DEVELOPMENT OF A MOBILE CASH ACCEPTANCE MODEL: STRUCTURAL EQUATION APPROACH

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DECLARATION

I declare that this is my own work and this dissertation does not incorporate without acknowledgement any material previously submitted for a Degree or Diploma in any other University or institute of higher learning and to the best of my knowledge and belief it does not contain any material previously published or written by another person except where the acknowledgement is made in the text.

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ABSTRACT

Development of a mobile cash acceptance model: structural equation approach

This study intends to develop a conceptual model integrating the dimensions of mobile service quality (MSQ) in to other determinants of usage intension (UI) of Mobile Cash (MC) services using Partial Least Square – Structural Equation Modeling (PLS-SEM). The Extended Unified Theory of Acceptance and Use of Technology (UTAUT2) has been selected as the theoretical base for the study. Considering both functional and technical quality aspects of MSQ, seven dimensions have been used (Reliability (REL), Responsiveness (RES), Assurance (ASU), Empathy (EMP), Tangibles (TAN), Convenience (CON), and Customer Perceived Network Quality (NQT)). A survey was carried out in a Higher Education Institute with a sample of 272 MC users. The measurement model assessment has revealed an adequate level of reliability, and validity in the measurement instrument. Therefore, eight different models have been formulated and tested using PLS-SEM to identify a statistically significant model. The standardized root mean square residual (SRMR) used as the determinant of model goodness of fit and bootstrapping procedures were used to determine the significant paths within each model. Based on the indications of the Recommended model, it was concluded that only five UTAUT2 variables (Performance Expectancy, Social Influence, Facilitating Conditions, Price Value and Habit) have direct effects ($p<0.05$) on UI and only the six dimensions that represent the functional quality aspect of MSQ (RES, ASU, CON, TAN, EMP and REL) have shown significant indirect effects ($p<0.05$) on UI where RES alone showed a negative effect. Since the technical quality dimension (NQT) did not show any significant effect on UI, the service providers are recommended to pay more attention on the functional quality rather than technical quality to improve future usage of Mobile cash services.

Key words: Mobile Cash Services, Mobile Service Quality, PLS-SEM, Usage Intension, UTAUT2

DEDICATION

This dissertation is dedicated to my beloved mother and all my dearest teachers for teaching me the very difficult subject of life

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A.M.A.S.M. Bandara

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LIST OF ABBREVIATIONS

AVE	Average Variance Extracted
CMV	Common Method Variance
GoF	Goodness of Fit
HTMT	Heterotrait-Monotrait Ratio
IT	Information Technology
MMT	Mobile Money Transfer
MP	Mobile Payments
MSP	Mobile Service Provider
PLS	Partial Least Squares
SEM	Structural Equation Modelling
SQ	Service Quality
SRMR	Standardized Root Mean Square Residual
TAM	Technology Acceptance Model
TRA	Theory of Reasoned Action
TRCSL	Telecommunication Regulatory Commission of Sri Lanka
UTAUT	Unified Theory of Acceptance and Use of Technology
UTAUT2	Extended Unified Theory of Acceptance and Use of Technology
VAS	Value Added Services

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CHAPTER 1
INTRODUCTION

1.1 Objective

The aim of this chapter is to offer an introduction to the dissertation. First, it presents the background of the study, research objectives and justification, research problem, and map of the dissertation and its organization.

1.2 Background of the study

The developments of mobile phones and related technologies have made a significant impact on the entire globe by transforming the way of living in many different dimensions (Richardson, Weaver, & Zorn Jr, 2005). Over the past decade, the advancements of mobile technologies made the mobile phone a multipurpose hand held device that can handle diverse set of activities in addition of handling the basic interpersonal communication (Kuo & Yen, 2009).

In addition to the traditional voice and text services, the Mobile Service Providers (MSPs) started to offer different Value Added Services (VAS) to the existing customer base to improve the earnings per connection. The term VAS has been defined by Kuo & Yen (2009) as “non-core services which are offered to the customers apart from the core or basic services being offered, such as voice calls”. Among the many varieties of VAS, a facility that attracted the attention of many people was the possibility of executing economic transaction over the mobile platforms. Since there were promising signs of higher user attraction for such services, MSPs in collaboration with other organizations started to deliver certain services that includes an economic transaction such as ticket booking in a railway.

More recently, the MSPs have introduced the concept of Mobile Cash services transforming the mobile connection into a mini bank account that can deposit, withdraw, transfer and receive monitory value using a personal mobile connection. With the introduction of such services by MSPs, a high consumer acceptance rate was

expected since the mobile users were provided with a more convenient way of fulfilling some of their financial needs (Gerrard & Barton Cunningham, 2003). However, despite of all the efforts made by organizations, the actual usage of such services is in a lower level in many countries and regions (Venkatesh, Thong, & Xu, 2012; Wang & Lin, 2012; Zhao, Lu, Zhang, & Chau, 2012).

Due to the nature of having lower acceptance levels, the adoption and acceptance of technologies are considered to be a popular research area. The objectives of most of the studies related to technology acceptance and related issues can be broadly classified in to two categories: (1) develop theoretical models conceptualizing the technology acceptance and (2) to validate the existing models in different contexts (i.e. in different products, different cultures and different organizations) (Venkatesh, et.al. 2012).

1.3 Development of mobile technologies

The recent developments of mobile devices and related technologies have enabled it to be used for various purposes other than the traditional communication purposes. Earlier, the mobile communication infrastructure facilities were limited to some of the highly urbanized regions of developed countries. Moreover, during the earlier stages, the service charges were significantly higher than the other alternatives existed during that era. However, rapid developments in the mobile technologies and the infrastructure and the reduction of the service charges had made it a ubiquitous service covering most of the regions of the world.

Throughout the last three decades, the developments of the mobile telecommunication facilities can be broadly categorized into four generations: First Generation (1G), Second Generation (2G), Third Generation (3G) and Fourth Generation (4G) (GSMA, 2010). The facilities provided under the 1G technology were capable only to transmit voice communication from one hand set to another. In line with the requirement, the handsets available on that era were much simpler devices than today which were designed only to send and receive voice and text messages.

