outside Dar es Salaam (Richard & Mandari, 2017; Ndekwa et al, 2018). Consequently, the present study intentionally chose students from Dar es Salaam as the subjects, backed by attributes of Dar es Salaam being the mega city and main financial hub in Tanzania.

The chapter commences with a description of the design of the research, the techniques and the reason in support of the chosen approaches are the best one. It is followed by the population, the sample and the sampling strategy along with the reasons behind them. Then come survey research tools explanation, with details about instruments' origin, reliability, and validity. The researched variables are defined in terms of operational definitions based on the study. Further discussion of the research protocol and commitment to a fair adherence to standards related to the ethical issues and the role of the researcher in the research bias minimization is given. The chapter ends with describing data collection procedures and recommending some analysis technique along with final conclusions.

3.2 Research Approach and Design

A discourse of methods in research involves articulation of approaches in terms of processes and procedures employed in the collection and meaningful manipulation of data.

Research methods employed in a given study are determined by the philosophical architype underlying the investigation as well as research approach and design. In this regard, to be able to clearly comprehend the architecture of research methods employed in the study at hand and the rationale for their selection, it is important to first explore the triplet concepts of philosophical paradigm, research approach, and research design. The triplet terms provide information on the steps and procedures that are necessary in performing a particular research (Creswell, 2014 as cited in Haviz & Maris, 2018).

3.2.1 Philosophical Paradigm

Philosophical paradigm is a tool with which the research is embodied. Philosophy can be considered as a discussion focused around knowledge, wisdom or something else that cannot be proven. It is an inquiry into reality (Turyahikayo, 2021 paraphrasing Payne, 2015). Meanwhile, the paradigm is a concept made up of the basic assumptions that guide the study of particular disciplines, which Kuhn (1962) defines as "the underlying assumptions and intellectual structure of a field of inquiry" (Kuhn, 1962 as cited in, Turyahikayo, 2021, p.211). This inquiry paradigm is the theory by which the researcher pursues the study of the reality of the world in order to give a meaningful interpretation and understanding of the phenomenon which is to be studied (Rehman & Alharthi 2016; Turyahikayo, 2021). It stands for sets of values, norms and rules which a researching community has created and supported throughout time (Scott & Usher, 1996, in Tombs & Pugsley, 2020).

Whereas there are a number of successful schools of philosophy in gaining prominence in the social sciences, the philosophical paradigms that have dominated the social science research are positivism and interpretivism. Positivism arm of philosophical paradigm relates to a branch of philosophy that postulates existence of a real life that is constant, independent of man and governed

by immutable laws of nature (Rehman & Alharthi, 2016). The positivistic paradigm is the most radiant branch of philosophy and has been in existence for a relatively longer period of time, tracing its origins in the Ancient Greeks, but gaining its highest hegemony during the nineteenth century (Cohen et al., 2007).

Nevertheless, the dominance of the positivism paradigm was challenged by the birth of the interpretivism paradigm which rejects the existence of an objective reality and in place therefore posits a view on a socially constructed multiple realities which are inseparable from the researcher (Grix, 2004 cited in Rehman & Alharthi, 2016). Proponents of the interpretivism paradigm view reality as being mediated only through human senses and thus the only way we can know reality is through studying interpretations humans attach to particular social phenomena in the course of interactions. To support this argument, they further posit that human senses not only transmit but also filter reality, therefore, reality is only known from the lens of these filters. In this respect, the insights on the given realities can simply be gained through the study of the subjective realities which knowledge attaches to the social trends to which people relate. Distinct from the positivism versions, other variant paradigms that have recently emerged consist of pragmatism, post-modernism, and critical realism. The discussion in this matter, revolves on the two main dichotomous viewpoints namely, positivism and interpretivism. The author in this study has opted for the positivistic paradigm.

The duo positions of positivism and interpretivism form the mainstream ground on which research constituents namely, ontological orientation, epistemological setup, and methodological approaches are anchored (Cohen et al., 2007; Rehman & Alharthi, 2016). Ontology is part of philosophy that covers the question of whether the phenomenon is real and how the given phenomenon exists (Ma & Ma, 2022). The positivistic paradigm consists in a specific ontological

view that affirms that the phenomena exist even if those phenomena are not observed and that natural laws explain their behaviour making them possible to understand through experience. In contrast, the interpretivism says that phenomenon is formed as people interpret and interact with them, it is referred to interpretivist paradigm (Cohen et al.,2007). Interpretation and interaction of people produce the existence of these phenomena (Rehman & Alharthi,2016). Ontologically, this study assumes a position grounded in the assumption that the stances of students as regards the adoption intents for mobile financial transactions are intact regardless of human interpretations around them.

Twinning with the ontology concept is philosophical thought of epistemology. It is an offshoot of philosophy that dwells in the ways through which theory or knowledge about a particular phenomenon is gathered (Carson et al., 2005 cited in Man & Man, 2022). It has its foundations in the field of science that deals with the ways through which knowledge is developed as well as how researchers see the world (Ryan, 2018). Epistemologically, positivistic perspective assumes that the researcher is independently detached from objective reality being studied. It is based on assumption that the researcher who is far from phenomenon is rational and capable of objectively comprehending what reality is and moreover as well can find the truth about what is happening (Guba & Lincoln, 1994 as cited in Rehman & Alharthi, 2016). This assumption is contrary to the interpretivism theory which opposed to the view that social occurrence can be studied as a natural phenomenon and therefore should be examined in their own specific social contexts. The epistemological view adopted in this study is that of the researcher being able to independently and objectively investigate social phenomena regardless of social interpretations and that natural science methods may be successfully deployed in the study of social phenomena.

The third dimension in the case of philosophical theory is methodology. It consists of the general direction of the research management strategy including steps that have to be followed to conduct research (Alharahsheh & Pius, 2020). Research methodology is a design process or development of research-based procedure for conducting rather than the procedure or method of conducting research (Igwenagu 2016). It is a design process or development of a procedure for conducting research rather than the procedure or method for doing research (Igwenagu, 2016). Methodology stipulates the roadmap to be taken by a researcher for undertaking an objective observation of the world (Rehman & Alharthi, 2016). Research methods are a component of the research methodology. They are the specific means or techniques by which the research is conducted, such as techniques for gathering and meaningful manipulation of data, examples of which are questionnaires and interviews schedules (Rehman & Alharthi, 2016).

In the positivistic paradigm, methodology is the one that builds models using the statistical techniques which are used in the quantitative analysis and on the other hand, interpretivism is the one that describes the phenomena through the means of qualitative analysis of the existing meanings and beliefs (Cohen et al., 2007). Under the positivistic methodology, the research is aimed at gathering empirical evidence via hypotheses testing and deductive analysis of resulted data to determine causality connection between the variables within a view aimed at controlling, forecasting, constructing theory or establishing causality (Rehman & Alharthi, 2016). By deductive approach the researcher problems and expected theories are stated before the data is collected. On the contrast, the interpretive methodology involves collection and inductive analysis of mainly qualitative data by determining patterns that are then consolidated into broad themes to describe a phenomenon and ultimately produce a theory (Cohen et al., 2007). Positivism mostly conducts the survey and examination of data through questionnaires and statistical methods while

the interpretivism uses ethnography and interviews. Accordingly, employed in this study is the positivistic methodology which involves the use of questionnaires in the collection of empirical data followed by quantitative analysis of hypotheses based on statistical techniques of data analysis.

Based on the preceding the philosophical overview underpinning the research process, the study regarding student intentions for adoption of mobile financial transactions in Dar es Salaam universities was aligned to the positivistic approach. Preference of the positivism over the interpretive paradigm was grounded on the merits it offers in terms of the systematic procedures in studying social phenomena, that renders the measurability of its parameters. Through the positivistic paradigm, a fair number of benefits can be achieved, above all, a validity that is considered superior, an increased reliability, and a better generalizability. The attributes of positivist paradigm, make it possible the use scientific methods of research process, in manners similar to that of natural science. Thus, empirical study which uses the empirical test and methods have the potential for producing insights of very high calibre as far as validity and reliability are concerned (Cohen, 2007). This increased level of certainty and consistency, within the paradigm, leads to the achievement of high levels of generalization of the population as a whole (Johnson & Onwuegbuzie, 2004). Therefore; the study questions and objectives adopted for this study have reflection on the paradigm of positivism rather than the interpretive and critical theory. Even so, positivism perspective is selected and applied in the context that is cognizant of its boundaries in social sciences as the phenomena involved are cannot easily quantified or standardized (Rehman & Alharthi, 2016).

3.2.2 Research Approach

A study approach refers to planned procedures for conducting research, including description of underpinning assumptions, methods of gathering and meaningful manipulation of data as well as interpretation (Grover, 2015). The type of philosophical paradigm adopted in a given research dictates the research approach to be deployed in conducting research. In deciding the kind of research approach to use, one needs to consider the philosophical assumptions related to procedures of the investigation referred to as research design; and the specific research methods with regard to gathering of data, data analysis and interpreting study results. Three main categories of research approach from which one may be adopted are quantitative, qualitative and mixed approach. Quantitative approach involves study of specific phenomena in terms of measurable units expressed by means of numerical values. The aim of quantitative approach to a study is to verify the objective assumptions on the basis of analysis the figures and the relationships establish. It focuses on examining quantifiable variables and relationships that exist between them by testing objective hypothesis aligned to given theories. The researcher in quantitative research seeks to answer the question on what or how, by collecting and analyzing quantifiable data (Goertzen, 2017).

In contrast, qualitative approach involves study of phenomenon that cannot be expressed in measurable quantities by examining patterns to establish meanings or process (Alharahsheh & Pius, 2020). The core purpose underlying qualitative approach to research is to investigate a social phenomenon and the way individuals or groups of people interact with it. The researcher in qualitative research approach, collects and analyses subjective non-quantifiable data in the attempt to answer the question why. The approach is designed to provide deep understanding on specific phenomena based on individual experiences with no provision for generalization of the results of

the studyto other segments of the population (Creswell, 2002; Easterby et al., 2008; Alharahsheh & Pius, 2020).

Researchers have come across a hybrid approach which has added certain elements from both categories of studies – qualitatively conducted as well as those that are quantitatively conducted. The mixed-method studies are a more recent techniques and is concerned with integration of data collection instruments that are either qualitative/ quantitative or empirical to ensure that research is completed ideally. However, despite the increasing popularity of the mixed method research over the recent years, the mono-method approaches continue to dominate most of the social science research, suggesting the importance of critical reflection on whether the MMR method is really warranted before adopting it (Timans et al., 2019).

This study on university students' Mobile financial transactions acceptance in Tanzania used the quantitative method of study to investigate levels of influence of a given set of behavioural determinants (independent elements) on intention of students to adopt mobile financial transactions (dependent variable). Study aims to respond to issues around mobile financial transactions usage intention factors in Tanzania, identifying drivers underlying behaviour intention and those drivers that are considered as the most influential as far as the adoption intents for mobile money transactions are concerned. This was recognized earlier where it was noted that the use of quantitative approaches is frequently associated with studies focused on the causal relationship as is the case with most of the studies (Vogelsang et al., 2013). In addition to standardization, the quantitative approach is also replicable by other researchers leading to the relevant verification, reproduction, and criticism. Quantitative approach also encompasses the requirement for detachment of the researcher from the research subjects, which feature when coupled with the other attributes of the quantitative approach gives room for production of relatively more objective

results (Gerrish & Lathlean, 2015, Ed.). This approach also works well for evaluating the predictive power of current theories, which is to a certain extent partly achieved in this study through testing academic thoughts as regards adoption of mobile phone-based payment transactions.

3.2.3 Research Design

Research design refers to a comprehensive arrangement that highlights how the conceptual research problem is appropriately translated into empirical research procedures (Asenahabi, 2019). It outlines the strategy and approach that has to be used in responding to the research question and purpose. Research designs are in three broad categories: the research design can take the architecture of quantitative form, qualitative form or hybrid form that combines features of the two, known as mixed method design. Deployment of a certain research design is an outcome of research purpose, research question(s), or study hypotheses that build as the research is developed (Novosel, 2022). Quantitative research designs refer to a group of research designs and procedures in which measure and use data that can be quantified (Kothari, 2007). The methods in this approach broadly depend on how variables are associated and executed by conducting empirical studies, through data collection and measurements, or hypothesis testing and data generation (Asenahabi, 2019). Data gathering and analysis include data collection by both experimental and nonexperimental methods deploying quantitative and statistical methods.

Referring to qualitative research designs, they constitute a set of techniques and procedures that seek to understand reality based on interpretations and conclusions drawn from opinions of the participants regarding their experiences on a given social problem or phenomenon (Creswell, 2014). They entail processes for generating qualitative, non-quantifiable data using open-ended questions. Some of the examples of qualitatively designed research include case studies,

phenomenological research, narration research, grounded theory, and ethnographic action research; where commonly used data collection methods in the qualitative research design include interview, observation and participation (Asenahabi, 2019).

Endeavours to overcome limitations associated with the mono-method designs of quantitative and qualitative research designs brought about the birth of mixed method research designs. These designs involve an integration of research methods and techniques by eliminating weak points from quantitative and qualitative research designs and consolidating on positive features to create synergies. It is possible to integrate the methods either sequentially (from one method to another) or concurrently (working with more than one method at the same time) or all over together besides. Some of the typical mixed method designs include mixed methods that are: convergent parallel; explanatory sequential; and exploratory sequential (Hesse-Biber & Johnson, 2015; Asenahabi, 2019). Lately, there has been a growing view among researchers that deployment of mixed method research provides insights beyond understanding of any one method and as such, it is richer as well as more comprehensive, when compared to the use of one method alone, be it quantitative or qualitative (Neuman, 2014). Yet, this complex way of researching also means that mixed method designs have their own limitations, of being complex itself and resource consuming.

Having opted for quantitative approach a priori, this work adopted corresponding quantitative designs, narrowing down to the non-experimental techniques applied and as compared to the experimental one. Experimental designs involve researchers introducing research subjects to the specific interventions like procedures or treatment to measure the effect (Asenahabi, 2019). Controlled tests in the laboratory offer a researcher the ability to easily tell whether a certain cause results into a given action by simply isolating the study environment so as to give the subject more control over what the researcher decides to demonstrate. There are limitations in the conduct of

experiments due to resources required for investment, materials and time. In contrast, the second type of the experimental designs that are non-experimental involve passive collection of data which is devoid of administration of any intervention to the subjects. They do not eat much of the resources and thus, the course could be completed in an extremely short period.

Within the non-experimental research designs there are two: descriptive and correlational designs. The descriptive design in its turn means that the scientist is just describing a particular phenomenon of interest without telling how this certain phenomenon is connected with other variables of interest. This kind of design ensures that the students understand practically the full process of research. The correlational study is a type of a quantitative research that is connected with the not-experimental design and it is undertaken to catch relationship between variables. Given that the study at hand employs a deeper understanding of how variables are related to each other, a correlational design of research is used since it enables to achieve this research objective successfully. This research design does not need conditions to control values of independent variables to determine its effect on the dependent variable. It uses empirical evidence to ascertain and describe multiple relationships within diverse sets of latent variables.

In descriptive designs the researchers seek to only describe a phenomenon of interest without having to explain relationships between variables. An example of such design is the case study. A correlational study is a quantitative research in which non-experimental design deployed to describe associations existing between multiple sets of variables. This kind of study does not require some settings for manipulation of autonomous variables so as to establish effects on the reliant variable, rather than establishing empirical evidence on existence and magnitude of relationship between two or more variables.

3.3 Research Population and Sample

Undergraduate students attending universities that are located in Dar es Salaam, Tanzania, formed the sample in the study at hand. This is an inquiry about first degree students and to ensure homogeneity, the study did not consider lower courses like diploma or certificate, and graduate level. The undergraduate university students of 20-30 years were the age majority. Dar es Salaam is a largest city in Tanzania which is home to some of the most prominent and well-known universities in country that make them magnet for enrollment of students who come from every tight corner of the country that in turn makes them more presentable to the study population. The student population is literate including science, social, business and ICT students among others. The study's participants were collected from different years of study giving room for some who might not be familiar with utilization of financial transactions by mobile technology. The statistics of the fully accredited universities in Tanzania, as of March 2023, showed that there were 32 universities, 11 of which were based in Dar es Salaam (TCU, 2023).

This study was centered on students in the undergraduate level unmindful of the course or group they are in. The university students are the most important group of those who use growing technological tools (Alsayed et al., 2020) The advantage of universities students as the technologically active group with high rate of literacy is that they are the most highly open to the introduction of technologies driven financial services. Students at the university are the future business leaders and be medical or political leaders with the power to shape the community’s behaviour. The attitudes and behavior of university students exert the most profound impact in these years on a society at large. Robb and Woodyard (2011) pointed out that people who used wise financial habits such as savings and budgeting make positive traits that leads to financial stability and security not only to the community in which they belong but eventually, to the entire country or society.

The study used a technic multistage stratified sampling where universities which were involved firstly were purposively selected. The second stage meant random selection of colleges, schools or faculties; then systematic random selection of service recipients. This work involved the four Dar es Salaam based universities. Two of these universities were owned by the government while the other two were privately owned. The four universities were chosen on the ground that they had the largest number of students attending them. Notwithstanding total accuracy in representation, research paid attention to the diversity within the universities such as significant faculties/schools/colleges and students in varied years of study. The council came up with the strategy of holding meetings of the area where the attendees will be queried regarding their involvement.

The campus population age of students mainly falls between 18 and 20 years old and represents a diverse crowd of different ethnicities. However, there have been measures to improve gender equality of the universities and this has been successfully done during the last recent years. Such as in the period between the academic years 2015/2016 and 2020/2021, Enrollment ratio in Tanzania universities for boys and girls reduced from 1.85 to 1.29 respectively (TCU, 2022). The sampled universities have a varied range of courses i.e health and pharmaceutical sciences; social sciences; business studies; information communication technology, engineering, architecture, education, law, agricultural economics and among others. The overall headcount of students enrolled in undergraduate programs within universities in Tanzania in 2021/2022 was 171,066 (TCU, 2021). TCU (2019) indicated a rise in the number of people that joined higher level institutions by 55.5 percent within a period of five years from 2012/13 to 2017/2018. Taking that the growth rate is a constant value, if apply it to enrollment of the university students in the

2017/2018 which is 27,891 students the estimated enrollment level in 2022/2023 would be around 43,370 students which shows an estimated sampling frame.

Table 3.1

Estimates of University Enrollment in 2022/23

Sn	Name of University	Enrollment in 2017/2018	Estimated enrollment in 2022/2023	Proportion	Proportionate Sample
1	University of Dar es Salaam	20,000	31,100	0.70	280
2	Ardhi University	4,280	6,655	0.16	60
3	St. Joseph University in Tanzania	1,712	2,662	0.07	30
4	Kampala International University in Tanzania	1,899	2,953	0.07	30
	Total enrollment	27,891	43,370	1.00	400

Note: Data pulled from different sources include Tanzania Commission for Universities (TCU, 2019)

From Table 3.1, proportional representation of the sample in the study suggests drawing participants in the ratios of 280:60:30:30 the respective universities which include the University of Dar es Salaam (UDSM), Ardhi University (ARU), St. Joseph University in Tanzania (SJUT) and Kampala International University in Tanzania (KIUT). However, in order to streamline the dangers of over representation of UDSM, the ratios were adjusted to 200:100:50:50 for UDSM; Ardhi University; St Joseph University in Tanzania; and Kampala International University in Tanzania, the corresponding capacities.

3.3.1 Dar es Salaam University

The University of Dar es Salaam (UDSM) is the biggest university in terms of enrollment, number of colleges, schools and faculties and the first to be established among universities in Tanzania. The University has 7 colleges, schools, and institutes. Notwithstanding the spatial

distribution of the colleges, schools and institutes where some of them are situated out of the vicinity of city of Dar es Salaam, a sample that could be conveniently taken included 1 college, 1 school and 1 institute. These institutes are the College of Agriculture and Food Technology (CoAF); the UDSM Business School (UDBS), and the Institute of Development Studies (IDS). The CoAF had 5 distinct undergraduate programs of which two were particularly chosen; while UDBS had 7 courses from which two programs were randomly selected; lastly, IDS offered only one program in which the program was selected with a total of 5 study programs selected to participate in the study and each of them received 80 questionnaires to be completed by 40 courageous students so that eventually the total participation in the class enrollment list for each of the programs featured a sampling population from which participants were selected with a system.

3.3.2 Ardhi University

Ardhi University (ARU) is among the public academic institutions which carries a long history of transformation delivering programs in land related fields of study. For undergraduate students, the University comprises of 4 schools which are School of Architecture, Construction Economics and Management (SACEM), with 5 programs; School of Environmental Science and Technology (SEST), with 3 programs; School of Earth Science, Real Estate, Business and Informatic or commonly known as (SERBI) with 8 programs; and School of Spatial Planning and Social Science (SSPSS), with from the four schools, after intimating with the two schools, a particular program was selected from the sample frame. The schools specified in this policy were SACEM. Therefore, Economics which is the main stream was the sampling frame; and SEST in the program BSc. In particular, ESM (Environmental Science and Management) was used as the data sampling area. A total of 200 students from both programs, identified through the systemic

random sampling method, completed the questionnaires with 100 of them staying back to give responses, and able to meet the minimum number of participants in accordance with Ardhi University 's rules of thumb, based on assumption of 50 percent response rate.

3.3.3 St Joseph University in Tanzania

St. Joseph University in Tanzania (SJUIT) is one of the universities whose numbers of registered students in Dar are among the highest. The university runs programs in engineering, information, communication technology, education, and allied health sciences. There were two main colleges: the College of Engineering and Technology; and the College of Health Sciences. One of the programs was identified . this was the College of Engineering and Technology and the chosen program to be offered in the College was Computer Science and Information Systems Engineering among the five programs. Questionnaires were sent to the list of 100 students who studied in this program, with a belief that the response rate of 50% was acceptable and, hence, the 50 participants in St. Joseph University in Tanzania were enough for the required sample.

3.3.4 Kampala International University in Tanzania

With its roots being as the Constituent College of Kampala International University in Uganda in 2008, Kampala International University in Tanzania (KIUT) is a fully-fledged university which attained its status in 2017 and among the privately-owned universities. KIUT had one of the highest enrollment levels. The university prides itself with four faculties which include Computing faculty; Management and Social Sciences; Medicine and Pharmacy Sciences; Education and Legal Studies; and Allied Health Sciences. The selection of the Faculty of Medicine and Pharmaceutical Sciences was done intentionally as it's the faculty with the highest number of departments of which their number totals 14 in comparison to any to the rest of the faculties each of which has 3 departments. The Department of Medical Laboratory Sciences was consequently

chosen out of the 14 departments under the Health Studies Academy and the questionnaire was availed to the purposively selected group of 100 students with the probability of 50 responses due to the 50 percent response rate assumption.

3.3.5 Determination of the Sample Size

Important components of determining sample size (n) are the probability of manifestation of a fact(p); the maximum error allowable which is expressed as non-percentage value (e); and the z-score which is the value signifying either the desired or the acceptable level of confidence. Based on Cochran (1977), the formula developed for computation of size of a sample from a population whose size is unknown is given by:

$$n = z^2(100-p)/e^2$$

where:

n	=	sample size
p	=	frequency of occurrence of a phenomenon in percentage
e	=	maximum error
z	=	value that corresponds to required level of confidence

The study adopted parameters values that are commonly used in management research including: reaching 95% confidence levels with 5% margin of error (Taherdoost, 2017). Let p be unknown and p= 50% will be assumed in the selective sampling thus achieving the maximum variance resulting in the maximum sample size (Taherdoost, 2017). Mapping the problem onto a normal distribution results in a z-value of 1.96 indicative of a 95% confidence interval. Therefore, these values set the supporting the following:

$$n = z^2(100-p)/e^2$$

$$= (1.96)^2\ (50\%)(100\text{-}50\%)/(0.05)^2$$

$$= (3.8416)(0.5)(0.5)/(0.05)(0.05)$$

= 0.9604/0.0025

= 384.16

In case of a known or estimable population as is the case with the study at hand, the recommendation is to apply a small population size correction as in the formula (Uakarn et al., 2021):

$n = p(1-p)/\{e^2/z^2+p(1-p)/N\}$

whereby:

n = size of the sample

N = size of the population

e = acceptable sampling error

p = the population proportions

z = z value at reliability level or significance level.

From Table 3.1 above, N = 43,370; e = 0.05; p = 0.5; and z = 1.96 give the following sample size:

$n = 0.5(1-0.5)/[0.05^2/1.96^2 + 0.5(1-0.5)/43,370]$

$= 0.25/[0.0025/3.8416 +0.25/43,370]$

$= 0.25/[0.000651 + 0.00000576435324]$

$= 0.25/0.000656534865526114$

$= 380.79$

= approximately 381 students.

The sample size is therefore set at 400 students to cater for unacceptable-responses.

3.3.6 Power Analysis

Power analyses allow for determining the optimal ground of a sample size which will be enough for detection of an effect. Significant components of power analysis are level of

significance, power, effect size, duration, type of the test, model of statistics and distribution of the data (Ledermann, Rudaz & Cui, 2022). The strength of a test is equal to the likelihood of getting rid of false null hypothesis which is described by the value 1 - β. A test might able to make the right decision of declaring an effect as there is no such effect actually present, which is the null hypothesis. The study budget was based on results of power analysis conducted in G*Power statistical software which then led to the determination of a required sample size. The use of G Power software appears to be very universal and it is quite useful in determining the samples sizes and power for process modeling (Faul et al., 2009). It is also worth to mention the G*Power software which is applicable in identifying the proper sample size and power analysis when it comes to many statistical test types e.g. F, t, χ2, z, and exact tests. As a principle, the rule of thumb can be said to be maintained at a minimum of .8 (equivalent to 80%). Consequently, a sufficient sample size is that which minimizes Type I error at the level of .05 or .01 and a power at the level of .8 or .9 respectively depending on the investigator preference on what is regarded as high enough precision (Ledermann et al., 2022). The power of a test is the likelihood of dropping off a false null hypothesis, expressed as 1- β. It is in fact, an ability of the test to do the right course of action that is reject the hypothesis when the effect is in factually not present.

The study employed the G*Power statistical software in conducting power analysis and ultimately determining an appropriate sample size. The use of G*Power software for such tests is very universal; and it is very appropriate for the carrying out sample and power sizes of structural equation models (Faul et al., 2009). It is apt to add that the G*Power software is appropriate in the determination of sample size and power analysis in relation to various statistical tests including F, t, χ^2, z, and exact tests. Ideally, the rule of thumb calls the power of a study to be maintained at not less than 0.8 (which can also be specified as 80%). Accordingly, a sufficient sample size is that

which minimizes Type I error to as low as 0.05 or 0.01 and a power as high as 0.8 or 0.9 respectively depending on the researcher preference on precision (Ledermann, Rudaz, & Cui, 2022). Summarily, this study aimed at establishing:

i. the effects of six autonomous variables (PU, PE, SI, PR, FC and AT) on one non-autonomous variable (IU);

ii. the mediating effect of AT on associations of PU and PE on IU; and

iii. the moderation outcomes of GE on primary associations of autonomous variables (PU, PE, SI, PR, FC and AT) with IU;

An appropriate statistical test suited for testing the sample and power sizes based on G*Power software is the F-test: ANCOVA (that considers main effects; fixed effects; and interactions) based on Apriori (determination of required sample size). In line with the position of Kang (2021), the input values with the corresponding output results of the G*Power analysis are stated below.

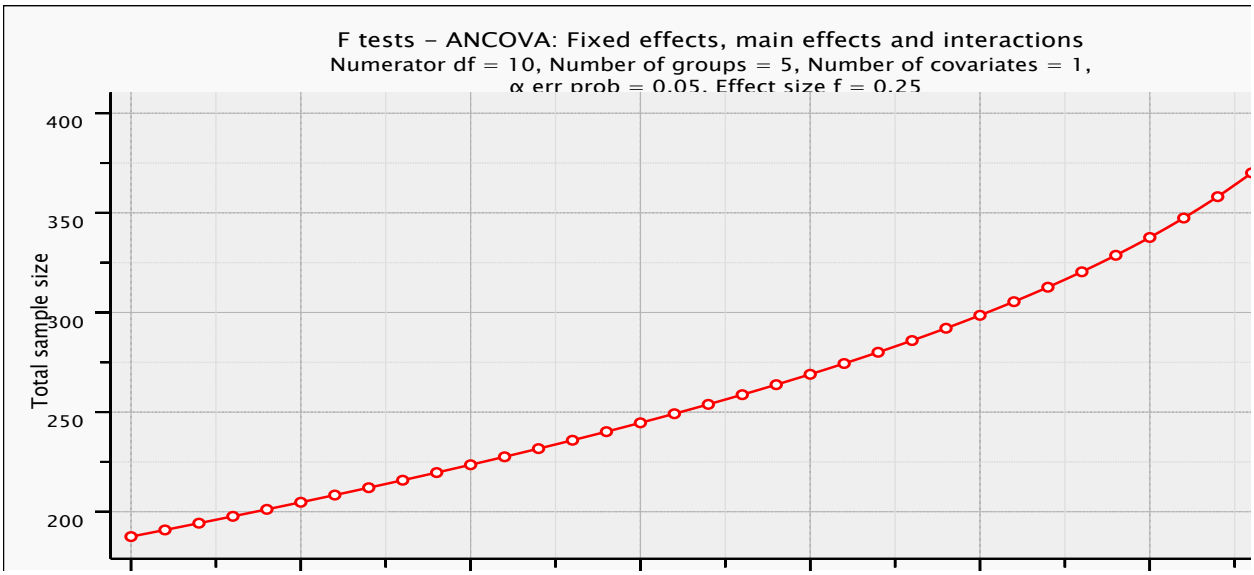
Input:	effect-size f	=	0.25
	α err probability	=	0.05
	Power (1-β)	=	0.95
	Numerator df	=	10
	Number of groups	=	5
	Number of covariates	=	1
Output:	Non-centrality parameter λ	=	25.0000000
	Critical F	=	1.8547531
	Denominator df	=	394
	Total size of sample	=	400
	Actual power	=	0.9504058

The ground finding coming out of the analysis that the minimum sample size for strong effect is 400 participants at 95% power effect. The results of the analysis maintain a Type I error that is

lower than 0.05 as Power is as high as 0.95 (Ledermann, Rudaz, & Cui, 2022). Figure 3.1 is the G*Power Graph or Plot.

Figure 3.1

*Results of G*Power Plot*



Note: Generated by the Author (2023) based on initial primary data.

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3.4 Materials/Instrumentation of Research Tools

As a case of quantitative research, this study built on the deductive strategy involved testing and analyzing of existing theories/models through testing hypotheses. As such, it was more suitable for questionnaire for survey as data collection method in studies that look at the nature of variables' relationship (Elhajjar & Ouaida, 2020). Survey questionnaires enable researchers to gather data from huge populations in a standard-way, allowing for data comparison (Bryman & Bell, 2015). As concerns the methodology, the study primarily used online self-administered questionnaires to gather data for analysis. Surveys provided a mechanism for gathering and analyzing quantitative data utilizing the software.

Conducting survey through self-administration of questionnaires was the much cheaper technique for reaching wide of people who might be being geographically dispersed which possibly results in no interviewer influences due to social factors such as gender, ethnicity and social background (Bryman, 2015). The approach is also very convenient for the respondents as whenever they are available and in place, they could answer the questionnaire at their own pace. Besides, literacy levels of university students have got the advantage of using self-administered questionnaires to collect data as they meet the criteria of comprehending the meaning of questions so that they can give appropriate answers.

The questionnaire has been provided with the items that come from both previously reviewed and current models in the testing of the hypotheses that incorporate the constructs of Technology Adoption Model (TAM) with the United Theory on Adoption and Use of Technology (UTAUT). Combination of the items will be the main component of the test that predominantly determine the effect of independent elements of Utility Perceptions (PU), Ease of usage Perceptions (PE), Attitude (AT), Social inspiration (SI), Risk Perception (PR) and Facilitative Conditions (FC) on dependent factor which is behavioural intents to undertake mobile phone-based financial transactions. The researcher took care to make the self-administered questionnaires less limiting through a series of measures. Instances such as re-contact to have all complete again responses; actions promoting precision, clarity of language; creating survey questionnaires such that reasonable number of questions is not overloaded; inclusion of cover letter and an explanation on the objective of the study and how the results may be important to participants and to the community at large. Mainly, data collection was from online google forms which made it have less respondent bias which could have occurred from scenario such as having to read the whole questionnaire before answering the first question (Bryman, 2015). The core contents used in the

Table 3.2

Core Contents of the Questionnaire

Construct	Measurement Items
Utility Perceptions	(a) Mobile financial transactions would be useful in my daily life
	(b) Using mobile financial transactions raises my likelihood of accomplishing my important tasks
	(c) Undertaking mobile financial transactions would enhance the speed of accomplishing my tasks
	(d) Adopting mobile financial transactions would enhance my efficiency
Ease of usage Perceptions	(a) I can understand and clearly communicate with mobile financial transactions
	(b) I would not need much mental endeavor to interaction with mobile financial transactions does
	(c) It is not hard to deploy mobile financial transactions in whatever I intend to do
	(d) I consider mobile financial transactions procedure flexible enough to interrelate with
Social Inspiration	(a) Members of my family feel that I have to undertake mobile financial transactions
	(b) My friends are of the opinion that I have to undertake mobile financial transactions
	(c) Persons I know consider adopting mobile financial transactions a noble idea
Risk Perception	(a) Deciding on the possibility of mobile financial transactions is associated with risk
	(b) Using mobile financial transactions puts my privacy at risk
	(c) Mobile financial transactions has more uncertainties
	(d) I generally believe that adopting mobile financial transactions is associated with risk
Facilitative conditions	(a) I have resources that are important for me undertake mobile financial transactions
	(b) I am equipped with knowledge required to undertake mobile financial transactions
	(c) Help is readily available when I face problems in undertaking mobile financial transactions
Intention to undertake	(a) Given the opportunity, I will undertake mobile financial transactions
	(b) I have the possibility of undertaking mobile financial transactions soon in the future
	(c) I am ready to undertaking mobile financial transactions soon in time to come
	(d) I intend to undertake mobile financial transactions when the opportunity arises

Table 3.3

Core Contents of the Questionnaire…

Attitude	**(a) Undertaking mobile financial transactions is a noble idea**
	(b) Using mobile financial transactions is wise
	(c) Using mobile financial transactions is beneficial
	(d) Using mobile financial transactions is interesting

Note: Compiled by the Author (2023)

questionnaire besides demographic questions were as stipulated in Table 3.2. The participants were required to complete their responses in the order of 1 – 5 where the numbers had the following meanings: (1) Highly disapprove; (2) Disapprove; (3) Uncertain; (4) Approve; and (5) Highly approve.

3.5 Operational Definition of Variables

Based on the integrated model that includes the Technology Adoption Model (TAM) and the United Theory on Adoption and Usage of Technology (UTAUT), this research sought to undertake an assessment of the influence that exogenous variables utility perceptions; ease of usage perceptions; risk perceptions; social inspiration; attitude; and facilitative circumstances exert on endogenous variable intention to undertake (IU) mobile financial services among students of fully fledged universities in Tanzania based in the Dar es Salaam city. The study aimed to explore magnitudes of mediation impact arising from the variable Attitude (AT) on association assumed to exist between two primary variables of ease of usage perceptions (PU)and utility perceptions (PE) with dependent variable intention to undertake mobile financial transactions. Another facet of investigation dealt with in this study relates to examination of the impact of gender in its capacity as a moderating element in the associations construed between the set of exogenous primary constructs of PE, PU, PR, SI, FC and AT with the endogenous construct of intention to

undertake (IU) mobile financial transactions. In undertaking the research process, the following operational definitions for the variables PE, PU, PR, SI, FC and AT were considered.

3.5.1 Utility Perceptions

The independent variable Utility Perceptions (PU) integrates in its assurance the degree in which a person believes that utilizing a certain emerging technology is going to improve the tasks at hand (Shaikh et al., 2022). The PU involves the assessment of the perceived impact of the mobile financial transactions upon the participant's existence (its utility); the level of satisfaction with financial services in regard to its allowing to achieve more important tasks; the degree to which using financial services makes the participant more productive (Baabdullah et al. 2019). Each of the indicators was evaluated on the scale of 1-5, so the participants had options to express their sentiment starting from highly disapprove; disapprove; uncertain, approve, and lastly highly approve.

3.5.2 Ease of usage Perceptions

An independent variable ease of usage perceptions (PE) describes dimensions, within which individuals realize applying a certain technology should be effortless, and one would not find it overwhelming to use (Shaikh et al., 2022). The degree of understanding mobile financial transactions (how comprehensive and easy the procedures are), cognitive effort (how much mental exertion the participant has to put into it), utility (how convenient mobile services are to accomplish tasks), and flexibility (how much influence participant has over the services) were the variables considered important in this study (Mohammadi, 2015). The measure was carried by an ordinal scale of 1-5 numbers which are translated as (1) Highly disapprove; (2) Disapprove; (3) Uncertain; (4) Approve; and (5) Highly Approve.

3.5.3 Social inspiration

Social inspiration (SI) is understood as the magnitude of influence in the intents of an individual to undertake a system resulting from what humans those persons trust into their social circle say about a specific behaviour whether friend or family member (Singh et al. 2020). SI stands for social inspiration and was measured in accordance with Peer-acceptance and Family approval ratings; and others' opinion as to whether the use of MMM is beneficial or not (Giovanis et al., 2019). The categorical indicators were dichotomized into 1 and 0 or yes and no, but the rating indicators were ordinal and measured employed the likert scale 1-5, with the interpretation of (1) Highly disapprove; (2) Disapprove; (3) Uncertain; (4) Approve; and (5) Highly Approve.

3.5.4 Facilitative conditions

This is referred to as facilitation conditions (FCs) and it involves being identified whether the environmental factors are considered to be an accelerator or obstacle to a particular system or technological application (Venkatesh et al., 2003 as cited in Hilal & Varela-Neira, 2022). Ultimately, it is the subjective feeling of the user on if the system is expedient in utilization of the system with regard to technical infrastructure. FinTech is an independent factor which was measured in accordance with the perceptions within the minds of respondents regarding the easiness in getting the resources needed to adequately undertake mobile financial transactions; their knowledge levels in matters that necessitate to use of Mobile financial transactions; and self-efficacy assessed by the participant’s ability to seek help from others to solve problems that they face when using Mobile financial transactions. The indicators varied and used an ordinal measurement scale of 1-5, with the meaning showing up as (1) Highly disapprove; (2) Disapprove; (3) Uncertain; (4) Approve; and (5) Highly Approve.

3.5.5 Risk Perception

Risk perception (PR) indicates a concordance of an individual's subjective feelings of risk expectation and exposed security levels when using the given tools (Farah et al. 2018). PR was described manner by which an individual, views the undertaking of mobile financial transactions to be associated with risk; the extent to which using mobile financial transactions put the participant's privacy at risk; the degree to which Mobile financial transactions has more uncertainties; and the extent to which the participant generally believes using mobile financial transactions to be risky (Glavee-Geo et al, 2020). The variable indicators are ordinal and the measurement undertaken based on Likert scale of 1-5, with the interpretation of (1) Highly disapprove; (2) Disapprove; (3) Uncertain; (4) Approve; and (5) Highly Approve.