However, the 2G mobile technologies have leaped a significant step forward by providing the data transmission facilities to the mobile devices. Since the data transmission was enabled on the same channel that was used in transmitting voice and text without interruptions (Vriendt, Laine, Lerouge, & Xu, 2002), the mobile phone had transformed into a multi-tasking and multi-purposive device. As a result of that, the global mobile telecommunication industry was provided with unlimited growth potentials. Focusing on these new opportunities created by enabling the data transmissions, 3G and 4G mobile technologies were further improved the data transmission capabilities of mobile devices and the speed of the mobile networks.

1.4 Mobile telecommunication industry of Sri Lanka

Telecommunication Regulatory Commission of Sri Lanka (TRCSL) which was established under the Sri Lanka Telecommunication (Amendment) Act No. 27 of 1996 is the governing body of the Sri Lankan telecommunication industry. According to Central Bank of Sri Lanka (2015), there are 38 licensed ventures including five MSPs within the Telecommunication sector of Sri Lanka under 11 different categories of services. Table 1.1 indicates the estimated market share for each company. At the initial stage of the industry, being a new innovation, the service providers were enjoying substantial profit margins by setting high prices for the services they offer (Bishara et al., 2004).

Table 1.1 Estimated market share of mobile service providers

Service Provider	Estimated Market Share
Dialog	35%
Mobitel	23%
Etisalat	21%
Airtel	14%
Hutch	7%

Source: Central Bank of Sri Lanka (2015)

According to the Central Bank of Sri Lanka (2015), Sri Lanka reports the highest mobile phone penetration rate (i.e. 107% in the year 2014) among the South Asian countries. Table 1.2 indicates the provincial distribution of telephone facilities as a percentage of households.

Table 1.2 Distribution of telephone facilities among households

Telephone Facilities	Western	Central	Southern	Northern	Eastern	North Western	North Central	Uva	Sabaragamuwa	All Island
Fixed Telephone Lines only (%)	4.4	8.6	6.7	2.5	3.4	6.2	8.9	12.9	7.5	6.4
Mobile only (%)	47.4	45.9	53.8	68.6	61.2	56.6	52.7	38.9	45.7	50.9
Fixed and Mobile (%)	41.3	34.4	27.5	16.9	11.1	25.3	23.6	30.5	29.2	30.3
No Telephone Facilities (%)	6.9	11.1	12	12	24.3	11.9	14.8	17.8	17.6	12.5

Source: Central Bank of Sri Lanka (2015)

Based on the payment method, the Sri Lankan mobile users are provided with 2 major types of connections (i.e. prepaid and postpaid). The users of the prepaid connection type have to deposit money prior the use of service where the charges for the use of different types of services on offer are deducted from it. The users of the postpaid account type on the other hand, are allowed to use the services on the credit basis on which the monthly bills are issued. Usually, the monthly charges for such type of a connection include a fixed amount and a variable amount that depends on the usage of each service on offer.

1.5 Mobile value added services

The opportunities provided with the advancement of the mobile technologies, were exploited by the MSPs to offer some additional services blended with the traditional

service mix to the existing and potential customer base. The benefits that most of the VASs provided for the service providers are twofold: firstly, it had become one of the main sources of income as it was expected that the VASs can increase the average return per connection (Kuo & Yen, 2009). Secondly, the mix of VASs offered by each service provider would differentiate it from competitors providing a greater platform for competitive advantage (Cricelli, Grimaldi, & Ghiron, 2011).

In addition to the MSPs, various third parties have also started to exploit the opportunity by making the mobile platforms a new channel to deliver certain services to a wider community. Some of these services were integrated with the service mix of the MSPs while others were designed to be independent from the network service. However, these carrier independent services were designed to use the data facility provided on a mobile network (Cricelli et al., 2011).

1.6 Mobile cash services

The versions of Mobile Financial Services that facilitate financial transactions without linking with a regular bank account are referred to be the Mobile Cash services. Mobile Cash service can be defined as "An account that is primarily accessed using a mobile phone" (GSMA, 2010). Further to that, Mobile Money Transfer (MMT) and Mobile Payments (MP) are considered to be the typical forms of transactional activities provided with Mobile Cash services. According to GSMA (2010), MMT can be defined as a movement of value that is made from a mobile cash account, accrues to such a service, and is initiated using a mobile phone. MP, on the other hand, refers to person-to-business payments that are made with a mobile phone.

Dialog, a leading MSP of Sri Lanka, introduced the first Mobile Cash service in Sri Lanka with the name of "ezCash" during the year 2012. At present, the Sri Lankan mobile users are provided with 2 e-Wallet services operated by 2 MSPs (Di Castri, 2013).

1.7 Problem statement

It is evident in the existing literature that, the acceptance and use of the technologies is a popular research area. Contextually, any technology can be classified in to two categories: (1) organizational context and (2) consumer context. However, the current literature reveals that adoption of technologies in the organizational context are being extensively researched leaving a research gap in relation to the adoption of technologies in the consumer context (Venkatesh et al., 2012).

Moreover, many theoretical models that have been developed and validated were in relation to various technologies in organizations (Ajzen, 1991; Venkatesh & Davis, 1996, 2000; Venkatesh, Morris & Davis, 2003). However, despite of the major differences in the two contexts, many studies on the technologies in the consumer context have used these theoretical models. Therefore, the existing literature consist of a knowledge gap on the specific determinants of acceptance and use of technologies in the consumer context. Since the technologies related to mobile telephony are considered to be ubiquitous technologies in the consumer context with the potential to contribute in major societal transformations (Bishara et al., 2004) the findings of this study will contribute to fill the above identified research gaps.

On the other hand, the Mobile Cash services are designed to deliver through a mobile network. Thus, it can be argued that the use of Mobile Cash services may depend on the quality of the dependent technology i.e. mobile connection. Thus, it can be further argued that, the service quality of the mobile connection could be a major determinant of usage of Mobile Cash services. Despite of these arguments, most of the existing literature available on the usage of Mobile Cash have focused only on the technological aspects ignoring the service component (Hsu & Lin, 2015; van der Wal, Pampallis, & Bond, 2002). However, this study attempted to propose a conceptual model integrating the dynamics of service quality to explain the usage intention of mobile cash services. Since the existing literature consists of only a few researches on this nature, the findings of this study will contribute to fill the existing gap of knowledge.

It is further evident that the researches on the determinants of technology usage are rarely conducted in the Sri Lankan context. Moreover, many researches argue that the acceptance and use of technologies are strongly influenced by the cultural background. Thus, the findings of this study will provide important insights in relation to the context of Sri Lanka that would be useful for both academia and mobile industry of the country.