3.5.6 Attitude

Attitude (AT) refers to an individual's predisposition as regards a given action or behaviour (Giovanis et al., 2019). As is frequently the case with many studies on adoption of technology. AT is a mediating variable mainly between independent variables PU and PE and the dependent variable IU. In this study, AT on Mobile financial transactions was measured by the extent to which the participant's positive consideration of the use of Mobile financial transactions by assessing the extent to which the participants consider using mobile financial transactions to be a good idea, wise, beneficial and interesting (Giovanis et al., 2019). The variable indicators are ordinal and the measurement undertaken based on the Likert scale of 1-5, with the interpretation of (1) Highly disapprove; (2) Disapprove; (3) Uncertain; (4) Approve; and (5) Highly Approve.

3.5.7 Intention to Undertake

Intention to undertake (IU) or User Acceptance, therefore, is within its subjective nature of the likelihood of performing a given behavior without the interference of outside factors (Lo Presti

et al., 2021). From a practical perspective, the PR component of this investigation was intended at ascertaining the extent to which prospective and extant users of mobile money perceive the personal risk of using mobile money service; the extent to which individual thinks his/her privacy is compromised by using mobile money; the degree of uncertainty that mobile money users feel while making mobile transactions, and; the extent to which the mobile money user personally views these transactions as being risky. The indicators that are not constant are ordinal and was measured with the help of a likert scale with the possibility to choose an option from 1-5, where option: (1) Highly disapprove; (2) Disapprove; (3) Uncertain; (4) Approve; and (5) Highly Approve.

3.5.8 Moderation Effects of Gender

At first action (AT) is described as a mental condition within a person that precedes some action or behaviour (Giovanis et al., 2019). With this research, the degree of compliance to mobile financial transactions is assessed through the assessments that people make regarding mobile financial transactions by identifying the people's extent of thinking about Mobile financial transactions as a good idea, a smart decision, something that is beneficial, and something that appeals to them (Giovanis et al., 2019). Many indicators will be represented in Likert scale in order to make the study more exact. It was the grading 1-5, initially, it can be (1) Highly disapprove; (2) Disapprove; (3) Uncertain; (4) Approve; and (5) Highly Approve.

3.6 Study Procedures and Ethical Assurances

The study on adaptation of Mobile financial transactions by university students is meant to be carried out through questionnaire survey on participants. The process of data collection was implemented effectively including observance of ethical values and principles under the supervision of the University Research Ethics Committee, which was the approved UREC.

The study was carried out according to the ethical requirements, such as due consent, duty of care and confidentiality. Data collection instruments of the like, which include the consent form, questionnaire, and gatekeeper letters were developed by using approved and university prepared templates which are known to be reliable. The study chose a short questionnaire with only closed questions which helps avoiding psychological harm and making research more objective as well. The tools which were going to be employed for data collection were first submitted to the UREC for approval, with approval obtained prior to progression with data collection.

Once the researcher got the approval from the ethics committee (UREC) on all instruments that intended to use for the collection of data such as questionnaires, informed consent form and the gatekeeper letter, then researcher could go ahead and seek the access to the participants from the university registrars. The sympathizers' letters required consent from registrars responsible for selected campuses while access to the students would be guaranteed through approval by the students' leaders.

This discussion was permitted by giving an authorization to the researcher to access student information by passing to the researcher the students details work through student leadership who distributed the questionnaires on behalf of the researcher. Questionnaires were distributed in media, for example through physical addresses and forms online. The questionnaire and consent of the participant was disseminated online. Congruent physical distribution was however employed where difficulties in getting online contact were encountered. The researcher distributed the questionnaires to students who were recruited by a student club coordinator who were asked to complete and return the completed questionnaires within the stipulated period of time.

In the first step, the future participants were asked to fill out the informed consent forms proving their right to participate as well as their agreement with the terms of the research. The investigator informed the subjects on the freedom they have to quit the research without any penalty and no impact to them. For Keeney, the protection of the privacy of the participants' data has been taken care of by the use of coding in place of real names during the study. Also, the data capture and feedback pertaining to the researcher were carried out by the researcher alone. The paper-based questionnaires, and the data collected by them were safe-guarded by the use passwords that were access only by an individual computer which is not shared with anyone.

3.6.1 Ethical Assurances

Ethical assurance ranks extremely high in research, primarily dealing with human participants, as it did with the research organised to evaluate adoption of mobile banking among students within universities located in Dar es Salaam Tanzania. In the ethics part under this study, the protocol includes a number of ethical elements directed by the Unicaf University Research Security Policy (2019) and was endorsed by the Committee of Research Ethics of the University before data was gathered. The study was carried out with no greater risk to participants than would be expected from routine examination. Googled, the average age bracket for university students is within the range of 25 – 40 years with substantial number of participants falling within this the narrower age group range of 20 – 30 years. The surveys were developed for people who were not having disabilities and people who cannot sign the consent forms.

On the same footing, the studies have made researchers accountable for the ethical standards to be adhered to that are overlooked by research ethics committees. Research committees are designed for the purpose of guaranteeing that the net benefits from research activities are at no time disproportionate to the associated effects and for safeguarding the research participants rights

(Zechmeister & Shaughnessy, 1992; Brunger & Burgess, 2005; Rosenthal & Rosnow, 2008). This research involved the following four research ethics: concepts of individuals, non-maleficence, beneficence, and justice as pointed out in Beauchamp and Childress's (2008) work on principles of bioethics.

Non-maleficence. The principle of non-maleficence in terms of ethics is straightforward: 'do no harm'. The way of non-maleficence is to preclude research subjects from coping all sorts of harm such as physical, psychological and others. These circumstances like data misuse with no permission whether internet or office robots, invasive approaches into a data owner's life or confidential data disclosure (Saunders et al, 2009) could bring damage to research participants. The central idea that necessities the attitude of 'primum non nocere' (above all, do no harm) is the cornerstone on which the concept of non-maleficence is built. And the non-maleficence principle becomes the pillar that researchers and institutions adopt to conduct research (Cohen et al., 2007).

Considering the fact that the research limited participation to those university students who are not minors though the obtained disclosures ensured that the participants were adults and their participation was due to sound mindedness. The subjects of the case study filled in the standard form which stated their rights to get the information about the process of the investigation; any risks they could encounter; and freedom to leave the study without any further consequences for them. The study did not have participants who were disabled people and could not talk for themselves because they were denied informed permission.

Beneficence. The principle of beneficence encompasses a basic but still crucial moral responsibility of acting to fulfil the interests of others in the first place. The pledge expects the higher principle to be exercised than the practical nature of mercy, kindness and charity which are

all charity done at one's freewill. This is mainly this principle is about the researcher's duty of care to do good but not utilitarian way of science of pleasure maximization or pain minimization (Beauchamp & Childress, 2008). By maintaining the following ethical principle, which is beneficence, share with the individuals the possible benefits they may get as well as to their community through their participation in the study.

Although some participants may have their concerns and skepticism about the overall goals of the research, ensure that they understand and clarify the potential benefits and risks arising from their participation to thus make them participate (Cohen et al., 2007). The discussion of a justifiable amount of benefits that people may receive from the study is still a major debate philosophical. This particular work adheres to ethical principle of beneficence by an underlying principle in terms of potential benefits either for the research participant presently, the field of research or the society at large. This point clearly shows up in the synopsis requisite of the questionnaire, and the reason is that it provides guidelines using which the responders would be able to give their reply to the questions.

Respect for person. The research study comes from an ethical paradigm of respect for persons, and therefore, one of the major ethical concerns would be the protection of participant's autonomy. It is meant to uphold one's rights, such whichever right - privacy, opinion, choice, governance, or action that is embraced by one's own beliefs and values (Beauchamp & Childress, 2008). The intention was to make the participants aware of the study through their personal consent forms so that they had the liberty to decide on their voluntary engagement in the study that their answers would not be traced back. The study did not involve any concerns that would possibly put the participants at risk but it also does not involve young people or those individuals with a lack of capacity, such as seniors or persons with mental illness. The participants were informed on their

right to choose on whether to participate or withdraw at any time without any consequences on their part (Orb et al., 2001; Rosenthal & Rosnow, 2008; Varkey, 2021).

Justice. Research justice means fair, equitable and deserved treatment of a person. The term distributive justice is specifically used to denote an unequal distribution of privileges and rights in society. It differentiates it from other forms of justice like criminal justice that is an impartial dispensation of punishments and rectificatory justice, which is the fairness in compensation for contracts and malpractices (Varkey, 2021). The pillars of distributive justice comprise equal distribution; or distribution according to needs, expended effort, merit or free market principles. According to Beauchamp and Childress (2008, p. 227), the ethical principle of justice was also supported by the "principle of formal equality" that was attributed to Aristotle in his proposition "Equals must be treated equal, and unequal must be treated unequal". The rule of equity comes up to be quite distant as there is no focus in sharing of rewards and responsibilities.

Informed Consent. The most common method of getting the informed consent from the participants is through the informed consent form which contains the rights and responsibilities of each of the parties (Hammersley & Traianou, 2012). Main ingredients in the process of Informed consent are the ability of a person to understand the information and to decide; the adequacy of the disclosure of information; the adequate comprehension of the disclosed information; and voluntary consent. As the informed consent forms used in the study, the UREC designed and approved them ensuring their suitability and that the requirements for participants' informed consent to participate in the research have been met. Subjects are in majority over the age of majority and literate, and can provide an informed consent and wish to participate in the research.

Considering the fact that the ethical principles meet some practical applications, the use of these principles is not immune from the critics and debates. The emergence of a judgmental

analysis of different ethical principles is a necessary issue. The main principle of evaluating a particular research upon ethical values is the requirement of balancing costs and benefits. It is through the issue of this kind of balance that the debate starts on the effectiveness of the measures among the costs and the benefits. Principles of ethics in research are a part of the effort to solve the enigma. To strike a balance, Wa-Mbaleka (2019) says that a researcher has to be rationally concerned about the well-being of both the participants and the society at large.

3.7 Data Collection and Analysis

Gathering of data and its subsequent analysis in a research depend is a function of the selected research approach and design. This particular study utilized a quantitative approach for data collection and will use quantitative methods of data analysis, which are detailed.

3.7.1 Data Collection Methods

Data on student opinions on using mobile financial transactions were obtained from structured questionnaires. The questionnaires were administered online through google forms and distributed physically to selected students in accordance to the sampling strategy. Participants were provided with questionnaires and asked to respond to the questions contained therein, and return the completed questionnaires within the specified period of not more than 30 days. Online as well as physical completed questionnaire were collected and then coded for data analysis.

This quantitative research is implemented by the use of a deductive strategy with survey questionnaires which is a renown, supreme tool for gathering of research data for this kind of research design. The basis for its selection therefore, lies in its popularity in studies that offer testing of existing theories/models through testing of hypotheses. The questionnaires also work quite well for researches that aim to survey a large population using a standardised data collection method (Bryman, 2015). The survey has taken its items from the references of peer-reviewed as

well as recent studies like the ones done by Giovanis et al. (2019), Baabdullah et al. (2019), Mohammadi (2015), and Glavee-Geo et al. (2020). Items in the tool for gathering of data were verified to establish the validity as well as reliability based on prior work established by Giovanis et al. (2019), are as shown in Table 3.3.

Then one was supposed to act as a gatekeeper and the questionnaire was administered both physically and online to the students of the selected universities therefore starting with the informed consent of the participants. Google forms were used as online medium to survey the students, whereas the face to face meeting was used to distribute the physical surveys to the students in classroom settings. The participants who were using physical distribution followed by signing and return of informed consent forms, while and participants who were participating via online were first required to express their informed consent and then to move forward to the filling of the questionnaires. Results from the performed questionnaires were coded and further computed with dedicated software.

Table 3.4

Validity and Reliability Measures in Previous Data Collection Instruments

Construct	Cronbach's Alpha	Average Variance Extracted	Composite Reliability
Utility Perceptions (PU)	.925	.568	.837
Ease of usage Perceptions (PE)	.921	.560	.834
Attitude (AT)	.951	.689	.898
Social inspiration (SI)	.937	.698	.873
Risk Perception (PR)	.945	.605	.893
Facilitative conditions (FC)	.940	.707	.878
Intention to undertake (IU)	.974	.819	.947

Note: Compiled by the Author from Giovanis et al. (2019)

3.7.2 Data Analysis Techniques

The quantitative study on acceptance of Mobile financial transactions aimed at carrying out the data analysis using quantitative approaches, which involving testing of hypothesis, as shown by the theories that already exist or are given (Gerrish & Lathlean, 2015; Ed.). An integrated model of eight hypotheses with four constructs drawn from the Technology Adoption Model (TAM) and the United Theory on Adoption and Usage of Technology (UTAUT) was used. The core objective of the research was about testing the independent variables: Utility Perceptions (PU), Ease of usage Perceptions (PE), Social inspiration (SI), Risk Perception (PR), Facilitative Conditions (FC) and Attitude (AT) and establish the way in which such factors drive patterns in the dependent variable: - Intention to undertake mobile financial transactions. They were also used to neutralize the influence of Gender (GE) in the interplay governing Social inspiration (SI) and Intentions to undertake (IU) as well as between Risk Perception (PR) and Intention to undertake (IU) mobile financial transactions. Preferred analytical techniques for deployment in this multi-variate correlational inquiry happens to be the structural equation modelling (SEM) which is believed to have higher order of complexity compared to the first-generation techniques like multivariate regression; logistic regression; or analysis of variance (ANOVA) (Chin et al., 2020). SEM implies the analysis of multivariate relations using the statistical methods of structural modeling between measured data and variables.

The SEM is more likely the preferred technique when compared to the other traditional methods due to the ability of it to simultaneously model the complex cause and effect relationship between the constructs as well as it being able to estimate the various characteristics of the variables by (Rehman et al., 2019). The design opted for in this study was to utilize correlational approach that aims at establishing the cause-effect relationship among the variables investigated. Along with other advantages, SEM also stands out as the most reliable data analysis method due

to its capability to identify interconnections within information-rich hidden structures as well as in studies with measurement errors (Civelek, 2018). It is precisely because of all the mentioned strengths that the scientists specially favor using SEM as an instrument when they know that their data is generally prone errors in the measurements as well as problems of multicollinearity (Alhassan et al., 2020). For example, systematical review of literature contained in the article by Soudien et al. 2020 illuminated that adoption of mobile banking by prospective consumers were studied with SEM which is the main tools of analysis, that included such statistical techniques as partial least squares branch of the SEM, as well as path analysis.

SEM has two major twin branches: Covariance-based Structural Equation Modelling (CB-SEM) as well as Partial Least Squares Structural Equation Modelling (PLS-SEM). While on the side of CB-SEM, a fundamental use is the testing of the theories or the rejection of the theories by way of hypothesis development, in the case of the PLS-SEM the primary use is to ascertain causal relationships between the variables (Chin et al., 2020). While PLS-SEM was considered the most accurate choice, the most suitable would have been the application of it, as it is perfect to capture empirical evidence of the existence and strength of influence exerted by independent variables to dependent variable of PU, PE, SI, PR and FC on IU. Applying the SEM, data analysis involves testing of correlational relationships on direct association; mediated association; and the moderation effects. The relevant econometric model specification for this relationship is presented below

$$IU_i = \beta_0 + \beta_1 PE_i + \beta_2 PU_i + \beta_3 SI_i + \beta_4 PR_i + \beta_5 FC_i + \beta_6 AT_i + \varepsilon_i \text{.....Eq (i)}$$

Where $\beta_0, \beta_1, \ldots \beta_6$ are coefficients to be estimated; PE, PU, PR, SI, FC and AT being the predictor variables and IU the dependent variable

The second category of hypotheses are those intended at assessing mediation effects. Through an iterative process, the model identified one exogenous construct as a mediator variable on the relationships, namely AT. This variable is assumed to mediate the relationships between PU and IU as well as between PE and IU. We derive the model for mediation effects as follows:

$$AT_i = \alpha_0 + \alpha_1 PU_i + \alpha_2 PE_i + u_i$$

$$IU_i = \beta_0 + \beta_1 PU_i + \beta_2 PE_i + \beta_3 AT_i + \varepsilon_i \text{.....Eq (ii)}$$

Mediation effects would be arrived at through the following:

Total effects = Direct effects + Indirect effects

Direct effects of PU on IU = β_1

Indirect effects of PU on IU = $\alpha_1 * \beta_3$

Total effects of PU on IU = $\beta_1 + \alpha_1 * \beta_3$

Direct effects of PE on IU = β_2

Indirect effects of PE on IU = $\alpha_2 * \beta_3$

Total effects of PE on IU = $\beta_2 + \alpha_2 * \beta_3$

The moderating variable Gender (GE) as well as the endogenous construct intents on usage (IU) were common denominators in both cases. In this case, the resultant model examined the influence of the predictor variables PU, PE, SI, PR, FC, and AT on the resultant variable IU. We base our analysis of the moderation effects on the following generic formula:

$$Y_i = \beta_0 + \sum_{j=1}^{k} \beta_j X_{ij} + \gamma_i Z_i + \sum_{j=1}^{k} \delta_j \left(X_{ij} * Z_i\right) + \varepsilon_i$$

Where: β_j is the effects produced by X_j on Y_j when Z = 0

γ is effects of Z on Y when all the independent variables $X_i = 0$

δ_i is the coefficient of moderation that measures the effects of a unit change in Z on the effects of X_i on Y_i. and j = 1, 2, 3 …k

In the case at hand, we thus have the following equation:

$$Y_i = \beta_0 + \beta_1 PU_i + \beta_2 PE_i + \beta_3 SI_i + \beta_4 PR_i + \beta_5 FC_i + \beta_6 AT_i + \gamma_i GE_i + \delta_1(PU_i GE_i) + \delta_2(PE_i GE_i) + \delta_3(SI_i GE_i) + \delta_4(PR_i GE_i) + \delta_5(FC_i GE_i) + \delta_6(AT_i GE_i) + \varepsilon_i \ldots\ldots\ldots\ldots\ldots \text{ Eq (iii)}$$

Exported data was loaded to SMART-PLS® 4 package for further analysis. Data analysis in PLS-SEM occurs in two phases or models – starting with the measurement model or confirmatory factor analysis (CFA) then followed by the structural model. The CFA model would assess the magnitude to which observed variables explain the latent variables (Civelektekin, 2018). The CFA model would confirm that this model assumes the expected levels of reliability as well as validity within its measurement phase. Concerning the structural model this is the type that structures associations among the latent variables that are considered in the study, and also outlines the magnitude of their causal relationships.

3.8 Summary

In this section, the methods employed are illustrated for the research study task which intends not only to show the progress but also to look at the common problem that is witnessed among the university students who are believed to be very knowledgeable in technological matters (Alsayed et al., 2020). It outlines a sequential approach adopted in establishing relationships among study variables both exogenous and endogenous variables. It dwelt on the scholarly exploration of the relevant theoretical perspectives in terms of the philosophical underpinnings, research design and approach, identification of the study population, sampling strategy, instrumentations, ethical considerations and data collection procedures as well as a discourse of preferred techniques in the analysis of empirically gathered data.

Close consideration of the study approach and associated design led to selection of the positivistic philosophical paradigm as opposed to the interpretivism, the selection being inspired by the pros that the positivistic paradigm offers in terms of its relative ontological and epistemological orientations in comparison with its alternative. The approach entails a systematic process that is employed in understanding social situations making it possible the ability for quantitative measurability of the parameters. In view of the foregoing, the study methods adopted for deployment in this study are reflective of the paradigm of positivism paradigm adopted within the study and within the perimeter of the social sciences dimensions which are not readily amenable to quantification and standardization. In line with the positivistic paradigm, the study employed quantitative design that involves the use of hypothesis testing to investigate relationships between variables, hinged on the given set of theories. The study adopted a correlational study method that uses hypothesis to examine causal relationships to describe the influence of a given set of behavioural factors, in this case exogenous variables PU, PE, SI, PR, FC and AT on the identified endogenous latent construct, intents of university students to undertake (IU) mobile financial transactions, focusing on students in universities located in Dar es Salaam, Tanzania.

The survey was design to focus on population of undergraduate students studying in universities based in Dar es Salaam Tanzania. This is a population whose audience comprised largely of a cohort of young folks who stand to share similar attributes such as common age group of 20-30, and harmonized levels of literacy. The participants were selected from different fields and years of study in for the same of composing a sample with diverse characteristics and experiences, some whom are less likely to be conversant on deployment of technology-enabled financial transactions in their backgrounds. Various study fields are included in the focal student population including science, social, business and ICT students among others in order that

members present in the selected sample are actually representing the typical population of student in selected universities. Further still, Dar es Salaam is a largest city in Tanzania which is home to some of the most prominent and well-known universities in country that make them magnet for enrollment of students who come from every tight corner of the country that in turn makes them more presentable to the study population.

The sampling strategy adopted a multistage and stratified sampling approach, where the Researcher chose four universities two Government-owned and two privately owned, based on enrollment levels. Based on the proportion of the overall enrollment, the sample was proportionately distributed to the University of Dar es Salaam (UDSM); St Joseph University in Tanzania (SJUT); Ardhi University (ARU); and Kampala International University in Tanzania (KIUT) respectively.

As customarily with surveys, a questionnaire was developed for data collection using the quantitative research approach. Besides questions soliciting for demographic information, the questionnaire is stuffed with items derived from both previously peer-reviewed and current models that have been applied in testing of the hypotheses on constructs related to the Technology Adoption Model (TAM) as well as the United Theory on Adoption and Usage of Technology (UTAUT). The use of both distribution channels serves to address some of the limitations of either method and leverage on their relative advantages such as economy and minimization of respondent bias associated with the physical contacts. Online distribution of questionnaires is also considered a relatively less expensive method for reaching large audiences (Bryman, 2015).

Besides technical aspects, ethical issues are involved as they are related to the ethical requirements for research. The instruments for data collection, mainly the questionnaire and gatekeepers' letters were given the approval of the UREC for deployment in this study. Again, the

study structure was shaped by the hind sight on key principles for ethical research including non-maleficence, beneficence, respect for persons, justice and informed consent. Informed consent form was developed from university designed samples. The researcher designed the questionnaire, the participant information sheet, and a gatekeeper's letter in accordance with the ethics guidelines. With the aid of the student leadership, the researcher was then able to gather study participants. The participants entering the study were required to first sign their consent forms, proving their appropriate understanding and capability of participating in the study. Data confidentiality has been further adopted through encryption and safekeeping measures.

Methods of data collection was designed to employ structured questionnaires administered both electronically and physically. The quantitative survey was implemented based on a deductive research strategy where questionnaires serve as core instrument for gathering of empirical data, owing to its ubiquitous use in studies that involve testing of theories/models by the use of hypotheses. Those participating through Google forms were required to check in the fields indicating that they were able to read and clearly understand instructions, contents, intentions and that they are willing to freely take part in the research. They were also to indicate that they are of mature age and free of disability. Students reached through face to face meeting were required to sign off the field indicating their informed consent as well as their ability to give informed consent. Results from the performed questionnaires were coded and further computed with dedicated software.

At this final part of this chapter, procedures deployed in the gathering and analysis of data are presented by proposing the statistical technique of structural equation modelling (SEM), which a famous multivariate analysis tool for investigation of structural relationships amongst observed or measured variables and unobserved or latent variables. In view of the foregoing contexts, this

study has preferred the PLS-SEM rather than its counterparty the CB-SEM. With the PLS-SEM applied as the strategy to investigate causality among variables, the current study will be in a position to empirically demonstrate presence and ascertain magnitude of the influence contained in relationships that associate independent constructs PU, PE, SI, PR, FC, AT with the dependent construct IU.

Further, this study proposes subsequent application of SMART-PLS 4 software in the assessment of the two phases or models – one of which is the measurement phase and the other subsequent one is the structural assessment phase. The Confirmatory Factor Analysis (CFA) Model would be used to ascertain the variances that deviate observed variables from latent variables (Civelek, 2018). It is under the CFA phase that it is expected to be the one to verify whether the proposed instruments provide sufficient assurance regarding the reliability as well as the validity features in measurement model. Another stage is when the assessment of structural model would give a degree of relations among latent variables in the research and determine the magnitudes of the causal relationships.

CHAPTER 4 : RESEARCH FINDINGS

4.1 Overview

This investigation was built on an empirical examination of the underlying reasons that make students favourably inclined to use financial services offered via telephones. It aims to identify most important factors that will provoke mobile financial transactions user intensions, the grasp of which will give means to push up adoptions of the services leading to the attainment of financial inclusion objectives finally. This is to satisfy the hunger created by the development of the mobile-technology enhanced telecommunication that, without doubt, is so advanced now compared to early times. As mobile phones have demonstrated high over-the-top usage and deep penetration in Africa and similar developing economies, it was expected that the tools and applications of such technologies would eventually promote massive growth in the usage of financial services through the deployment of mobile devices. Learning-based researches have in the majority cases found low uptake of mobile financial transactions, even among the university students, believed to be the most innovative and technology adopters (Abdinoor & Mbamba, 2017).

The research adopted a quantitative method to investigate measurable quantities of impact that certain factors exert on use intentions for mobile financial transaction (MFT) among students in Dar-es-Salaam, Tanzania. MFT are the transactions of financial services wherein the process is done through the digital or channels of mobile devices including as cellphones or tablets, as in the case of Fisher (2017); and Shaikh and Karjaluoto (2019). Using integrated theory based on the United Theory on Adoption and Usage of Technology (UTAUT) as well as the Technology Adoption Model (TAM), the survey subjected empirical data collected from the questionnaires, in order to clarify the dichotomous relationships involved in exogenous constructs on one hand, and the endogenous variable, mobile financial transactions uses intentions on the other. Exogenous

variables in this study include but not limited to (PU); (PE); (SI); (FC); and (PR). Moreover, the influence of AT and GE on the connection between exogenous endogenous variables was investigated by the research report. The intention for the research came about because of the need to identify basic factors which hinge on how users perceive mobile financial transactions with the aim of adoption. The outcomes of the study provided useful information that for supporting policy and managerial changes toward an ultimate goal of widespread usage of MFT leading to financial inclusion. Therefore, the understanding of what encourages financial services acceptance also revealed on how other technologies such as block chain and distributed ledger technology; big data analytics; machine learning; cloud computing; artificial intelligence; and related applications for financial service access and use in countries that are at growth stage would work in strategy. On a different note, the research was seen as essential because of the contribution it would make to the body of knowledge within the research community. University students are at the heart of technological acceptance and therefore, they form a core target group. College students, being avid users of financial services at a young age, they represent an important population group in boosting financial service usage. The process would be accelerated through the knowledge of the factors that leads to their perception in the MFT adopting the intention. Participation of university is a strategic approach to mobilize actions within the communities that generate impact community through influence in lifestyles and leadership positions.

Another inspiration in undertaking this research anchored in the dire need for contributing to bridging research gaps identified in prior studies that focused on adoption of mobile financial transactions anchored on technology use models. On the other hand, the gaps include context-based ones; population-related ones; and model-based ones. Within the development of the study, it is expected that the extension of the study to particular areas will fill the context related gaps

(Souiden et al., 2021; Shaikh et al., 2022). Based on past research, the pendulum of MFT adoption literature swings in favour of the experiences in advanced economies of Europe, the Middle East, and Asia (Souiden et al., 2020; Shaikh et al., 2022). However, this particular study is set in developing economy, Tanzania, and contributes to filling the research gap that is region-specific.

Here, an opposite view was echoed as a fanning towards university students was construed in an attempt to cover the population gap by integrating, a segment that has no or limited experience in Mobile financial transactions usage (Dhingra & Gupta, 2020). The research aimed at recruiting a significant number of individuals who had no mobile banking experience yet and thus, complemented other studies done earlier on mobile banking clients. Conceding that university students would have a lack of savings, they have to be categorized into this group of participants.

The integration of them is secondly envisioned as a bridge of the gaps associated with the use of a single isolated model and the apparent gaps observed to be associated with application of the model constructs (Elhajjar & Ouaida, 2020). The integrated model is being projected as the solution that will pull together the benefits of the individual models to produce synergies. Additionally, the incorporation of moderating and mediating factors: Attitude and Gender respectively, was also expected to help in filling existing knowledge gaps (Baabdullah et al., 2019; Sharma, 2019; Merhi et al., 2019; Tiwari et al., 2021).

The data was collected empirically by giving questionnaires that were both physical and electronic form. Data collection exercise laid the ground for a data analysis, which was achieved by the use of statistical analysis, and the logical extraction, summarising, organising, cleaning, and modelling. The methods used in the reflective data analysis model are quantitative in nature instead of the qualitative analysis method which includes analysing the themes and patterns emerging from

the collected data plus the participants (Cohen et al. 2007). Through the employment of data analysis numbers on different properties, conclusions may be made from which information can be determined. According to the utilized data analytical method, data could be compared to whether it is ratio, nominal, ordinal, or interval. Nominal and ordinal data are categorical data, meaning that these data are very easy to analyze which classical statistics use. The other two groups which in fact is composite of interval and ratio data are wholly presented and therefore they have higher standard manipulation and statistical analysis.

While carrying out analysis of the empirical data, the research was chiefly cognisant of the fact that it will be the basis for making inference about the entire population. Inferential statistics and descriptive analytics use totally different logic. The former one results in predictions and/or inferences, the latter one gives explanations and/or representations of data properties only. The most of the times study apply mean, mode, median, variance, and standard deviation as descriptive statistics. The second category which is equally important is the inferential statistic. It involves complex data analysis techniques. It is about utilizing data accrued from various sources to generate predictions and inferences made in respect with the characteristics of the study population or phenomena that can occur in the future. Inferential statistics tools include both bivariate correlational relationships and multivariate model fitting (e.g. difference testing, hypothesis testing, regression and canonical analysis, multiple regression, structural equation modeling (Cohen et al., 2007; Kothari & Garg, 2019)).

In this course, the researchers applied the technique of structural-equation-modelling (SEM) for analysis of empirical data that was gained from the participants of the research. SEM is a reliable statistical source to detect patterns of relations among multiple variables in those data sets with high interdependence among the variables. The approach could be categorized as data

analysis technique of kind two, which is rather new and in general considered second-generation data analysis technique in comparison to linear ANOVA, linear regression, logistic regression and multiple regression among others (Hair et al., 2019). The technique combines components related to factor analysis with those of multiple regression analysis. SEM is considered as an advanced technique which beats the deficiencies of the conventional analysis method such as intense relationships of the data set being not possible. As opposed to existing methodologies that work well only on simple model designations with observable variables whose value cannot be estimated with any errors, SEM ensures simultaneous estimation and modelling of complex relationships across multiple exogenous and endogenous variables and is less distorted by whether the data measurement errors and multicollinearity are present or not (Chin et al., 2020). SEM is easily differentiated with other statistical methods such as regressions that depends on the data set in establishing a relationship between variables, due to its capability to use a theoretical model to confirm a relationship that exists among the data set variables (Civelek, 2018).

SEM may convert into factor analysis; path analysis; structural regression; or latent change model (Civelek, 2018). In the case of factor analysis, it is an offshoot of SEM which looks at the variables (components) and their similarities while cutting back on the variables. The two main forms of factor analysis explain the structure of complex variable relationship well, that is, explanatory factor analysis which involves identifying factors inside the complex of variable relationship. However, the confirmatory factor analysis requires data, which primarily helps in the approval of pre-designed bipolarity or structure of factors. It is a technique to affirm the existences of major verified factors and relationships set up in the hypotheses (Cohen, 2007; Liu et al., 2023).

Path analysis is the data analytical techniques that are involved with investigating and testing the relationships amongst the observed variables. Path analysis in substantially more

advanced than regression model, which includes measurement of observable variables, both exogenous and endogenous, into the same model. Hence, it is possible, through this method, to look at both, the direct and indirect effects between any given relationships. The other side of path analysis involves the limitations in observing latent variables, which may result in the increase of the measurement errors (Meydan & Şen cited in Civelek 2018).

The final category of analysis of confirmatory factors (CFA) are structural regression models that combine both measurement and structural models. The methods are the fusion of regression analysis as well as confirmatory factor analysis. They are aimed to verify the relationships between latent variables and, due to this, they sometimes provide reliable results despite the noisy data. Putting other models aside are latent change model. As latent growth curve models or latent curve analysis, so called to explain changes in the same phenomenon through time, the latent change models are designed (Raykov & Marcoulides, 2006; Doğan, 2015).

The core purpose of this study was to investigate factors that drive or hinder users' MFT adoption intentions leveraging on the structural-equation-modeling with special focus on the partial least squares (PLS-SEM). Selection of the PLS-SEM was based on its demonstrated capabilities plus the trends on wide application for a determination of causal associations among pairs of variables while the twin of PLS-SEM is CB-SEM which is used to set up a confirmative or a rejective theory by nature. The CB-SEM figures out to what degree a given theoretical model fit the matrix of covariance and the dataset in particular. Moreover, as this research involved a non-experimental correlation study that targeted the empirical causal relationship among PU, PE, SI, PR, FC and AT to endogenous variable IU, PLS-SEM has been chosen to be the best fit to meaningfully manipulate the data.

Analysis of data that was empirically gathered in this study deploys the Smart PLS 4 software package, which evaluated the measurement model in the initial phase and the structural model as the subsequent phase. Measurement modelling assessment relate to the ascertainment of extent to which observed items can reflect the underlying values in the latent variables as well as to give proof of the proposed assertions about how valid and how reliable is the model in measuring the intended phenomena (Blaikie, 2003; Civelek, 2018). Analogous to the model of measurements, the evaluation of the structural model represents a second-stage assessment process flow by mediating and testing hypothetical causal associations between construed latent variables. It is at this stage of factor analytical/structural model, that we devise and apply tests to ascertain and establish assumed causal relationships, and the degree of the strength with which the latent variables correlate.

The present chapter is intended to elaborate in a step-by-step manner how the crucial data analysis techniques have been used within the inquiry and reflects on outcomes generated from the analysis using empirically gathered data. The chapter concerns the integral aspect of the trustworthiness of data followed by the detailed information of the participants' demographics later on the use of the descriptive statistics, reliability and validity considerations, support of the hypothesis findings, setting up of the mediating and moderating impact and finally the analysis of the research findings.

4.2 Trustworthiness of Data

The factor of trustworthiness being significant in research is inevitable. It serves as a confidence pack to the readers towards the reliability, confirmability, transferability, and dependability of the research finding. This requirement comes from the fact that sample data is used instead of population among the other possible reasons. For the purpose of the confidence, it

is necessary that the sample to be so well-represented that the results obtained are valid for the whole population of the analyzed sample (Landreneau, 2009). These, therefore, necessitate the fact that the study offers clarification on all the process across the research procedure such as sample selection, participants and their relevance, location and time (Trochim, 2006). Concerning the representative composition of the participants, selection of participants for the research considered the requirement for the classification to be consistent and meaningful facilitating the attainability of the objectives of the investigation conducted. Execution of this study assessed and explored the views of students in universities on factors that dictate their use intentions of mobile financial transactions. Since Dar es Salaam is a megacity in our country, it was completely fair for choosing such city to draw a sample because the city is representative of diverse students who have diverse ethnic backgrounds as well. Also, college students involved in the study were deemed as the most suitable representatives of the youths who are adults within age group range of between twenty and thirty years old and often than not are the most active users of new technologies. The sampling design that was purposed was purposely designed in such a manner that it provided adequate representation of the study population by the way of a multistage method of random selection of participants. As for the study members, came from different university programs studies including development studies; information communication technology; health business; engineering; and pharmaceutical sciences; social studies; education; architectural studies; and agricultural sciences.

4.2.1 Internal Validity

The internal validity basically means how possible it is to create a model that offers definition of endogenous variables as well as exogenous variables with clear articulation of the influences that govern the relationship between them (Heffner, 2017). R-squared symbol uses the variation of the endogenous variable and defines it in response not only to the changes of the

exogenous variable but also of the exogenous factors (Shuttleworth, 2008). The internal validity is the systematic way in which the researcher implies that the measure is capable of providing accurate measurement of what the instrument is intentionally designed to measure. This research was found to be internally valid; the findings were confirmed.

4.2.2 Objectivity of Research

A research that is unbiased can only be demonstrated by the impartiality of evidence presented. Unbiasedness of a research is determined by how much there is from the researcher's personal views, beliefs, and the influences of perceptions (van Dongen & Sikorski, 2021). The incorporation of quantitative research analysis tools in the research process is believed to bring a certain degree of objectivity. By using quantitative research methods, data is collected and analyzed in ways that can be precisely repeated, and the researcher wishes to stay away from his research objects (Payne & Payne, 2004). In the first stage of this study, the researcher went to the gate keepers for the permission, people some were able to give it in writing others just verbally. The researcher moved on to reach the students by means of leaders from the student association clubs who provided lists of students (sampling frames) taken from enrolment records in the chosen courses. Accordingly, a significant number of samples were randomly selected form the list of students enrolled in the particular class. Access to tangible space as well as WhatsApp numbers was used. The consent forms and questionnaires for participation in the research were given to the students physically as well as via WhatsApp. The google forms and printed out questionnaire were issued through participant's phone numbers and physical contact particularly when electronic administration was not possible due to non-availability of mobile phone numbers or email addresses. 45 days of data collection was done through cross-sectional quantitative study in July-August of 2023. The study had the maximum 500 students spread among four different universities

who were contacted to complete the questionnaire and 452 of them fully participated and submitted their completed questionnaires. The data-cleaning overlay slashed the number of answered questionnaires used in the data analysis; down to a staggering 449. Study sample were the universities that participated in the study and [the number of administered questionnaires] [(200, 100, 100, 100)]. Survey work at SJUIT and KIUT were by hand, meanwhile, at UDSM and ARU questionnaire administration of both by hand and electronic. The number of compiled questionnaires from the participants at University of Dar es Salaam (UDSM) was 188; at the Ardhi

Table 4.1

Demographic Characteristics of Participants

	Demographics	Frequency N	Percent %
Gender	Females	218	49.6
	Males	231	51.4
University	University of Dar es Salaam	188	41.9
	Ardhi University	89	19.8
	St Joseph University in Tanzania	78	17.4
	Kampala Int. University in Tanzania	94	20.9
Age Group	Under 21-year-old	29	6.5
	21 to 30-year-olds	410	91.3
	31 to 40-year-old	10	2.2
	41 and above year old	0	0.0
Field of Study	Info. Communication Technology	47	10.5
	Natural Sciences	106	23.6
	Business Studies	51	11.4
	Social Studies	95	21.2
	Others	150	33.4
Year of Study	First Year	101	22.5
	Second Year	175	39.0
	Third Year	132	29.4
	Fourth	36	8.0
	Fifth Year	5	1.1

Note: prepared by the Author (2024), N=449

University was 89; St Joseph University in Tanzania (SJUIT) was 78; and KIUT (94). Afterwards

the information became digitized and fed into an excel sheet from which the data cleaning exercise was carried out.

4.2.3 Cleaning of Data

Data collected from the excel sheet was subjected to validation by searching for any flat line response, outliers and clerical errors. The semi-structured interview data cleaning process decreased the number of respondents from 452 to 449 that were then imported to be captured in the SMART PLS4 software.

4.2.4 Multicollinearity

The specification test is implemented by fitting the structural model to estimate path coefficients and carrying out regression analysis of each endogenous variable on its respective exogenous variables by utilizing OLS method. This can only be realized provided that those exogenous variables are not accompanying each other, meaning there have no multicollinearity issues. Multicollinearity means there is a case where two or more explanatory variables that are strongly correlated to each other. It is, in that regard, a challenge to tell the real impact of each of the exogenous variables on the dependent variable because of this (Gilstrap, 2013). High degree of multicollinearity makes it even more difficult for econometricians to claim the statistical significance of the exogenous variables. Structural model is subject to assessment considering whether or not of there are high collinearity degrees need to be considered before going for the assessment of the structural relationship.

The ratio of the variance of a multicollinear variable to its variance inflation factor (VIF) is one of the key indicators of collinearity. A benchmark VIF value is VIF = 5, where those VIF values above 5 would reflect the existence of potential correlation problems (Hair et al., 2019). Summarizing VIFs the collinearity level was assessed and the value above 5 was noted on the

construct PU. The collinearity for the construct PU on IU was assessed, and a VIF value of 5.022 was established, but was not ejected because it was close to 5. Despite being above 5.0 the VIF value of 5.022 was retained because according Milly et al. (2021), a variance of less than .1 is considered an acceptable range.

Table 4.2

VIF Values for Independent Variables

Independent Variables	VIF Values for Dependent Variables	
	AT	IU
AT		2.628
FC	1.728	3.234
PE	2.272	4.341
PR	1.060	2.150
PU	2.118	5.022*
SI	1.875	3.413
Gender x FC		3.075
Gender x SI		3.441
Gender x PU		4.046
Gender x PR		2.138
Gender x PE		4.178

Note: prepared by the Author (2024).

Note: * Variables with VIF > 5.0

4.1 Determination of Validity and Reliability

The reliability and validity associated with a research instrument are the essential features to be followed for good research. The two intertwined ideas, allow the researcher to strive towards truth and meaning for the analysis that is done and the interpretation that is made (Creswell, 2014). Reliability is a crucial aspect of validity which can be said like a research should first be reliable then it will be valid. In contrast, it is unacceptable for a measuring device to be valid but unreliable.

In regards to reliability, this means that a measurement instrument has the capacity to demonstrate stability and consistency (Neuman, 2014). The reproducibility of experiments usually relates to the attributes of the measurement instrument regarding its accuracy, reliability, and ability to produce consistent results from the same participants and environment over time. (The reproducibility of experiment is often defined as the instrument's accuracy, reliability and stability when the same measurements are taken from the same participants and environment over time). From a technical point of view, reliability is an indicator of how accurately the measurement device evades or minimises error in its results. It is the proportion of the readings a measurement device produces that can be attributed to the "true" variations in the phenomenon being observed rather than the measurement instrument's own inherent errors. A measurement instrument is said to be reliable when during a test it can maximize the proportion of the readings because of "true" variations. The evaluation in this study used the instrument tested, which was proved to be valid to the highest level.

4.1.1 Indicator Reliability

Reliability of the indicator denote the extent at which it contributes to the construct the indicator is based on. In reflective structural model, reliability indicators are assessed based on factor loadings. Factor loading indicates the degree of association of the factors to the variable they purport to be. One of the fundamental conditions that should be satisfied is that for the selected items or factors to be most contributive to the underlying variable and less to others (Blaikie, 2003). This measure for factor loadings ranges from -1. 0 and +1. 0 at the origin indicating weak association or a loading closer to 1 to indicate strong association. The rule of thumb is that for any logical value of factor loading the amount must be 0.708 or above (Hair et al., 2019) that is

interpreted as a sufficient correlation. In this study, all the factor loadings were above the .70 benchmark score consistent with the construct they were presumed to measure (see Table 4.4).

4.1.2 Internal Consistency Reliability

Reliability of internal consistency, as a rule, describes the degree of association between the indicators with the latent variable. It identifies, and relates, items or factors that collectively produce a similar or constant set of results to one other as the outcome. Different approaches for establishing the reliability through internal consistency that are being used for reflective model are Cronbach's α (Alpha) and Composite Reliability (CR).

In 1951 Lee Cronbach created Cronbach's alpha, and in current practice, it is one of the most common methods of determining internal consistency (Blaikie, 2003; Tavakol & Dennick, 2011). The magnitude of Cronbach's alpha can be anything in between 0 and 1, with a bigger value indicating a more powerful internal consistency reliability (Hair et al., 2019). A minimum but an agreeable calibrated metric of Cronbach's alpha in confirmatory research lies between 0. 70 and 0.9 where $SD = ((X - u)/u)^2 / n$ being that S is spread out across n. Measurement values larger than 0.9 of these items are inadmissible because they fall into the concept-redundant category and thus, they damage the validity of the construct (Diamantopoulos et al. 2012 as cited in Hair et al. 2021).

The most important thing of internal consistency is the composite reliability (rho_c) which is referred to the work Jöreskog (1971). The same mechanism of computing composite reliability as well as the accompanying thresholds is subject to Cronbach's alpha but gives better values than Cronbach's alpha as a result. When thinking in this regard, Cronbach's Alpha as a measure is conservative compared to composite reliability.

The two metrics have certain differences which are visible in the way of as Cronbach's alpha has certain limitations such as the assumption of equality in indicator loadings, also known

Table 4.3

Factor Loadings

		AT	FC	IU	PE	PR	PU	SI
Attitude	AT1	.893						
	AT2	.900						
	AT3	.897						
	AT4	.898						
Facilitative conditions	FC1		.881					
	FC2		.907					
	FC3		.893					
Intention to undertake	IU1			.855				
	IU2			.908				
	IU3			.891				
	IU4			.867				
Ease of usage Perceptions	PE1				.812			
	PE2				.765			
	PE3				.873			
	PE4				.825			
Risk Perception	PR1					.861		
	PR2					.867		
	PR3					.827		
	PR4					.712		
Utility Perceptions	PU1						.848	
	PU2						.865	
	PU3						.862	
	PU4						.798	
Social inspiration	SI1							.856
	SI2							.896
	SI3							.871

Note: compiled by the Author (2024)

as tau-equivalence (Hair et al., 2021). What Cronbach's α displayed constitutes the foundation or floor above which estimation of acceptable levels of internal consistent reliability should lie, as it widely applied (Trizano-Hermosilla & Alvarado, 2016 cited by Hair et al., 2021). Similar to

Cronbach's α, composite reliability's acceptable values is that which falls within a range of 0.70 and 0.90 is also considered acceptable. As indicated below in Table 4.4; results of assessment of reliability in the space of internal consistency based on Cronbach's α as well as Composite Reliability in this study were both above the limit of .7 suggesting acceptable internal consistency reliability.

4.1.3 Construct Validity

The construct validity, in turn, pertains to the ability of an instrument to provide accurate measurements of what exactly it is intended to measure. In a quantitative research the concept is the measure of the ability indicators have in gauging the underlying phenomenon. It embodies the degree respectively to which the indicators and the measured concept are matching to each other (Durand & Chantler, 2014). Convergent validity is then broken down into two branches of validities, which are, convergent validity as well as discriminant validity.

Table 4.4

Empirical values of Cronbach's α (Alpha) and the Composite Reliability (CR)

Variable	Cronbach's α	CR
AT	.919	.943
FC	.874	.922
IU	.903	.932
PE	.837	.891
PR	.866	.890
PU	.865	.908
SI	.847	.907

Note: produced by the Author (2024)

4.1.1 Convergent Validity

Convergence validity corresponds to the manner in which indicators converge in a way

that contributes to the construction of variations of the investigated construct. A widely used method to conduct assessment of convergence validity is the measure of average variance extracted (AVE). AVE gauged as the amount of the variation due to construct relative to the magnitude of variation resulting from measuring errors. It is a tool that is deployed in assessing how well is the construct captured by the measure as reflected by the amount of error in measurement (dos Santos & Cirillo, 2023). The recommended target AVE value should be greater than 50% imply that a particular construct within the model explains more than half (50%) of the variations that is produced by the underlying indicators (Hair et al., 2022). Thus, convergent validity derived construct values in this work are more than what the instrumental value offers. In all the scenarios the results were accurate with AVE greater than 50% suggesting convergent validity within the acceptable range (See Table 4.5).

Table4.5

Convergent Validity based on AVE

Construct	**AVE**
AT	.805
FC	.799
IU	.775
PE	.672
PR	.671
PU	.712
SI	.765

Note: Compiled by the Author (2024)

4.1.2 Discriminant Validity

The alternative way of assessing validity of a construct is called discriminant validity. This kind of validity (discriminant) is explained in the sense of an extent by which indicators for one of the construct variables are differentiated from other construct variables indicators. It means that

one cannot apply indicators to explain constructs other than the one that it is linked to (Gerbing & Anderson, 1988). The greatest used indicator of assessment of discriminant validity has typically been the Fornell–Larcker (FL) criterion which was introduced by Fornell and Larcker (1981). The mechanics of measuring the FL-criteria metric utters the need for a proper value of AVE for every construct needs to be higher than the shared variance among constructs of the model. Modern researches have indicated that although the FL is a very good discriminant validity measuring criterion, its strength is greatly impaired when the loadings respectively assigned to the indicators of a specific factor are very tight together and particularly if gaps between factor loadings is not more than .2. Besides, the FL criterion has been seen as the most imperfect metric in discrimination validity due to this (Radomir & Moisescu, 2019). The metric, however, is chosen in this study because it is the most current and therefore is the method used by the majority of researchers. As evident under Table 4.6 of this study, the square roots of the AVE for each of the constructs in the model (bolded) turned out to be greater than the value of correlations of the construct loadings with those of the rest of constructs, demonstrating inclusion of valid discriminant criterion.

Table 4.6

Assessment of Discriminant Validity based on Fornell and Larcker Criterion

	AT	FC	IU	PE	PR	PU	SI
AT	**.897**						
FC	.599	**.894**					
IU	.746	.608	**.880**				
PE	.673	.542	.661	**.820**			
PR	.113	.228	.099	.143	**.819**		
PU	.714	.530	.684	.693	.137	**.844**	
SI	.546	.572	.538	.602	.187	.559	**.875**

Note: compilation by the Author (2024)

Another way of determining discriminant validity is through cross-loadings. Cross-loadings are employed to determine whether an indicator is associated with a particular construct

Table 4.7

Discriminant Validity: Cross Loadings

	AT	FC	IU	PE	PR	PU	SI
AT1	**.893**	.607	.724	.614	.106	.666	.527
AT2	**.900**	.472	.640	.592	.117	.613	.461
AT3	**.898**	.546	.660	.582	.071	.624	.475
AT4	**.898**	.515	.645	.625	.111	.655	.490
FC1	.486	**.881**	.491	.477	.229	.450	.477
FC2	.541	**.907**	.554	.506	.188	.476	.537
FC3	.571	**.893**	.579	.470	.199	.491	.517
IU1	.714	.563	**.856**	.602	.063	.623	.471
IU2	.631	.553	**.908**	.547	.105	.577	.468
IU3	.641	.519	**.891**	.610	.109	.603	.454
IU4	.632	.503	**.866**	.564	.074	.602	.500
PE1	.580	.436	.529	**.812**	.076	.557	.440
PE2	.461	.362	.455	**.765**	.113	.473	.355
PE3	.595	.513	.587	**.873**	.116	.610	.557
PE4	.557	.451	.583	**.825**	.162	.617	.597
PR1	.086	.204	.095	.125	**.861**	.127	.194
PR2	.075	.161	.094	.122	**.866**	.112	.163
PR3	.107	.200	.040	.105	**.827**	.086	.106
PR4	-.019	.080	.020	.055	**.711**	.000	.097
PU1	.644	.529	.610	.641	.123	**.848**	.489
PU2	.578	.438	.571	.554	.113	**.865**	.460
PU3	.639	.461	.615	.594	.103	**.862**	.498
PU4	.538	.344	.503	.542	.126	**.798**	.436
SI1	.428	.427	.413	.462	.154	.426	**.856**
SI2	.474	.519	.455	.519	.180	.490	**.896**
SI3	.520	.544	.531	.586	.157	.540	**.871**

Note: compiled by Author (2024)

much more than it associates with the remaining constructs stipulated within the model. Under Table 4.7 above, it is shown that the indicators in the model have high loadings with their

conceptual constructs and low loadings with other constructs suggesting the presence of discriminant validity.

A third relatively new test for assessing adequacy of discriminant validity is the Heterotrait-Monotrait (HTMT) ratio developed by Henseler et al. (2015). The HTMT ratio is calculated as the ratio of the average correlation of items for all the constructs divided by the geometric mean of the average correlation of the items within a construct (Hair et al., 2029).

Higher values of HTMT indicate that discriminant validity may be a problem. HTMT is developed to address FL-criterion deficiencies and, thus, viewed as a stronger discriminant validity indicator. It is advised that the value of the HTMT ratio should not be over .90 (Henseler et al., 2015). HTMT-based assessment of discriminant validity in the model involved in this study found all values of the HTMT ratios were less than .90 indicating good fit of discriminative validity within in the model.

Table4.8

Discriminant Validity based on Heterotrait Monotrait Ratio (HTMT)

	AT	FC	IU	PE	PR	PU	SI
AT							
FC	.663						
IU	.814	.680					
PE	.763	.629	.755				
PR	.098	.221	.091	.142			
PU	.796	.602	.770	.807	.116		
SI	.612	.658	.608	.700	.193	.646	

Note: prepared by the Author (2024)

4.2 Model Specification

An exploration of the various models and perspectives on technology adoption intentions

regarding mobile financial transactions led to specification of an integrated model constituting of the Technology Adoption Model (TAM) and United Theory on Adoption and Usage of Technology (UTAUT). The conceptual design of the model involved constructs extracted from the constituent models based on the filtration approach that saw a total of 6 independent variables, 1 dependent variable and 1 moderating variable. From the TAM, three constructs were extracted. These were Perceptions on Utility (PU), Perceptions on Ease of use (PE) and Attitude (AT). The remaining constructs: Social Inspiration (SI), Perception on Risk (PR) and Facilitative Conditions (FC) were taken from the UTAUT.

Based on the integrated model, three correlational equations were derived under Section 3.7.2 on Data Analysis Techniques, three econometric equations were derived to estimate direct, mediated and moderated relationships as follows:

$$IU_i = \alpha + \beta_1 PE_i + \beta_2 PU_i + \beta_3 SI_i + \beta_4 PR_i + \beta_5 FC_i + \beta_6 AT_i + \varepsilon_i \text{ ……..Eq (i)}$$

$$IU_i = \alpha + \beta_1 PU_i + \beta_2 PE_i + \beta_3 AT_i + \varepsilon_i \text{……....Eq (ii)}$$

$$IU_i = \alpha + \beta_1 PU_i + \beta_2 PE_i + \beta_3 SI_i + \beta_4 PR_i + \beta_5 FC_i + \beta_6 AT_i + \gamma_i GE_i + \delta_1 (PU_i GE_i) +$$

$$\delta_2 (PE_i GE_i) + \delta_3 (SI_i GE_i) + \delta_4 (PR_i GE_i) + \delta_5 (FC_i GE_i) + \delta_6 (AT_i GE_i) + \varepsilon_i \text{……. Eq (iii)}$$

Where:

IU	=	Intention to Use
PE	=	Perceptions on Ease of use
PU	=	Perceptions on Utility
SI	=	Social Inspiration
PR	=	Perception on Risk
FC	=	Facilitative Conditions
AT	=	Attitude
GE	=	Gender
α	=	Constant Factor or the Intercept
β0	=	Coefficients of each variable

ε = Error terms

Based on the survey data, the model was generated and tested for its goodness of fit; explanatory power; and predictive power.

4.2.1 Assessment of Model Fit

In the course of undertaking this study, consideration was made on the applicability of the assessment of the model fit. Also known as goodness of fit, the model fit is described as an extent to which a given model matches the data under observation (Maydeu-Olivares & Forero, 2010). However, unlike in the case of CB-SEM, the application of model fit procedures is less relevant in empirical studies based on PLS-SEM. This is so because, while CB-SEM relies heavily on procedures involving minimization of divergences of observations from the covariance matrix estimates, PLS-SEM is concerned with tests in respect of the chemistry between estimates of prediction and the underlying theory (Shmueli, 2010). It is from this backdrop that Hair et al. (2019) suggest that model-fit metrics such as Standardised Root Mean square Residual (SRMR) should be cautiously applied in relation to studies based on PLS-SEM.

The model deployed in the study was assessed on its fit on the basis of the results of the calculated metrics of Standardised Root Mean square Residual (SRMR) as well as the Normed Fit Index (NFI). Acceptable thresholds are for the SRMR needs to be less than .08 whereas the NFI should be larger than .90 (Hu & Bentler,1999). Based on computations on Table 4.9, values of SRMR and NFI were outside the acceptable boundaries with SRMR of .085 slightly higher than the prescribed ceiling of .08 and the NFI .821 similarly lower than the recommended floor of .90 suggesting some potential issues with the fitness of the model. Nevertheless, despite the highlighted issues, the analysis proceeded with analysis including the seemingly redundant factors on the grounds of the relevance of model fit metrics as highlighted earlier in this section.

Table 4.9

Model Fit Metrics Prior to Adjustments

	Saturated model	Estimated model
SRMR	.08	.085
d_ULS	2.423	2.739
d_G	.654	.698
Chi-square	1394.204	1493.4
NFI	.832	.821

Note: compiled by the Author (2024)

In view of the identified model fit issues, an investigation was made into the nature of the empirical data where it was found that two factors related to the construct on risk perceptions, specifically PR3 and PR4 which bore loadings of.310 and -.152 which were extremely below the required minimum threshold of .70 and were therefore removed. The examination also found that

Table 4.10

Model Fit Metrics After Adjustments

	Saturated model	Estimated model
SRMR	.033	.040
d_ULS	.324	.474
d_G	.286	.304
Chi-square	688.462	718.085
NFI	.909	.905

Note: compiled by the Author (2024)

the moderating construct GE had substantially insignificant contribution and was thus equally removed from the model. Removal of the undesired factors improved the values of SRMR and NFI to .04 and .905 which were within acceptable thresholds of less than .08 and higher than .90 respectively (Table 4.10).

4.2.2 Explanatory Power of the Model

Explanatory power which is alternatively called in-sample predictive power can be described as the extent to which variances in the endogenous variable of a model is capable of being explained by variances in the exogenous variables. Explanatory power is commonly measured using R^2 which is a metric that computes the amount of change observed in the dependent construct that is attributable to proportion changes in the exogenous variables (Rigdon, 2012). R^2 assumes a value 0 and 1 where the higher the value of R^2 the more the explanatory power. A suitable value of R^2 according to Hair et al. (2021) should be at least 0.1.

The study involved an examination of explanatory power associated with the model by assessing the extent to which variations in the endogenous variables AT and IU were contributed by their respective exogenous variables. As indicated in Figure 2.1, running of the model generated R^2 values of .571 and .644 for the endogenous variable AT and the endogenous variable IU respectively. Such findings are interpreted to mean 57.1 percent of variation in the endogenous AT is the outcome of the exogenous constructs PU and PE whereas 64.4 percent of variations observed in the dependent latent construct IU is attributed to variations in the independent factors PU, PE, SI, PR, FC and AT. Based on the findings, the model logic is supported as it is clearly evident that the explanatory power R^2 of the model tends to rise in line with the increase in the number of exogenous variables.

A second metric used in the measurement of the explanatory power of the model was F^2, defined as a quantitative change in R^2 that arises as a result of excluding a particular exogenous latent variable from the model. An alternative name for the F^2 metric is as the effect size. Similar to R^2, values of F^2 can fall between 0 and 1 where higher values are indicative of stronger effect size. The effect size measured by F^2 can be classified in three Cohen (1988)'s segments of small effect size where F^2 ranges from 0.02 to 0.15; medium effect size with F^2 ranging from 0.15 to–

0.35; and large effect size with F^2 values 0.35 and above. Table 4.11 provides a range of F^2 values in respect of the dependent constructs AT and IU for each of its associated exogenous construct.

Table 4.11

F-Square Values on Effect Sized of Constructs on Endogenous Variables

	AT	IU
AT		.154
FC		.052
PE	.070	.030
PR		.004*
PU	.191	.043
SI		.001*

Note: compiled by the Author (2024).

Note 1: * variables where $F^2 < .02$ indicating negligible effect size.

Reading from Table 4.11, exogenous constructs PE and PU exert medium effect sizes on endogenous construct AT since their F2 values fall within the range of 0.02 and 0.35. Similarly, as regards to the dependent variable IU, the exogenous constructs AT, FC, PE and PU exerted medium effect size on the dependent variable IU where the values of F2 fell within the range of 0.02 – 0.35. On the same footing, the exogenous constructs PR and SI revealed negligible effect sizes with values of F^2 less than 0.02. This observation suggests that the contribution of the construct PR and SI in the variations in the dependent construct IU is less evident.

4.2.3 Predictive Power of the Model

In determining predictive power of the model, this study conducted quantitative measurement of errors of prediction contained in the indicators of the independent constructs. To be acceptable, a model needs to demonstrate that it minimises prediction errors evidenced by generating predicted values that are sufficiently close to actual values. A metrics that are most frequently employed in the measurement of predictive power of a given model include Q^2, the

mean absolute error (MAE); as well as the root mean square error (RMSE). Regarding the Q^2, (also known as the Stone-Geisser indicator), is described as a metric that used to measures predictive relevance of dependent constructs (Shmueli et al., 2019). Predictive relevance explains the scope by which the endogenous latent variable predicts data values for the indicators. Benchmark thresholds that are recommended for Q^2 are similar to the thresholds applicable to F^2. Q2 values that fall within the range of 0.02 – 0.15 are regarded to indicate small predictive relevance; those that fall within the range of 0.15 – 0.35 considered to indicate moderate predictive relevance; and values equal or higher than 0.35 suggest strong predictive relevance accordingly (Hair et al., 2013). The endogenous latent variables AT and IU were assessed for predictive relevance based on the Q^2 metric. The results showed that Q^2 values for endogenous latent constructs AT and IU were .597 and .575 respectively pointing to existence of a strong predictive power in the model.

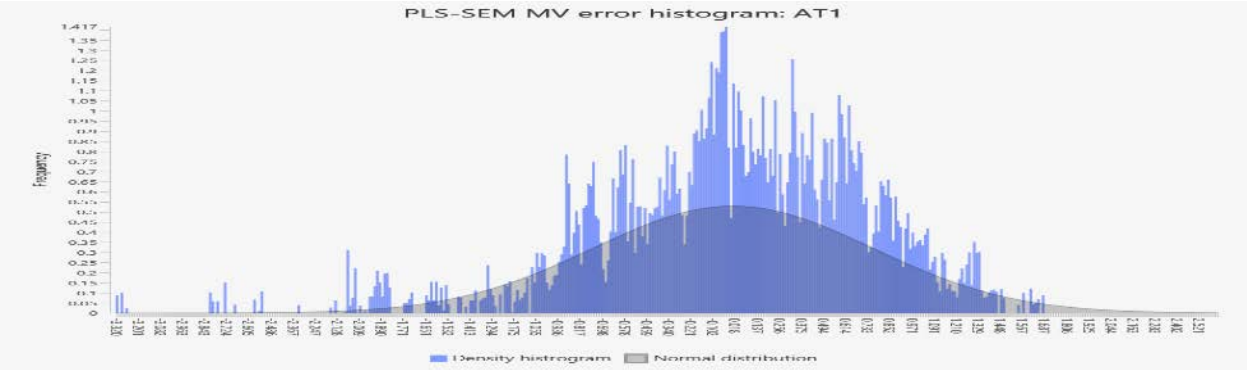
A third metric that is frequently employed in the assessment of predictive power is the RMSE being the abbreviation of Root Mean Square Error and is similarly based on quantitative measurement of prediction errors. However, the metric is only applicable in the circumstance that the distribution is symmetrical. If the distributions are largely asymmetrical distributions, the alternative metric of Mean Absolute Error (MAE) is viewed to be most appropriate metric used in quantitative of prediction errors (Shmueli et al., 2019). Conducting the assessment of symmetricity of data distribution involved in the study, it was found the distribution is adequately symmetrical (see Figure 4.1) which suggested to the use of RMSE as the most appropriate metric.

Application of the RMSE metric in determining the model's predictive power, involves comparing values of the RMSE with standard parameters known as LM benchmark values. The amount of predictive power for the model was based on the number of RMSE indicators falling

on a certain level in comparison with the LM benchmark. The decision criteria are set in such a way as when all the RMSE values are less than the LM benchmark values it is suggestive of high predictive power of the model.

Figure 4.1

Assessment of Indicator Symmetricity (AT1)



Note: compiled by the Author (2024)

However, when an equal number or majority of the RMSE values are lower than the LM benchmark, it is indicative of medium power of the model.

Table 4.12

Predictive Power of the Model after Adjustment

Variable	Q^2predict	RMSE	MAE	LM_RMSE	LM_MAE
AT1	.538	.754	.574	.755	.565
AT2	.425	.815	.616	.826	.632
AT3	.464	.822	.596	.844	.621
AT4	.492	.782	.604	.801	.616
IU1	.482	.821	.615	.846	.625
IU2	.415	.836	.624	.852	.639
IU3	.444	.871	.657	.883	.670
IU4	.416	.871*	.649	.864	.648

Note: prepared by the Author (2024)

Note1: * variables with RMSE value > LM_RMSE value

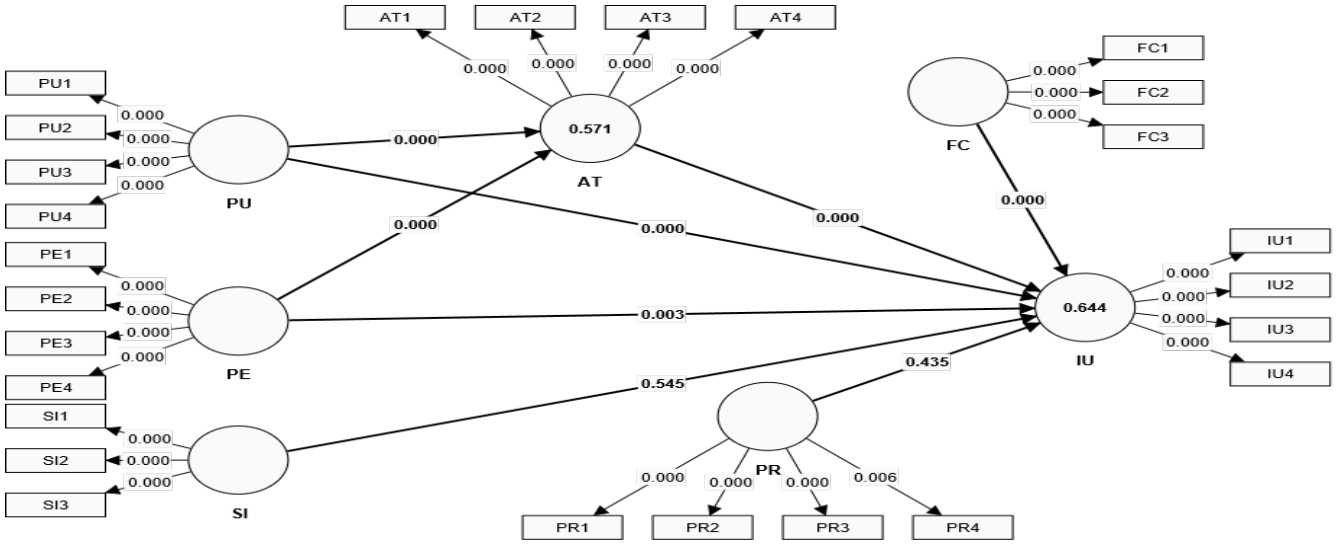
Alternatively, when the minority number of RMSE values are less than the LM benchmark it points out to low predictive power inherent in the model. Table 4.12 indicates that the majority of the RMSE values (7 out of 8 indicators) were less than LM benchmark values, suggesting that the model contains medium predictive power which is acceptable.

4.3 Results of Assessment of Hypothesized Relationships

After the model has proved reliable and valid, the study acquired its momentum for the next phase in terms of SEM-based analysis. This is the phase involving finding generated from the structural model stage, alternatively called the inner model. The first step in the analytical stage of the study was the evaluation of descriptive statistics dimension covered under the measurement phase. For structural model evaluation, occasionally would start off with the evaluation of any collinearity issues in the model, which in this study, had already been carried out in the measurement model assessment. Then we proceeded to the testing of significance levels in the

Figure 4.2

Graphical Presentation of the Study Model



Note: produced by the Author (2024)

hypothesized relationships among the dichotomous sets of latent variables, and then finally used

the model to examine its explanatory power and prediction power. Path analysis is a central stage in structural-equation-modelling (SEM). During this stage, the hypothesized relationship is tested to determine if it is significant. Fourteen hypotheses were developed; six were for direct relationships, two were for mediating effects and six were for moderation.

4.3.1 Examination of Direct Relationships

There were 6 hypotheses (H_1 to H_6) be developed. These were the direct effect of endogenous variables and exogenous variables. The objectives evaluated to determine whether these exogenous variables namely PU, PE, SI, PR, FC, and AT had a limited effect on the endogenous variable IU and defined as following:

H_1: A strong association exists between PU and the IU for university students in Tanzania.

H_2: PE strongly affects intents (IU) of university students in Tanzania in undertaking MFTs.

H_3: The SI has significant impact on intents to undertake MFT by university students in Tanzania.

H_4: The PR bears a strong influence on student intent (IU) to undertake MFT in Tanzania

Table 4.13

Direct influence of Independent Variables

H	Direct Relationship	Original sample	Sample mean	Std deviation	T statistics	P values
H_1	PU -> IU	.197	.197	.053	3.725	.000
H_2	PE -> IU	.161	.159	.054	2.965	.003
H_3	SI -> IU	.028	.027	.045	0.613*	.540**
H_4	PR -> IU	.040	.035	.035	1.142*	.254**
H_5	FC -> IU	.186	.184	.047	3.944	.000
H_6	AT -> IU	.375	.376	.057	6.514	.000

Note: prepared by the Author (2024)

Note1: * variables with t-value < 1.96; *Note 2:* ** variables with p-value > .05

H_5: Supportive conditions (FC) exerts substantial impact on MFT use perceptions in respect of MFT among university students in Tanzania.

H_6: Attitude (AT) demonstrates substantial influence on intents to use (IU) mobile financial transactions among university students in Tanzania.

Results for each of the particular hypothesis described above, are as in the following paragraphs:

(a) Results of H_1 on association of Utility Perceptions (PU) with Intentions for undertaking (IU) of mobile financial services.

The correlations between PU and IU yielded a p-value of .000 which is lesser as compared to the threshold of .05 hypothesizing the moderating presence of a significant effect on the utility perceptions in relation to mobile financial transactions intentions to use link. This explains how this finding is supported using value of t statistic 3.725 which is greater relative to the set limit of 1.96 at $\alpha = .05$ for two-tailed tests. In this regard, hypothesis H_1 with a formulation: A strong direct association exists between utility perceptions (PU) and the behavioural Intentions to undertake mobile financial transactions by university students in Tanzania was found. Therefore the hypothesis accepted, concluding that utility perceptions interact strongly with the behavioural use intentions in respect of mobile financial transactions.

(b) Results of H_2 regarding the association of Ease of usage Perceptions (PE) with behavioural Intents to undertake (IU) Mobile financial services by students in universities based in Dar es Salaam, Tanzania.

Further tests conducted on the association between EP and IU regarding mobile financial services showed a p-statistic of .003 which was lower than the established upper benchmark of .05 suggesting the existence of a substantial degree of influence between the two variables. This finding on the significant statistical association of PE on IU is again arrived at from the value of t-

statistic of 2.965 which is larger than the threshold value of 1. 96 which is used only in two tailed tests. In view of the results, the hypothesis H_2 which stated: Ease of usage perceptions (PE) is the factor that strongly affects students of universities in Tanzania in terms of behavioural intent in undertaking mobile financial transactions (IU) was accepted. It was rather found that ease of usage perceptions had substantial impact on MFT use-behavioural intentions among university students in Tanzania.

(c) Results of H3 on the impact from Social inspiration (SI) to the behavioural intention by university students to adopt mobile financial services (IU) in Tanzania

The test of SI relationship with the behavioural intentions to undertake (IU) Mobile financial services identified the p value of .540 which is above the set comparable point of .05 implies almost zero/negligible impact of SI on IU. This is in line with that t statistic for is equal to .613 which is lower than the cut-off value of 1.96 utilized in two-sided tests. In this case, hypothesis H_3 that stated: The hypothetical constructed variable Social inspiration (SI) exerts significant impact on the behavioural Intents (IU) of university students in Tanzania to adopt the use of mobile financial transactions was voided. It was therefore affirmed that proposition that social dimensions are no longer impactful in determining behavioural use intentions within university student communities.

(d) Results of H_4 relating to the consequence of Risk Perception (PR) on behavioural Intentions to Undertake (IU) Mobile financial services by university students in Tanzania.

H_4 which stated that Risk Perception would have no impact on behaviour intention to undertake mobile financial transactions had a p-statistic of .254. This was substantially higher than the minimum prescribed benchmark value of .05 proposing presence of a nil correlation involved in the association of the two variables – risk perception and use intent. Analogously, the t-statistic

value was found to be 1.142 which is less than the tolerable limit of 1.96 suitable in the two-sided tests. In this case, hypothesis H_4 that related to existence of influence of perception of risk (PR) on the behavioural use intentions (UI) regarding financial service in Tanzania by the university students was dropped. Ultimately, the proposition underlying the hypothesis was disapproved, emphasizing on the ineffectiveness of risk perceptions in influencing behavioural use intentions (IU) for mobile financial transactions by university students in Tanzania.

(e) Results of H_5 relating to association between Facilitative Conditions (FC) and students' behavioural use intentions (IU) for Mobile financial services within universities in Tanzania

Former tests performed on H_5 with regard to the correlation of facilitative conditions (FC) and behavioural intensions to use (IU) of mobile financial services showed a value of the p-statistic as .000 which is adequately lower compared to the minimum recommended ceiling of .05 used in respect of two-tailed tests to indicate whether significant correlational effects exist in between the two variables under examination. This finding is backed by the value of t-statistic which is equal to 3.944 a value that is above the 1.96 minimum threshold recommended for two-sided tests. In this regard, hypothesis H_5 which postulated: In Tanzania the hypothesized facilitation conditions have impactful relationship with behavioural use perceptions in respect of MFT among university students in Tanzania was accepted. The conclusion derived from this observation is supportive conditions surrounding the application of mobile financial transactions have an important bearing to the perceptions of university students as regard to the use of the services.

(f) Results of H_6 related to the association involving Attitude (AT) with behavioural user intent (IU) in respect of mobile financial services among students in Tanzanian universities based in Dar es Salaam.

Correlations tests carried out in relation to H_6 specifically on the relationship between AT and IU on mobile financial transactions gave a value of a p-statistic equal to .000 which is quite smaller compared to maximum acceptable threshold value of .05 used in two-tailed tests hence implying the inherent existence of statistically significant relationship involving the variables namely a significant impact of AT on IU. This assertion is complemented by the fact that the value of t statistic is 6.514 which is greater than the recommended minimum value of 1.96 for two-sided tests in determining if the difference is statistically significant. In this case, hypothesis H_6 which postulated that Attitude (AT) influences behavioural intentions to use (IU) mobile financial services among university students in Tanzania was accepted. The assertive position affirming on the role of AT in influencing behavioural user intentions regarding mobile financial services within students studying in universities in Tanzania was adopted.

On the basis of the findings unearthed in the analysis, it become evident that four factors PU, PE, FC, and AT have emerged as statistically significant predictors of IU as the p-values of these four factors were less than the pre-determinate p level of .05 then the related hypotheses have been accepted. On the other hand, the study has found that latent variables SI and PR are not statistically significant in influencing IU in relation to MFT with the corresponding p-values of 0.784 and 0.439 and t-statistic values of .613 and 1.142 respectively, being outside the boundaries of acceptable ranges of p-value and t-values of .05 and 1. 96 respectively. Hence the decisions to reject their respective hypotheses.

4.3.2 Determination of Mediation Effects

The study included an estimation of and evaluation of mediation impact of Attitude (AT) on the interaction between exogeneous variables utility perceptions (PU) and ease of usage perceptions (PE) with the endogenous variable behavioural mobile financial transactions use

intention (IU) in line with the posited TAM. Examination of the mediation effects from AT in respect of the association involving exogenous variables with endogenous variables used bootstrapping total effects technique (Preacher & Hayes, 2008) to obtain Variance Accounted for (VAF) values as indirect effect expressed as ratio of indirect effects to total effects (Rehman et al., 2019).

(a) *Results of H_7 on Attitude (AT)-Mediated association between Utility Perceptions (PU) and behavioural intentions to use (IU) Mobile financial services by university students in Tanzania*

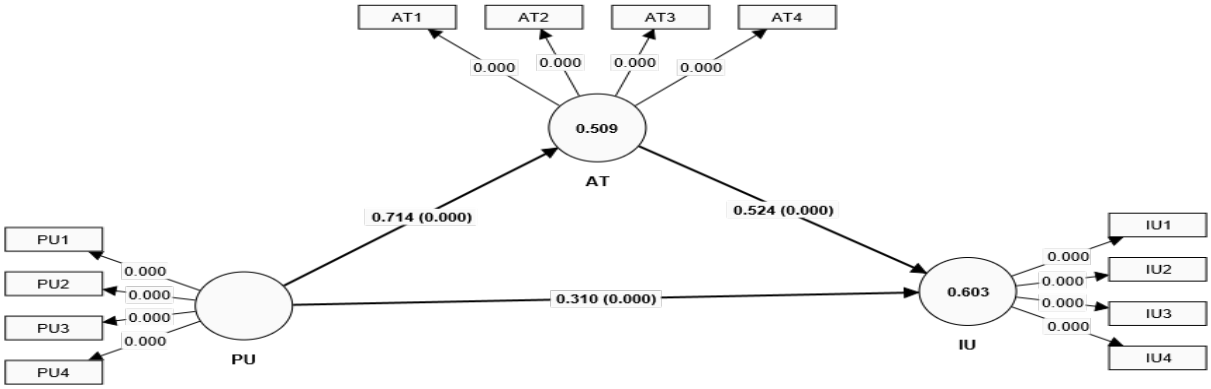
Hypothesis H_7 examined the mediation influence of AT on the association between PU and behavioural intentions to use (IU) mobile financial services by university students in Tanzania. The tests conducted to establish existence of mediation effects are depicted by Figure 4.3. The indirect mediation effects in AT for the association of PU with IU were analyzed and tested. The results of the tests revealed existence of significant indirect effects with a p-statistic value of .000 coupled with a t-value of 8.365 suggesting the presence of mediation effects. In this case, hypothesis H_7 that stated: AT mediates the relation between utility perceptions (PU) and use intentions (IU) for mobile financial transactions by university students in Tanzania was accepted. An observed scenario grounded on the proposition of strong mediation impact of AT on the relationship between the two variables was henceforth cemented.