1.8 Objectives of the study

On view of the problem statement, the primary objective of the study is to develop a conceptual model integrating the dimensions of mobile service quality in to other determinants of usage intension of Mobile Cash services.

In line with the primary objective, the secondary objectives of the study are:

- To review the existing user acceptance models on Mobile Cash services and identify a suitable model to explain the usage intention of Mobile Cash Services
- To formulate a conceptual model integrating mobile service quality in to the above identified model to explain the determinants of user acceptance of Mobile Cash service

1.9 Significance of the study

Previous literature reveals that there are large number of studies attempted to model the user acceptance of technology (Venkatesh, Morris, Davis, & Davis, 2003). However, a research gap can still be identified in relation to the acceptance of technologies in the consumer context as the earlier researchers have given a prominence to the technologies in the organizational context. Moreover, being a relatively new technology, acceptance and use of Mobile Cash services is not sufficiently investigated especially in a developing country such as Sri Lanka. Thus, the findings of this research will have a significant contribution to the existing knowledge base.

Further, the findings of this study will be beneficial to the society in many ways. Mainly, the telecommunication industry will be benefitted by better understanding the consumer behavior so that they would be able to expand their businesses contributing to the economic growth of the country and providing more employment opportunities to the Sri Lankan Citizens.

Moreover, Mobile Cash is regarded to be a different channel for delivering the financial services. Offering financial services through electronic channels and encouraging the customers to use these channels would benefit the organizations by reducing the institutional operational costs (Calisir & Gumussoy, 2008). Further, the users were also provided with a more convenient way of accessing their financial information and meeting some of their financial needs (Gerrard & Barton Cunningham, 2003). However, despite of all the efforts made by organizations, the acceptance of these services was recorded to be lower than the forecasted levels. The existing literature also confirms the same phenomenon i.e. the actual usage of such services is in a lower level in many countries and regions despite the availability of such services (Venkatesh et al., 2012; Wang & Lin, 2012; Zhao et al., 2012). Therefore, the results of this study would help the MSPs to popularize the service so that the Sri Lankan community to have a greater level of financial inclusion due to the possibility of reaching to a wider community.

1.10 Outline of the dissertation

Chapter one provides an overview to the research. This chapter explains research problem, research objectives and justification.

Chapter two offers a review of the literature and theory on acceptance and use of technology and service quality. This chapter presents the research hypotheses and a conceptual framework to be used in this research.

Chapter three discusses the methodology of the study, research design, research procedures, sample design, and data analysis utilized are presented in the chapter.

Chapter four reports a descriptive statistic of the sample, details the results of reliability of the scales, and PLS path model development and testing procedure. In addition, the results were discussed and interpreted.

Chapter five discusses the conclusions and recommendations of the study. First, it presents the findings derived from the research and recommendations are made based on the findings. Finally, it concludes the dissertation.

CHAPTER 2
LITERATURE REVIEW

2.1 Objective

The objective of this chapter is to provide a review of the existing literature of technology acceptance and mobile service quality. This review aims to identify a suitable technology acceptance model as the theoretical base for this study. This chapter also explores the concept of mobile service quality to identify its dimensions.

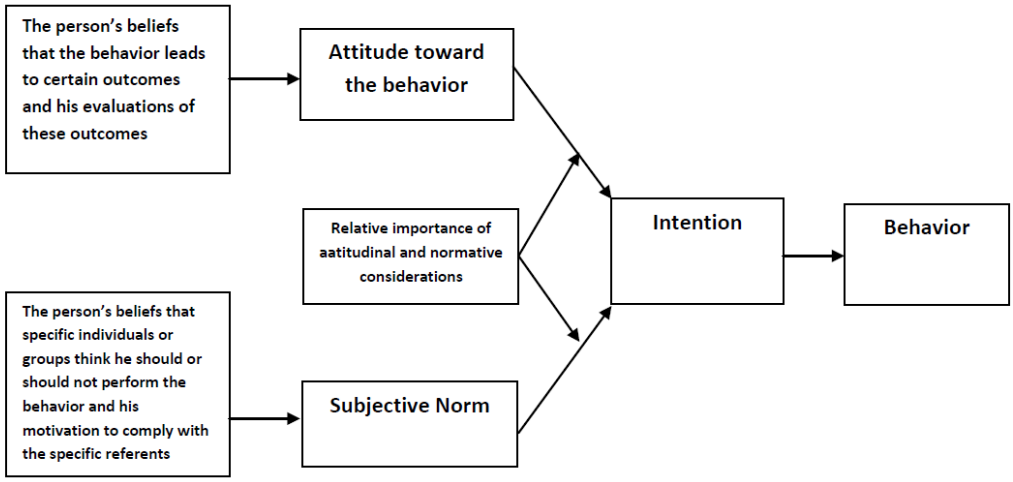
2.2 Technology acceptance by individuals

Dillon & Morris (1996) defined technology acceptance as the demonstrable willingness within a user group to employ information technology (IT) for the tasks it was designed to support. There are many researches available on the acceptance and usage of IT and it is considered to be one of the most researched areas within modern IS context (Benbasat & Zmud, 1999). As a result of that, over the years, a variety of theoretical models have been introduced, applied, modified and integrated from diverse disciplines such as social psychology, sociology and marketing in order to explain the IT acceptance and usage (Venkatesh et al., 2003). However, the observable fact is that, almost all the technology acceptance models have originated associating the psychological theories.

2.2.1 Theory of reasoned action (TRA)

The Theory of Reasoned Action (TRA) (Figure 2.1) was developed by Ajzen and Fishbein (1980) with the assumptions of human beings are usually quite rational and make systematic use of the information available to them (Ajzen & Fishbein, 1980). TRA identifies that the determinants of intended behaviors and a person's intentions are twofold; one is personal in nature and the other reflecting social influence. Attitude

towards the belief is considered as a personal factor that influences an individual's positive or negative evaluation of performing a behavior. Subjective norms are a person's perception of social pressures to perform or not to perform a particular behavior. Theory of Reasoned Action concludes that a person's behavioral intention depends on the person's attitude towards the behavior and subjective norms (Ajzen & Fishbein, 1980).