When the direct impact of PU on IU was tested, a p value of .000 and a value of t-statistic at 5.833 were established, supporting the claim that the mediation effect is partial. Total effects were derived from the results of direct and indirect effects generating a p value of .000 which can be and a t-value of 19.466 supporting the existence of a strong but partial mediating effects exerted

by AT on the association involving the variables PU and IU. Also, since the correlations for direct effect and indirect

Figure 4.3

AT- Mediated Relationship between PU and IU



Note: produced by the Author (2024)

effect are both positive, it can be asserted that AT partly complements partial mediation in explaining how PU influences IU.

Table 4.14

Mediation of AT on Relationship between PU and IU

Effect Type	Effect	Coefficient	T-value	p-value	Remark
Total Effects	PU -> IU	.684	19.466	.000	Significant
Indirect Effects	PU -> AT -> IU	.374	8.365	.000	Significant
Direct Effects	PU -> IU	.310	5.833	.000	Significant
VAF	IE/TE	54.68%			
Conclusion		Moderately Strong Partial Mediation of AT between PU & IU			

Note: compiled by the Author (2024)

What is the nature of Mediation? The nature of mediation in research refers to whether the relationship between an independent variable (IV) and a dependent variable (DV) is explained, in

whole or in part, through a mediating variable (MV). To refine the conclusion statistically, scholars often compute the Variance Accounted For (VAF), which helps determine the strength of the mediation.

Average indirect effect – VAF is calculated as the beta coefficient in terms of the proportion of indirect effect to total effect. In other words, it measures the indirect effects of the two variables as a percentage of indirect effects relative to total effects. As the guiding principle, there is no mediation if the VAF is less than 20%; the mediation is partial if VAF value falls between 20% and 80%; and the mediation is full if is greater than 80% (Ali et al., 2022). In this regard, the computed VAF value of 54% was noted consistent with the stated finding on partial mediation.

(b) *Results of H_8 on Attitude (AT)-Mediated association involving Ease of usage Perception (PE) with Intents to undertakes (IU) with regard to using mobile financial transactions by students in Tanzanian universities*

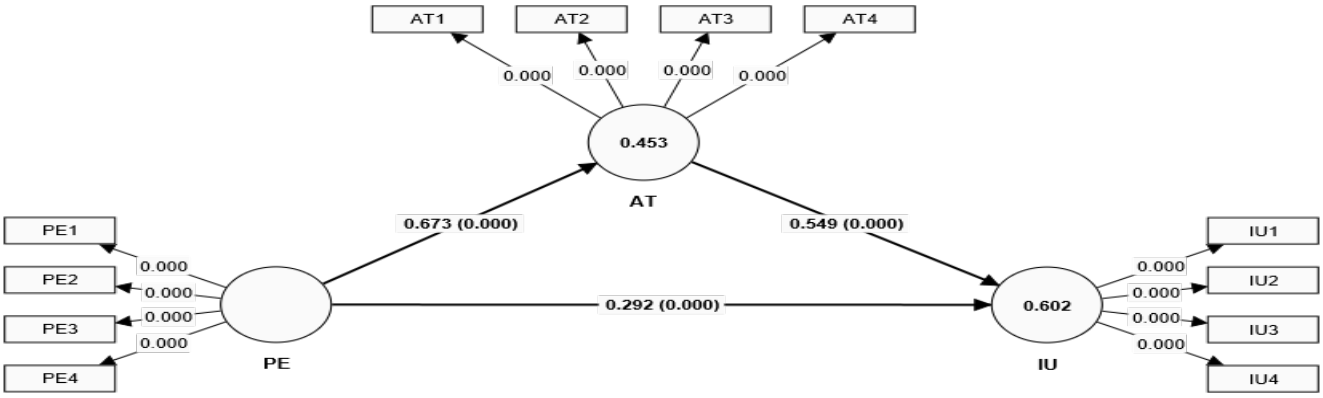
The relationship between PE and IU as depicted in Figure 4.4 was also analysed through mediation analysis in relation to the effect of AT. Power of PE on IU through AT resulted in statistics as shown under Table 4.14 yielding indirect effect of PE on IU as significant with p value of .000 and the t-value was found to be 8.082 at least indicating mediation effect present. Accordingly, H_8 that stated: The attitude (AT) effectively mediated the association of ease of usage perceptions (PE) with behavioural Use Intents (IU) of students in universities regarding mobile financial transactions: the case of Tanzania was accepted.

It was then established that total effect generated a *p* value of .000 and a t-value of 17. 418 with the values of both the direct effect and indirect effect in positive which shows that the mediation that holds on the relationship between PE and IU was partial and complementary. Once

more, partial mediation was confirmed through the calculation of variance accounted for (VAF). The VAF was calculated to be 55.82. This lies between 20 and 80 % thus supporting the claim of strong partial mediation of AT on the association of PE with IU.

Figure 4.4

AT Mediated Relationship between PE and IU



Note: compiled by the Author (2024)

Explanation of this result is that 55.82% of the effects or influence variations of the exogenous construct PE to the endogenous construct IU passes through the intermediate variable AT.

Table 4.15

AT-Mediated Relationship between PE and IU

Type of Effect	Effect	Path Coefficient	T-value	p-value	Remark
Total Effect	PE -> IU	.661	17.418	.000	Significant
Indirect Effect	PE -> AT -> IU	.369	8.082	.000	Significant
Direct Effect	PE -> IU	.292	5.090	.000	Significant
VAF	IE/TE	55.82%			
Conclusion		Moderately Strong Partial Mediation of AT between PU & IU			

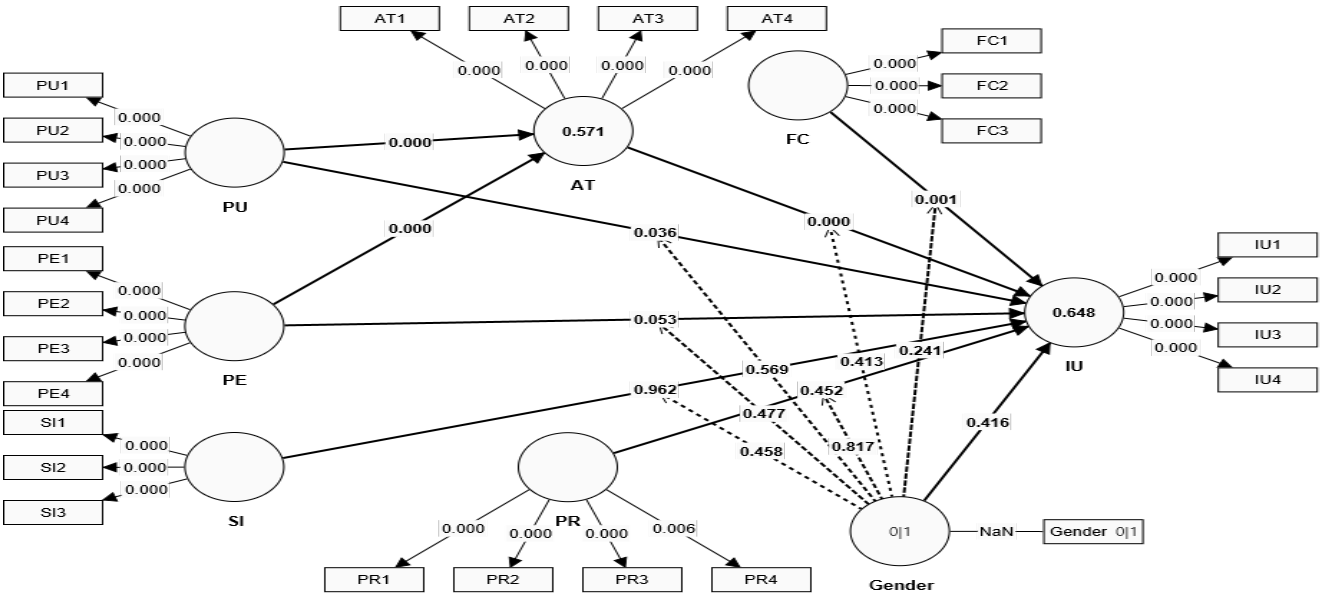
Note: compiled by the Author (2024)

4.3.3 Determination of Moderation Effect

It also explored moderating effects of gender (GE) on the paired associations, with exogenous variables on one side and endogenous variable IU on the other. For the sake of clarity, a moderator is described as a control or causal variable which modifies the nature and size of relationships between independent variables and dependent variables. They often are nominals like gender, race, ethnic group, religion or ordinals like weight, height and age. Using the literature analysis and target population, Gender (GE) was determined to be the moderating variable of most relevance that might be examined. The variable was recoded with 1 being male and 2 being female. A two-tailed test was used since it is not fully ascertained whether the relationship can be higher in males as compared to females and the other way round.

Figure 4.5

Graphical Presentation of Moderation Effects of Gender



Note: prepared by the Author (2024)

Analysis of moderation effects was conducted on six hypotheses H_9 to H_{14} with results as following:

(a) *Results of H_9 regarding Moderating effects of Gender (GE) on the association of Ease of usage perceptions (PE) with Intention to undertakes (IU) by university students in using financial services delivered through mobile devices.*

Table 4.16 below depicts that the significance of moderation of GE on the relationship between PU and IU was insignificant with p-value of .566 which is above the acceptable ceiling of .05 applicable to two-sided tests. The findings are indicative of the fact that no significant divergence exists between the gender dimensions of female and male students in perceiving utility of mobile financial transactions behavioural intentions to use the services. Therefore, hypothesis H_9 that stated: Gender (GE) moderates the association of utility perceptions (PU) with behavioural intentions for use (IU) in undertaking mobile financial services by students in universities located in Dar es Salaam, Tanzania stood rejected. However, even though the moderation effect is insignificant, even a small positive coefficient in the interaction of gender on the association between PU and IU implies that females' influence of PU on MFT use intentions is stronger than males' in students.

Table 4.16

Moderation Effects of Gender on the Association between PU and IU

	Original sample	Sample mean	Std deviation	T statistics	P values
Gender -> IU	-.049	-.049	.060	.813	.416
PU -> IU	.160	.162	.077	2.094	.036
Gender x PU -> IU	.059	.057	.102	.574	.566

Note: produced by the Author (2024)

(b) *Results of H_{10} regarding moderation of Gender (GE) on the association of Ease of usage Perceptions (PE) with behavioural intentions to use (IU) by university students in Tanzanian the use financial services delivered through mobile devices*

Tests that were run on H_{10} to establish moderating impact of GE on the association between Ease of usage perceptions (PE) found the GE did not have moderating impact that could influence or modify the nature and size of the relationship, as p-statistic was .475 which is higher than the maximum threshold of .05. This explains that there are no notable differences in perceptions between male students and their counterparty female students in terms of response regarding use intentions affected by perceptions on ease of usage of mobile financial transactions. In view of such a case, Hypothesis H_{10} that stated: GE moderates PU-IU relationship by university students' perceptions of behavioural intentions to undertake mobile financial transactions in Tanzania was rejected. Nevertheless, it should be noted that, although the moderating effect was rather insufficient, still the value of .071 indicated some slight effects in which the positive coefficient implies that the effect of PE on IU is much higher for females than males, since males were assigned a code of 1 and females a code of 2.

Table 4.17

Moderation Effects of Gender on the Association between PE and IU

	Original sample	Sample mean	Std deviation	T statistics	P values
Gender -> IU	-.049	-.049	.060	.813	.416
PE -> IU	.144	.138	.075	1.934	.053
Gender x PE -> IU	.071	.076	.100	.715	.475

Note: produced by the Author (2024)

(c) *Results of H_{11} regarding Moderation of Gender (GE) on the association of Social inspiration (SI) with behavioural intentions (IU) by university students in Tanzanian the use financial services delivered through mobile devices*

Gender (GE) as a moderational variable on the social inspiration (SI) and IU relationship generated a p value of .463 which is more than the maximum of .05 as indicated in Table 4.18 below. The findings indicate that there was no statistical significance between the gender

categories (males and females) in responding to questions regarding of use intentions that are related to social inspiration regarding the intention to undertake mobile financial transactions. In this regard, Hypothesis H_{11} that stated: gender (GE) as a significant control variable on the influential effects of Social Inspiration (SI) on behavioural intent for undertaking (IU) mobile financial transactions by university students in Tanzania was rejected. The same can be said in respect of the fact that positive sign of the coefficient of .066 suggests that although the effect is rather an insignificant moderating effect, the extant small effect of PE on IU is much higher in females than in males.

Table 4.18

Moderation Effects of Gender on the Association between SI and IU

	Original sample	Sample mean	Std deviation	T statistics	P values
Gender -> IU	-.049	-.049	.060	.813	.416
SI -> IU	-.003	-.001	.068	.049	.961
Gender x SI -> IU	.066	.057	.090	.735	.463

Note: produced by the Author (2024)

(d) *Results of H_{12} regarding Moderation of Gender (GE) on the association of Risk Perception (PR) with behavioural intentions (IU) by university students in Tanzania on the use financial services delivered through mobile devices*

Moderating effects of GE on the interaction between Risk Perception (PR) and Intentions by university students to Use (IU) financial services driven through mobile devices were examined and found to be statistically insignificant. The results of the tests on moderation of GE on the association between the two factors revealed a p-statistic value of .816 regarded as substantially higher than the set acceptable ceiling value of p which is .05 prescribed for two-tailed tests. The results suggested that there exists negligible difference in perceptions as a result of gender

orientation among students in their response with regard to use intentions which are affected by risk perceptions in using mobile financial transactions. Therefore, Hypothesis H_{12} that hypothesized that GE produces moderation effects within the interplay of PR on IU in relation to the adoption of mobile phone-based financial transactions by students within universities in Tanzania was discarded. However as can be noted from Table 4.19 that the sign of the coefficient is positive with a value of .014 though the moderating effect is not significant, the positive signed coefficient indicates that GE impact on the association between PR with IU and is fairly stronger for females than males.

Table 4.19

Moderation Effects of Gender on the Association between PR and IU

	Original sample	Sample mean	Std deviation	T statistics	P values
Gender -> IU	-.049	-.049	.060	.813	.416
PR -> IU	-.039	.028	.052	.749	.454
Gender x PR -> IU	.014	.011	.061	.233	.816

Note: compiled by the Author (2024)

(e) *Results of H_{13} regarding Moderation of Gender (GE) on the association of facilitative conditions (FC) with Intention to undertake (IU) by university students in Tanzania on the use financial services delivered through mobile devices*

Hypothesis $H1_3$ testing: The moderating effect of GE on the interaction between facilitative conditions (FC) and behavioural intentions to use (IU) Mobile financial transactions among university students in Tanzania produced insignificant results. The finding portrayed the fact that the importance of gender as a moderator also did not appear since it had a p value of .242 which was outside an acceptable perimeter value .05 applicable to two-sided tests. The results were suggestive of the fact that negligible differences exist in perceptions between the gender variance

among students' feedback on the use intentions that can be shaped by facilitative conditions regarding the use of mobile financial transactions. In this case, Hypothesis H_{13}that postulated that Gender exhibits moderating impact on the association of the construct FC with the construct IU was rejected and not affirmed. Nevertheless, while the effects were in overall insignificant, the minute effects that exist measured more favourably towards males than females as the coefficient was negative at -.107 derived from the code used for male participants being 1 and female participants 2. As a rule of thumb, the gender category assigned a higher value of coding is reflected to be stronger when the sign of the coefficient is positive and vice versa. Therefore, the insignificant gender (GE)-based moderation effects on the association of FC with IU will be distinctly exhibited in males as compared to their female counter parties.

Table 4.20

Moderation Effects of Gender on the Association between FC and IU

	Original sample	Sample mean	Std deviation	T statistics	P values
FC -> IU	.229	.223	.069	3.311	.001
Gender -> IU	-.049	-.049	.060	.813	.416
Gender x FC -> IU	-.107	-.100	.091	1.169	.242

Note: produced by the Author (2024)

(f) *Results of H_{14} regarding Moderation of Gender (GE) on the association of Attitude (AT) with behavioural intentions (IU) by university students in Tanzania on the use financial services delivered through mobile devices*

Similar to preceding tests on moderation, analysis of moderation impact of Gender (GE) on the interaction between Attitude (AT) and IU was insignificant, with a p-statistic value of .411which considered significantly greater the prescribe maximum threshold of .05 applied to double-sided tests. The results show that male and female students are not significantly different in their response regarding use intents influenced by Attitude in using mobile financial facilities.

It is in this regard that Hypothesis H_{14} that stated: Gender (GE) possesses a moderative role in the interaction of Attitude (AT) with behavioural intents to undertake (IU) mobile financial transactions by university students in Tanzania was rejected, instead of being affirmed. The little moderating consequences of Gender was however, found to be weaker in females when compared to males as the value of the coefficient was negative at -.095.

Table 4.21

Moderation Effects of Gender on the Relationship between AT and IU

	Original sample	Sample mean	Std deviation	T statistics	P values
AT -> IU	.414	.417	.087	4.780	.000
Gender -> IU	-.049	-.049	.060	.813	.416
Gender x AT -> IU	-.095	-.096	.116	.822	.411

Note: Produced by the Author (2024)

4.4 Evaluation of Research Findings

Research findings were discussed in relation to the theoretical and conceptual frameworks adopted especially in relation to the propositions that underpinned the renowned model, the Technology Adoption Model (TAM) and the model which constitutes of an extension that combines both acceptance intents and actual use of technology, the UTAUT are pillars underlying this study. Evaluation also gauges results generated by the study against observations made by prior researchers who explored on the subject. Explanation is given in relation to the expected and unexpected or contradictory findings in reference to previous researches outlined in the literature review. Assessment was made on predicted relationships and their outcomes, the prediction ability inherent in the model as well as the explanatory value of that particular model. Evaluation begins with consideration of the extent to which observations made on demographic attributes of the population impacts the results produced by the study. This is then complemented by an evaluation of 14 hypotheses that were were used to test hypothetical relationships assumed to exist between

various exogeneous factors and the endogenous construct, the behavioural intention of students in universities to use mobile financial transactions. The relationships were grouped under three specific categories of direct relationships; mediated relationships, and moderating effects on assumed relationships. This section presents the findings of each hypothesis and their validity in relation to literature.

4.4.1 Evaluation of Population Demographics

Another notable observation in the population attributes of the segment under the study was the significant presence of existing users of mobile financial transactions. The study also found a significant increment in the percentage of people who are now using at least one form of mobile financial transactions when compared with findings of earlier studies and observations regarding the other general population. The results showed that as much as 65 per cent of the participants were utilizing the most sophisticated form of mobile financial transactions- mobile banking services, the other forms of mobile money and mobile payment facilities used by the rest of the participants were 21 percent and 14 percent respectively. This implies that financial services adoption is moving away from the observation made by Ndekwa et al (2018) who reported low adoption of financial services by university students in Tanzania. It also diverges from the statistics as per TCRA (2021) and BOT (2021) which showed 61 percent of users associated with mobile financial transactions related to mobile money services. This is probably due to changes in behaviour of participants overtime. The increase in the number of smartphones and experiences acquired in the use of various services delivered through the mobile digital platforms might have contributed to this increase. An alternative explanation may as well be attributed to the characteristics attached to the population at hand, where the average age of the participants lies within an age group of 21-30 which constitutes largely of youths. The age characteristic is

complemented by the high literacy levels. University students are clearly known for their higher literacy rates relative to other populations. Younger age and higher levels of literacy are generally perceived as having positive correlation with adoption of new technologies (Elhajjar & Ouida,2020; Dhingra & Gupta, 2020) and therefore may have contributed significantly to this surge.

4.4.2 Evaluation of Results in Direct Relationships

Six hypotheses were developed to test direct association of exogeneous latent variables PE, PU, FC, SI; AT, and PR6, with the endogenous latent variable IU which respectively examined the consequential impact of ease of usage and utility perceptions; enabling conditions, societal pressures, and risk perception on adoption intentions towards the services delivered through mobile devices. These are the direct interactions between the various pairs of exogenous and endogenous latent variables.

(a) Evaluation of the Results of H_1 regarding the interaction of Utility Perceptions (PU) with Use Intentions (IU) by University Students in Tanzania in relations to Mobile financial services.

Hypothesis one (H_1) aimed at establishing the direct impact which Utility Perception (PU) had on Behavioural Intention for Use (IU) of mobile financial transactions. This produced a p-value of .000 the result which is less than the maximum acceptable threshold of .05 for double sided tests. It also generated a t value of 3.725 which is also within above the minimum boundary of 1.96 for the same kind of study design. These results mean that PU has statistically significant impact on IU and thus the hypothesized association between PU and IU regarding the use mobile financial transactions among university students in Tanzania is accepted. This empirical observation corroborates studies by other scholars which Davis (1989) himself and other

researchers like Govender and Sihlali (2014); Milly et al (2021) among others who found out Utility Perceptions to be an important contributory factor in the intention to undertake new technologies and technology enabled services. However, a very few researchers and authors like Rehman et al. (2019) had seen some of their findings showing that perceive utility does not pose any significant or impactful influence on behavioural intentd to undertake mobile phone-based banking. Utility Perceptions as the most influential predictor of behavioural intents for undertaking mobile financial transactions indicates that people will use the service when they can understand tangible benefits it will have on them.

(b) Evaluation of Results of H_2 in respect of the relationship that associates Ease of usage Perceptions (PE) with Behavioural Use Intentions (IU) by University Students in Tanzania in respect of Mobile financial services

The second hypothesis (H_2) aimed at validating direct interaction between ease of usage perception (PE) with behavioural intents for Use (IU) mobile phone-based financial services among university students in Tanzania. The second hypothesis H_2 was also supported by the outcomes of the tests conducted where the p- value was .000 which is less than the maximum acceptable value of .05 for double-sided tests. This also applies to the t value which was found to be 2.965 which is also higher than the minimum acceptable boundary of 1.96 for same kind of research design which are two tailed. The statistical results caused acceptance of the hypothesis that presupposed presence of statistical influence within the relationship. This means that the impact of PE on IU in respect of use of Mobile financial transactions is statistically significant. The results of the study were found to be in alignment with those of previous studies that were related to this model (Davis 1989; Himel et al. 2021; Makanyeza 2017; Elhajjar & Ouaida 2020; Hanafizadeh et al. 2014; Milly et al. 2021). This denotes that perceptions of potential users are

strongly influenced by beliefs among students that the use of mobile financial transactions would be simple to understand and apply to the extent that no extra efforts would be required (Rehman et al., 2019). When discussing the results of the tests, Elhajjar and Ouaida (2020) noted the disproportionate impact of ease of usage perceptions as these indicators grow due to heightened literacy and awareness levels meaning that it is easier for literate users who understand the service to switch over to mobile financial transactions. A similar argument was also used by Tiwari et al. (2021) who associated the observed positive results with participants' boosted confidence resulting from the use of smartphones and different applications which later influenced the easiness of the usability of the service.

(c) Evaluation of Results on H_3 in respect of the association of Social inspiration (SI) with behavioural Intentions by Students in universities Tanzania regarding Mobile financial services

The hypothesis (H_3) developed to conceptualise the statistical significance of the consequential effects of Social inspiration (SI) on intentions of students to undertake (IU) mobile financial services. The failure of the tests was observed where the p-value was found to be .540 substantially greater than the ceiling threshold of .005 recommended for two-sided measurements. A complementary metric is the t-value which generated the value of .613 similarly falling outside the perimeter of recommended threshold of 1.96 affirming to proposition of the hypothesis that heralded on absence of impact of SI on IU. The results revealed that the association was not substantially significant which therefore called for hypothesis to be rejected rather than being affirmed. This means that SI does not impact the potential the intentions of potential users of Mobile financial transactions to adopt the service. People are less likely to be convinced by their relatives and friends on whether or not to use mobile financial transactions. This is no new

discovery, as literature review showed other prior empirical studies on the topic that also had similar results wherein nearly half of the studies registered significant effects (Dhingra & Gupta, 2020; Islam et al., 2019; Savi´c & Pešterac, 2020; Kaplan & Gürbüz, 2021; Marpaung et al., 2022).

Some possible reasons why the results of impact significance are low may be inferred from the claims of the proponents of the model Venkatesh and Davis (2000) who related social inspiration (SI) with early stages of adoption of new technology and especially owing to the limited experience in relation to the new technology (Belsoska et al., 2020). Findings from the empirical results indicated that majority of the students use smartphone and this proved that most students have enough exposure in the use of mobile financial transactions hence feel confident to make personal decisions regarding the use of the service without reference or guidance by the opinions of close allies as stated by Tiwari et al. (2021). One of the most common explanations for the lack of significance of the influential effects arising from social factors in the studied issue are that the customer has a desire to make decision by themselves on matters of money which are considers to be very personal and even confidential (Oliveira et al. 2014; Raza et al., 2018; Iskandar et al., 2020; Singh & Srivastava, 2020).

(d) Evaluation of the Results of H_4 in respect of the association of Risk Perceptions (PR) with Intentions by University Students in Tanzania to Use (IU) Mobile financial services.

The fourth hypothesis (H4) examined whether Risk Perception (PR) has an impact on student intention to undertake (IU) financial services delivered through mobile devices. A p-value of .254 was observed which is higher than the acceptable ceiling of .05 an indication that the interactions between the two variables are statistically weak. Equally indicative statistics was the t-value of 1.142 which was below the minimum acceptable floor of 1.96 that suggest lack of statistical interplay between latent variables, PR and IU. Results generated by these tests

culminated into rejection of the hypothesis on account of insignificant statistical influence. Such findings are opposed from the outcomes recorded in most of the previous researches conducted. Fewer studies investigated the impact of PR on IU in relation to technology-based services compared to the other variables considered herein but most of the studies conducted proved that there exists a negative association involving PR with IU (Rehman et al., 2019; Iskandar et al., 2020; Milly & Ridwan, 2021; Tiwari et al. 2021). Nonetheless, the outcomes of the present inquiry also concur with study results generated by Nurlaily et al. (2020) who explored on the risk concerns among generation z in respect of intentions on continued use for FinTech where they found very weak influence implying a statistically insignificant relationship. They (ibid) attributed such phenomenon to generational attributes of paying less attention with regard to loss of privacy to personal data as a result of limited experience. The difference in paradoxical results regarding this construct may as well be the result of the intellectual composition of the study population- young university students with literate levels. University students are a favorable population segment with high literacy and the obvious benefits of young people, which is a favorable condition for high risk-taking behavior and the subsequent adoption of the technology (Riddell & Song, 2012; Alsayed et al., 2020).

The inconsistencies in the findings regarding the weak explanatory power of risk perceptions on intentions to use mobile financial transactions could be elaborated by the developments in perceptions generated in accordance with the changes in experience with use. Nonetheless, the above argument is somehow undermined by the results of the Finscope 2023 survey which is a supply side research into financial services. The survey observed that the proportion of adult population that uses banking financial services in Tanzania has gone up moderately measured from 17 percent in 2017 to 22 percent in 2023 with the growth being spurred

mainly by banking services provided through mobile phones. Nonetheless, the fact that the university students that have adopted the mobile banking services have done so at an exponential rate clearly suggests that the exponential growth is more likely to be a product of change in the population segment rather than a change in behaviour over time.

A few other explanations concerning the fact that Risk Perception does not impact the intents for adoption of mobile phone-driven financial transactions is linked to the trust that users of financial services have on the strengths and capabilities of service providers in developing and maintaining systems that offer some assurance on security and confidentiality of data and information. For instance, the insignificant effect observed by Singh and Srivastava (2020) was explained to stem from the customers' confidence in the security performance of the bank and overall scant interest in the potential dangers in using mobile banking service. However, Farah et al. (2018) give an alternative explanation where they state that the insignificant effects of Risk Perception are traced to the structure of the model regarding failure to consider individual use intentions and other individual perceptions of risk. They (ibid) proposed that Risk Perception should be replaced with a new construct, which is referred to as perceived credibility which is conceived to incorporate an individual's beliefs in regard to trust, security and privacy in a technology-based application.

(e) Evaluation of the Results of H_5 regarding the impact that Facilitative conditions (FC) exert on Intentions by University Students in Tanzania to Use (IU) Mobile financial services

Hypothesis 5 aimed to test the influential effect of Facilitative circumstances (FC) on the intents of students to use (IU) mobile financial services. The p-value calculated from the test is .000 which is less than threshold of .05 as well as the t-value of 3.944 which is clearly larger than the minimum significance level of 1.96 meaning that the FC does have a statistically substantial

influence on IU and this therefore leads to the acceptance of the hypothesis that construed existence of a strong association of FC on IU. These findings therefore imply that the elements of supportive environment such as access to basic infrastructure, technical support and knowledge are likely to exert a bearing on a person's attitude as regards usage of mobile financial transactions.

The results were in accordance with the results indicated in previous studies because most of the previous studies found significantly positive association between facilitative conditions and behavioural intention to undertake technology driven services (Dhingra & Gupta 2020; Islam et al., 2019; Iskandar et al., 2020; Kaplan & Gürbüz, 2021; Raza et al., 2019; Savic & Pešterac 202). But only a relatively small number of empirical studies did not show significant effects (Farah et al., 2018; Kwateng et al., 2019; Marpaung et al., 2022; Rachmawati et al., 2020; Trinh et al., 2020). This means that in deciding whether or not use Mobile financial transactions, people are inspired by the availability of supportive environment and facilities.

(f) Evaluation of Results on tests conducted in respect of H_6 regarding the consequential influence of Attitude (AT) on the Intentions of university students to undertake (IU) mobile financial services in Tanzania

Another component that was explored in the study was the direct effects of Attitude (AT) on the purchase intention (IU) by university students in respect of mobile financial services which is denoted as Hypothesis six (H_6). Thus, the test carried out under this hypothesis results in a p-value of .000 which is also within the acceptable boundary value of .05 for studies this design. Corollary, the t-value was 6.514 which above statistics for the threshold 1.96 signifying a statistically significant positive influence of AT on IU, and therefore the hypothesis received acceptance. The finding is similar to what has been concluded in other studies relating to the acceptance of technology (Elhajjar & Ouaida, 2020; Hong 2019; Rehman et al., 2019; Siyal et al.,

2019; Gbongli & Amedjonekou, 2019; Himel et al., 2021). The result of this test means that an individual's inclination towards mobile financial transactions has an important bearing on the individual behavioural intention to undertake the service that is people with positive inclination have greater chances of adopting the service and vice versa.

4.4.3 Evaluation of Results on Mediated Effects

Two mediated models were proposed to explore the mediation effects sprouting from the factor of attitude (AT) on relationships that associate exogenous latent variables PU and PE with the endogenous latent variable IU. The AT used as a mediating variable was decided by its growing tendency to be used as a mediator, particularly in a series of studies reported in the literature where the state of behavioural adoption of technology is mediated through the AT and a large number of them were shown to be significant (Souiden et al., 2020).

(a) *Evaluation of Results of Hypothesis H_7 regarding the Attitude (AT)-mediated association of Utility Perception (PU) with behavioural intentions by university students (IU) to undertake mobile financial services*

Hypothesis seven (H_7) tested the effects of AT moderating the association of Utility Perceptions (PU) with Intention to undertake (IU) mobile financial services. Tests specifically sought to establish the existence, nature and magnitude of the mediation effects of AT on the association of exogenous variables with endogenous variables. Tests conducted to establish direct relationship generated a p-statistic of .000 and a t-statistic of 5.833 suggesting existence of statistically significant direct association between of the autonomous latent construct PU with the reliant latent variable IU. Indirect effects were also statistically significant as evident from the p-value of .000 and t-value of 8.365. The variance accounted for (VAF) ratio of 54.688% is indicative of partial mediation of AT on the association of PU with IU. The hypothesis can thus be said to be

accepted. This finding is congruent to the mediation effect of AT as predicted by Venkatesh and Davis (2000) – the mediating role of AT in impacting the relationship associating social norms with behavioural intention to undertake technology based financial transactions. Rao and Troshani (2007), Gbongli and Amedjonekou (2019), and Giovanis et al. (2019) are some of the authors who reported similar findings. It is for this that AT amplifies the impact of Utility Perceptions to students' IU for Mobile financial transactions.

(b) *Evaluation of Test Results in respect of Hypothesis H_8 on the Effects of Attitude (AT) in mediating the association between Ease of usage perceptions (PE) and behavioural intentions (IU)by university students to undertake mobile financial services.*

Hypothesis 8 (H_8) was about assessment of the effects of mediation of Attitude (AT) on the interaction of Ease of usage Perceptions (PE) on intents for undertaking (IU) of mobile financial services among university students. Furthermore, much like the case of PU, direct and indirect mediating implications of AT across the association of PE with IU were also revealed as statistically strong considering the realized value of p-statistic of .000 which clearly noted to be below the maximum acceptable value of .05 thus accepted assertion of the hypothesis. Likewise, the t-values asserted similar scenario as evidenced where the values were 5.090 and 8.082 for direct and indirect effects respectively both being greater than the minimum threshold of 1.96. The VAF value was 55.82% translated into Moderately Strong Partial Mediation of AT within the interaction of the exogenous variable PE with the endogenous variable IU. This strong mediating implications of Attitude on the association of ease of usage perceptions with use intention on mobile financial transactions was found to be consistent with what was observed by Hong (2019). Generally, the finding suggests that the participant's supportive or antagonising inclination

regarding the significance of the said services augments or decreases the impact created by ease of usage perceptions on the intentions for applying the technology driven services.

4.4.4 Evaluation of Results on Moderation Effects

In testing GE as a moderating variable of the relationships between a diverse set of selected exogenous latent constructs and the earmarked endogenous latent variable IU, the study involved testing of hypotheses H_9 to H_{14} which are related to hypotheses corresponding with the bearings of PU, PE, SI, PR, FC and AT on IU respectively. None of the tests results revealed significant moderating role for Gender on the correlation between the exogenous variables and their consequential influence on the intents for adopting the technology-based applications inclusive of mobile financial transactions. This was in line with the revelations of numerous previous studies that were focused on the subject of adoption of technologies including Crabbe et al. (2009); Faqih and Jaradat (2015); Makanyeza (2017); Park et al. (2019); and Dhingra and Gupta (2020). Examination of the impact of moderation of Gender on the explanatory capability within the model expressed in terms of R^2 of the dependent variable IU indicated slight increase from .643 before application of the moderator GE to .646 after applying the moderator. Articulate descriptions of the specific test results are as highlighted hereunder.

(a) *Evaluation of Test Results on H_9 regarding the Effects of Gender (GE) in moderating the association between Utility Perceptions (PU) and behavioural use intentions (IU) in respect of Mobile financial services by university students in Tanzania*

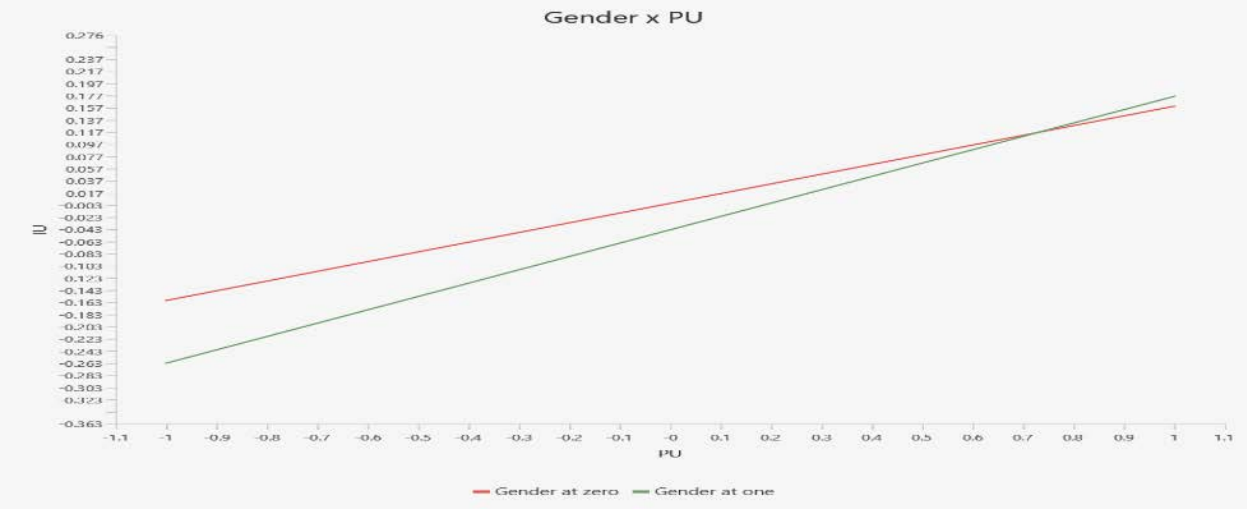
Hypothesis H_9 stated that Gender (GE) has no moderation effect on the interaction between utility perceptions (PU) and behavioural use intentions (IU) by students in universities regarding Mobile financial services. The test on the proposed hypothesis failed to show any significant moderation in the gender group given that the p-value was .475 well higher than the maximum

recommended benchmark of .05. In similar vein, the t-statistic value of .715 which was significantly below the minimum threshold of 1.96 hence the hypothesis was rejected. It means that gender difference has no bearing in influencing the magnitude of the influence of utility perceptions on the use intentions as far as mobile financial transactions are concerned. A probable cause of this phenomenon is the level of power given to the female child over the recent decades that resulted in similar exposure in regard to utilization of technological equipment for both young men and young women. Dhingra and Gupta (2020) agree to this and explained the little contribution of gender as having the same experience in undertaking mobile phone-based banking transactions that culminated into familiarity with the service for both gender categories.

Even though the value of the interaction is marginal and of little importance, the coefficient is still positive .059 shows that the effect of PU on IU in female students is slightly greater than that with male students. This finding tells us that despite the overall impact being minor, differences are still prevalent in the perceptions within potential users regarding utility of financial

Figure 4.6

Slope Analysis on Moderation Effects of Gender on the PU-IU Relationship



Note: produced by the Author (2024)

services between male and female participants with female student influenced more highly by attributes of utility than their male counterparties. The interpretation arises from the way of assignment of the measurement codes where male candidates were assigned a code of 1 and females a code of 2. Therefore, positive signs of coefficient is associated with a stronger influence in females whose code is higher than male participant with a code of 1. This further insight concerning disparities in the influence partially corroborate the findings uncovered from the study by Glavee-Geo et al. (2017) who also demonstrated that females were more exposed to the influence of the PU on the AT than males.

Based on Figure 4.6, simple slopes suggested existence of positive influence of utility perceptions on Intentions to undertake mobile financial transactions as the slopes are slanting upwards from the left side to the right side. While the findings suggested existence of insignificant gender dissimilarity between the perceptions of males from those of females as regards to role of utility of mobile financial transactions and its influence on adoption, the graphic presentation indicates that the influence of UP on IU is stronger in females (represented by one) whose line is steeper than that of male students.

(b) *Evaluation of Test Results in respect of H_{10} regarding the Effects of Gender (GE) in moderating the association between Ease of usage perceptions (PE) and behavioural use intentions (IU) by students in universities in respect of Mobile financial services*

Hypothesis H10- involving assessment of moderation effects of Gender on the association between PE and IU was also tested but produced outputs with no significance due to the fact that the p-value was .475 higher than .05 and t-value of .715 substantially below the acceptable minimum threshold of 1.96. In that regard, the finding called for rejecting the suggested hypothesis that hypothesized of existence of moderation effects of the gender on the interaction between the

two latent variables. The test outcomes of the tests mean that male and female students hold almost similar perception around the association of the variable ease of usage of mobile financial services with that which regards the decision for the student to use the services. Nonetheless, this small impact was still positive since the intercept of the value was .071 indicates that the impact generated by use perceptions (PE) on adoption intentions (IU) exert a slightly stronger effect on females as compared to males. Such results in terms of greater impact of PE on IU for women than men in terms of PE on IU for mobile financial transactions use was also reported by Riquelme and Rios (2010) in respect of mobile banking. Despite the above studies there were other studies which had no significant moderating effects on intention for use of technology (Faqih & Jaradat, 2015). The reason for the similar responses of male and female students and, therefore, the insignificant statistically insignificant differences in the results of the tests on Utility Perceptions are the same: students are familiar with smartphones and their applications due to the experience of using these devices (Dhingra & Gupta, 2020).

Figure 4.7

Slope Analysis on Moderation Effects of Gender on PE-IU Relationship

*Note***:** produced by the Author (2024)

The graphical representation on Figure 4.7 demonstrates a positive relationship associating Ease of usage Perceptions (PE) with behavioural intention to undertake (IU) mobile financial services as the slopes are slanting upwards from left to right. Despite the general conclusion on insignificant effects of gender difference between males and females as regards to their perception on ease of usage of mobile financial transactions, the consequences of the variable PE on IU are higher in females (represented by one) whose line is steeper compared to that of male counterparties (represented by zero). This means that female students are slightly more likely to be influenced by the ease of usage features associated with Mobile financial transactions than their male counterparties.

(c) *Evaluation of Test Results in respect of H_{11} regarding moderation impacts of Gender (GE) on the interaction between Social inspiration (SI) and behavioural intentions by students in universities to use (IU) mobile financial services*

The eleventh hypothesis H_{11} was concerning the analysis of moderation effect of Gender (GE) and the effects of social inspiration (SI) exerts on the construct of behavioural intents (IU) of university students in Tanzania to adopt mobile financial services. The tests revealed that GE had no considerable mediating effects on the association between SI and IU owing to the fact that the p-statistic value was .463 which is significantly bigger than the acceptable benchmark threshold of .05. In the same stance, the results indicated a t-statistic value of .735 substantiating the hypothesized views on the absence of disparities in the influence of social effects in the use intents for mobile financial transactions by male and female students. Previous research has found similar outcomes in the absence or insubstantial differences across gender moderation on the interplay of the variable social inspiration with the endogenous variable in respect of prospective users intents to adopt the technological application (Kwateng, et al., 2018; Goularte & Zilber, 2020). The

evidence of minimal effects can be attributed to exposure of male and female students to smartphones and their applications being similar given that they are both exposed owing to usage experience (Dhingra & Gupta, 2020).

The positive value of the intercept stood at .066 explaining the minor differences in SI on IU being largely notable in females relative to males. This is also supported by the graphical representation in the slope analysis under Figure 4.8 that indicates the line representing zero is flat while that which represents one is steeply slanging upwards. This means that the consequences of social inspiration on intentions for undertaking mobile financial transactions is weaker in male students but stronger in female students.

Figure 4.8

Slope Analysis on Moderation Effects of Gender on SI-IU Relationship

Note: compiled by the Author (2024)

(d) *Evaluation of Test Results in respect of H_{12} regarding Moderating of Effects of Gender (GE) on the association between Risk Perceptions (PR) and behavioural intentions by students in universities to use (IU) mobile financial services*

H_{12} assessed whether GE could moderate the relation between the PR and the IU of university students in Tanzania regarding utilisation of mobile phone-based financial services. While effects

of Gender on the relationship of PR to IU was found to be insignificant with the value of the p-statistic of .816 which is higher than the maximum acceptable threshold of .05. Likewise, the value of t-statistic signified a weak gender-based moderation effects on the association of risk perceptions with mobile financial transactions use intentions. A similarity in technology-use perceptions in the female and male groups was found in the current study and in most other studies that defined similarity in the perceptions of technology use between male and female participants. An example of such kind of study is work of Glavee-Geo et al. (2017) which like others, the author discovered marginal gender-based moderation effects on the PR-IU associateship.

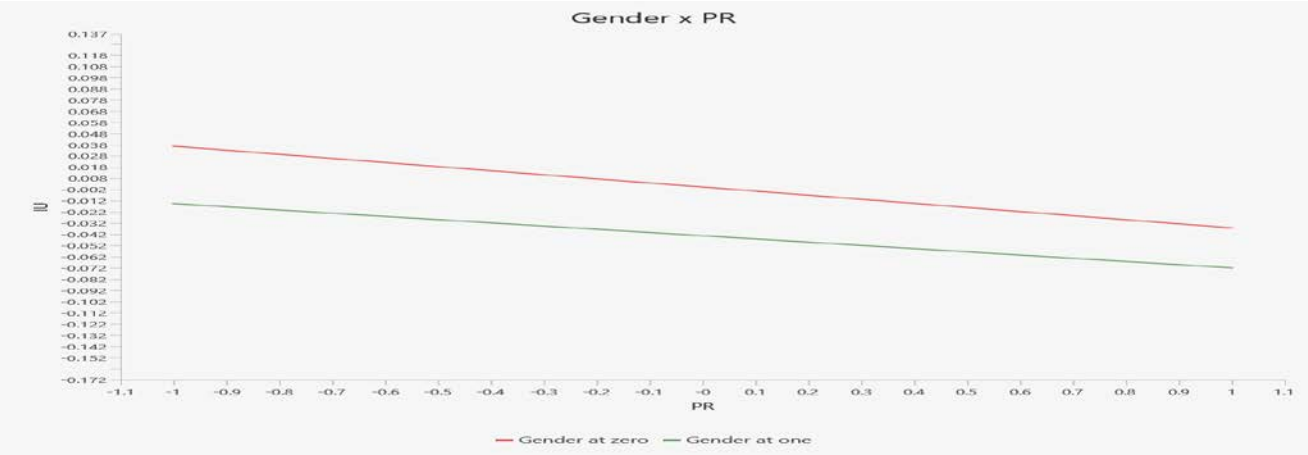
The positive value of the intercept, though representing insignificant effects, it is positive .014 suggestive of the fact that the interplay governing variables PR and IU is higher for the female gender than males. Nurlaily et al. (2020) in their examination of moderating effect of gender as a determinant of continued use intention of Generation Z related to FinTech discovered significance of gender as moderator in relationship between risk perception and continued intention for use of FinTech. In contrast to this finding, they (ibid) further found relatively stronger effects of Risk Perception concerns in males than females. The same reason regarding observation of a similar exposure to smartphones and applications by female and male participants and thus their familiarity with the technology as conveyed by Dhingra & Gupta, 2020 would be applicable to this case. The results on absence of moderation effects on the relationship between PR and IU is demonstrated by graphical presentation of the slope analysis under Figure 4.9.

The graphical representation of the slope analysis under Figure 4.9 demonstrates absence of gender-based moderation effects within the relationship involving Risk Perception (PR) with intentions to undertake (IU) mobile phone-based financial transactions as lines both lines are parallel and gently slating downwards from left to right. The results are supportive of the assertion

that Risk Perception is of no impact on MFT use intentions in not only its own right but even when segregated by gender dimensions.

Figure 4.9

Slope Analysis on Moderation Effects of Gender on PR-IU Relationship



Note: produced by the Author (2024)

(e) *Evaluation of Test Results in respect of H_{13} regarding Effects of Gender (GE) in Moderating the association between Facilitative conditions (FC) and behavioural use intentions by students in universities to use (IU) Mobile financial services*

The moderating role of Gender (GE) on the correlation between Facilitative conditions (FC) and Intention to undertake (IU) of university students in Tanzania to use mobile financial services was tested under Hypothesis thirteen (H_{13}). GE was found to bear no significant moderating effect in relation to the effects of FC on IU. This suggests that both male and female students are equally influenced in perceptions towards the consequences of facilitative circumstances on decisions of whether to make use mobile financial transactions. This insight is drawn from similarity in exposure to new technologies such as smart phones which has significantly reduced the gap between the perceptions of male and female adoption (Goularte & Zilber, 2020).

However, the negative value of intercept which is -.107 which is rather insignificant, is indicative of differences in the perceptions where the influence of facilitating condition is much stronger in male participants compared to their female counterparts. This finding is in contrast with the observation by

Figure 4.10

Slope Analysis on the Moderation Effects of Gender on FC-IU Relationship

Note: compiled by the Author (2024)

Kwateng, et al. (2018) as well as Goularte and Zilber (2020) who posited some moderation effects of Gender on relationship that involves FC with behavioural intent for use of technology and noted females having more tendency to rely on external support (FC) than males (Kwateng, et al., 2018). This is also likely to be the result of heightened confidence in females following exposures to smart phone use over time as explained in preceding factors, supported by the findings by Dhingra and Gupta (2020).

Despite the insignificant statistical moderating effects of FC on IU, the slope analysis under figure 4.10 demonstrates upward slanting lines with a line representing zero (males) much steeper

than that which represents one (female). This phenomenon is suggestive of stronger positive influence of facilitative conditions on behavioural MFT use intentions among males than among females. It implies that male students are much more likely to be influenced by facilitative conditions in their perceptions on MFT adoption intentions as compared to their female counterparties.

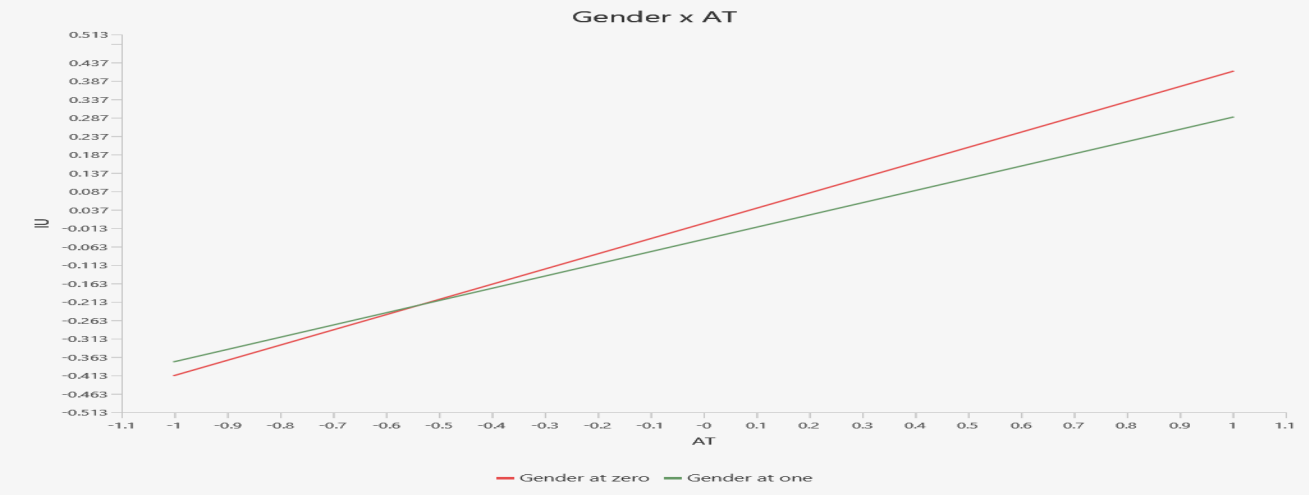
(f) *Evaluation of Test Results in respect of H_{14} regarding the Effects of Gender (GE) in Moderating the association between Attitude (AT) and behavioural use intentions (IU) by students in universities related to Mobile financial services*

H_{14} investigated the moderating effects of Gender (GE) on the association of Attitude (AT) with behavioural use intents within the minds of university students in Tanzania to use Mobile financial transactions. Similar to observed results in the preceding relationships, the tests run in respect of moderating influence of Gender (GE) on the association between the latent variables AT and IU were examined and demonstrated no significant moderating effects of gender, revealing the sample t-value and p-value of .822 and .411 respectively. Such results point to the fact that the perceptions in terms of the role of attitude on the decision to use mobile financial transactions are uniform across gender groups. The test results were in alignment with the work of Ogutu et al. (2014) who also noted that moderator variables such as gender did not impact on the correlation between attitude as regards to intentions on internet-based advertising and purchase. However, the insignificant GE moderating effects in this respect was the opposite of their original formulation by Venkatesh et al. (2000) that hypothesized that gender difference would lead to stronger effects of AT on IU in males than females. Differences in the findings from the previous studies can also be explained by similar elevated exposure to technological applications in both the male and female groups.

The graphical representation of the slope analysis regarding moderation effects of AT on IU under Figure 4.11 supports the assertion on insignificant influence of gender since the differences in the slopes of the lines representing the two gender dimensions, male and female, was marginal. Nevertheless, the line representing zero (males) was much steeper as compared to that which represents one (female), implying that male students are slightly more inclined to be influenced by AT in their adoption intentions as compared to their female counterparties.

Figure 4.11

Slope Analysis on Moderation Effects of Gender on AT-IU Relationship



*Note***:** compiled by the Author (2024)

4.4.5 Evaluation of the Model's Explanatory Power

The model deployed in this study was also assessed regarding its explanatory capabilities using the coefficient of determination or variance R^2, explained in the endogenous latent variables namely AT and IU. Assuming an acceptable minimum R^2 of .10 recommended by Hair et al. (2021), the evaluation came with the results that the model is capable of adequately explaining variations in dependent variables quite satisfactorily as evidenced by high values of R^2 which were .571 and .644 for the two endogenous variables AT and IU respectively. The above statistics

indicate that the exogenous latent variables PU and PE explain 57.1% of the variances in the endogenous factor AT; while autonomous latent factors PU, PE, SI, PR, FC and AT can explain about 64.4 % of variations found within the dependent latent construct IU. Gauged on recommended thresholds, the explanatory potential of the model was moderate. Such results and conclusions are drawn from the calibration by Rehman et al. (2018) who classified values of R^2 in groups of .0 - .25 as weak; .25 - .75 as moderate and higher than .75 as strong. The comprehensiveness of the 64.4 percent is also considered sufficient and compares well with the findings of previously conducted studies like Sharma (2019) with value of R^2 of 65. 4%; Baabdullah et al. (2019) with R^2 of 58%; Venkatesh et al. (2003) with R^2 of 56%; and Akturan and Tezcan (2012) with R^2 value of 52. 9%. However, the R^2 for these models is as high as 76.9 % have also been observed for example Singh and Srivastava (2018).

A discussion on the effects size based on F^2 revealed that exogenous latent variables FC, PE and had medium effects on endogenous variable AT. The assessment of the effect size in accordance with Cohen (1988)'s classification of bands, F^2 can be classified in three segments of small effect size where F^2 ranges from 0.02 to 0.15; medium effect size with F^2 ranging from 0.15 to– 0.35; and large effect size with F^2 values 0.35 PU and above (Hair et al. ,2021). In determination of effect of size of the autonomous factors on the dependent variable AT, values of F^2 were .70 representing PE and .191 representing PU, translated into small and medium effect size respectively. Likewise, F^2 values for exogenous latent variables determining the endogenous variable IU, the effect sizes for AT, FC, PE and PU fell under the value of 0. 15 – .35 meaning that the endogenous variable IU is with a medium effect size on the exogenous variables while as PR and SI had their F^2 values less than .02 indicating negligible effect size on the endogenous variable IU. This means the impact of removing a particular construct among the variables AT, FC, PE or

PU would result in moderate impact whereas the removal of the constructs SI or PR would have no impact in the results of the endogenous variable.

4.4.6 Evaluation of Model's Predictive Power

Analysis performed using determination of predictive power using Stone-Geisser's Q^2 applied to both endogenous variables AT and IU revealed practically very strong predictive relevance with Q^2 values of .597 and .575 respectively. Since the computed values were significantly higher than the minimum floor of 0.0 ($Q^2 > 0$), the requirement was met, thereby affirming presence of predictive power. Besides, the predictive strength of the model in terms of Q^2 values was deemed fairly high compared to that of some of the previous models including Sobaih and Elshaer (2022) who reported a Q^2 value of .314 and Alhajjaj (2021) with a Q^2 value of .492. The model's predictive power, measured on the basis of Root Mean Square Error (RMSE), was also satisfactory with most (7/8) indicators showing RMSE values which were substantially lower compared to the prescribed LM benchmarks, indicating that the model at hand had moderate strength for prediction.

4.4.7 Corroboration of Results with Prior Study Results

The overall comparative view of the results of the study in relations to existing literature regarding the hypothesized phenomena revealed mixed directions. While results of some hypotheses corroborated positively with prior study findings, others were largely in contrast. Hypotheses whose outcomes were in agreement with results of previous studies include H1, H2, H5 and H6 in the direct relationship; as well as H7 and H8 in the mediation analysis. H1 affirmed the outcomes of the studies by Davis (1989); El Hajjar & Ouaida (2020); Milly et al (2021) and Himel et al. (2021) who observed the crucial role of utility features in driving adoption intentions. Likewise, H2 affirmed observations by Davis (1989); Himel et al. (2021); Makanyeza (2017);

Elhajjar and Ouaida (2020); and Milly et al. (2021) on the importance of usage simplicity perceptions in influencing adoption intents.

Other positively corroborated hypothesis was in respect of the role of facilitative conditions which had been pointed out by Iskandar et al. (2020); Kaplan and Gürbüz (2021); Raza et al. (2019); and Savic and Pešterac (2022). In the same vein, the study highlighted on the role of attitude in dictating adoption intentions both as an independent predictor factor as well as a mediating variable. This finding corroborated highly with the findings Elhajjar and Ouaida (2020); Hong (2019); Siyal et al. (2019); Gbongli and Amedjonekou (2019) and Himel et al. (2021); and Gbongli and Amedjonekou (2019), and Giovanis et al. (2019) respectively.

On the other hand, results of H3 and H4 suggested that social inspiration and perception of risk were less influential in decisions of university students to adopt mobile financial transactions, contrasting the majority of previous studies such as Dhingra and Gupta (2020); Kaplan and Gürbüz (2021); and Marpaung et al. (2022), Rehman et al. (2019); Iskandar et al. (2020); Milly and Ridwan (2021); and Tiwari et al. (2021) who had highlighted on their significance in driving usage intentions. The likely reasons for the contrasting results being increased usage experience and the possible advantages of demographic profile of the population. Similarly, the observation on absence of gender moderation impact was in contrast by Nurlaily et al. (2020); Kwateng, et al. (2019); and Goularte and Zilber (2020), a likely result of common exposure to mobile phones by both gender segments.

4.1 Summary

The fourth chapter hinged around the output obtained from the analytical work carried out on empirical data gathered from that actual sample of 449 respondents, being undergraduate students studying in four universities in Dar es Salaam, Tanzania. Using quantitative research

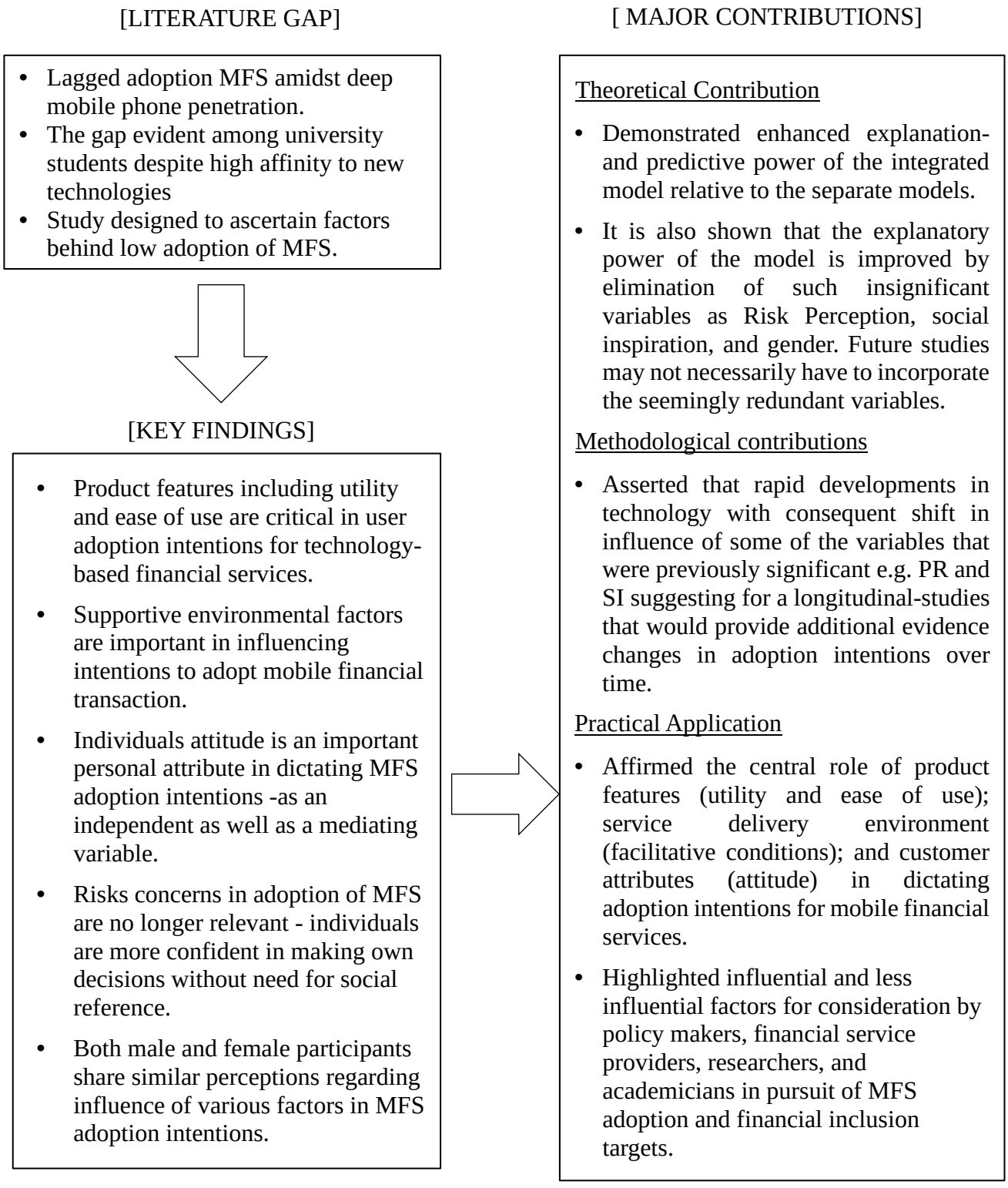
methods, the study sought to test perceptions of university students regarding their intention to undertake mobile financial transactions on a basis of selected exogenous variables. The objective was to ascertain the most influential factors on use intentions, on the insights of which measures for promoting adoption of Mobile financial transactions (MFT) can be built. It was also meant to examine applicability of the theoretical framework to the specified population segment constituting of students in the universities.

As is common with structural equation modelling analysis, analytical procedures were carried out in two stages, the first stage being evaluation of the outer or measuring model, complemented by an evaluation of the inner or structured model. The measurement stage was assessed and found to have acceptable levels of data quality in terms of data worthiness, collinearity, reliability and validity. Reliability as a core attribute of an instrument's ability to produce output that is consistently stable with various input and over a period of time, was measured in its two dimensions - indicator reliability and internal consistency. Measured from the point of view of factor loadings, indicator reliability was confirmed as all the factor loadings were above the .70 benchmark score consistent with the rule of thumb suggests the value of factor loadings to be .708 or above for an acceptable reliability of the indicators (Hair et al., 2019). Internal consistency which is an attribute that reflects relationships between indicators and the associated latent variable, was assessed based on the two most important metrics of Cronbach's α (Alpha) and the Composite Reliability (CR). The evaluation produced values for two metrics, Cronbach's Alpha and Composite Reliability fell within the desirable range of 0.70 and 0.90 is also considered acceptable internal consistency reliability

Together with this, an assurance was sought in respect of the validity of the measurement instruments including consideration of construct validity broken down into the convergent validity

Figure 4.12

Conceptual Map or Flow Diagram



and discriminatory validity dimensions. As regards to construct validity, which refers to a generic term that constitutes the capability of an instrument to produce accurate measurements in terms what it was actually supposed to measure. The first portion of construct validity refers to convergent validity which is indicative of the level by which the indicators converge to contribute to the variations within the construct in question. Assessed through the metric of average variance extracted (AVE) all test scenarios revealed a value of AVE greater than 50% suggesting acceptable convergent validity. The interpretation of the metric is that more than 50% variations in the construct are capable of being explained by the specified factors (dos Santos & Cirillo, 2023).

Another measure for construct validity is discriminant validity was measured based on four metrics of Fornell–Larcker (FL) which is the squared roots of the AVE; then based on Cross Loadings; and subsequently based on the Heterotrait-Monotrait (HTMT) ratio. The results from the assessments indicated that all the metrics were found to be within acceptable thresholds. In terms of the FL criterion, it was established that square roots of average variance extracted (AVE) in respect of each of the constructs were greater than the correlations of the construct with any of the remaining constructs, suggesting presence of adequate discriminant validity. Similarly, the measure that employed cross-loadings revealed results where all the indicators involved in the model had higher loadings with their related constructs than with the rest of the constructs, confirming presence of adequate discriminant validity. Likewise, when discriminant validity examined based on the HTMT metric, all the resultant values were less than 0.90 within the acceptable ceiling of .90 (Henseler et al., 2015) justifying the conclusion that discriminatory validity is well established within this particular model.

Assessment of the inner or structural model commenced with examination of multicollinearity by making use of one of the core metrics of collinearity- the ratio of the variance

of a multicollinear variable to its variance inflation factor (VIF). It was established that except for PU, all constructs had their VIF values below the acceptable benchmark VIF value of 5 suggesting the model to be free of multicollinearity issues. The VIF value for PU was assessed to be 5.022 which is within the margin of 0.1 above the 5-benchmark parameter, that is considered to still be an acceptable range (Daoud, 2017; Ringle et al., 2010cited in Milly et al., 2021) leading to non-elimination of the construct. Acceptance of the VIF value of 5.022 for PU was also backed by the propositions of James et al. (2013) who observed cases where VIF values in the ranges from 5 to 10 were considered to be associated with moderate level of collinearity, hence acceptable.

Rooted in PLS-SEM, the study carried out some data analysis with the support of SmartPLS4 software, looking at the way different associations within multiple latent variables within the inner model. To this effect tests were conducted to determine the impact of the exogeneous variables UP, EP, SI, FC, RP and AT on the endogenous variable intentions of university students to undertake (IU) mobile financial transactions in Tanzania, which produced outcome with mixed findings. The research found that direct impact of UP, EP, FC and AT on IU related to mobile financial transactions was significant while that of SI and PR proved otherwise as they showed no notable effects. The results were supported by a substantial number of prior studies suggesting that indeed the four factors significantly influenced adoption intentions by university students into using Mobile financial transactions. The contrasting results in respect of SI and PR were also supported by the literature as well as the demographic data related to the participants, where it was shown that a substantial number of research participants reported to be extant users of mobile financial transactions, an indication of having developed the self-driven confidence in using the service, hence less reliance on the opinions of close allies as well as less fears on the potential risks associated with using the services.

An investigation was also conducted on the mediated effects of the associations involving PU, PE on IU through the medium of AT which established existence of statistically significant effects. It was concluded that AT exerted moderate partial mediation involving pairs of the autonomous factors and endogenous factors as the VAF values for these pairs were 54.68% and 55.82% respectively, justified by the recommended calibration that suggesting no mediation if the VAF is less than 20%; partial mediation if VAF value falls between 20% and 80%; and full mediation if VAF is greater than 80% (Ali et al., 2022). The research also gathered that AT mediates the influences between the second exogenous factor PE with IU in a partial and supplementary mediation. The finding cemented the proposition that AT constitutes a fundamental factor in the determination of behavioural use intentions both as a sole factor and as a mediating element within the association of PU and PE with IU.

Moderation role of GE in impacting the relation between earmarked autonomous constructs and the reliant construct IU was evaluated and found to be absent. The indirect analysis for moderating impact of Gender on all the relationships involving all the exogeneous variables PU, PE, SI, PR, FC and AT on the endogenous variable IU was found to be insignificant. Notwithstanding the small observed moderation effects, gender-based differences were evident with results related to variables PU, PE, SI and PR having positive coefficients indicating stronger perceptions in females (assigned code 1) as compared to males (assigned code 0). The remaining variables FC and AT revealed results with negative-signed coefficients, a reflection of stronger perception in males compared to female participants. Such results were affirmed by slope analysis that showed steeper slopes in lines related to females for variables PU, PE and SI. The opposite was also true for FC and AT where lines representing males were much steeper. The line representing PR showed no effects on gender difference as they were flat, supporting the

correlational result which unlike others, produced a positive coefficient with a value of 0,014 which is close to zero. From the results, it may be concluded that while not significant, the exogenous variables produced varying gender-based influence on IU. This view was consistent with the results found in the assessment of moderation impact of Gender on the explanatory capability of the model expressed using R^2 of the dependent variable IU reflecting a marginal increase from .643 before application of the moderator GE to .646 after applying the moderator.

Despite little relevance to PLS-SEM, assessment was made on the model fit on the basis of the metrics of Normed Fit Index (NFI) as well as the Standardised Root Mean square Residual (SRMR) where acceptable thresholds should be larger than .90 and less than .08 respectively (Hu & Bentler,1999). Initial computations produced results which were outside acceptable parametric ranges with NFI of .821 falling short of the minimum threshold of .90 and the SRMR of .085 which was marginally higher than the recommended ceiling of .08suggesting existence potential problems with the model fit. Investigation into the root cause for the issues in the empirical data suggested removal of factors with extremely low factor loadings and the moderating construct GE resulting in improved values of NFI and SRMR of .905 and .04 that fall within acceptable boundaries, with the key lesson being the importance of the metrics in identification of problems inherent within data so as to produce acceptable model fit regardless of the model in use.

The study also entailed testing of the metric explanatory power, the effect size and predictive power where the metric of R^2, F^2 and RMSE respectively were used. In PR and SI the metric values for the variables were however somewhat outside acceptable ranges for such measures as explanatory power, effect size and predictive relevance. The F^2 values that the analysis showed for the variables PR and SI were .004 and .001 which are below the lower threshold of .02 implying that they did not impact the latter endogenous variable IU. The evaluation of predictive

strength of the model according to RMSE indicated that the model had medium predictive strength since RMSE value for most of its endogenous variable are smaller than RMSE values for naïve LM landmark. In this case the model achieved acceptable metrics in terms of explanatory and predictive powers giving reasonable assurance on its practical application.

In overall, the study model and test results were found to be within acceptable ranges thresholds attesting to the integrity of recommendations to be drawn therefrom. All the deviations observed in the empirical results obtained appropriate explanation. The results serve to provide useful information in the derivation of research implications deduced from the results, as articulated in the next chapter to which practical recommendations identified.

CHAPTER 5 : IMPLICATIONS, RECOMMENDATIONS, AND CONCLUSIONS

5.1 Overview

Emergence of advanced technologies over the recent couple of decades has transformed the way of life for businesses and individuals alike. Some of the contemporary technologies that have significantly contributed to this twist, examples of which include mobile communications, cloud computing, data analytics, machine learning; blockchain, artificial intelligence and many more. Particular interest in this study has been on appraisal of the bearing perceived outcomes of advancement in mobile communication technology, which has made it possible to assemble almost all aspects of business processes and services into smaller mobile gadgets such as a smartphone. However, despite the unprecedented growth in the technological invention in the area of mobile communications, it is still to manifest paralleled output in terms of adoption and the consequent reflection in financial inclusion. Progress made in the new tech gadgets inventions rallied huge hopes among supporters for accelerating the economy development due to the inclusive financial services (Mhlanga & Denhere, 2020). Based on benefits of speed, economy and convenience, the new technologies were expected to lead to ‘mass’ adoptions in Mobile financial transactions with the potential of increased progress in financial inclusion (Tsouli, 2022; Achieng & Ingari, 2015). But a few years have passed with low rate of progress in mobile technology adoption in financial services and this remind of unrealised shared vision (Richard & Mandari, 2017; Abdinoor & Mbamba, 2017). Recent studies have highlighted new increases in using financial services delivered through mobile devices during the COVID 19 pandemic but significant levels of exclusion are still present in most areas of Tanzania and around the world. Besides, significant portions of enhancements were transacted mainly through mobile money transfer services that amounted to 61 per cent of total money transactions by 2021 (TCRA, 2021; BOT, 2021). This is manifested by the fact that 52% of adult population in Tanzania did not have bank account nor did

they have mobile money account as of end of 2021 Scenario (Word Bank Group, 2021). Expectation gap was also recorded as a statical finding among university students; an assumedly very much technology enthusiastic group (Ndekwa et al., 2018; Alsayed et al., 2020). Students at the University level are a target group of individuals who almost have a 24/7 access to smart phones as they are used as the means of channeling academic work. The stipends are paid through bank accounts that the student is expected to open. The university student is therefore ideally placed to easily adopt the services of mobile financial transactions in carrying out financial transactions in their day-to-day lives.

This was because the intentions for use of mobile financial services by the financially literate university students was a paradoxical phenomenon that motivated this study to scrutinize various factors that would explain what has apparently been a slow or lower than expected rate of embrace of mobile phone-based financial transactions in Tanzania as well as in other parts of the globe. Another interesting observation might be that university students possess the capacity to effect behavioural change in actions, lifestyles and choices in societies (Robb & Woodyard, 2011). Interventions for improving financial inclusion are more likely to have positive outcomes when the behaviours are understood and appropriate interventions are developed using the right understanding among university students and graduates. This therefore, tried to explore perceptions of students in regard to use of Mobile financial transactions depending on universities in Dar es Salaam which is the largest city as well as the most financially vibrant business home for Tanzania. It was further considered that the study would generate useful output for consumption by financial service providers who are striving to increase the perimeter of their product uptake by increasing the customer base through utilisation of technology-driven distribution channels.

Output produced by this research could be usefully deployed by financial service providers in creating business promotion strategies and strengthening their competitive edge.

The author analyzed the literature and found that many researchers have been paying attention to the adoption of technology or using technology driven services using TAM, UTAUT models which are theoretical evolutionary derivative of the Theory of Reasoned Action (TRA) established by Fishbein and Ajzen in 1975. An aspect supported by the TRA is that decision to perform a particular behavour would culminate into actual performance of the behavior. A number of empirical research on adoption of technology conducted majorly in developed countries, Asian and Middle East nation (Souiden et al. ,2021), provide diverse results, on which the grounds of this study is established strongly.

The research adopted a quantitative correlational design in its techniques for gathering and manipulation of data. Selection of research methods deployed in this study was guided by the positivist philosophical position that uses mainly the objective quantitative data that involve observation of variables for testing with aid of constructs associated with the hybrid of the Technology Adoption Model (TAM) with the United Theory on Adoption and Usage of Technology (UTAUT). Appropriately designed questionnaires were used to collect data, which was analysed based on statistical techniques that are relevant to the integrated model with a view to establishing the impact of the chosen set of variables on the behavioural intention of the students of various universities of Dar es Salaam, Tanzania towards using Mobile financial services. The research specifically employed the structural equation model-partial least squares method to conduct analytical manipulation of the empirical data, based on the software branded as SmartPLS4. The data analysis involved among other procedures, testing hypothesized relationship, mediation and moderation analysis as well as assessment of the fitness of model,

explanatory power together with its predictive power to arrive at conclusions and recommendations.

The core purpose underlying this study centred in ascertaining and revealing vital components-both facilitators and constrains in customer perceptions concerning the utilization of Mobile financial services from which relevant strategies can be developed to target for massive uses to Mobile financial services in order to improve financial inclusion (Tsouli, 2022). Having acquired this knowledge, this study particularly aimed at offering insights concerning the sluggish increase in the uptake of the Mobile financial services amidst deep and extensive mobile phone penetration rates in Tanzania and similar emerging market economies in other analogous countries (Abdinoor & Mbamba, 2017).The dearth of empirical research information in respect of students' technology adoption in Tanzania and especially in Dar es Salaam, will add to the pool of knowledge amongst scholars.

The research was governed by principles of ethical precautions prescribed by oversight entities including the Research Ethics Committee of Unicaf University and the Research Committee of the Tanzania Commission for Science and Technology covering the entire spectrum of the research process from the research design, development of questionnaires, data gathering process, to the analysis and reporting of findings. Due ethical regard was made to a number of ethical requirements such as ethical risks to participants whereby it was considered that the study posed minimal ethical risk in view of the participating population being of majority age, mostly within the age bracket of 21 – 30 years and exclusion of persons with disabilities as well as those who are not in a position to express informed consent. The researcher was generally mindful of research ethics in its dimensions including the principles of ethics such as respect for persons, informed consent, beneficence, justice and non-maleficence (Beauchamp & Childress, 2008).

This chapter articulates an analytical account of the research findings including consideration of the research implications, recommendations and conclusion. Research implications in organized in terms of the components of the tested hypothesis on both direct and indirect relationship as well as mediating and moderating effects on the relationships. It also provides an account of theoretical implications in respect of the results of explanatory power, effect sizes and predictive power associated with the integrated model employed in the study.

5.2 Research Implications

Data analysis and evaluation of research findings pave way to consideration of research implication which seeks to ascertain the relevance and practical application of the findings to real life situations. In view of the study findings, a number of implications including practical, theoretical and methodological considerations can be drawn. The implications seek to inform and support policy makers and financial service providers in developing measures for enhancing massive adoption of Mobile financial transactions for business growth and ultimate increase in financial inclusion. The discussion on implication extends to other spheres of the academic thought by consideration of the theoretical contributions achieved through application of the models and methodologies. In this respect, implications arising from the findings produced by the study hinged around the aspects of the propositions of the hypotheses as well as model properties. Financial service providers are also likely to benefit from the analytical results of the research in their pursuit for growing business through increased customer population by deploying the insights into their promotional strategies.

5.2.1 Implications Related to Population Demographics

The study findings indicated a major increase in the percentage of the population that now utilizes Mobile financial transactions in comparison to some of the observations recorded in past

study periods. The study also noted that a massive 65 percent of the participating individuals were current consumers of mobile banking services which represents the highest level of Mobile financial transactions use. The assumption is for progressive use of Mobile financial transactions, where an individual would begin with mobile money services then advance to mobile payments and later on progress to mobile banking services. Out of the gathered data, the proportions of other forms of Mobile financial transactions in use were: mobile money service 21 percent and mobile payment services 14 percent. Such a finding was important due to the fact that participants who claimed to be using mobile money service which is considered an entry or basic stage of mobile financial transactions usage was lower in number compared to those who reported to be using mobile banking services, regarded as an advanced stage of mobile financial transactions usage. This was a significant departure from figures provided by TCRA (2021) and BOT (2021) which showed that the bulk of users of mobile financial transactions (61%) were associated with mobile money services. It is also a change from the observation by Ndekwa et al. (2018) on the low uptake of financial services among university students in Tanzania. The explanation behind the exponential shift was the increased exposure to smart phones over the recent past, the outcome of which was an increase in user confidence to pursue the various modes of mobile financial transactions including mobile banking services. The implication advocated through this finding is that university students are adequately equipped to utilize mobile financial transactions relative to other population segments in the country. It would therefore be very useful for policy makers, regulators and financial service providers to leverage on this understanding and make use of the university students as ambassadors in undertaking transactions administered through mobile devices and gadgets such as mobile money, and mobile payments so as to pass their experiences over to other population groups.