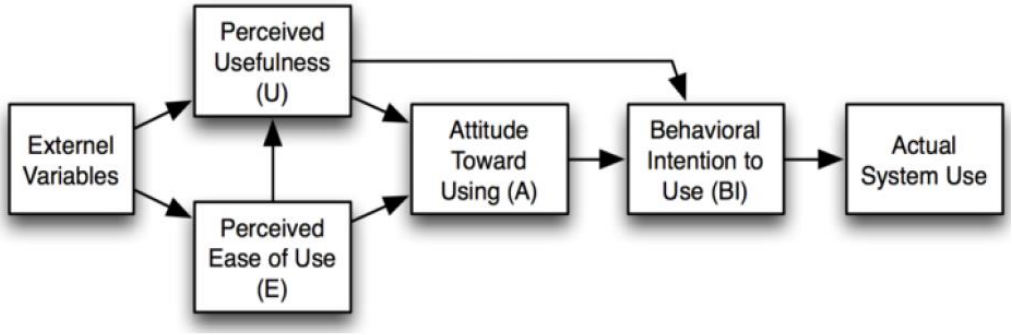
Source: Ajzen and Fishbein (1980, P.8)

Figure 2.1 Theory of Reasoned Action

2.2.2 Technology acceptance model (TAM)

Technology Acceptance Model (TAM) (Figure 2.2) is a widely used model, introduced by Davis (1989) as an extension to the TRA. TAM was developed with the intention of providing an answer to the question of how users come to accept information systems. According to Davis (1989), perceived usefulness is the degree to which a person believes that using a particular system would enhance his or her job performance. In addition, perceived ease of use, has been identified as the degree to which a person believes that using a particular system would be free from effort. It is believed that both these variables determine the attitude towards using and according

to TAM, behavioral intention to use was considered to be jointly determined by a person's attitude toward using a system and perceived usefulness.

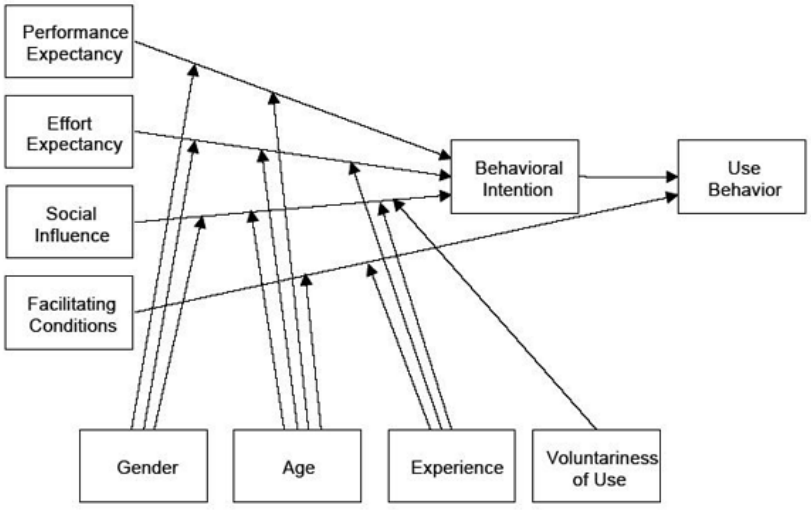


Source: Davis (1989, P. 985)

Figure 2.2 Technology Acceptance Model (TAM)

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

Unified Theory of Acceptance and Use of Technology (UTAUT) (Figure 2.3) was developed with the expectation to explain the critical factors affecting to the prediction of both behavioral intention to use and actual use of a technology used primarily in organizational contexts (Venkatesh et al. 2003).



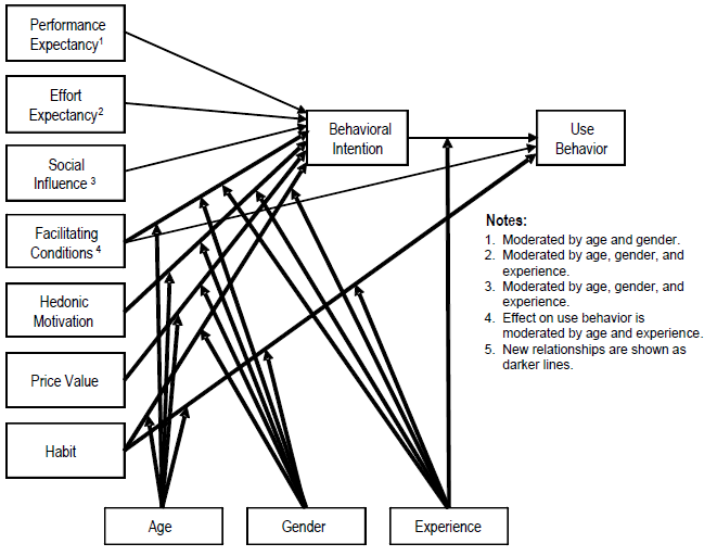
Source: Venkatesh & Zhang (2010, p.8)

Figure 2.3 Unified Theory of acceptance and Use of Technology

The theory identifies that four key constructs namely: performance expectancy (PE), effort expectancy (EE), social influence (SI), and facilitating conditions (FC) influence an individual's usage intention and actual use of a technology. Gender, age, experience, and voluntariness of use are identified to be the moderating factors of the above four key constructs (Venkatesh et al. 2003).

The theory was developed through a review and consolidation of the constructs of eight models that were used in explaining the information systems usage and behavior. Those theories are: Theory of Reasoned Action, TAM, Motivational Model, Theory of Planned Behavior, Combined Theory of Planned Behavior/Technology Acceptance Model, Model of PC Utilization, Innovation Diffusion Theory, And Social Cognitive Theory (Venkatesh & Zhang, 2010). Due to this, the UTAUT is regarded as one of the comprehensive model to explain the user adoption of technology.

2.2.4 Extended unified theory of acceptance and use of technology (UTAUT2)



Source: Venkatesh et al. (2012, P. 160)

Figure 2.4 Unified Theory of acceptance and Use of Technology 2

Venkatesh et al. (2012) amended the UTAUT model to use for the technologies in the consumer contexts based on their findings from a research conducted in Hong Kong. In which the UTAUT model was extended by adding three new constructs i.e. hedonic

motivation (HM), price value (PV) and habit (HB) as key constructs in addition to the constructs available in the UTAUT (Figure 2.4).

UTAUT2 was designed to analyze the technology use and acceptance in consumer context. It is considered as a powerful and parsimonious model that helps to understand technology adoption behavior (Raman & Don, 2013; Venkatesh et al., 2012).