5.2.2 Implications of Tests on Direct Effects

It was sought to establish whether identified exogenous variables had a significant bearing in the output associated with the endogenous variable. Examination of these causal effects was carried out quantitively based on testing of respective hypothesis. Six hypotheses were formulated in the testing of direct impact on relationship between external factors or variables and endogenous variable. The hypotheses aimed at examining the significant levels of impact of the factors associated with the exogenous latent variables on the overall behavioural intentions for adoption of the Mobile financial transactions. Dimensions considered to signify behavioural use intention as were firm willingness, likelihood, openness and inclination to using financial services in the near future when the opportunity arises (Giovanis et al., 2019). After carrying out tests, the following relationships showed mixed results; four relationships from the total of six relationships under consideration were found to possess statistically strong influence thus resulting in the decision to accept the hypotheses related to them while the other two relationships were not statistically significant hence resulting in rejection of their related hypotheses. Results of the tests in respect of each hypothesis and the implication arising out of the corresponding hypothesis are discussed under the next section (s).

(a) *Theoretical implications of the Results of H_1 in relation to the role of Utility Perceptions (PU) on university students' Intentions to Undertake (IU) mobile financial services in Tanzania*

The hypothesis one (H_1) was developed with the focus on examining the level of impact that utility perceptions exert on use intentions. The tests conducted for Utility Perceptions and intention to undertake and showed statistically significant p value of .000 and t value of 3.725 implying denial of the hypothesis by claiming that there exists strong influence of utility perceptions on students' intents in undertaking mobile financial transactions. Clearly, test of this hypothesis

showed that Utility Perceptions has significant consequences on use intention of university students regarding mobile financial services. Items that were loaded in describing perceived construct utility correspond to utility of mobile financial transactions for daily life; accomplishing assigned tasks; efficiency in performing tasks; productivity. The factor loadings for all the factors were high and proved to be greater than the minimum of .70 thus indicating that all the factors were somehow relevant in ascertaining Utility Perceptions. In this regard, the role of the factors underpinning Utility Perceptions in explaining intentions to use mobile financial transactions was vindicated by the significant impact of significance of the test results. Thus, the higher Utility Perceptions demonstrates its great importance as a predictor that reveals the indicator of the productivity, efficiency, and utility of the technological equipment in this case the mobile device in forming mobile financial services regarding user intentions (Milly et al., 2021). This implies that promotional activities that target building perceptions regarding benefits of mobile financial transactions would generate significant outcomes if adopted in the promotion of the use of mobile financial transactions to university students in Tanzania. By emphasizing on the benefits associated by the use of mobile financial services such as speed of service, convenience, flexibility and reduced costs, financial service providers are likely to entice sizeable number of prospective customers into using financial services delivered through mobile devices.

(b) *Exploring the Implications of Test Results on association between Ease of usage Perceptions (PE) and intentions for undertaking (IU) mobile financial services among University Students in Tanzania*

Examination of the influence generated by ease of usage perceptions on the potential for adopting mobile financial services was carried out under the second hypothesis (H_2). Testing of the second hypothesis (H_2) also proved to be significant as it outlined the effect of PE on IU with

p- value = .003 and t value of 2.965 respectively. The findings show that students had positive perception towards Ease of usage Perceptions which significantly predicts IU of mobile financial services which explains why when the hypothesis was tested it had to be accepted. This outcome demonstrates that the students' perceived behavioural intention will be associated with their belief or perception concerning the easiness of the mobile financial transaction technology (Rehman et al., 2019). The finding was important because it indicated that the perceived easiness of the mobile financial transactions technology impacts students' intention of carrying out mobile financial services. This finding can be explained by the well-established view that Ease of usage Perceptions constitutes a fundamental determinant of behavioural intention for mobile financial transactions (Zaineldeen et al., 2020). This entails that the given technology will be utilized by people who perceive it to be user-friendly (Rehman et al., 2019).

The instrument applied in the measurement of ease of usage perception and its impact on the intentions for undertaking mobile financial services incorporated four elements which are construed as contributing to the ease of usage construct. These included how the interactions with mobile financial services are transparent and easy to understand, do not demand much cognitive workload, and have the use of processes that are not rigid or inflexible. It also entailed the usability or how the user can get the mobile financial services to do what he or she intended. The factors could easily map within the factors identified by Davis (1989) within TAM 2 which incorporates the characteristics of technology vis-à-vis how easy to learn, how controllable, how clear and understandable, how skill-becoming, and how easy to use the technology. Relevance of the construct of Ease of usage Perceptions suggests that information on aspects of mobility, intuitiveness and/or simplicity, straightforwardness, and understandability of using mobile financial services are important considerations in forming intentions to use mobile financial

services. Regarding the type of the device and service for providing financial services where it is complex, these findings show, that this aspect reduces the readiness to use MFTs, thus features or description, which tell users on easy handling the device, might be useful for other influences the readiness to use MFTs.

(c) *Practical and hypothetical meaningfulness of the outcomes of H_3 for understanding the impact of Social inspiration (SI) on Intentions to Use (IU) mobile financial services by the Students of the Universities of Tanzania*.

The results obtained from the tests run on the third hypothesis (H_3) showed that there is a very minimal effect generated by social inspiration on the behavioural intents of students toward utilizing mobile financial services with the p-value of .540 and t-value of .613 thus calling for rejection of the hypothesis. This finding on the insignificance of social inspiration in the delineation of intentions to use technology indicates that relatives and friends play no or minimal role in intention to undertake mobile financial services by university students in Tanzania. Another argument drawn from these findings would suggest that intents of students to utilise given mobile technology is independent of the influence from close allies. Person to person persuasion in using mobile financial transactions will thus be unlikely to produce any significant outcome.

The results can also be explained in terms of assertions put forth by the proponents of the model Venkatesh and Davis (2000) who attributed importance of SI to early stages of new technology due to high uncertainty regarding the technology (Belsoska et al., 2020). Thus, in this case therefore, the perceived little or no impact can be ascribed to the accumulated use experience by university students due to the high prevalence of smartphone use. The students had ample time on the use of mobile financial transactions and therefore are of the opinion that they do not require advice of their close friends as to whether or not to engage in the service. Neither does the

communal perceptions of high esteem exist regarding the use of mobile phone-based financial transactions together with their subdivisions. Therefore, reliance on word of mouth in spreading information and encouraging university students to use Mobile financial services is very likely to be less effective.

(d) *Interpretations of the Outcomes of H_4 concerning the Effects of Risk Perceptions (PR) as regards to Intentions to undertake (IU) mobile financial services among University Students in Tanzania*.

Testing of the fourth hypothesis established that Risk Perception did not have an effect on students' intentions regarding intents for undertake financial services after recording statistically insignificant, carrying p and t values of .254 and 1.142 respectively, this made rejection of the hypothesis possible. The findings suggest that university students are less cautious about the risks associated with their choices of using mobile financial services. The research indicates that the individual fear of losing some thing or the other due to technology driven service has evolved over the time and also due to use experience (Lema, 2017). The research also noted that all the research participants have at some point, engaged in at least one category of mobile financial transactions, either m-banking, mobile money transfer or mobile payments, thus giving a certain level of confidence. During the usage, the participants acquired necessary experience and competence regarding possible security and confidentiality that arises out of undertaking mobile financial transactions. The age group under study could also be the reason for the observed phenomenon. It is commonly believed that young individuals with no or limited savings are less worried about the possibility of losing information or the breach of personal data privacy. The findings therefore imply that measures for promoting adoption of mobile financial transactions among university students may be confidently carried out with no fears of negative hindrances due to risk

perceptions. Rather than stressing on the potential threats, emphasis on the positive aspects has high likelihood for success in enticing prospective financial services customers into using the mobile phone-delivered services.

(e) *Implications of the Results of H_5 in regard to consequences of Facilitative Circumstances on Intentions to Undertake mobile financial services by Students of Tanzanian universities.*

During the testing of the fifth hypothesis, it was stated that facilitative conditions had the strongest impact on students' intention to undertake financial services enabled by mobile devices with the p-value of .000 t-value of 3.944 leading to the acceptance of the proposed hypothesis. The test results underscore the necessity to provide for the extent of manipulation of environmental factors for the achievement of objectives (Venkatesh et al., 2003). The implication advanced by this finding is that individuals are enticed to deploy mobile financial transactions depending on the supportive environmental factors in relation to the device, information on how to access the technology-based service and the mode through which such a service is administered.

In view of the preceding description above, factors onboarded under the construct of facilitative conditions included availability of resources, knowledge and third party help in advancing the adoption rate for mobile financial transactions. Significance of the tests implies that resources, knowledge and information are critical in driving adoption intentions related to Mobile financial transactions. In this regard, cost of the devices and service; awareness about how the financial services could be used and have access to knowledge people who can help in this regard are important in understanding whether or not the participant is willing to use mobile financial transactions. By addressing the gaps related to availability of smartphones, availability of power, information on usage and support such as simple instructions in clear and understandable language,

assurance of support and similar services are likely to motivate multitudes of prospective customers into using mobile financial transactions.

(f) *Theoretical Implications of the Results of H_6: What Role does the Attitude (AT) play toward Mobile financial transactions have in University Students' Use Intentions (IU) in relation to mobile financial services in Tanzania?*

Regarding the effects of attitude on students' intents for undertaking mobile financial services, the research results of examination of the sixth hypothesis also demonstrated that there was a positive impact of attitude with p-value .000 and with a t-value of 6.514 leading to acceptance of the hypothesis. This can be explained as an attitude of the student in relation to the significance of mobile financial transactions determines or has an important impact on the intents of the student in undertaking mobile financial transactions. Individuals would likely be willing to use a given service if they had a positive belief towards the service.

Constituent antecedent factors that were considered in the determination of the AT construct included the person's view on whether the use of mobile financial services would be a good, wise, beneficial idea and interesting. They constituted psychological views of the individual with regard to the service offering. Following the significant positive statistical results, it can be concluded that attitude is an important facet for consideration in determining intentions for use of mobile financial transactions. Hence, those strategies that can offer positive perception concerning the use of mobile financial transactions are crucial in promoting intentions to use these services. Therefore, consideration of this observation that considers the attitudinal perspectives in devising strategies for increasing usage of technology-based financial services would be quite useful. Financial service providers and other promoters of financial inclusion are likely to succeed in their

endeavours by embarking on shaping the attitudes for their prospective clients providing positive information regarding the mobile financial transactions.

5.2.3 Implications of Mediated Effects

Fundamental variable identified in literature as mediating variable is Attitude. From the theoretical foundation of the TAM, the AT variable was found to mediate the relationship that flows from utility perception and eases of use perceptions to behavioural use intentions. Mediation analysis serves to determine whether an identified intervening variable called the mediator influences the strength of the relation between a given set of exogeneous and endogenous construct(s). In this case, the examination of mediation effects of attitude was conducted on the associations between two exogenous variables related to utility perceptions and ease of usage perceptions on one hand, and intentions to undertake mobile financial transactions. It was sought to investigate and establish whether an individual's attitudinal orientation (positive or negative) strengthens or weakens the association between the pairs and produced results as described hereunder:

(a) Implications of results of Hypothesis 7 as regards the mediation influence of Attitude (AT) on the association between Utility perceptions (PU) and behavioural use Intentions (IU) for Mobile financial services among students in Tanzanian universities.

The seventh hypothesis that tested the mediation effects of attitude partially supported the literature because attitude effects were statistically significant in moderating the relationship between the students' perception on the utility of mobile financial services and their intentions to use the services in which the VAF ratio was 54.68%, which means that the hypothesized information had grounds for acceptance. They show United direct and indirect effects that were substantial with p-values less than .05. The partial mediation effect size of attitude on the Utility

Perceptions to use intentions relationship is .000. This implies that the consequences of utility perceptions on intentions to carry out mobile financial transactions cannot be underestimated especially among participants who hold a positive attitude to using such services. The results corroborated the observation made by Rifa'i (2020) in respect of the role of attitude in influencing utility perceptions on adoption intentions. Findings drawn from the study also highlighted on the mediation roles of attitude on the association of utility perceptions with use intentions, and that such mediation is partial. The finding can be interpreted to mean that the flow of influence of the exogenous latent variables to the endogenous latent variable was not fully channeled through attitude nor fully channeled outside attitude. This means AT played a role in partially strengthening the influence that PU exert on IU related to MFT. Practical implication of this result is that measures aimed at promoting use of mobile financial transactions based on the utility perceptions would be amplified by enhancement of the individuals' attitudes towards the services. Attitude is conclusively a core driver to use intentions both in its own sake and through mediation with the variable Utility Perceptions.

(b) Implications of results of Hypothesis 8 as regards the mediation influence of Attitude on the association between ease of usage perceptions (PE) and behavioural use Intentions (IU) for Mobile financial services among students in Tanzanian universities.

The results of the tests conducted on the 8th hypothesis also showed that attitude significantly mediated the statistical association between students' perceptions on ease of usage of mobile financial services and their intentions to use such services with the ratio of the VAF of 55.82%, which can be considered to suggest acceptance of the hypothesis. From the results it was further found that the mediation impact of attitude on the ultimate consequences of ease of usage perceptions in influencing usage intentions is partial, revealing a statistically significant p-values

of .000 in respect of direct as well as indirect mediation effects. This means that the resultant impact on use intentions is strengthened by the individual's positive view of ease of usage of mobile financial services. It implies that the impact created by perceptions regarding ease of usage intents to undertake mobile financial services used in the study is stronger among those who have positive inclination on utilisation of the services. Again, the research findings explained that attitude partly and imperfectly facilitated the association of Ease of usage Perceptions with use intentions and thereby complementing the impact generated by ease of usage perceptions on the intents for undertaking mobile financial transactions. The strong mediating effect of Attitude between Ease of usage Perceptions and Usage Intents was also found is consistent with observations made by Hong (2019) and essentially connotes that the participant's supportive or antagonistic views on the significance of the stated mobile financial services augments or decreases the impact created by ease of usage perceptions on the intentions to apply the services. In this regard, the consolidation of Attitude together with Ease of usage perceptions amounts to production of strong influence in the determination of use intentions both as complementary to one another and on own separate accounts.

5.2.4 Implications of Moderation Effects

Hypotheses H_9 through hypothesis H_{14} were tested in order to investigate moderation effects of gender on relations associating latent variables of PE, PU, SI, FC, AT and PR with the endogenous variable IU. These relations proved to be insignificant thus allowing to reject the hypotheses. These results suggest that the interactions of the exogenous factors with the endogenous factor IU as regard to undertaking of mobile financial transactions were statistically not significant regardless of the gender orientation of the respondent. Differences in perceptions regarding influential factors in the intents for undertaking mobile financial transactions between

gender categories of females and males were marginal. Specific analysis of implications in the results for each of the hypotheses is articulated hereunder:

(a) *Implications of Results of H_9 regarding Moderation of Effects of Gender (GE) on the association between Utility Perceptions (PU) and behavioural use intentions (IU) for Mobile financial services by students in Tanzanian universities*

It was of interest to establish whether gender dimensions have a role in the determination of use intentions in relation to the specific factors in this case utility perceptions. This question was answered through testing of the ninth hypothesis for examining existence of gender-based differences in user-intention responses for the latent construct of utility perceptions. The test run on hypothesis H_9 show that there were no significant gender moderation effects on the relation of Utility Perceptions and students' behavioural intentions to use mobile financial transactions whereby a p-value of .566 was observed leading to rejection of the hypothesis as an appropriate option. The findings in this case showed no difference in the perceptions the male-female dichotomy with regards to the impact of Utility Perceptions on the intention of students in universities to undertake mobile financial transactions. Practical implications of such results include the useful insights generated for policy makers and financial service providers on the more or less negligible role of gender differences in promotion usage of mobile financial transactions. Effective marketing and promotional initiatives that aim at raising the awareness about the utility of mobile financial transactions do not need to necessarily distinguish between and/or target the two gender groups. However, the positive sign of the coefficient implied that the insignificant moderating effects that existed varied slightly in the case of females relative to males – meaning that female students are more highly affected by Utility Perceptions than male students. This

difference might be helpful in further theoretical advancements and research that try to dive deeper into the origins of the differences and developments.

(b) *Implications of Results of H_{10} regarding Moderation of Effects of Gender (GE) on the association between ease of usage perceptions (PE) and behavioural use intentions (IU) for Mobile financial services by students in Tanzanian universities*

The tenth hypothesis was developed to examine the strength of gender in moderating behavioural response to the factor related to ease of usage perceptions. The test run on hypothesis H_{10} reflected the minute significance of the moderating roles of gender on Ease of usage Perceptions as regards to student behavioural intent to undertake mobile financial transactions with p value of .475 with ultimate rejection of the hypothesis. Henceforth, it was indicated that there virtually existed no difference in perceptions between the gender groups as far as ease of usage and its impact on intention to undertake mobile financial transactions is concerned. While the construct of Ease of usage Perceptions was significant in determining usage intent, gender dimensions on the interaction had no moderating impact. This implies that promotion of usage of mobile financial transactions on the basis of Ease of usage Perceptions would not suit the segmentation strategy that differentiates between the male and females. The conclusion is that gender exerts no moderating influence on the interaction that exists involving perceived easiness of usage and behavioural use intentions.

However, there was a slight difference in this owing to the positive sign of the coefficient which is obtained from the assignment of males as 1 and females as 2. This implied that the ‘statistically insignificant moderating effects’ were somehow stronger in the case of females than males. In the context of academic literature, it can be argued that female participants are somewhat more susceptible to the resultant impact created by Ease of usage Perceptions than their male

counterparts. Further insights in this respect my be required in order to ascertain prevalence of gender differentials within other population segments other than students who have been exposed to similar learning environment.

(c) *Implications of Results of H_{11} regarding Moderation of Effects of the factor of Gender (GE) in respect of the association between Social inspiration (SI) and behavioural use intentions (IU) for Mobile financial services by students in Tanzanian universities*

In establishing how much moderating impact gender may have as regards to the association of Social inspiration with use intentions for mobile financial services another hypothesis denoted H_{11} was developed. A test run on hypothesis H_{11} showed that the gender factor has no significant moderating impact on the association involving social inspiration with students' behavioural intents to undertake mobile financial transactions at the .05 level of significance with a p-value of .463 thus leading to rejection of the hypothesis. The findings in this case indicate shared perception by male and female students being affected by social inspiration on intentions of the respondents to undertake mobile financial transactions. Although no significant difference was observed to exist between social inspiration and students' intents for undertaking mobile financial transactions though originally, gender as a variable that indicates moderation effect had equally a very small impact on this relation. It is therefore reasonable to conclude that utilising social inspiration in formulating policies or marketing strategies and or gender dimensions would be useless. Social inspiration within either of the gender items is of little significance in influence use intentions and therefore financial service providers need not deploy social relations in their drive to increase adoption of financial services via use of mobile devices.

(d) *Implications of Results of H_{12} regarding Moderation of Effects of Gender (GE) on the association of Risk Perceptions (PR) with behavioural use intentions (IU) for Mobile financial services by students in Tanzanian universities*

The researcher was also interested in understanding the extent to which gender dimensions are critical in portraying perception differences as regards to use intentions for mobile financial services. This was examined through development of an appropriate hypothesis (H_{12}). The test performed on hypothesis H_{12} suggestive of absence of significant moderation impacts arising from gender orientation, regarding the influence of Risk Perception of the user with students' behavioral intentions for undertaking mobile financial transactions with p-value .816 and hence necessitating to reject the hypothesis. These findings indicated absence of difference of risk perceptions between male and female students and pointing to the similarity of their perceptions about the effects of Risk Perception on Intentions to Undertake mobile financial transactions. The effect of Risk Perception was similar with the effect of social inspiration showing only a little statistical significance. The findings with regards to the moderating effects of the relationship were also equally asymptomatic in that it revealed that the association that exists incorporating Risk Perception with behavioural intent to undertake mobile financial transactions would not be affected by the kind of promotional measures used to drive usage of mobile financial transactions, anchored on the association of Risk Perception with the behavioural intention to undertake the service would not be reflective of gender related differences. Regarding the gender difference for the theoretical developments, there exists a positive signed beta coefficient, signifying that the insignificance of the moderating effects is slightly higher for females than males, which may be explained by the increased impact of the risk perceptions on the use intentions of female than male students.

(e) *Implications of Results of H_{13} regarding Moderation of Effects of Gender (GE) on the association between Facilitative conditions (FC) and behavioural use intentions (IU) for Mobile financial services by students in Tanzanian universities*

Hypothesis thirteen (H_{13}) was developed with a view to ascertaining the extent of gender moderation for use of MFT. When performing the test on hypothesis H_{13} there was found an insignificant gender-based moderation effects on the association of facilitative conditions with students behavioural use intentions for mobile financial transactions with a p-value of .242 in which case rejection of hypothesis was a consequent outcome. Concerning the created hypotheses, the resulting comparisons indicated that there was no substantial difference in the results in the opinions collected from male and those of female students in terms of perceiving the impact of facilitative conditions on their intentions to conduct mobile financial transactions. It is identified that since the magnitude of the statistical significance in the association that exists incorporating facilitative conditions with behavioural intention to undertake MFT remains the same as the original one, the gender moderating effects on the relationship were not significant. That is, it was not necessary to consider gender dimensions in initiating efforts for increasing the rate of mobile financial transactions usage for facilitative conditions can be enhanced without considering these dimensions. Despite the small impact, the difference, still, manifested a little bit higher in males than females on account of the negative-signed beta coefficient. The proposition underlying this finding may be validated further research involving a wider scope of audience who may have distinct attributes from those of the population under study.

(f) *Implications of Results of H_{14} regarding Moderation of Effects of Gender (GE) on the association between Attitude (AT) and behavioural use intentions (IU) for Mobile financial services by students in Tanzanian universities*

In the quest for insights regarding gender-based segmentation on behavioural use intentions arising from the influence of Attitude, the hypothesis 14 was developed. The test on hypothesis H_{14} found that the moderation effects for gender on the association between attitude and students' behavioural intentions to use mobile financial transactions were not significant with p-value = .411 suggesting rejection of the corresponding hypothesis. With regard to this hypothesis or research question, the findings indicated that no gender-based difference prevails in perceptions students regarding the influential impact of attitude on their intentions of using the mobile financial transactions. On the other hand, and despite the fact that the association between attitude and use intentions was significant in its statistical value; the gender moderation effects did not take significant statistical values. The findings conclude that targeting male and female customers differently in terms of designing policies and marketing for increase in undertaking mobile financial transactions in this country would be neither effective nor feasible. Again, the total beta for the moderating effects on the facilitative conditions was negative, indicating that the small moderation effect exists but slightly more pronounced amongst male respondents than female. This implies that attitude exerts a slightly stronger influence in females than in their counterparty males in terms of intentions to undertake mobile financial transactions.

5.2.5 Theoretical Implications

The findings of the study assist in the understanding of theoretical implication aspect in relation to the concepts and their linkages. Some of the specific implications include the evidence traced from the model and constructs that were used in the study. In respect of the model, the study adopted an integrated model where key constructs from both TAM and UTAUT models were used to explain variations in use intention and resulted in improved explanatory power over the individual models. This implies that one of the recommendations that may be used to enhance the

weakness of the model may include a recommendation on the use of integrated models, which forms part of the academic contribution to the store of knowledge on research on adoption of technology-driven financial services. The study further in light of F^2 metric established that the impact of the three remaining exogenous factors, social inspiration (SI), Risk Perception (RP), had small effect sizes on all endogenous variables; these findings corroborate those obtained from the significance tests. Noticeably, the outcomes of the evaluation regarding the 'predictive power' inherent in the model based on Stone-Geisser's Q^2 showed that indeed the model possessed strong 'predictive relevance' because of the computed value of Q^2 which was .492 which was higher than the minimum threshold of zero. This means that the model was designed effectively thus providing the necessary forecasting capability for inferential purposes.

Although the model fit metrics are generally considered of less value to studies based on PLS-SEM, the study adopted hybrid model that incorporated an evaluation of fitness in the model fit on the basis of the metric of Standardised Root Mean square Residual (SRMR) together with the Normed Fit Index (NFI) resulted in obtainable values of .085 and .821 suggesting mixed implications. The SRMR value of .085 was slightly higher than the prescribed maximum of .08. Similar scenario applied to the value of NFI of .821 which fell short of the minimum allowable threshold of .90 showing that the model was adequately in a good fit. Nevertheless, regarding eligibility of the same model, when we removed extreme values for the factors PR3 and PR4 and the moderating construct of GE the values of SRMR and NFI became acceptable at .04 and .905 respectively. This indicates that a suitable integrated model for moderation of the relationships in the study is one that does not use Gender as a moderating factor in addition to excluding some of the factors in the exogenous construct of Risk Perception.

5.3 Recommendations for Application

The study aimed at investigating behavioural intentions towards acceptance of mobile financial transactions by students in selected universities with the purpose of figuring out some important findings that would help in finding practical solutions to financial inclusion concerns that are generated from low adoption of financial services in Tanzania and other comparable economies. The consideration of empirical data obtained through the course of the study enables the identification of several important research implications that can be used to derive recommendations for practical applications. The recommendations mostly refer to sharing of highlights on tentative measures that may be considered or adopted by policy makers; financial service providers; and the research community in their respective efforts on the issues of advancing policy development; enhancing of financial service usage; and growing of theory and knowledge. Study conclusions based upon the study offer lessons/ recommendations that can be classified into areas of population demographics; direct effect factors; mediated effect factors; moderation effects; and theory development.

5.3.1 Population Demographics

The attributes and dynamics of the study population were found to strongly support development of positive perceptions as regards to intentions for use of Mobile financial transactions. Age and literacy profiles were core attributes in attracting behavioural use intentions observed from the test results. The recommendations related to demographic profiles mostly refer to sharing of highlights on tentative measures that may be considered or adopted by policy makers; financial service providers; and the research community in their respective efforts on the issues of advancing policy development; enhancing of financial service usage; and growing of theory and knowledge. Study conclusions based upon the study offer lessons/ recommendations that can be

classified into areas of population demographics; direct effect factors; mediated effect factors; moderation effects; and theory development. Further adoptions also require more attention to be paid to the categories of the population which are less educated and older ones as they are to be less included for the policy makers and financial service providers recommendations.

5.3.2 Recommendations on Factors with Direct Effects

Analysis of hypotheses which were formulated to assess direct association between exogenous and endogenous variables indicated both positive and negative impact on use intentions to mobile financial transactions. In both ways, there are lessons that can be learned from hypothesized about consequences of utility perceptions, ease of usage perceptions, social inspiration, risk perception, attitude, and facilitative conditions on behavioural intent for undertaking mobile financial transactions. These factors offer key information on the type of initiatives that can be used by policy makers and the providers of financial service in order to propel explosive uptake of mobile financial transactions to improve financial inclusion. Results in respect to relationships exhibited mixed results as four out of the six relationships were significant leading to acceptance of the associated hypotheses and the other two being insignificant and consequently resulting in rejection their respective hypotheses. Recommendations generated from findings of the tests in relation to every hypothesis and their implications in regard to every hypothesis are discussed under the subsequent section(s).

(a) Recommendations from the Results of H_1 regarding the influence of Utility Perceptions (PU) on Intentions in undertaking (IU) mobile financial services by University Students in Tanzania

While testing hypothesis (H_1), statistically significant relationship was established between Utility Perceptions and behavioural inclination for undertaking mobile financial services with p-

value of .000 and t value of 3.725 implying there is strong evidence of a significant impact on students' intention to utilize mobile financial services thus disconfirming the hypothesis. This implies that the users were highly motivated by information pertaining to the worth of the services in fulfilling a type of demands. Therefore, measures aimed at generating perceptions or beliefs about the attractive benefits of the mobile financial services probably would be effective when employed to advocate the use of the mobile financial transactions amongst university students in Tanzania. In this regard, if more university students are encouraged into adopting the use of mobile financial transactions, service providers should educate their customers on multitudes advantages of using mobile financial transactions. When the degree to which mobile financial transactions are viewed as problem solvers and/or problem makers (otherwise perceivable luxury items) goes high, then the majority of the potential users can make adoption intentions. Regulators, policymakers, financial service providers and developers need to develop devices and applications that offer mobile based financial services that are user friendly with features that enhance practical utility to encourage potential users to adopt the devices and their applications.

(b) Recommendations from the Results of H_2 regarding the stimulus of Ease of usage Perceptions (PE) on Intentions to Undertake (IU) mobile financial services by University Students in Tanzania

In order to demonstrate the validity of the relationship between PE and IU mobile financial transactions conceived in the second hypothesis (H_2), the outputs generated from the variance analysis showed that PE impact on IU mobile financial services with p-statistic value at .003 and t-statistic value at 2.965. It was found that in regression studies an association is considered significant when a p-statistic value is lower than .05 and t-statistic value greater than the 1.96 threshold, which would result in the acceptance of the hypothesis. This result shows that Ease of

usage Perceptions strongly correlates positively with the intention to or undertaking mobile financial transactions among the students. It therefore negates the hypothesis that postulated a weak relationship construed to exist involving ease of usage perceptions with intents for undertaking mobile phone-administered financial transactions. This outcome can be analyzed as the intention of students to use mobile financial transactions is posited on their perception on how easy it is to the technology behind the mobile financial transactions (Rehman et al., 2019). A conclusion that can be drawn from this case is that the quality of the technology to obtain the mobile financial transactions has an impact on intents of the students to undertake mobile finance services. Students that perceive the given technological application to be lower in terms of complexity and therefore easily useable will be more inclined to be involved in use of the technology. Devices and or service may be complicated in which case indication to users on how easy it is to use the devices with mobile financial transactions might be beneficial with respect to boosting usage or adoption. It is therefore advisable that operators of the mobile financial transactions focus on simple and easy to use and use technology. They should concurrently provide instructions on the procedures for using the services through short menus and ensure the customers that consistent technical support is there to help them out in case they face difficulties. Financial service providers should endeavor to create apps that are more user-friendly and can improve the curiosity of users to check out more. Rehman et al. (2019) had a similar take when they underscored the importance of aligning the service's features to the customers' level of comprehension. Another factor that may be considered is that financial service providers should try to offer more choices of services to customers with a view to encouraging more customers into undertaking mobile financial transactions (Naruetharadhol et al., 2021).

(c) Recommendations from the Results of H_3 regarding the consequences of Social inspiration (SI) on Intentions to Undertake (IU) mobile financial services by university students in Tanzania

The results of the tests conducted in hypothesis 3 (H_3) demonstrated that the impact of social inspiration in dictating intents of students to undertake mobile financial services was insignificant as supported by the p-statistic value of .540 and a t – statistic value of .613 leading to rejection of the hypothesis. Low levels of influence of social inspiration in driving the intents to undertake technological application or system signify that Social inspiration is not a factor which is instrumental in the decision to carry out mobile financial transactions in this investigation which entails the influence of relatives and friends on intents of students to undertake mobile tech-financial transactions in Tanzania: A study of university students. The freedom of students to become consumers of given mobile technology is highly independent to the power of close allies. Hence, building reliance of person to person persuasion when marketing mobile financial services will not tackle the problem significantly. The difference in their results was attributed to social inspiration and it is likely that this was the actual reason as most of the participants were users of one form of mobile financial transactions or the other, with most of them using mobile banking services; which confirmed the aforementioned assertion that social inspiration constitutes an impactful factor in promoting the adoption of new technological applications (Venkatesh & Davis, 2000). Mobile financial transactions are not considered new technology anymore. Customers are now comfortable relying on the services offered through the technology. Therefore, mobile financial services providers do not have a mandate of relying on individual user references to achieve massive adoption of the service. Promoting the adoption of Mobile financial services through strategies such as network marketing therefore hard. Rather it is advisable to adopt other

promotion strategies which include marketing materials that informs on the utility of the Mobile financial services and that these services are easy to use the mobile phone services.

(d) Recommendations of the Results of H_4 regarding the influence of Risk Perception (PR) on Intentions to Use (IU) Mobile financial services by university students in Tanzania

Analysis of the fourth hypothesis also revealed that none of the variables affected students' views regarding their intentions to undertake mobile financial transactions since values of the p and t are not significant at .254 and 1.143 respectively; therefore, we reject the hypothesis. The findings indicate that university students did not perceive high potential risks when making their choice to use mobile financial services. However, risk perceptions do not play any function in the choice of individual consumers to adopt mobile financial services. The possible reason for these findings could be an increase in confidence due to such factors as lapse of time or exposure to the technology-driven services (Lema, 2017). It is therefore recommended to ignore risk perception fears in as far as strategies for promoting growth in usage of mobile financial services are concerned. Since the potential users are quite confident, policy makers and financial service providers should not expend excessive resources in trying to provide assurance as regards to security or other concerns related to risk perceptions. Nevertheless, financial service providers need to continue enhancing security and data protection measures in order to maintain continued trust of the consumers of financial services in using mobile based delivery channels.

(e) *Recommendations of the Results of H_5 regarding the influence of Facilitative conditions (FC) on Intentions to Use (IU) Mobile financial services by University* Students in Tanzania

In the test of the fifth hypothesis, it was observed that facilitative conditions have stronger impact on students' motivation to adopt Mobile financial services and this was proved by the p-value .000 t-value of 3.944 finally suggesting that the hypothesis by accepted. Test results indicate

for the requirement to calculate the extent of manipulation of the environmental variables for achievement of goals (Venkatesh et al., 2003). This implies that resources, knowledge and support on mobile financial transactions is essential in influencing the users' intention for mobile financial services. Utilisation mobile-driven financial services is therefore based on the perception of situation components such as the cost of devices involved, whether supportive people and tools are available and so on. These include the cost of the devices and service, knowledge and understanding of how the financial services may be used and availability of individuals who can help the participant when he or she requires the services. These make it necessary that financial service providers ensure that there is favourable environment to increase the rate of adoptions. Here are some examples: menus with a short number of repetitions, the use of a frequently asked question, the use of chatbots, and the availability of service provider staff who will provide support for customers who are trying to use the service by 24-hour call (Dhingra & Gupta, 2021; Iskandar et al., 2020).

(f) Recommendations from the Results of H_6 regarding the influence of Attitude (AT) on Intentions to Use (IU) Mobile financial services by University Students in Tanzania

Findings observed on the tests related to the influence of attitude on use intentions for Mobile financial services revealed existence of statistically significant influence where the recorded p value was .000 and t value stood at 6.514. This means that the attitude of the student regarding the importance of mobile financial transactions directly relate to the intents for applying mobile financial services. Implications of such results is that provision of positive attitude with regards deployment of mobile financial services in their daily activities facilitates intention to undertake the services. This observation means that there is a need to consider Attitude as crucial factor in the definition of principal determinants of adoption use emergent technology or technology-driven

service such as mobile financial transactions. Intention was impacted by the attitude of the prospective user of mobile financial transactions. Financial service providers need to cultivate the right attitudes in the people who can become their clients. Clearly, this aspect could be motivated by supplying sufficient information regarding the importance of mobile financial services. Aspects that are likely to result in negative views regarding the use of mobile financial transactions should be avoided and be replaced with measures that could inculcate positive impressions. Providers of financial services need to provide information that promote positive attitude among the public and focus less on the negative aspects such as security concerns and potential barriers.

5.3.3 Mediation Effects of Attitude

An analysis of the mediation effects of attitude on the relationships between two primary exogenous constructs—Utility Perceptions as well as Ease of usage Perceptions in relation to the endogenous construct - intention to undertake (IU) mobile financial services generated the following results:

(a) *Recommendations from the Results of Hypothesis H_7 regarding Mediation Effect of Attitude (AT) on Relationship considered to exist between Utility Perceptions (PU) and behavioural intentions to undertake (IU) mobile financial services by university students in Tanzania*

There was also a mediation effect of attitude under the seventh hypothesis and the significant results strengthened the impact of students' perception on the utility of mobile financial services on their intentions to use the services with a VAF of 54.68%, resulting in accepting the corresponding hypothesis. The identification of major direct and indirect effects that are statistically significant with p-values equal to .000 is a low to moderate level of partially mediated effects of attitude in the association involving Utility Perceptions and use intentions. This implies

that Utility Perceptions of the mobile financial transactions has more significant impact on intention of participants who have positive inclination as regards to the nature and usage of the services. This finding also suggested that the attitude mediates the relationship of the Utility Perceptions and use intentions partially meaning that the consequence from the autonomous variable to the dependent constrcut is not completely through attitude. Financial service providers, regulators and policy makers who seek to increase the rate of adoption of mobile financial transactions are advised to deploy measures that incorporates both impressions of benefits or utility of the services coupled with those of raising positive view of the services.

(b) *Recommendations from Results of Hypothesis H_8 regarding Mediation Effect of Attitude (AT) on the association of Ease of usage Perceptions (PE) with personal behavioural intents for undertaking (IU) mobile financial services by university students in Tanzania*

Hypothesis 8 – Attitude mediated the relationship between students' perception on utility of mobile financial services and their intents to undertake the financial transactions via mobile phones with the VAF at 55.82% which would have led to accepting the hypothesis. It further showed that attitude partially mediated the relationship that exists between ease of usage perceptions and usage intentions with a significance of .000 for both direct and indirect effects. This implies that people with positive attitude towards utilization of mobile financial transactions are likely to have a stronger influence of perceptions related to the easiness of using mobile financial transactions on their respective intention to undertake the services. As such, the results suggested further that the mediating variable, attitude had substantial consequences on relationship guiding the independent variable (Ease of usage Perceptions) vis a vis the dependent variable (intentions to undertake) and that the impact is partial and complementary. This outcome implies that attitude generates a strengthening impact on the association connecting Ease of usage

Perceptions and intentions for undertaking mobile financial services. It suggests that ease of usage perceptions of the services are effectively moderated by the participant's positive orientation towards the relevance of the services.

AT has strong indicating partial mediation effects meaning that there was influence of PU on IU but mediated by AT amongst mobile financial service users in Tanzania. It is therefore recommended that more promotional messages concerning the utility of the mobile financial services be spiked to reinforce the positive attitude towards potential users of mobile financial services. Similar to the its influence on PU, attitude had a significant role explaining the association incorporating PE with IU of mobile financial transactions with strong partial mediation. The implication of such finding was that the moderating consequences of ease of usage perceptions on intents to undertake mobile financial services was particularly more pronounced among participants with positive view of the effect that ease of usage of mobile financial services. It is hence crucial for the financial service providers to carry out programs that create positive perceptions for the potential consumers to encourage them to adopt mobile financial transactions.

5.3.4 Recommendations from Results of Moderation Effects

Tests were conducted to establish whether there are notable differences in perceptions between male and female participants in relation to the use intentions for mobile financial services. The moderation of gender on the associations governing various pairs of exogenous elements and the endogenous factor IU showed that the exogenous independent variables did not significantly distinguish the influence of responses by male from those of female respondents towards in relation to the exogenous variable IU. The tests were done for hypotheses H_9 through H_{14} to test for moderation effects incorporating exogenous variables PU, SI, PE, FC, AT and PR and endogenous variable IU with respect to the moderating variable gender and found none, which led

to rejection of the hypotheses. The results have an implication that female and male students respond in a similar way to factors affecting their intentions to use mobile financial services. However, it would be advisable that similar measures be stimulated to encourage potential users to adopt mobile financial services. Specific recommendations related to the results of the hypothesis can be outlined as in the following sections:

(a) *Recommendations from Results of H_9 regarding Gender (GE)-based moderation of Effects on the association of Utility Perceptions (PU) with behavioural intentions to use (IU) Mobile financial services by university students in Tanzania*

The test of Hypothesis H_9 also confirmed the non-significant interactive effect of gender on the PU and students' behavioral intentions to use MFT with a value of the p-statistic standing at .566 suggestive of rejecting the hypothesis at the same time. In this case, the results indicated no gender-based differences in students' perceptions regarding the role of Utility Perceptions in shaping their intentions to use mobile financial services. The positive sign for the coefficient indicated that the little moderating effects that are present are higher in female students compared to male students, meaning that female students are more easily influenced by Utility Perceptions than the male students. Thus, it is suggested that approaches that promote use of mobile financial services based on Utility Perceptions should also be applied equally among males as well as among females.

(b) *Recommendations from the Results of H_{10} regarding Moderation of Effects of Gender (GE) on the Relationship between Ease of usage Perceptions (PE) and behavioural intentions to use (IU) Mobile financial services by university students in Tanzania*

A further test conducted on hypothesis H_{10} showed no significance of moderation effects of gender on the interplay between an independent variable Ease of usage Perceptions with the

dependent variable intentions to undertake mobile financial services by students, with a p-value of .475 so that they can lead to rejection of the hypothesis. When an assessment was done on the consequence of the variable Ease of usage Perceptions on behaviour intents regarding undertaking of mobile financial services, the results revealed that there was minute or no difference in how male and female students perceived this influence. The positive sign of the coefficient denoted that the significant moderation effects that do exist are greater in females than in males and thus imply that female students are more influenced by Ease of usage Perceptions than male students. Given the observation on negligible impacts, it is suggested that those adopted measures that aim to enhance Ease of usage Perceptions regarding adoption of mobile financial transactions should be applied for both females and males.

(c) *Recommendations from the Results of H_{11} regarding Moderation of Effects of Gender (GE) over the association involving Social inspiration (SI) and intentions to conduct mobile financial services (IU) by students studying in Tanzanian based universities.*

When the test on hypothesis H_{11} was carried out, there was no significant gender-based moderation effects on the interaction that incorporates social inspiration with students' intents for adoption of mobile financial services; p-value = .463 thus rejecting the hypothesis. In this case, findings indicated absence of notable difference in perceptions between female-male gender dimensions concerning the impact created by social inspiration to predict intentions to undertake mobile financial transactions. Yet the positive sign for the coefficient shows that the present minute effects are stronger in the female students compared to the male students. This implies that female students are influenced more significantly by social factors than male students. Regarding the above observation on effects being insignificant, relevant recommendations are that actions in

promoting adoption of mobile financial transactions through social inspiration should be applied equally for female and males.

(d) *Recommendations from the Results of H_{12} regarding Moderation of Effects of Gender (GE) on the Relationship between Risk Perception (PR) and behavioural intentions to use (IU) Mobile financial services by university students in Tanzania*

The test on hypothesis H_{12} showed that gender did not moderate Risk Perception of use with students behavioural intentions to use mobile financial services with a p-value of .816 and therefore rejecting the alternative hypothesis. In relation to this, all the results indicated a congruent perception of female students and their counterparty male students on the role of risk perception in dictating intention to undertake mobile financial transactions. The positive sign associated with the coefficient indicated that the results showed that relatively few moderation effects that are found are stronger among female students than male students, indicating that female students are more impacted by Risk Perception than are male students. Since there were no significant differences, this implies that the measures adopted in further promoting adoption of mobile financial services need not consider risk perceptions, and this applies to both female and males without exception. For example, information regarding whether or not the mobile device has highest degree of security features would have no impact on the perceptions of the potential user of the service, for the male and females alike. To them what matters most are the benefits arising from the use of the devices and are less concerned with potential risks. This is an important information to providers of financial services as now they would only focus on one angle regarding the benefits in their promotional initiatives rather than wasting resources in trying to provide assurance to counter risk perception concerns.

(e) *Recommendations from the Results of H_{13} regarding Gender (GE)- based moderation of Effects on the association involving Facilitative conditions (FC) with behavioural intents for use (IU) Mobile financial services by university students in Tanzania*

The test of moderation of gender on the association of facilitative conditions with students' behavioral intents for undertaking MFT as proposed by hypothesis H_{13} led to weak moderation effects with a p-value of .242, thus leading to rejecting the hypothesis. In view of this observation, the assumed relationship in terms of influence of facilitative conditions on intents to undertake mobile financial transactions indicated negligible difference in perception between male students and their counterparty female students. Additionally, the negatively-signed coefficient was indicative of the insignificant moderating relationship that exists is positive, an indication that males are more strongly influenced than by facilitative conditions than females. Therefore, measures adopted in promoting adoption of mobile financial transactions based on facilitative conditions should be equally applied to female and male users after observing the insignificance of the effects. The insignificant results notwithstanding, the slight differences in the nature of influence between males and females points to the potential area of academic interest. Facilitative conditions such as availability of user information which is simple, clear and understandable, availability of user-friendly gadgets, availability of service provider support should be provided without regard to gender differences.

(f) Proposes from H_{14} concerning Gender (GE)-based moderation Effects on the association of Attitude (AT) with behavioural intentions to use (IU) mobile financial services among university students in Tanzania.

The test on hypothesis H_{14} showed that the gender factor moderated less significantly the relationship assumed to exist between attitude and behavioural intent regarding utilizing mobile

financial transactions with a p-value .411 leading to rejection of the hypothesis. In this instance, the findings indicated that perceptions of the impact created by the variable of attitude on the intention for undertaking mobile finance were similar between male and female students. The finding means that while the original results on the significance of the influence of Attitude on use intentions was significant, the significance level does not vary between gender categories. Nevertheless, a closer look at the results indicated that the coefficient was associated with a negative sign suggesting that the possible negligible moderating effects that are present are stronger in the male population relative to female counterparties, meaning that female students are less influenced by attitude compared to male students. Absence of substantial gender-based differences in perceptions in the group of research participants relieves financial service providers from the need for gender-based segmentation of strategic initiative for driving growth in the adoption rates. In view of the observations on modest effects, it is suggested that the strategies developed to increase adoption of MFT adoption based on the effects of attitude should not be calibrated on the basis of either female or male recipients.

5.4 Recommendations on Theory Development

The dynamism of the technology industry necessitates evaluation of the theories governing adoption of the technology over time. This is evident in the evolutional theoretical developments that has taken place as regards to adoption of technology and its associated applications over the past couple of decades. As observed under the literature section, theories related to adoption of technology have metamorphosized with time with subsequent improvements emerging from the Theory of Reasoned Action through Planned Behaviour Theory, then the Innovation Diffusion Theory, followed by Task-Technology Fit Model, and subsequently the TAM and its variants and later on the UTAUT. Part of the endeavours for enhancing the explanatory capabilities of the model

has involved integration of one or more models. In wake of this understanding study utilized the integration of the TAM and the UTAUT as one of the contributing factors to addressing research knowledge gap as very few studies have adopted this integration approach (Singh & Srivastava 2018; Le et al., 2020; Hong & Chung-Ang, 2019). The explanation and predictive power of the integrated one performed higher than for the separate models. Accordingly, part of the insights drawn from study would be for researchers to consider integrating two or more models with a view to increasing the power of explanation. Moreover, it is shown that the model is improved by deleting such insignificant variables as Risk Perception, social inspiration, and gender. Therefore, the study concludes that some future studies that may be based on similar model may not necessarily have to incorporate the seemingly redundant variables of Risk Perception and social inspiration.

5.5 Recommendations for Future Research

Undertaken within the settings of university students, the study results show a generally positive perception of students in undertaking mobile financial transactions. The research would also help to highlight some of the predictor variables strongly influencing intention to adopt mobile financial services among students in universities. It opens up interesting implications, including highlighting its theoretical and practical significance while acknowledging potential limitations that may be addressed in future studies (Lynne, 2023) within larger population segments; particular product lines; alternative research methodologies; enhanced model development; and increased technological capabilities.

5.5.1 Population Demographics

The overall positive attitude towards use intentions and actual usage of Mobile financial services is also impressive when the study focuses on university students, as almost 100% of

participants had prior experience in some sort of mobile financial services. One of the most significant findings is that students believe that making use of mobile phone-based money services is associated with negligible magnitudes of risk, which means that chances for a mass market is tremendous. Students' profile at the universities is characterized by high literacy rates, narrow age span; homogeneity of behaviour that may not be applicable to other populations. Previous studies have linked high technology adoption with literacy rates and the young age of the population (Onyeaka et al., 2021; Elhajjar & Ouida, 2020). Students who are exposed to common learning environment also likely shape students into common cultural orientation, the result of which may lead to similarity of perceptions and behavioural use intentions. To validate this assertion further, future research should focus on other populations other than the university learners who would have diverse demographic attributes ranging from levels of literacy, age and other contexts that would provide further useful reference points. This would serve as a validation of whether or not the empirical observations were largely the consequences of the uniqueness of population under study.

Regarding geographical context, the study was carried out in Tanzania where the mobile penetration was high but FI was low. There are high uptake rates of mobile financial channels such as M-pesa, Tigo-pesa, Halopesa etc but relative high exclusion from the formal finance sector. Yet, Tanzania is one of the countries with the highest financial exclusion cases in East Africa (Finscope, 2023). Unlike highly developed economies, like the case with most countries at growth stage, it is characterized by scarcity of research on the potential for utilizing technology for promoting large use of financial services in the country. Similar studies have been conducted in the country and similar economies but in few numbers. Further study within the country and its peers would provide enough information that can be compared with the data gathered from similar

studies conducted in relatively more advanced economies where most of the studies have been carried out previously. Further future researches made under contrasting social and economic environment would be able to offer additional valuable inputs in identifying the stimulus of various factors on the behavioural intents behavior toward undertaking mobile financial transactions (Hong, 2019; Rehman et al., 2019). This would also provide valuable insights on how the dynamics through which countries can exploit technology to fast track the rate of financial inclusion (Himel et al., 2021).

5.5.2 Specific Product Offerings

The study considered the broad perceptions of students on adopting MFT irrespective of whether the perspective was specifically related to MB; MP; or MM. These are the three major branches of mobile financial services. Mobile banking (MB) are services of banking transactions carried out between a customer and the bank or bank related third parties through the use of a mobile gadgets such as cellular phones or tablets (Gbongli et al., 2019). Mobile payment (MP) services constitutes a kind of e-financial transaction that takes place between two individuals or organizations over a non-bank mobile phone account (Sleiman et al., 2022). Mobile money services are transactions in which e-money is transferred from one subscriber of a mobile money service offered by a telecom service provider to another subscriber (Mbongli et.al 2019). While distinguishable, the three categories of mobile financial transactions are quite intertwined with some transaction carried out across the categories. According to results derived from the study, the level of usage relative to previous studies concerning mobile financial services is considerably high. Mobile banking services have been used by a larger proportion of the respondents (65 percent); while mobile money service users account for 21 percent of the sample and the mobile payment service users account for 14 percent; and 0 percent had no experience in using any of

these services at all. These results contrast the findings from Finscope (2023) which prescribes a different profile where the use of mobile money services dictates over general banking service with 65 percent of adult population using mobile money services and 22 percent on general banking service inclusive of mobile banking. In this regard, a future study that include clear distinction between the various categories of Mobile financial services would reveal additional lessons regarding certain behavioural aspects that predict the usage of each of the mobile financial transaction domains. This view is also supported propagated by Gupta and Dhingra (2022) pointing out to the need for in-depth study of the specific category of MFT so as to understand the specific features and functionalities and aligning them to consumer preferences and experiences. In this way, users of the research would be able to devise promotional measures on the basis of the specific sub-categories of mobile financial services.

5.5.3 Research design and methods

This study was carried out in accordance with quantitative correlational designs in which only statistical analysis is used to analyze closed-ended questionnaire data similar to the majority of the inquiries on technology acceptance. The limitation associated with this approach is that it provides little room for further expansion especially in terms of additional things that could be discussed like the rationale behind a particular decision. It also has a narrow scope for affirmative conclusions regarding the causality between factors. Correlational research designs do not support the establishment of causality between variables in the respective research but are essential in identifying the relationship between the variables under study (Albashrawi et al., 2019).To expand the scope of information gathered from the research, it is hence advisable for some future research to focus on adding qualitative methods such as interviews and focused discussions to uncover

people's thoughts that led to certain adoption behaviors. It may also be useful to complement the research with additional methodologies such as experimental designs.

Likewise, the study deployed a cross-sectional study design where empirical data was collected at an almost single point in time. Choice of the cross-sectional research design was motivated by resource constraints in terms of both, time and financial resources which could not be substantive enough to conduct a longitudinal study. Although cross-sectional designs are useful in determining existing trends, they are ineffective in the analysis of temporal change (Caruana et al., 2015). Therefore, it is worthwhile to note that some of the items that were previously significant in past studies are no longer so, in the current study. This could be from the fact that there is the interplay of many factors, one of them being time. Hence, it may be useful to obtain additional information of a complementary nature by conducting a longitudinal study that would explain the impact of change on mobile financial transactions adoption intentions over time. Further, while relevant to quantitative cross-sectional studies, SEM does not offer much in evaluating latent heterogeneity and therefore inappropriate for causality testing (Luyao et al., 2022). While some of the variables that had previously been significant – such as risk perception as well as social inspiration – are no longer influential in the current study. This may be as a result of a combination of various factors but change associated with time decay plays a significant role. In this case, it might be useful to undertake a longitudinal study to gain additional evidence as to how mobile financial transactions adoption intentions change over time. This may include follow up of the same cohort of participants after a specified period or conducting again cross-sectional study on a comparable group of students at a later date.

A common method bias was another aspect of the performed study since the self-reported data was used in the research. Common method variance is the difference in variability that exists

across the manifest indicators in the model due to the method of measurement rather than due to the effects of the relationships being investigated (Kock, 2015). Respondents or research participants may be encouraged by a given set of factors to react in a similar fashion as they respond to the questions in the questionnaire and this may lead to optimistic estimates of the effect. Examples of common method variance arises when a particular question in a questionnaire is interpreted in a similar way or there is a general feeling by the participant that by responding the questions a certain way would please the researcher hence common method variance. In some cases, participants may not be interested in participating at all due to certain factors or fatigue and this can pose a challenge of filling questionnaires for completion. However, precautions against common method variance were ensured through ensuring proper instructions, and clarifications about certain aspects such as assurance of anonymity, and are not deemed foolproof remedies against common variance.

5.5.4 Improved Model Designs

TAM/UTAUT integrated model was used to test the hypothesised contribution of antecedent factors to behavioural intentions for using of Mobile financial transactions among university students in Tanzania. Realistic data always includes more information than the model has room for, and the modeler is forced to choose which factors are most important to include. Anchoring on findings gathered from previous research, a set of constructs was then chosen for the study to be conducted. After carrying out hypothesis tests, some of the constructs were found to be significant while others were not. For example, performance expectation; effort expectation; Trust Perception; price/value; and hedonic motive were excluded from the set of integrated factors. It becomes evident that performance expectation; effort expectation, and Trust are captured in some extent within Utility Perceptions; Ease of usage Perceptions; and Risk Perception

respectively, therefore not considered in a direct manner. Hedonic Motivation and Price Value may, however, be probably added in a future study model although they are not frequently used. Hedonic appeal is some enjoyment gained through a given technology (Shaikh et al. 2022). Students are especially attracted by various entertaining factors like music and movies. Hence it would be useful for future studies to develop the model to incorporate the construct of Hedonic Motives and its consequences on the intentions for undertaking mobile financial services in the near future.

In addition, a future study which is going to focus on university students may also include the construct Price Value in the proposed measurement model. Price value is the exchange between the values of benefits and sacrifices priced in terms of monetary, emotional, and quality and social values (Huang & Kao, 2015). This may be clarified as the total cost incurred in term of money or non-money for customer to enjoy the benefits of mobile financial services. This would be equally be of significance to a study focused on university students since they would have relatively low incomes. Furthermore, moderation effects of gender were also investigated in the study. Studies with greater samples of participants other than university students would therefore be crucial. Further research would also help determine the utility of the test for moderation to other populations and whether the empirical findings of hypothesis testing reveal substantial differences in perceptions between males and females which would be accurate for other segments of the population (Hong, 2019). One may also need to look at the moderation of other variables such as education and age. This would effectively supplement the findings of this study in that it may have had an influence of high literacy rates and narrow age range of participants.

A final suggestion is for future research to measure other extrinsic variables such as perceived service quality, perceived service cost, and perceived credibility. As evidenced in the

results significant progress has been achieved in the population under study to use MFS. These services and the question of their relevance to the communities in which they are offered and the provision of the services remain pertinent. Again, one of the crucial challenges for a student is the affordability factor. Future studies may in this regard aim at assessing the degree to which perceived cost is likely to impact on the intents for adopting the mobile financial transactions.

5.5.5 Application on Advanced Technologies

Latest developments in technology have led to digital transformation in all spheres of life including dimensions of financial service offerings. Revolutionaries in mobile communication, cloud computing and data analytics stand to provide unparalleled insights in the social behaviour of prospective users of Mobile financial transactions. A study that leverages on data generated from the new technologies stands to effectively complement insights generated from the self-reported data gathered in the cross-sectional study. Therefore, future similar study should consider employing technological advancement especially in terms of financial technologies (FinTech) and applications through Artificial Intelligence (AI) to offer additional significant contributions.

The method used in the study was PLS-SEM which does use self-reported data that may be associated with common error variance. To deal with the problem of self-reported measurement in the study, one can utilize some other types of measurement including the use of questions with different structures for independent variables compared to those for dependent variables (Jordan & Troth, 2020). On the other hand, one can also think of using technology-based approaches in checking the accuracy and consistency of the information provided through self-reporting. For instance, using big data analytics and AI they should be able to identify individual perceptions and attitudinal behavior towards usage of an individual technology. Future researches may therefore necessitate the utilization of such modern technologies to supplement this survey research.

Implications of user attitudes regarding intents for undertaking mobile financial transactions highlighted in current investigative work can also be extrapolated to other technological innovations in the area of finance and banking. Further research focused on future scenarios of financial services based on the new technological applications and delivered through the mobile phone would be beneficial to the research community. The study researched on mobile financial services in a broad sense but an in-depth research of specific aspects of mobile financial services such as the patterns of mobile phone-channeled banking, payment and money services would give more valuable knowledge. Further studies of this sort would serve to contribute to the findings presented in this study.

5.6 Limitations of the Study

While successfully conducted, the study faced a number of limitations that had a bearing on the kind of outcomes revealed. Clear understanding of the magnitude of the impact generated from the limitations would suggest undertaking similar research incorporating the new dimensions. However, based on the experiences encountered within the context of prior research articulated under the review of literature, the extent of variations in the outcomes arising from the cited limitations is likely to be marginal. Some of the dimensions that contributed to shaping the study findings include the scope of the study; study design and methodology; and rapid change of time.

The number one limitation was construed in terms of the scope of the study where the focus on university students. While on one hand, this comes as a strength in terms of population homogeneity, it is on the other hand perceived as a limitation in terms of inability to grasp adoption perceptions inherent in the other segment of the youth population, which could provide additional insights of the matter to the overall youth population. Nevertheless, the mitigation providing assurance on the implications of the limitation is the widespread use of smartphones across the

youths which suggests that perceptions and attitudes towards the technology are likely to be similar across youths regardless of the research context.

The second item was the limitation conceived in terms of the research methods and design. This study deployed quantitative research methods involving correlational design which uses statistical analysis to analyze data collected through closed-ended questionnaires. The potential limitation of this approach is the limited flexibility for expansion that may require consideration of additional items into the discussion such as the investigation on the rationale behind a particular decision. In addition, correlational research designs do not support the establishment of causality between variables in the respective research but are essential in identifying the relationship between the variables under study (Albashrawi et al., 2019). Deployment of quantitative correlational design was motivated by the experience observed in previous studies related to adoption of technology were able to produce quality results based on quantitative methods and corroborated by the results of this study. The overall expectation is therefore a thin line in the divergence arising from the use of the single-sided methods relative to the mixed methods. Yet, the study involving hybrid methodology stands to provide additional comfort to readers by employing complementary qualitative research techniques such as interviews and focused discussions to uncover people's thoughts behind certain adoption behaviors.

Thirdly, the study deployed a cross-sectional study design where empirical data was collected at an almost single point in time. While useful in determining existing trends, cross-sectional designs are considered ineffective in the analysis of impact generated from change of time (Caruana et al., 2015). One of the key observations revealed from the study is the substantial shift in circumstances whereby, some of the items previously seen as significant, are no longer such. The exponential change is attributable to an interplay of multiple factors, time lapse being one.

The impact of change in time is even more pronounced in studies related to technology that is generated considered to experience rapid changes over time. Adoption of the cross-sectional research design was driven by the limitation of the resource envelope in terms of time and financial resources. Longitudinal and panel studies could provide additional insights to mitigate the impact of time lapse on mobile financial services adoption intentions. Nevertheless, output produced from the cross-sectional study constitute a solid foundation upon which future studies my complementarily build on.

Another limitation considered to potentially exist within the study framework is the use of self-reported data as opposed to independent observation, which method is generally associated with the problem of common method bias. Common method variance is the difference in variability that exists across the manifest indicators in the model due to the method of measurement rather than due to the effects of the relationships being investigated (Kock, 2015). Research participants may be influenced to respond in a certain way in response to particular intentions rather than expressing honest opinions on the questions, which may lead to unrealistic estimates of the effect. Examples of common method variance arises when a particular question in a questionnaire is interpreted in a similar way or there is a general feeling by the participant that by responding the questions a certain way would please the researcher hence common method variance. In some cases, participants may not be interested in participating at all due to certain factors or fatigue and this can pose a challenge of filling questionnaires for completion. However, precautions against common method variance were ensured through ensuring proper instructions, and clarifications about certain aspects such as assurance of anonymity, and are not deemed foolproof remedies against common variance. In addition, during data cleaning exercise, three

questionnaires were removed from the sample on account of providing flat responses, an indication of disinterest in the subject matter.

5.7 Conclusion of Research Study

Empirical observations of paradoxical events related to exponential mobile communication advancements on one hand and the relatively slow uptake of mobile financial transactions on the other was part of the study. This was based on the fact that the growth rates in financial inclusion are not commensurate with the expectations from the potential of technology to drive large adoption of technology enabled financial services and resultant growth in financial inclusion (Mhlanga & Denhere, 2020; Tsouli, 2022). Based on the philosophical positivist paradigm, this study adopted an ontological perspective that took a positivist worldview of reality: the objective social world that is there independently of the observer, as opposed to interpretivism which views phenomena as constructed through interpreters (Junjie & Yingxin, 2022). It used an observational, between-subjects research design to examine various hypotheses concerning the association involving independent, exogenous factors with dependent, endogenous factors. The direction of such an implied health correlational research design was anchored on several reasons as a strong instrument in empirical confirmation of several relationships among variables, as well as assessment of inference, and replication by other researchers provided that the experimentation is well designed (Novosel, 2022) & (Gerrish & Lathlean 2015, Ed). Another consideration that informed the choice of the quantitative research approaches lies in the type of data collection and packages like questionnaires and statistical analysis packages.

Consequently, the quantitative study use a United of TAM and UTAUT models to analyse the effect that the factors have on the behavioural intention of University students in Dar es Salaam to use the technology driven financial services. For the sake of hypothesis testing, this study sought

to establish existence and magnitude of association of the given exogenous factors with the endogenous factor in respect of students' behavioural intent in undertaking mobile financial services in general without any classifications into; Segments of mobile money services (MMS), mobile payment services (MPS) and mobile banking services (MBS). The recognition of the critical and influential factors was deemed as vital in crafting strategies to increase scale up of adoption of mobile phone-administered financial transactions, and eventually capturing the desired vision in raising financial inclusion.

Based on the above observation, the core motivation for this study was to establish an understanding of factors contributing to the fairly low utilization of mobile financial services despite the high mobile phone usage that is prevalent today in Tanzania and other developing world nations in general (Abdinoor & Mbamba, 2017). Since there was an analogous increased adoption level among university students as was seen earlier despite the fact that they are prisoners of emerging technologies, the study was conducted within the student communities in Tanzanian universities.

This study was deemed relevant as it would add to ongoing efforts in the pursuit of expansion of financial access and also enhancing the scope and depth, which is a critical component in poverty eradication agenda. Recruiting university students would help implement policies within communities because they are potentially future key shapers of lifestyles and business decisions. Understanding the determinant influencing the uptake of financial services would also help in shedding light on how other advancements in technology such as buffer technologies such as block chain technology; machine learning; artificial intelligence; big data analytics; and many related applications can be harnessed in strategies for increasing the

accessibility and usability of financial services among the emerging economies. The study was further deemed relevant in adding knowledge to the pool within the research community.

Drawing from the study results, a number of recommendations for policy makers, financial service providers, and the research community were deduced. The central message in the recommendations regarded the insights generated to provide practical solutions and contribute towards policy development; promotion of financial service usage; and development of theoretical knowledge. The recommendations were made in the aspects of population demographics; factors with significant influence; non-influential factors; mediation effects; theoretical contributions and future research. Suggestions were availed for future studies to consider expanding the coverage of the population under study; focusing strategies on most significant drivers of MFT adoption; application of innovatively integrated models; and consideration for inclusion of additional/alternative mediating and moderating factors.

Staged among university students, the study results depicted substantial strides in the use of Mobile financial transactions with an overwhelming majority at 65 percent of participants reporting prior experience in mobile banking services, an advanced form of mobile financial transactions; and the remaining 21 percent and 14 percent reporting experiences in mobile payment and mobile money services respectively. This phenomenon contrasts the general observation of low financial service usage trends, and the majority (61 percent) of which were confined to mobile money services (TCRA, 2021; BOT, 2021). Hypotheses: Increased uptake of Mobile financial transactions by university students may be attributed by high literacy levels (see Riddell & Song, 2012), and the benefits of age as proposed by Alsayed et al. (2020). This means that university students should be considered as the right demographic which can be actively utilized for pushing the financial inclusion agenda forward. Policy makers, suppliers of financial services and all

stakeholders in financial inclusion should think about how the experiences and way of life of university students and university graduates could be harnessed to encourage the members of the public in using the Mobile financial transactions all across the country.

The study affirmed the view that utility perceptions, ease of usage perceptions, attitude as well as facilitative conditions predicted intentions of undertaking mobile financial transactions among university students meaning people would be encouraged to use the service more when only given information on its utility to meet needs and the fact that using it would not be very complicated. They also depend with the readily available supports in adopting the service and the conditions that create a positive perception towards them. These findings provide support to the assertion especially with reference to the mediation results which show that there is strong partial mediation of the interplay between the dichotomous sets of variables of Utility Perceptions, use intentions, Ease of usage Perceptions with use intentions, by attitude. This led to the recommendation that marketing information should include elements that speak to the need the service will satisfy; way the service is easy to use; available support for the user; aspects that create a positive attitude towards the prospect user; and, it should bear no gender.

The insignificance of gender on the effects of exogenous variables on the intentions for undertaking mobile financial transactions suggests that the marketing information based on gender categories are unlikely to yield positive results. Financial service providers should instead utilize the enhanced confidence to engage in aggressive marketing techniques of enhancing the overall rate of adopting mobile phone-based financial transactions among the youths and the public. This conclusive position may also be equally applied to the results obtained in respect of the direct relationship of the variables social inspiration and Risk Perception on MFT use intentions whereby both variables were statistically weak. It was advised that efforts for promoting usage of Mobile

financial transactions based on the social dimensions as well as the avoidance of risk perceptions would not be effective in uplifting the usage of Mobile financial transactions among university students in Tanzania.

An integration of TAM and UTAUT was assumed within the study whereby a number of factors were drawn from both the constituent models depending on the frequency of previous usage and instances of significance. The TAM-UTAUT integrated model showed better fitness and predictive capability as compared to the individual models especially if Rankin's Risk Perception, social inspiration and gender were excluded. It was therefore suggested that in some future studies on the subject may equally benefit from integrating two or more models to achieve higher explanatory and predictive power. It was also recommended to include some of the latent constructs that excluded from the current analysis such as hedonic motivations and price value since while not as frequently used, they stand to influence the use intentions of university students on account of their emotional preferences and their economic status. In this respect, it was concluded that incorporation of additional models into the study would ultimately help to enhance its advancement and bring more additions to the existing knowledge base.

It also pointed out areas that future studies would usefully require attention to. One of such areas is the research population which can actually refer to quite a number of different things. The study was conducted among university students, and they may not be a true representation of the rest of population in certain ways, for instance, they are mostly literate and of nearly the same age. As it would be collected from similar survey conducted among other classes of population like youths other than students and people of different age groups. Any such other study would also facilitate to also confirm the mediation and moderation effects of attitude and gender respectively. The infrequent number of studies on adoption of technology in Tanzania and peer economies

would further suggest that such other study be preferably conducted in Tanzania which ranks among countries with highest levels of financial exclusion in East Africa (Finscope, 2023).

Again, this research-work assumed a cross-sectional design, thereby failing to adequately capture important aspects resulting from lapse of time (Caruana et al., 2015). In this case, the recommendation was to run a longitudinal study that would provide comparative analytical results on mobile financial transactions user perceptions over different settings and time. The longitudinal study could involve tracing of the same participants after a period of time or repeating the cross-sectional study on a similar group of different participants at some future date. The longitudinal study was also recommended as a means to overcome limitations associated with the common method bias generated through the use of self- reported data. This is the variance that is common to all variables in the model as a result of variation in the measurement method rather than the interactions of factors under study (Kock, 2015). Additional measures suggested to mitigate the effects of self-reported data in PLS-SEM involve the use questionnaires in which questions pertaining to dependent variables have dissimilar structure from those of independent variables (Jordan & Troth, 2020). A recommendation is also made on further exploration of the potential for validation of the insights obtained from the survey-based study through application of contemporary innovative technologies such as big data analytics; financial technologies (FinTech) applications; Artificial Intelligence (AI)-enabled applications. Future studies would therefore need to explore the potential of advanced technological capabilities in providing in-depth insights on perceptions and behavioural actions of users of Mobile financial transactions to complement the results of this self-reported data-based study.

As much as the study has established perceptions towards Mobile financial services in broad terms, which may not reveal specific behavioural insights pertaining the MFS subcategories

of MM, MP, and MB. Users of the MFS subcategories are likely to be distinct in terms of social and economic status, level of literacy or other social dimensions such as age or gender. There is therefore a for future studies to review the domains of MF which include mobile phone-based banking (MB); mobile phone-based payments (MP); and mobile phone-based money (MM) service design the study in line with the MFT subcategories. This would give the much-needed deeper understanding of behavioural factors that contribute to growth of each of the segments of interest for instance, the observed exponential growth in the Mobile Banking to 65 percent against the other domains of mobile financial transactions.

This study was also aware of the challenges of using models to mimic real life scenarios since there are always some factors that cannot be captured when modelling. In using the TAM/UTAUT integrated model the study analyzed the effect of one from this list from a pool of antecedents deemed to affect Mobile financial transactions usage in addition to the selected set: performance expectation; effort expectation; hedonic motives; Trust Perception; and price/value. In view of the behavioural characteristics of the university students as captive audiences to entertainment stimuli and having relatively low-incomes, the future research may also need to consider two factors: Hedonic Motivation and Price Value, although both the factors were seldom employed in the prior investigations. Hedonic motivation pertains to fun or entertainment received from applying a particular technological service (Shaikh et al., 2022) while price value entails the exchange of benefits for a stake which can be an emotionally-attached value, monetary-attached value, quality value, or socially-attached value (Huang and Kao, 2015). It was also suggested that for future research, the same should consider exploring the moderation effects of age in addition to the effects of gender.

All in all, the study reveals findings that offer significant contribution to existing literature on the customers' side views about factors influencing the intents for adopting financial transactions by students in universities based in a developing country context of Tanzania. As it stands, it provides useful information for policy makers, financial service providers, researchers, and academicians in an effort to actualize their various goals. Such information can be derived based on policies and regulations that aim at attaining set financial inclusion by enhancing development of appropriate and understandable products simplicity as well as creating enabling and conducive environment for the massive uptake of Mobile financial transactions. Also, the financial service providers, who want to sustain their presence and expand the business, can create products and services and devices consistent with beneficiaries' preferences highlighted in the research, such as precise manifested benefits, convenience, simplicity and support accessibility. Research scholars and academicians will also find something of interest and as such will be able to relate to theoretical and empirical outcomes, adding more knowledge to the stock of knowledge.

5.8 Summary

The fifth chapter provided an articulate view of implications arising from the results of the study from which recommendations for application, theory development and future research were drawn. Research implications were meant to appraise policy makers, financial service providers and academicians on the relevance of the findings in real life circumstances, shading light on critical factors in driving massive adoption of mobile financial transactions with ultimate impact on financial inclusion. Research implications reflected the nature of hypotheses that tested direct, indirect, mediation and moderation effects on relationships.

The outcomes of the tests applied on direct relationships revealed that four of the six relationships were statistically strong, resulting in acceptance of the hypotheses while the

remaining two were rejected on account of statistical insignificance. Hypotheses that were accepted suggested strong influence of perceived factors in relation to the benefits or utility, usage simplicity, supporting conditions, and the attitude in the customer's decision to adopt mobile financial services. Such findings implied that promotional measures that focus on perceptions regarding benefits and simplicity of using mobile financial transactions such as speed of service, convenience, flexibility and reduced costs, and user friendliness, would generate substantial outcomes in driving use of mobile financial services to university students in Tanzania. Likewise, emphasis on availability of supportive environment such as

availability of resources, availability of smartphones, availability of power, information on usage and support such as simple instructions in clear and understandable language, assurance of support and similar services are likely to motivate multitudes of potential users into adopting mobile financial transactions. Complementary to the foregoing external factors was the attitude factor, suggesting the strong influence of psychological standpoint of the individual in relation to the service offering. Implication of the finding was a view that strategies that create positive perception concerning the use of mobile financial transactions are crucial in promoting intentions for adoption of mobile financial transactions.

Negative research outcomes from hypotheses that tested direct associations related to the factors of Social Influence and Risk Perceptions, suggesting minimal impact of relatives and friends as well as fears of loss, in influencing adoption intentions to undertake mobile financial services among surveyed population. Insight drawn from this finding is that person to person persuasion in using mobile financial transactions is unlikely to produce significant outcome. In the same vein, accumulated use experience by university students resulting from high prevalence of smartphone use has rendered students less cautious about the risks associated with their choices of

using mobile financial services. Practical implications of the findings is that, reliance on word of mouth in spreading information and as well as stressing on alleviation potential threats to encourage university students to use mobile financial transactions are bound to be ineffective and would amount to unnecessary wastage of resources.

A second set of hypotheses gauged the mediation effects of attitude on the associations involving perceptions of usefulness and perception of ease of usage with the use intentions. Realization of the statistically significant role of attitude in both associations means that an individual's attitudinal orientation strengthens or weakens the association between the pairs of associations. The interpretation of the observation is that the flow of influence of the exogenous latent variables to the endogenous latent variable is not fully channeled through attitude nor fully channeled outside attitude. Practical implication of such results is that measures aimed at promoting use of mobile financial transactions based on perceptions regarding utility and ease of usage would be amplified by enhancement of the individuals' attitudes towards the services. Henceforth, the consolidation of Attitude together with perceptions related to Usefulness or Ease of usage amounts to production of strong influence in the determination of use intentions both as complementary to one another and on own separate accounts. Attitude is conclusively a core driver of use intentions both in its own sake and through mediation with the variable Utility Perceptions.

A third category of hypotheses focused on testing moderation effects of gender on the different pairs of associations, all of which were found to be statistically insignificant, meaning that differences in perceptions regarding influential factors in the intents for undertaking mobile financial transactions between gender categories of females and males were negligible. Lack of male-female dichotomy in perceptions in the associations related to utility perceptions, ease of use perceptions, social influence, risk perception, facilitating conditions and attitude suggest that

gender-based endeavours for promoting adoption of mobile financial services would amount to futile deployment of resources. Effective marketing and promotional initiatives that aim at raising the awareness about the importance of utility, ease of use, facilitating conditions, social influence, risk perceptions and attitude in driving adoption of mobile financial transactions need not distinguish between the gender groups. Nevertheless, while all factors were generally statistically insignificant, gender variations in some of the variables were evident with female subjects largely influenced by utility and simplicity features and males more responsive to facilitative conditions and customer attitude.

The survey outcomes also bear other implications in terms of theoretical contribution and demographic features of the population. In terms of theoretical contributions, study findings offer an understanding of concepts and their linkages and the resultant explanatory power, effect sizes and predictive power associated with the integrated model employed in the study. Integration of the constructs from both TAM and UTAUT models was found to produce relatively higher explanatory power compared to the separate models. This implies that one of the recommendations that may be used to enhance the weakness of the model may include a recommendation on the use of integrated models, which forms part of the academic contribution to the store of knowledge on research on adoption of technology-driven financial services. On the side population demographics, important was the revelation on increased levels of utilization of mobile financial transactions relative to some of the observations recorded in past study periods. Participants who claimed to be using mobile money service which is considered an entry or basic stage of mobile financial transactions usage was lower in number compared to those who reported to be using mobile banking services, regarded as an advanced stage of mobile financial transactions usage, a significant departure from prior statistics, the possible explanation being increase in confidence

to pursue the various modes of mobile financial services including mobile banking services as a result of increased exposure to smart phones over the recent past.

Insights derived from the research findings and implications were molded into practical recommendations in the form of applications to policy and business as well as future research endeavours pursued in advancement of knowledge. The recommendations illuminate insights on measures that may be considered or adopted by policy makers; financial service providers; and the research community in pursuit of their respective endeavours on policy development; enhancing usage of financial services; and advancement of theory and knowledge. Similar to study implications, recommendations and conclusion were developed along the areas of population demographics; direct effect factors; mediated effect factors; moderation effects; and theory development.

From within the hypothesized direct relationships four hypotheses regarding consequences of utility perceptions, ease of usage perceptions, attitude, and facilitative conditions had significant positive outcomes on behavioural intent for undertaking mobile financial transactions. These factors offer key information on the type of initiatives that can be used by policy makers and the providers of financial service in order to propel explosive uptake of mobile financial transactions to improve financial inclusion. Implication generated from findings was that measures that focus on perceptions regarding benefits and simplicity of using mobile financial transactions, availability of supportive environment and creation of positive psychological perception would have profound results in driving use of mobile financial transactions to university students in Tanzania. Service providers should therefore, endeavor to educate their customers with information concerning many advantages of using mobile financial transactions. Regulators, policymakers, financial service providers and developers need to develop devices and applications that offer mobile based

financial services that are user friendly with features that enhance practical utility to encourage potential users to adopt the devices and their applications. They should concurrently provide instructions on the procedures for using the services through short menus and ensure the customers that consistent technical support is there to help them out in case they face difficulties. Both regulators and financial service providers should ensure provide favourable environment such as provision of short menus with a short number of repetitions, use frequently asked question, chatbots, and service provider staff. It is further advisable to create the right attitudes in the potential clients by promoting aspects that are likely to inculcate positive impressions regarding the use of mobile financial transactions.