2.3 Selecting a theoretical base for the study.

Many of the models on user acceptance of new technologies were developed focusing on the adoption of new technologies within the organizational contexts. However, Venkatesh (2012) have developed the UTAUT2 specifically for the technology usage in consumer context.

Moreover, the theory was a further development of UTAUT that was developed through a review and consolidation of the constructs of eight other models that were used in explaining the IS usage and behavior. (Venkatesh & Zhang, 2010).

Due to these reasons, for this study, UTAUT2 was selected as the theoretical base for this study. Further, this selection supports the claim of "future research can identify other relevant factors that may help increase the applicability of UTAUT2 to a wide range of consumer technology use contexts" by Venkatesh et al. (2012, P. 173).

2.4 Service quality

In general, the service quality is considered to be a concept that varies on the personal and situational characteristics. Thus, the same quality level may perceived distinctively by different individuals and it may also distinctively perceived by the same individual in different situations. Parasuraman, Zeithaml, & Berry (1985) identified perceived service quality as a criterion involve in determining whether perceived service delivery meets, exceeds or fails to meet customer expectations. Many studies have noted that service quality in general is a determinant of competitiveness for establishing and sustaining satisfying relationships with customers. Previous studying suggests that

service quality is an important indicator of customer satisfaction (Spreng, Mackoy, Spreng Robert D., & Spreng, R.A. and MacKoy, 1996).

According to Parasuraman et al. (1985), service quality can be defined as the consumer's comparison between service expectation and service performance. Thus, it can be concluded that the quality of a service depends on whether that service consistently conforming to the expectations of the customers.

2.4.1 SERVQUAL model

Parasuraman et al. (1985) proposed a multi-dimensional research instrument termed as SERVQUAL to capture consumer expectations and perceptions of a service along the five dimensions that are believed to represent service quality. Those five dimensions include;

1. Tangibles – the appearance of physical facilities, including the equipment, personnel, and communication materials.
2. Reliability – the ability to perform the promised service dependably and accurately.
3. Responsiveness – the willingness to help customers.
4. Assurance – the knowledge and courtesy of employees and their ability to convey trust and confidence.
5. Empathy – the provision of caring, individualized attention to customers.

The model has been widely applied in a variety of contexts and cultural settings and found to be relatively robust. It has become the dominant measurement scale in the area of service quality (Parasuraman et al., 1985; Udo, Bagchi, & Kirs, 2011).

2.4.2 Mobile service quality

Many of the service quality related literature reveals that the primary focus of such studies are to apply the variations of SERVQUAL model in operationalizing the service quality (Liang, Ma, & Qi, 2013; Negi, 2009). However, Momaya & Gupta

(2008) claimed that such researches on service quality focused only on the service aspects, ignoring the role of technical quality.

The MSPs on the other hand, face a severe competition in most of the markets. To deal with the competition, these organizations are making substantial investments on improving technical quality paying less attention on enhancing the functional quality (van der Wal et al., 2002). Therefore, considering both aspects of Functional Quality and Technical Quality in research would provide advantages for both academia and industry (Momaya & Gupta, 2008; van der Wal et al., 2002).

In line with above, the service quality dimensions developed by Momaya & Gupta (2008) were used in the study since it conceptualizes both functional and technical aspects of mobile service quality. Moreover, the scale was specifically developed to measure the mobile service quality and since it focused on the Indian mobile users, the cultural background would not make a significant impact on the validity of the scale.

2.5 Chapter summary

This chapter reviewed literature related to two areas. First, it reviewed theories about technology acceptance. Thereafter, it explored the literature related to service quality. Based on these, UTAUT2 was identified as the suitable theoretical base for this study.

CHAPTER 3
METHODOLOGY

3.1 Objective

This chapter is focused on justifying and explaining the research methodology, design and the statistical methods used in this study.

3.2 Research methodology

This dissertation has taken a quantitative approach to investigate and develop a model to explain the usage intension of Mobile Cash services integrating the selected dimensions of Mobile service quality in to UTAUT2.

According to Neuman (2014), designing a study includes decisions about the type of sample, measure of the variables, and data collection techniques (such as questionnaires). In line with that, the data collection technique, sampling strategy, measurement of the variables, and statistical techniques deployed in this study with justifications are presented below.

3.3 Data collection technique

It is evident in literature that, there are two research design alternatives available in terms of the timing of data collections i.e. cross-sectional and longitudinal. In cross-sectional designs different people are investigated at the same time, whereas in longitudinal designs one group of individuals is examined over a period of time.

Cross sectional studies capture a still picture for the variables included in the research that perfectly matches to the objectives of this research. Further, this design type is incorporated with some advantages such as being time efficient, and not requiring the cooperation of respondents over a long period. Moreover, research on technology

acceptance has been conducted mainly in cross-sectional designs (Alawadhi & Morris, 2008; Pahnila et al., 2011; Venkatesh et al., 2003, 2012).

The literature further reveals that there are four major techniques available to gather data for quantitative type of studies i.e. structured observation, self-administered questionnaire, structured interview and content analysis of documents (Blaikie, 2010). Among these techniques, the self-administered questionnaire approach was selected for this research since it was the major technique used in related studies along the history (Ajzen & Fishbein, 1980; Venkatesh & Davis, 1996; Venkatesh et al., 2003, 2012). The questionnaire developed for this study is presented in Appendix A.

3.4 Sampling strategy

3.4.1 Unit of analysis

Units of analysis are wholes that researchers distinguish and can treat as independent elements, the 'whom' or 'what' under study (Hsu & Lin, 2016; Neuman, 2014). This study has defined its unit of analysis as users of Mobile Cash services.

3.4.2 Population

Previous researches in the technology acceptance literature reveals that studies with similar objectives have conducted in higher education institutes (Admiraal, Lockhorst, Smit, & Weijers, 2013; Park, 2009; Raman & Don, 2013; Selim, 2003) mainly because of the higher diffusion of different types of technologies within these institutes and the higher technological literacy of the students of this category. Therefore, in line with earlier studies, the researcher has selected the users of Mobile Cash services among undergraduate students of University of Peradeniya as the population for this study.

3.4.3 Sample size

In contrast to the practice of the wired telecommunication service providers, issuance of telephone directories is not practiced by mobile service providers. In fact, they treat customer details as confidential information and disclosure of any customer information to an outside party is done only upon an order of a court. Therefore, the list of potential respondents for the study (i.e. sampling frame) cannot be identified. Thus, the possibility of selecting a sample of respondents through simple random sampling technique is nullified.

As a solution, considering each of the nine faculties as a stratum, the questionnaires were emailed to all the undergraduates of each faculty irrespective of the usage of Mobile Cash services. The questionnaire and the body of the email have inserted clear instructions for the recipients to not to fill the questionnaire unless they have used the Mobile Cash services at least once. Later, before carrying out the analysis, the responses from non-users has been filtered out and obtained a sample of 272.

The distribution of the respondents across the faculties is presented in Table 3.1. As per the results, the highest number of responses received from a single faculty was 56 (20.6%) from the Faculty of Management while the 6 (2.2%) responses received from the Faculty of Dental Sciences was the lowest.

Table 3.1 Faculty level distribution of the sample

Faculty	Frequency
Faculty of Agriculture	39
Faculty of Allied Health Sciences	26
Faculty of Arts	37
Faculty of Dental Sciences	6
Faculty of Engineering	41
Faculty of Management	56
Faculty of Medicine	11
Faculty of Science	35
Faculty of Veterinary Medicine & Animal Science	21
Total	272

3.5 Research hypothesis

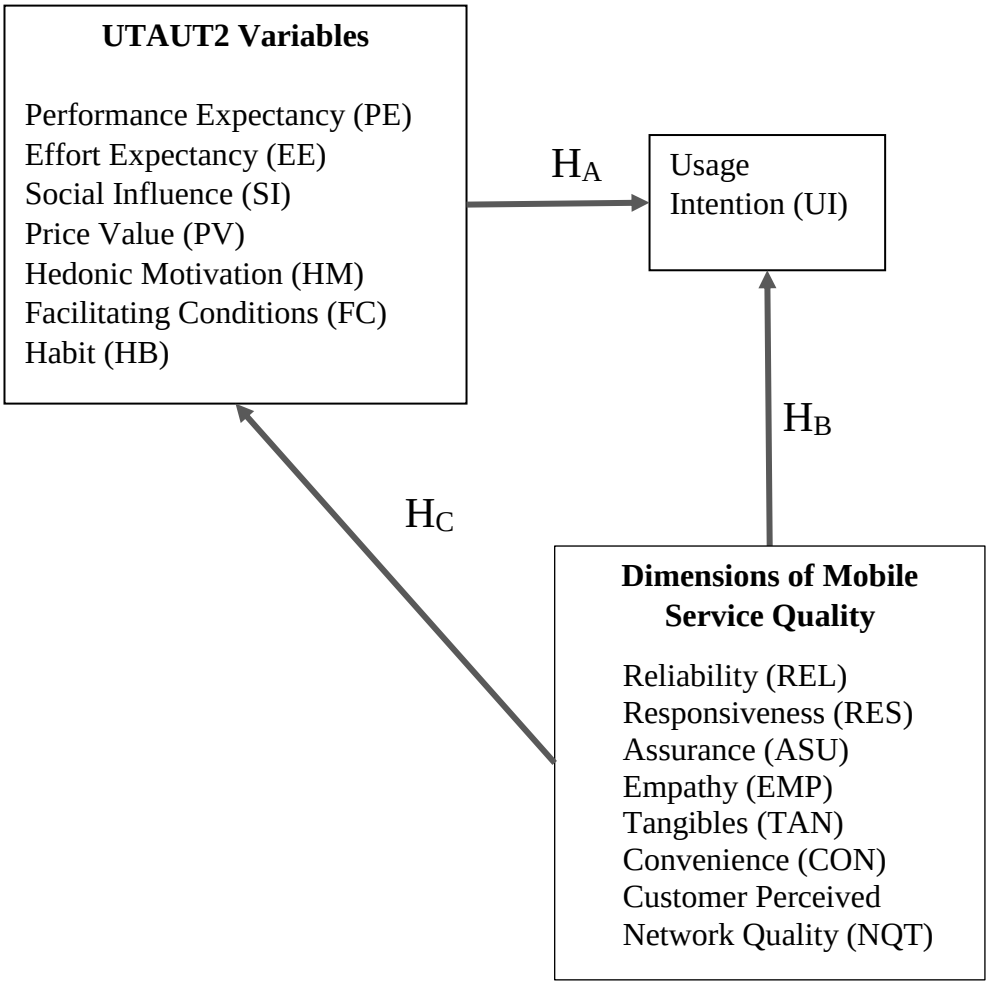
In line with the objectives of the research, following broad hypothesis are formulated for this research.

H_A: There is a significant direct effect from each of the predictor variable of UTAUT2 (i.e. PE, EE, SI, PV, HM, FC and HB) on UI.

H_B: There is a significant direct effect from each of the selected dimension of the mobile service quality (i.e. REL, RES, ASU, EMP, TAN, CON and NQT) on UI

H_C: There is a significant direct effect from each of the selected dimension of the mobile service quality (i.e. REL, RES, ASU, EMP, TAN, CON and NQT) on each predictor variable of UTAUT2 (i.e. PE, EE, SI, PV, HM, FC and HB)

3.6 Conceptual framework



3.7 Variables used in the study

3.7.1 Variables from UTAUT2

A total of eight variables including the dependent variable (Usage Intension) has been selected from UTAUT2. Definitions and theoretical background of each variable is explained in this section.

3.7.1.1 Performance expectancy (PE)

PE has been defined as the degree to which an individual believes that adopting the technology will help him or her to increase the work performance (Venkatesh et al., 2012). Further, many previous studies have reported that, PE has the strongest impact on the behavioral intention to use of different technologies (Venkatesh, M. Morris, et al., 2003; Pahnila, Siponen and Zheng, 2011; Venkatesh, Thong and Xu, 2012; Raman and Don, 2013)

3.7.1.2 Effort expectancy (EE)

EE has been defined as the degree of ease associated with the use of the technology (Venkatesh et al., 2012). Different forms of this construct have been used in other established theories of technology acceptance such as “Perceived Ease of Use” in TAM and “Degree of Complexity” in Innovation Diffusion Theory (Venkatesh et al., 2003). A greater level of behavioral intention is expected with a lessor level of EE.

3.7.1.3 Social influence (SI)

SI has been defined as the extent to which an individual perceives that important others believe he or she should use the new system. The effects of social relationships such as family, friends or peers are expected to capture with this construct (Venkatesh et al., 2012). The SI has been identified as a construct with a direct relationship with behavioral intention irrespective of whether the technology is in mandatory or

voluntary contexts (Alawadhi & Morris, 2008; Venkatesh et al., 2003, 2012). Further to that, SI is found to be a significant factor that can influence the technology adoption within the contexts related to mobile technologies (Raman & Don, 2013; Venkatesh et al., 2012).