Hypotheses on direct relationships regarding the factors of social influence and risk perception had negative results suggesting absence of influence on adoption intentions for mobile financial transactions. Practical implications of the findings is that, reliance on word of mouth in spreading information and as well as stressing on attempts to alleviate potential threats would have marginal impact in encouraging university students to use mobile financial transactions.

Therefore, mobile financial service providers do not have to rely individual user references such as network marketing to achieve massive adoption of the service, rather should adopt other promotion strategies which include marketing materials that informs on the utility and simplicity of using mobile phone services. They should as well ignore risk perception fears such as security concerns and related risks in promotional endeavours as potential users have grown in confidence. Yet, the providers need to continue enhancing security and data protection measures in order to maintain continued trust of the consumers. Similarly, in terms of mediation effects, attitude was found to strengthen the influence of Utility Perceptions as well as Ease of usage Perceptions on intention to undertake mobile financial transactions. The revelation implies that perceptions on

Utility and Ease of Use have higher influence on mobile financial transactions among participants who have positive inclination as regards to the nature and usage of the services. Corollary, it is advisable for financial service providers, regulators and policy makers to deploy measures that incorporates both impressions of benefits or utility of the services coupled with those of raising positive view of the services among the prospective users. Regarding moderation effects, the absence of significant impact of gender on the influence of variables PU, SI, PE, FC, AT and PR on IU leads to the suggestion that measures by financial service providers and regulators to stimulate adoption of mobile financial transactions should disregard gender differentiation measures.

In terms of theoretical contribution, the survey results indicated that integration of models was had a bearing in enhancement of the explanatory power. The explanation and predictive power of the integrated one performed higher than for the separate models. From the insights, a recommendation was made for future researchers to consider integrating two or more models with a view to increasing the power of explanation. Other aspects considered as part of future research recommendations included the need for change of contextual settings, product lines, research methodology and higher technological capabilities. Having staged the study within university student community characterized by high literacy rates, narrow age span; homogeneity of behaviour that may not be applicable to other populations. To further validate insights obtained from the study, future research should focus on other populations other than the university learners who may have diverse demographic attributes.

Regarding the contextual settings, staging another study in a different geographical location with social economic features similar to Tanzania may reveal further insights on identifying the stimulus of various factors regarding the behavioural intents behavior toward

undertaking mobile financial transactions. Besides, while study took broad view on perceptions of students regarding adopting MFS irrespective of the specificity of the components of Mobile banking (MB), Mobile payment (MP) and Mobile money (MM), in-depth exploration of the specific segments in future studies would reveal additional lessons regarding certain behavioural aspects that predict the usage of each of the mobile financial transactions.

This study also highlighted lessons on research methodology for consideration in furtuer research. Under a quantitative correlational design, the study deployed statistical analysis of data gathered using closed-ended questionnaires. To expand the scope of information gathered from the research, it is hence advisable for some future research to focus on adding qualitative methods such as interviews and focused discussions to uncover people's thoughts that led to certain adoption behaviors. It may also be useful to complement the research with additional methodologies such as experimental designs. Likewise, application of a cross-sectional study design is limited in the scope of analysis of phenomena as a result of time. Hence, future research based on longitudinal design it may be useful to obtain additional information of a complementary nature.

The set of constructs employed in the research was chosen based on the frequency of occurrence and significance in prior research. A number of excluded variables are nevertheless, likely to be influential on account of the intrinsic nature, in relation to the youth population. Future research may need to onboard Hedonic Motivation and Price Value Hedonic because of the appeal they provide to the youth, who strongly attracted to entertaining technologies and have low incomes. There may also be a need to explore the moderating effects of other factors such as education.

On the list of recommendations for future research is also the extent at which new technologies such as AI could be deployed generating data to complement insights generated from the self-reported data gathered in the cross-sectional study. Future similar study should consider employing technological advancement especially in terms of financial technologies (FinTech) and applications through Artificial Intelligence (AI) to offer additional significant contributions. In addition, to deal with the problem of self-reported measurement in the study, one can utilize some other types of measurement.

In conclusion, it is found that the study offers notable contribution to existing literature regarding customers' views about intents for adopting financial transactions within university student communities. It provides useful information for policy makers, financial service providers, researchers, and academicians in an effort to actualize their various goals. Such information can be utilized to enrich policies and regulations that aim at attaining set financial inclusion by enhancing development of appropriate and understandable products simplicity as well as creating enabling and conducive environment for the massive uptake of mobile financial transactions. Financial service providers stand to stretch out their presence by leveraging on the insights to create products and services and devices consistent with beneficiaries' preferences highlighted in the research, such as precise manifested benefits, convenience, simplicity and support accessibility. Besides, the research contributes to the stock of knowledge which may be of interest to scholars and academicians.

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APPENDICES

5.9 Appendix A: Research Ethics Application Form

REAF_DS - Version 3.3 AP ☐

UNICAF UNIVERSITY RESEARCH ETHICS APPLICATION FORM DOCTORAL STUDIES	UREC USE ONLY: Application No: Date Received:

Student's Name: Alfred Lameck Mkombo

Student's E-mail Address: fredmkombo@gmail.com

Student's ID #: R2011D11584347

Supervisor's Name: Dr. Lawrence Wahua

University Campus/Program: Unicaf University Zambia: PhD Doctorate of Philosophy

Research Project Title: THE ACCEPTANCE OF MOBILE FINANCIAL SERVICES BY UNIVERSITY STUDENTS IN DAR ES SALAM, TANZANIA

1. **Please state the timelines involved in the proposed research project:**

Estimated Start Date: 12-Jun-2023 Estimated End Date: 8-Sep-2023

2. **External Research Funding (if applicable):**

2.a. Do you have any external funding for your research?

☐ YES ☑ NO

If YES, please answer questions **2b** and **2c**.

2.b. List any external (third party) sources of funding you plan to utilise for your project. You need to include full details on the source of funds (e.g. state, private or individual sponsor), any prior / existing or future relationships between the funding body / sponsor and any of the principal investigator(s) or co-investigator(s) or student researcher(s), status and timeline of the application and any conditions attached.

2.c. If there are any perceived ethical issues or potential conflicts of interest arising from applying for and/or receiving external funding for the proposed research then these need to be fully disclosed below and also further elaborated on, in the relevant sections on ethical considerations later on in this form.

3. The research project

3.a. Project Summary:

In this section fully describe the purpose and underlying rationale for the proposed research project. Ensure that you pose the research questions to be examined, state the hypotheses, and discuss the expected results of your research and their potential.

It is important in your description to use plain language so it can be understood by all members of the UREC, especially those who are not necessarily experts in the particular discipline. To that effect ensure that you fully explain/define any technical terms or discipline-specific terminology (use the space provided in the box).

The purpose of this quantitative study is to gain an understanding of the behavioural factors that exert significant influence on student intentions to use mobile financial services that would contribute promoting usage of financial services and ultimately increase financial inclusion. The research applies an integrated model involving the Technology Acceptace Model (TAM) and the Unified Theory of Acceptance and Use of Technology (UTAUT) to investigate the influence of behavioural factors of perceived usefulness (PU), perceived ease of use (PEU), social influence (SI), Facilitating Conditions (FC), perceived risk (PR) and attitude (ATT) on behavioural intention (BI) to use mobile financial services. Research questions are:
RQ1: What is the ATT-mediated effect of PU on BI to use mobile financial services? RQ2: What is the ATT-mediated effect of PEU on BI to use mobile financial services? RQ3: What is the of SI on BI to use mobile financial services?;RQ4: What is the influence of PR on BI to use mobile financial services?; RQ5: To what extent does FC influence BI to use mobile financial services?; RQ6: What is the influence ATT on BI to use mobile financial services?; RQ7: What is the moderating impact of Gender (GE) on the effect of SI on BI to use mobile financial services?; RQ8: What is the moderating impact of GE on the influence of PR on BI to use mobile financial services? The Hypotheses are: H1: PU mediated by ATT has no effect on BI to use mobile financial services; H2: PEU mediated by ATT has no effect on BI to use mobile financial services; H3: SI has no influence on BI to use mobile financial services; H4: PR has no influence on BI to use mobile financial services; H5: FC have no influence on BI to use mobile financial services: H6: ATT has no impact on BI to adopt mobile financial services; H7: GE does not moderate the effect of SI on BI to adopt mobile financial services; and H8: GE has no impact on the influence of PR on BI to adopt mobile financial services. It is expected that results of this study will establish significant determinants of students' intention to use mobile financial services and contribute to efforts for promotion financial inclusion in Tanzania. After extensive literature review, the following changes were made: the approach was changed from mixed to quantitative; the model from TAM to integrated model involving the TAM and UTAUT; and increased number of variables as previous studies found they had significant influence on behavioural intention to adopt technology-based financial services.

3.b. Significance of the Proposed Research Study and Potential Benefits:

Outline the potential significance and/or benefits of the research (use the space provided in the box).

The significance of this study is of three folds: technological, policy, and operational (economically). Technological, the relevance of the extended technology acceptance model in this the proposed topic would be tested. Policy wise, the outcomes of the study would shape and reshape policies aimed at boosting the usage of mobile financial services among university students in general and youth in general. Operationally, firms would increase their profitability, efficiency, and sustainability by optimizing the lessons derived from the findings of this study. The study would also serve as a contemporary contribution to the usage of mobile financial services as a marketing strategy.

4. Project execution:

4.a. The following study is an:

- [x] experimental study (primary research)
- [ ] desktop study (secondary research)
- [ ] desktop study using existing databases involving information of human/animal subjects
- [ ] Other

If you have chosen 'Other' please Explain:

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4.b. Methods. The following study will involve:

- [x] a Quantitative methodology
- [ ] a Qualitative methodology
- [ ] a mixed methods approach

If you have chosen mixed methods please state below whether you are going to proceed with triangulation or not.

☐ YES ☐ NO

4.c. Please state below which tools you are going to use:

A	B	C
Select the tools to be used in your study	**Select how the tools selected in column A will be administered (select one or more)**	**Select what types of questions will be included in the tools previously selected in column A (select one or more)**
Interviews ☐	☐ Face-to-face ☐ Online with camera (synchronous live discussion with camera) ☐ Audio only (synchronous live discussion without camera, i.e., via phone)	☐ Open-ended questions ☐ Close-ended questions ☐ Includes section related to demographics
Focus Groups ☐	☐ Face-to-face ☐ Online with camera (synchronous live discussion with camera) ☐ Audio only (synchronous live discussion without camera, i.e., via phone)	☐ Open-ended questions ☐ Close-ended questions ☐ Includes section related to demographics
Questionnaire ☑	☐ Face-to-face self – administered questionnaire ☐ Online, i.e., via phone or any other platform. The researcher reads the questions to the participants ☑ Online asynchronous self-administered questionnaire (i.e., via email)	☐ Open-ended questions ☑ Close-ended questions ☑ Includes section related to demographics

A Select the tools to be used in your study	B Select how the tools selected in column A will be administered (select one or more)	C Select what types of questions will be included in the tools previously selected in column A (select one or more)
Experiments ☐	☐ Face-to-face ☐ Online with camera (synchronous live discussion with camera) ☐ Audio only (synchronous live discussion without camera, i.e., via phone) ☐ Asynchronously via any online platform	☐ Open-ended questions ☐ Close-ended questions ☐ Includes section related to demographics
Tests ☐	☐ Face-to-face ☐ Online with camera (synchronous live discussion with camera) ☐ Audio only (synchronous live discussion without camera, i.e., via phone) ☐ Asynchronously via any online platform	Provide a brief description of the test in the box 'Other' below.
Other		

5. **Participants:**

5 a. Does the Project involve the recruitment and participation of additional persons other than the researcher(s) themselves?

☑ YES **If YES, please complete all following sections.**

☐ NO **If NO, please directly proceed to Question 7.**

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5 b. Relevant Details of the Participants of the Proposed Research

State the number of participants you plan to recruit, and explain in the box below how the total number was calculated.

Number of participants: 400

The sample size was determined from published tables (Singh and Masuku, 2014). Based on compilation by the author, total population of students in participating universities is around 50,000. Assuming a confidence interval of 95% and a precision (p) of 5%, the required minimum sample size is 397 participants, rounded to 400 participants.

Describe important characteristics such as: demographics (e.g. age, gender, location, affiliation, level of fitness, intellectual ability etc). It is also important that you specify any inclusion and exclusion criteria that will be applied (e.g. eligibility criteria for participants).

Age range From 18 To 35

Gender ☑ Female ☑ Male

Eligibility Criteria:

- Inclusion criteria: Undergraduate students enrolled in selected universities in Dar es Salaam, Tanzania, who are capable of completing on-line questionnaires.
- Exclusion criteria: 1. Persons who are not students of any of the sampled universities.
  2. Persons who fall outside the age bracket of 18 - 35 years;

Disabilities/Disorders: You should only include the participants who can provide informed consent for themselves. Individuals who have a mental disability and are not in a position to provide their own consent should not participate in the study. Please provide information for any other disabilities/disorders the participants may have:

Persons who cannot provide informed consent for themselves (such as people with mental, visual or hearing or speaking disability) would not participate in the study.

Other relevant information (use the space provided in the box):

A convenient sample of universities would be selected. Participants (students) would be randomly selected for participation in the study. To facilitate distribution and for the sake of convenience electronic questionnaires would be used.

5 c. Participation & Research setting:

Clearly describe which group of participants (described in 5b) is completing/participating in the material(s)/tool(s) described in 4c above (use the space provided in the box)

Undergraduate students enrolled in selected universities in Dar es Salaam, Tanzania, who are capable of completing on-line questionnaires. Selected universities are University of Dar es Salaam; Ardhi University; St. Joseph University of Information Technology; and Kampala International University of Tanzania.

5 d. Recruitment Process for Human Research Participants:

Clearly describe how the potential participants will be identified, approached and recruited (use the space provided in the box).

1. Armed with the Unicaf University Research Ethics Committee's final approval letter, the Researcher would seek the approvals of selected universities through their Registrars.
2. The Researcher would request for contact information (emails and phone numbers) of undergraduate students of participating institutions from their Registrars..
3. The Informed Consent Forms and the link to the Questionnaire would be sent to the students' emails and WhatsApp numbers.
4. The Researcher would provide explanations and responses in respect to the Informed Consent Form and Questionnaire
5. Participants who consents would be provided with the questionnaires to complete and return within a given period of time.

5 e. Research Participants Informed Consent.

Select below which categories of participants will participate in the study. Complete the relevant Informed Consent form and submit it along with the REAF form.

Yes	No	Categories of participants	Form to be completed
☑	☐	Typically Developing population(s) above the maturity age *	Informed Consent Form
☐	☑	Typically Developing population(s) under the maturity age *	Guardian Informed Consent Form

* Maturity age is defined by national regulations in laws of the country in which the research is being conducted.

5 f. Relationship between the principal investigator and participants.

Is there any relationship between the principal investigator (student), co-investigators(s), (supervisor) and participant(s)? For example, if you are conducting research in a school environment on students in your classroom (e.g. instructor-student).

☐ YES ☑ NO

If YES, specify (use the space provided in the box).

6. Potential Risks of the Proposed Research Study.

6 a. i. Are there any potential risks, psychological harm and/or ethical issues associated with the proposed research study, other than risks pertaining to everyday life events?

☐ YES ☑ NO

If YES, specify below and answer the question 6 a.ii.

6 a.ii Provide information on what measures will be taken in order to exclude or minimise risks described in 6.a.i.

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6 b. Choose the appropriate option

		Yes	No
i.	Will you obtain a written informed consent form from all participants?	☑	☐
ii.	Does the research involve, as participants, people whose ability to give free and informed consent is in question?	☐	☑
iii.	Does this research involve participants who are children under maturity age? **If you answered YES to question iii, complete all following questions.** **If you answered NO to question iii, do not answer Questions iv, v, vi and proceed to Questions vii, viii, ix and x.**	☐	☑
iv.	Will the research tools be implemented in a professional educational setting in the presence of other adults (i.e. classroom in the presence of a teacher)?	☐	☐
v.	Will informed consent be obtained from the legal guardians (i.e. parents) of children?	☐	☐
vi.	Will verbal assent be obtained from children?	☐	☐
vii.	Will all data be treated as confidential? If NO, explain why confidentiality of the collected data is not appropriate for this proposed research project, providing details of how all participants will be informed of the fact that any data which they will provide will not be confidential.	☑	☐
viii.	Will all participants/data collected be anonymous? If NO, explain why and describe the procedures to be used to ensure the anonymity of participants and/or confidentiality of the collected data both during the conduct of the research and in the subsequent release of its findings.	☑	☐

		Yes	No
ix.	Have you ensured that personal data and research data collected from participants will be securely stored for five years?	☑	☐
x.	Does this research involve the deception of participants? If YES, describe the nature and extent of the deception involved. Explain how and when the deception will be revealed, and who will administer this debrief to the participants:	☐	☑

6 c. i. Are there any other ethical issues associated with the proposed research study that are not already adequately covered in the preceding sections?

☐ Yes ☑ No

If YES, specify (maximum 150 words).

6.c.ii Provide information on what measures will be taken in order to exclude or minimise ethical issues described in 6.c.i.

6 d. Indicate the Risk Rating.

☐ High ☑ Low

7. **Further Approvals**

All researchers are advised to check the regulations pertaining to research and General Data Protection Regulation (GDPR) of the country in which the research will take place as each country may have different restrictions on conducting research. **Are there any other approvals required (i.e., from a ministry or public agency in the country, in addition to ethics clearance from UREC) in order to carry out the proposed research study?**

☑ YES ☐ NO If YES, specify.

1. Researcher would seek the approvals of selected universities through their Registrars. This is the standard in Tanzania when external parties are to conduct researches using students of universities as participants.
2. Registrars would serve as the Gatekeepers to getting students' emails and phone numbers.

8. **Application Checklist**

Mark √ if the study involves any of the following:

☐ Children and young people under 18 years of age, vulnerable populations such as children with special educational needs (SEN), racial or ethnic minorities, socioeconomically disadvantaged persons, pregnant women, elderly, malnourished people, and ill people.

☐ Research that foresees risks and disadvantages that would affect any participant of the study such as anxiety, stress, pain or physical discomfort, harm risk (which is more than is expected from everyday life) or any other act that participants might believe is detrimental to their wellbeing and/or has the potential to / will infringe on their human rights / fundamental rights.

☐ Risk to the well-being and personal safety of the researcher.

☐ Administration of any substance (food / drink / chemicals / pharmaceuticals / supplements / chemical agent or vaccines or other substances (including vitamins or food substances) to human participants.

☐ Results that may have an adverse impact on the natural or built environment.

9. **Further documents**

Check that the following documents are attached to your application:

		ATTACHED	NOT APPLICABLE
1	Recruitment advertisement (if any)	☐	☑
2	Informed Consent Form / Guardian Informed Consent Form	☑	☐
3	Research Tool(s)	☑	☐
4	Gatekeeper Letter	☑	☐
5	Any other approvals required in order to carry out the proposed research study, e.g., institutional permission (e.g. school principal or company director) or approval from a local ethics or professional regulatory body.	☑	☐

10. Final Declaration by Applicants:

(a) I declare that this application is submitted on the basis that the information it contains is confidential and will only be used by Unicaf University for the explicit purpose of ethical review and monitoring of the conduct of the research proposed project as described in the preceding pages.

(b) I understand that this information will not be used for any other purpose without my prior consent, excluding use intended to satisfy reporting requirements to relevant regulatory bodies.

(c) The information in this form, together with any accompanying information, is complete and correct to the best of my knowledge and belief and I take full responsibility for it.

(d) I undertake to abide by the highest possible international ethical standards governing the Code of Practice for Research Involving Human Participants, as published by the UN WHO Research Ethics Review Committee (ERC) on http://www.who.int/ethics/research/en/ and to which Unicaf University aspires to adhere.

(e) In addition to respect any and all relevant professional bodies' codes of conduct and/or ethical guidelines, where applicable, while in pursuit of this research project.

☑ **I agree with all points listed under Question 10**

Student's Name: Alfred Lameck Mkombo

Supervisor's Name: Dr. Lawrence Wahua

Date of Application: 15-May-2023

Important Note:
Save your completed form (we suggest you also print a copy for your records) and then submit it to your UU Dissertation/project supervisor (tutor). **In the case of student projects, the responsibility lies with the Faculty Dissertation/Project Supervisor.** If this is a student application, then it should be submitted via the relevant link in the VLE. Please submit only electronically filled in copies; **do not** hand fill and submit scanned paper copies of this application.

5.10 Appendix B: UREC Provisional Approval

UNICAF UNIVERSITY

UREC Desision, Version 2.0

Unicaf University Research Ethics Committee Decision

Student's Name: Alfred Lameck Mkombo

Student's ID #: R2011D11584347

Supervisor's Name: Dr Lawrence Wahua

Program of Study: UU-DOC-900-1-ZM

Offer ID /Group ID: O36074G37292

Dissertation Stage: DS1

Research Project Title: THE ACCEPTANCE OF MOBILE FINANCIAL SERVICES BY UNIVERSITY STUDENTS IN DAR ES SALAM, TANZANIA

Comments: No comments

Decision*: A. Provisionally approved without revision or comments

Date: 25-Jul-2022

*Provisional approval provided at the Dissertation Stage 1, whereas the final approval is provided at the Dissertation stage 3. The student is allowed to proceed to data collection following the final approval.

5.11 Appendix C: UREC Final Approval

UREC Decision, Version 2.0

Unicaf University Research Ethics Committee Decision

Student's Name: Alfred Lameck Mkombo

Student's ID #: R2011D11584347

Supervisor's Name: Dr Lawrence Wahua

Program of Study: UU-DOC-900-3-ZM

Offer ID /Group ID: O59994G63325

Dissertation Stage: DS3

Research Project Title:

THE ACCEPTANCE OF MOBILE FINANCIAL SERVICES BY UNIVERSITY STUDENTS IN DAR ES SALAM, TANZANIA

Comments: No comments.

Decision*: A. Approved without revision or comments

Date: 14 Jun 2023

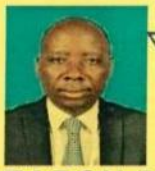
*Provisional approval provided at the Dissertation Stage 1, whereas the final approval is provided at the Dissertation stage 3. The student is allowed to proceed to data collection following the final approval.

5.12 Appendix D: Research Permit by COSTECH

UNITED REPUBLIC OF TANZANIA

MINISTRY OF EDUCATION, SCIENCE AND TECHNOLOGY

TANZANIA COMMISSION FOR SCIENCE AND TECHNOLOGY



TANZANIA COMMISSION FOR SCIENCE AND TECHNOLOGY P.O. Box 4302 DAR ES SALAAM

RESEARCH PERMIT

Permit No.	2023-932-NA-2023-983
Date issued	09th November, 2023
Researcher's Name	Alfred Lameck Mkombo
Nationality	Tanzanian
Research Title	The acceptance of mobile financial services by university students in Dar es Salam, Tanzania
Research Area(s)	Dar es Salaam
Validity	From: 09th November, 2023 to 08th November, 2024
Contacts of local collaborator (*with affiliated institution*)	

PROGRAM OFFICER

DIRECTOR GENERAL

IMPORTANT REQUIREMENTS

- ***A PI who wishes to continue with a research beyond the expiry date of the research permit should write to COSTECH two months before the operational permit's expiry date, to request for an extension or renewal of the permit.***
- *Research permit that involves collecting human, plant or animal materials / data that will be exported outside Tanzania must submit a signed Material Transfer Agreement (MTA), Data Transfer Agreement (DTA) between Tanzania host institution and the foreign counterpart. The MTA/DTA will indicate terms for collecting, storing/managing, transporting, disposal or returning of the materials/DATA to Tanzania after the closure of the research project.*
- *Any patent or intellectual property and royalty emanating from any research approved by the National Research Registration Committee (NRCC) shall be owned as stipulated in the research proposals and in accordance with the IP policy of the respective research institutions.*
- *All researchers are required to report to a Regional Administrative Secretary (RAS) of the study area and present the introduction letter and activity schedule (plan) prior starting any research activity.*
- *All researchers are required to submit quarterly progress reports and all relevant publications made after completion of the research.*
- *All communications should be addressed to COSTECH Director General through rclearance@costech.or.tz; dg@costech.or.tz or +255 (022) 2700749; +255 (022) 2771358. Terms and conditions of the permit are found at www.costech.or.tz*

Tanzania Commission for Science and Technology, Ali Hassan Mwinyi Road, P.O. Box 4302, Dar Es Salaam.
General line: +255(022) 277 1358, Fax: COSTECH, E-mail: dg@costech.or.tz.
Website: http://www.costech.or.tz/

UNITED REPUBLIC OF TANZANIA

MINISTRY OF EDUCATION, SCIENCE AND TECHNOLOGY

TANZANIA COMMISSION FOR SCIENCE AND TECHNOLOGY

In reply please quote: **RCA 2023/983** **Date: 09th November, 2023**

Permanent Secretary,
President's Office,
Regional Administration and Local Government,
P.O. Box 1923,
DODOMA.

Dear Sir/Madam,

INTRODUCTION LETTER ON RESEARCH PERMIT

I wish to introduce **Alfred Lameck Mkombo, a Tanzanian** who has been granted Research Permit No. 2023-932-NA-2023-983 dated **09th November, 2023.**

2. The permit allows him/her to conduct research titled **"The acceptance of mobile financial services by university students in Dar es Salam, Tanzania"** under the terms and conditions as per the National Research Registration and Clearance Guideline of 2022. The research will be conducted in **Dar es Salaam** Region.

3. COSTECH is therefore kindly requesting you to introduce the researcher(s) to relevant Regional Administrative Officer(s) and support with any necessary assistance and guidance under national laws and regulations.

4. Thank you for your cooperation

.....

Dr. Amos M. Nungu
DIRECTOR GENERAL

CC: Regional Administrative Secretary: **Dar es Salaam**

5.13 Appendix E: Gatekeepers Permission – Ardhi University

ARDHI UNIVERSITY

Telephone: (2775405)
Fax: (255-022) - 2775391
Telegrams: ARDHICHUO

P. O. Box 35176
Dar es Salaam
e-mail: dvcpfa@aru.ac.tz
website: http://www.aru.ac.tz

Ref. No. GA. 35/288/01/149

12th June, 2023

Alfred LameckMkombo
P.O.BOX 75713
Dar es Salaam

RE: REQUEST FOR APPROVAL AND STUDENTS' ACCESS TO CONDUCT RESEARCH

Reference is made to your letter dated 9th June, 2023 on the above subject.

I would like to inform you that your request to collect data from Ardhi University studentsfor a research title"*Factors that influence the behavioural acceptance of mobile financial services by University students in Dar es Salaam, Tanzania"***has been granted.**

Your request on students' contact details for distributing electronic questionnaires, please check with ARUSO (students' organization) president through phone no. 0734284423. During the period of data collection, you will be required to observe research ethics and national laws.

Yours,

For: DEPUTY VICE-CHANCELLOR
PLANNING, FINANCE AND ADMINISTRATION
ARDHI UNIVERSITY
P.O. Box 35176
DAR ES SALAAM

M. M. Sinda
For: Deputy Vice Chancellor- Planning, Finance and Administration

CamScanner

5.14 Appendix F: Gatekeepers Permission: University of Dar es Salaam

UNITED REPUBLIC OF TANZANI

MINISTRY OF EDUCATION, SCIENCE AND TECHNOLOGY

UNIVERSITY OF DAR ES SALAAM

DIRECTORATE OF RESEARCH AND PUBLICATION

In replying please quote:

Ref. No. AB.269/319/01

1st December, 2023

Director,
Institute of Development Studies,
University of Dar es Salaam.

RE: INTRODUCTORY LETTER

Kindly refer to the subject mentioned above.

2 This is to introduce **Alfred Lameck Mkombo** who is a student of the UNICAF University Cyprus (Zambia Campus). **Alfred Lameck Mkombo** is at the moment conducting data collection as part of his studies. The title of his research is "**The acceptance of mobile financial services by University students in Dar es Salaam, Tanzania**"

3 This is to request you to grant the above-mentioned student any help that may enable him to achieve his study objectives. The period for which this permission has been granted is from **November 2023 to November 2024.**

4 Yours sincerely.

Dr. Mussa I. Mgwatu
DIRECTOR OF RESEARCH AND PUBLICATION

c c Deputy Vice Chancellor - Research
c c **Alfred Lameck Mkombo**

Cranford Pratt Building, University of Dar es Salaam, P.O. Box 35091, Dar es Salaam
Phone: +255 22 2410500-8 Ext. 2084, Phone: +255 22 2410727, Direct Email: research@udsm.ac.tz, Website: www.udsm.ac.tz

Appendix G: Gatekeepers Permission – St. Joseph University in Tanzania

22.06.2023

To

Mr.Alfred Lameck Mkombo
P.O.Box 75713
Dar es Salaam.

Dear Alfred Lameck Mkombo

Based on your request letter dated 9th June 2023, we are pleased to inform you that you are permitted to collect research data from our University between 3rd- 21st of July 2023. This is for your kind information.

Regards

Prof. Mary Raja Slochanal Soosai
Professor of Electrical and Electronics Engineering
Director of Research and Postgraduate Studies
St. Joseph University in Tanzania
Dar es Salaam
Tanzania.

5.15 Appendix H: Gatekeepers Permission – Kampala International University in Tanzania

KAMPALA INTERNATIONAL UNIVERSITY IN TANZANIA

Gongo La Mboto, Pugu Road
P.O Box 9790, Dar es Salaam–Tanzania
Tel: +255 655 484 390
E-mail: dpsr@kiut.ac.tz
Website: www.kiut.ac.tz

DIRECTORATE OF POSTGRADUATE STUDIES &RESEARCH

23rd June, 2023

Ref. No. DPSR/PTCD/06

Mr. Alfred Lameck Mkombo
UNICAF University Zambia (UUZ)

Dear Mr. Alfred,

PERMISSION TO COLLECT DATA AT KAMPALA INTERANATIONAL UNIVERSITY IN TANZANIA

Reference is made to the letter from the Unicaf Research Ethic Committee (URE) dated on 10th June, 2023 on permission to collect data at Kampala International University in Tanzania. The request is approved. You are allowed to collect research data for your study titled: **The Acceptance of Mobile Finance Services by University Students in Dar es Salaam, Tanzania**from KIUT undergraduate students as requested to connect with your research.

Sincerely Yours,

Dr. Mary A. Mosha
Director, Postgraduate Studies and Research
For Vice Chancellor

KAMPALA INTERNATIONAL UNIVERSITY IN TANZANIA
BOARD OF POST GRADUATE STUDIES AND RESEARCH
P.O. BOX 9790, DAR ES SALAAM
23 JUN 2023

Deans/HODs

Please advise the PhD student in the process of collecting data as requested.

KAMPALA INTERNATIONAL UNIVERSITY IN TANZANIA
ACADEMIC REGISTRAR
23 JUN 2023

5.16 Appendix I: Informed Consent Form

UNICAF UNIVERSITY

UU_IC - Version 2.1

Informed Consent Form

Part 1: Debriefing of Participants

Student's Name: Alfred Lameck Mkombo

Student's E-mail Address: fredmkombo@gmail.com

Student ID #: R2011D11584347

Supervisor's Name: Dr. Lawrence Wahua

University Campus: Unicaf University Zambia (UUZ)

Program of Study: PhD Doctorate of Philosophy

Research Project Title: THE ACCEPTANCE OF MOBILE FINANCIAL SERVICES BY UNIVERSITY STUDENTS IN DAR ES SALAM, TANZANIA

Date: 14-May-2023

Provide a short description (purpose, aim and significance) of the research project, and explain why and how you have chosen this person to participate in this research (maximum 150 words).

This study is primarily conducted in partial fulfilment of the requirements for the award of Doctor of Philosophy degree in Management by Unicaf University Zambia. It aims at establishing the factors that significantly influence the behavioural intention of university students to use mobile financial services in Tanzania. It is the expectation of the study that its findings would Increase the adoption of mobile financial services in order to advance financial inclusion in Tanzania.

University students are key agents of change in society; and their participation in this study is of very high significance in achieving the purpose and specific objectives of this empirical endeavour.

The above named student is committed to ensuring participant's voluntarily participation in the research project and guaranteeing there are no potential risks and/or harms to the participants.

Participants have the right to withdraw at any stage (prior or post the completion) of the research without any consequences and without providing any explanation. In these cases, data collected will be deleted.

All data and information collected will be coded and will not be accessible to anyone outside this research. Data described and included in dissemination activities will only refer to coded information ensuring beyond the bounds of possibility participant identification.

I, Alfred Lameck Mkombo **, ensure that all information stated above is true and that all conditions have been met.**

Student's Signature: _____

UU_IC - Version 2.1

Informed Consent Form

Part 2: Certificate of Consent

This section is mandatory and should to be signed by the participant(s)

Student's Name: Alfred Lameck Mkombo

Student's E-mail Address: fredmkombo@gmail.com

Student ID #: R2011D11584347

Supervisor's Name: Dr. Lawrence Wahua

University Campus: Unicaf University Zambia (UUZ)

Program of Study: PhD Doctorate of Philosophy

Research Project Title: THE ACCEPTANCE OF MOBILE FINANCIAL SERVICES BY UNIVERSITY STUDENTS IN DAR ES SALAM, TANZANIA

I have read the foregoing information about this study, or it has been read to me. I have had the opportunity to ask questions and discuss about it. I have received satisfactory answers to all my questions and I have received enough information about this study. I understand that I am free to withdraw from this study at any time without giving a reason for withdrawing and without negative consequences. I consent to the use of multimedia (e.g. audio recordings, video recordings) for the purposes of my participation in this study. I understand that my data will remain anonymous and confidential, unless stated otherwise. I consent voluntarily to be a participant in this study.

Participant's Print name: _____

Participant's Signature: _____

Date:

If the Participant is illiterate:

I have witnessed the accurate reading of the consent form to the potential participant, and the individual has had an opportunity to ask questions. I confirm that the aforementioned individual has given consent freely.

Witness's Print name: _____

Witness's Signature: _____

Date:

5.17 Appendix J: Data Collection Tool

DATA COLLECTION TOOL: QUESTIONNAIRE

THE ACCEPTANCE OF MOBILE FINANCIAL TRANSACTIONS BY UNIVERSITY STUDENTS IN DAR ES SALAM, TANZANIA

1. BACKGROUND INFORMATION ON THE RESEARCH

P. O. Box 75713
Dar es Salaam.
June 10, 2023

Dear Sir/Madam,

Request to Participate in my Doctoral Research

I am Alfred Lameck Mkombo, a doctoral student of Unicaf University Zambia, in the research stage of Doctor of Philosophy degree in Business Administration.

As part of the compulsory requirements of the programme, I am conducting a research on the factors that influence the behavioural acceptance of Mobile financial transactions by university students in Dar es Salaam, Tanzania.

I request that you spare few minutes out of your busy schedule to complete this Questionnaire. This exercise is purely for academic purpose; as such, your identity and responses would be accorded utmost confidentialtity in line with my university's research ethics on safety of participants.

Your participation in this research is absolutely voluntary; and for that reason, you are not under any compulsion not to withdraw your participation at any point in time, should the need arise.

Thank you and God bless.

Yours sincerely,

Alfred L. Mkombo
Researcher

PART A: PARTICIPANTS BACKGROUND

1. Your name (optional) ……

2. Your email address ……Phone No. ……

3. Name of University: mark the appropriate answer with (V)

(a)	University of Dar es Salaam (UDSM)	
(b)	Ardhi University (ARU)	
(c)	St. Joseph University in Tanzania (SJUIT)	
(d)	Kampala International University in Tanzania (KIUT)	

4. Gender: mark the appropriate answer with (V)

(a)	Male	
(b)	Female	

5. Age bracket: mark the appropriate answer with (V)

(a)	20 years and below	
(b)	21 – 30 years	
(c)	31 – 40 years	
(d)	More than 40 years	

6. Field of study: mark the appropriate answer with (V)

(a)	Information Communication Technology	
(b)	Natural sciences	
(c)	Business studies	
(d)	Social sciences	
(e)	Others (specify) ……	

7. Year of study: mark the appropriate answer with (V)

(a)	First Year	
(b)	Second Year	
(c)	Third Year	
(d)	Fourth Year	
(e)	Fifth Year or Sixth Year	

8. Are you currently using any of the following mobile financial transactions? mark the appropriate answer with (V)

	Mobile financial transactions	Yes	No
(a)	Mobile banking service		
(b)	Mobile payment service		
(c)	Mobile money service		

PART B: FACTORS THAT INFLUENCE ACCEPTANCE OF MOBILE FINANCIAL TRANSACTIONS BY UNIVERSITY STUDENTS IN DAR ES SALAAM, TANZANIA.

Questionnaire guide: Please choose an appropriate answer that best describes the situation in question by inserting a (V) in the box corresponding the question. The numbers have the following meanings: **(1) Strongly disagree; (2) Disagree; (3) Uncertain; (4) Agree;** and **(5) Strongly agree.**

(a) Independent Variables

Sn	Construct	Measurement Items	1	2	3	4	5
1	Utility Perceptions	(a) Mobile financial transactions would be useful in my daily life					
		(b) Using Mobile financial transactions would increase my chances of achieving tasks that are important to me					
		(c) Using Mobile financial transactions would help me to accomplish tasks more quickly					
		(d) Using Mobile financial transactions would my productivity					
2	Ease of usage	(e) The interaction with Mobile financial transactions is clear and understandable					

	Perceptions	(f) Interaction with Mobile financial transactions does not require a lot of mental effort					
		(g) I find it easy to get Mobile financial transactions to do what I want it to do					
		(h) I would find a mobile financial transactions procedure to be flexible to interact with					
3	Social inspiration	(a) My family thinks that I should use Mobile financial transactions					
		(b) My friends think that I should use Mobile financial transactions					
		(c) People I knew think that using mobile financial transactions is a good idea					
4	Risk Perception	(a) The decision of whether to use mobile financial transactions is risky					
		(b) Using mobile financial transactions puts my privacy at risk					
		(c) Mobile financial transactions has more uncertainties					
		(d) In general, I believe using anmobile financial transactions is risky					
5	Facilitative conditions	(a) I have the resources necessary to use Mobile financial transactions					
		(b) I have the knowledge necessary to use Mobile financial transactions					
		(c) I can get help from others when I have difficulties using Mobile financial transactions					

(b) Dependent Variable

Sn	Construct	Measurement Items	1	2	3	4	5
6	Intention to undertake	(a) Given the opportunity, I will use Mobile financial transactions					
		(b) I am likely to use Mobile financial transactions in the near future					
		(c) I am open to using Mobile financial transactions in the near future					
		(d) I intend to use Mobile financial transactions when the opportunity arises					

(c) Mediating Variable

Sn	Construct	Measurement Items	1	2	3	4	5
7	Attitude	(a) Using mobile financial transactions is a good idea					
		(b) Using mobile financial transactions is wise					
		(c) Using mobile financial transactions is beneficial					
		(d) Using mobile financial transactions is interesting					

END