3.7.1.4 Price value (PV)

PV has been defined as the consumer's cognitive trade-off between the perceived benefits of the application and the monetary cost for using it (Venkatesh et al., 2012). This has been identified as an important factor by many researchers especially, for the adoption of the technologies in consumer contexts (Raman & Don, 2013; Venkatesh et al., 2012).

3.7.1.5 Hedonic motivation (HM)

According to Venkatesh et al. (2012), HM has been defined as the feelings of cheerfulness, joy, and enjoyment, which are stimulated by the use of technology. The users of the technologies expects to have pleasurable sensations from their sensory channels. The technology developers try to integrate their products with features and functionalities to provide a higher degree of user-friendliness (Igbaria, Iivari, & Maragahh, 1995).

3.7.1.6 Facilitation conditions (FC)

FC has been defined as the degree to which an individual believes that an organizational and technical infrastructure exists to support the use of the system (Venkatesh et al., 2012). The FC is conceptualized to explain the elements of supportive resources, technical support, prior knowledge and peer help available to a given technology (Raman & Don, 2013).

3.7.1.7 Habit (HB)

Venkatesh et al. (2012) have defined habit as the extent to which people tend to perform behaviors automatically because of learning. Moreover, Limayem et al. (2003) identified HB as an automatic behavior as opposed to a clear intentional behavior. However, to become a habit, an activity requires to be comprised of short term repetitions, reinforcement, clarity of the situation, interest, and ability to learn (Triandis, 1979).

3.7.1.8 Usage intention (UI)

UI has been defined as the degree to which a person has formulated conscious plans to perform or not perform some specified future behavior (Venkatesh, et.al. 2012). Further to that, Davis (1989) indicated that UI has a direct relationship to determine the usage where UI was defined to be the intensity of an individual's intention to complete a specific behavior. According to Ajzen (1991), UI can be considered as the closest factor in determining the usage of a technology.

3.7.2 Dimensions of mobile service quality

3.7.2.1 Functional quality

Functional quality dimension was conceptualized as a variation of SERVQUAL model. In addition to the original scale of SERVQUAL, 'convenience' has been added due to the nature of the mobile service context.

1. **Reliability (REL):** Ability to perform the service accurately and dependably, as promised (Momaya & Gupta, 2008; Parasuraman et al., 1985).
2. **Responsiveness (RES):** Willingness of the firm's staff to help customers and provide prompt services (Momaya & Gupta, 2008; Parasuraman et al., 1985).
3. **Assurance (ASU):** Knowledge and courtesy of employees and their abilities to inspire trust and confidence (Momaya & Gupta, 2008; Parasuraman et al., 1985).

4. **Empathy (EMP):** Ability of the service provider to provide a caring and personalized attention to each customer (Momaya & Gupta, 2008; Parasuraman et al., 1985).
5. **Tangibles (TAN):** Appearance of physical facilities, equipment, personnel and communication materials (Momaya & Gupta, 2008; Parasuraman et al., 1985).
6. **Convenience (CON):** Implies flexible and comfortable facilities to suit the customers' needs (De Carvalho & Faria Leite, 1999; Momaya & Gupta, 2008).

3.7.2.2 Customer perceived network quality (NQT)

The technical quality aspect was conceptualized by this variable and was used as an indicator of network performance in terms of voice quality, call drop rate, network coverage, and network congestion (Momaya & Gupta, 2008).

3.8 Measurement procedure

3.8.1 Filter question

A filter question (Table 3.2) was inserted in the questionnaire to determine whether a response is satisfying the criterion to be selected for the sample.

Table 3.2 Filter question

Question	Measurement
Do you use Mobile Cash services?	Dual option (Yes/ No)

3.8.2 Demographic questions

The demographic questions indicated in Table 3.3 have been inserted in the questionnaire to obtain a demographic profile of the sample.

Table 3.3 Demographic questions

Question	Measurement
Gender:	Dual option (Male/ Female)
Residential District (Please Specify):	Open question, single answer
Level of Study:	Open question, single answer (100 Level/ 200 Level/ 300 Level/ 400 Level/ 500 Level)
Faculty (Please Specify):	Open question, single answer (Faculty of Agriculture/ Faculty of Allied Health Sciences/ Faculty of Arts/ Faculty of Dental Sciences/ Faculty of Engineering/ Faculty of Management/ Faculty of Medicine/ Faculty of Science/ Faculty of Veterinary Medicine & Animal Science)

3.8.3 Latent variables

The study included eight latent variables adopted from UTAUT2 (i.e. performance expectancy (PE), effort expectancy (EE), social influence (SI), facilitating conditions (FC), hedonic motivation (HM), price value (PV), habit (HB), and usage intention (UI)). These variables were measured in relation to the usage experience of Mobile Cash services. In addition, the dimensions of mobile service quality was measured using another six latent variables (i.e. reliability (REL), responsiveness (RES), assurance (ASU), empathy (EMP), tangibles (TAN) convenience (CON) and customer perceived network quality (NQT)). These variables were measured in relation to the usage experience of the total mobile service package (i.e. voice calling, SMS, internet accessibility and etc.).

All these fifteen latent variables were measured using at least three to four items (observed variables) (Table 3.4) that are reliably reflective in nature. Seven point Likert scales ranged from ‘strongly disagree’ (1) to ‘strongly agree’ (7) were used in all cases.

Table 3.4 Latent variables and their respective items

Latent Variable	Code	Item	Adopted from
Reliability (REL)	REL1	Contact employees perform the service right the first time	(Momaya & Gupta, 2008)
	REL2	Provides the services at the promised time	
	REL3	You are kept well-informed about the progress of your complaints	
	REL4	Billing system is accurate and error free	
Responsiveness (RES)	RES1	Contact employees gives you a prompt service	(Momaya & Gupta, 2008)
	RES2	Your complaints/queries are taken seriously	
	RES3	Your complaints are resolved quickly	
	RES4	They are always willing to help you	
Assurance (ASU)	ASU1	Contact employees are friendly and polite while handling your complaints/queries	(Momaya & Gupta, 2008)
	ASU2	They have the adequate knowledge of tariffs and plans of service providers	
	ASU3	The behavior of contact employees instils confidence in you	
	ASU4	You feel safe in your transactions with your service provider	
Empathy (EMP)	EMP1	For lodging the complaints, service provider is easily accessible	(Momaya & Gupta, 2008)
	EMP2	Gives you individual attention	
	EMP3	Understands your specific needs	
	EMP4	Retailer network of your service provider is easily located	
Tangibles (TAN)	TAN1	Service provider's physical facilities are visually appealing	(Momaya & Gupta, 2008)
	TAN2	Contact employees appear neat	
	TAN3	Materials associated with the service (such as pamphlets etc.) are visually appealing	
Convenience (CON)	CON1	Convenient business hours	(Momaya & Gupta, 2008)
	CON2	Ease of lodging the complaints/queries	
	CON3	Your service provider provides flexibility in the payment of bills	
	CON4	Application formalities are simple	

Table 3.4 Continuation

Customer Perceived Network Quality (NQT)	NQT1	Your service provider provides sufficient geographical coverage (on highways, inside the buildings, and basement)	(Momaya & Gupta, 2008)
	NQT2	You experience minimum premature termination of calls during conversation (i.e., call drops)	
	NQT3	You get clear and undisturbed voice	
	NQT4	You are able to make calls at peak hours	
Performance Expectancy (PE)	PE1	I find mobile banking services useful in my daily life	(Venkatesh, et.al. 2012)
	PE2	Using mobile banking services increases my productivity	
	PE3	Using mobile banking services helps me accomplish things more quickly	
	PE4	Using mobile banking services increases my chances of achieving things that are important to me	
Effort Expectancy (EE)	EE1	Learning how to use mobile banking services is easy for me	(Venkatesh, et.al. 2012)
	EE2	My interaction with mobile banking services is clear and understandable	
	EE3	I find mobile banking services easy to use	
	EE4	It is easy for me to become skillful at using mobile banking services	
Social Influence (SI)	SI1	People who are important to me think that I should use mobile banking services	(Venkatesh, et.al. 2012)
	SI2	People who influence my behavior think that I should use mobile banking services	
	SI3	Mobile banking services use is a status symbol in my environment	
Facilitating Conditions (FC)	FC1	I have the resources necessary to use mobile banking services	(Venkatesh, et.al. 2012)
	FC2	I have the knowledge necessary to use mobile banking services	
	FC3	Mobile banking is compatible with other technologies I use	
	FC4	I can get help from others when I have difficulties using mobile banking services	

Table 3.4 Continuation

Hedonic motivation (HM)	HM1	Using mobile banking services is fun	(Venkatesh, et.al. 2012)
	HM2	Using mobile banking services is enjoyable	
	HM3	Using mobile banking services is entertaining	
Price Value (PV)	PV1	Mobile banking services are reasonably priced	(Venkatesh, et.al. 2012)
	PV2	Mobile banking services are reasonably priced comparing with other banking channels	
	PV3	Mobile banking services are a good value for the money	
	PV4	At the current price, mobile banking services provide a good value	
Habit (HB)	HB1	The use of mobile banking services has become a habit for me	(Venkatesh, et.al. 2012)
	HB2	I am addicted to using mobile banking services	
	HB3	I must use mobile banking services	
	HB4	Using mobile banking has become natural to me	
Adoption Intention (UI)	UI1	I intend to continue using mobile banking in the future	(Venkatesh, et.al. 2012)
	UI2	I will always try to use mobile banking in my daily life	
	UI3	I plan to continue to use mobile banking frequently	
	UI4	I expect that I would use mobile banking in future	

3.8.4 Results of the Pilot Study

Assessing the feasibility of a large scale data collection is the purpose of the pilot study. It consists of deploying survey distribution strategies in the same way as a full scale study would be organized (Sekaran & Bougie, 2013). In line with this, the questionnaires were distributed to a sample of 30 users of Mobile Cash services in the same university and analyzed for the reliability of the items. The results indicated that,

Cronbach's Alpha values for all the latent variables are higher than 0.7 indicating the survey instrument is a reliable one.

3.9 Analysis techniques

Being a quantitative study, variety of analytical techniques were available for selection as the techniques of analysis for this study. Previous literature have broadly identified four categories of quantitative analysis techniques: description, association, causation and inference (Sekaran, 2006). Descriptive techniques are mainly used to report the distribution of a sample across a range of variables. They include measures of frequency, central tendency and dispersion. Association techniques are used to determine the degree to which two variables co-vary. These include simple correlation, analysis of variance and covariance, and simple and multiple regressions. In order to establish causation, factor analysis, path analysis, structural equation modelling and regression are commonly used (Tabachnick & Fidell, 2007; Sekaran & Bougie, 2013). However, hypotheses and objectives of this dissertation is developed to extend an existing model by considering the causations between variables, the causation analysis techniques were used as major analysis technique.

3.9.1 Structural equation modelling

Structural equation modeling is a family of statistical techniques that has become a popular analysis technique in many social research areas. Its ability to model latent variables, to take into account various forms of measurement error, and to test entire theories makes it useful for many studies (Henseler, Hubona, & Ray, 2016). Structural equation modelling has two variations. The first one is variance-based SEM, also known as PLS-SEM or simply PLS (partial least squares). The second one is the covariance-based SEM which is usually referred as CB-SEM or simply SEM. Variance-based is a causal modelling technique, and its focus is maximizing the variance explained of the dependent variable. SEM concentrates on estimating the

statistical difference between the structure of theoretical relationships and the data (Hair, Ringle, & Sarstedt, 2011, 2012, 2013, 2014).

Both the PLS and SEM have distinctive advantages and disadvantages. Some of the advantages of PLS can be identified as follows: it minimizes the residual variances of the dependent variables, compared with SEM it presents less issues with model identification; it can work with smaller samples, and can directly incorporate reflective as well as formative constructs. The major disadvantage of PLS is that restrictions in theory testing. (Hair, Ringle, & Sarstedt, 2011, 2012, 2013, 2014).

On the other hand, SEM has the advantage of being a confirmatory technique appropriate for theory testing as it provides global estimates of model fit. Further, it can be applied to confirmatory factor analysis as well as causal modeling. The major disadvantages of SEM are that it requires larger samples, and its assumptions can be very restrictive since this technique assumes normality, linearity, and absence of multicollinearity (Tabachnick & Fidell, 2007).

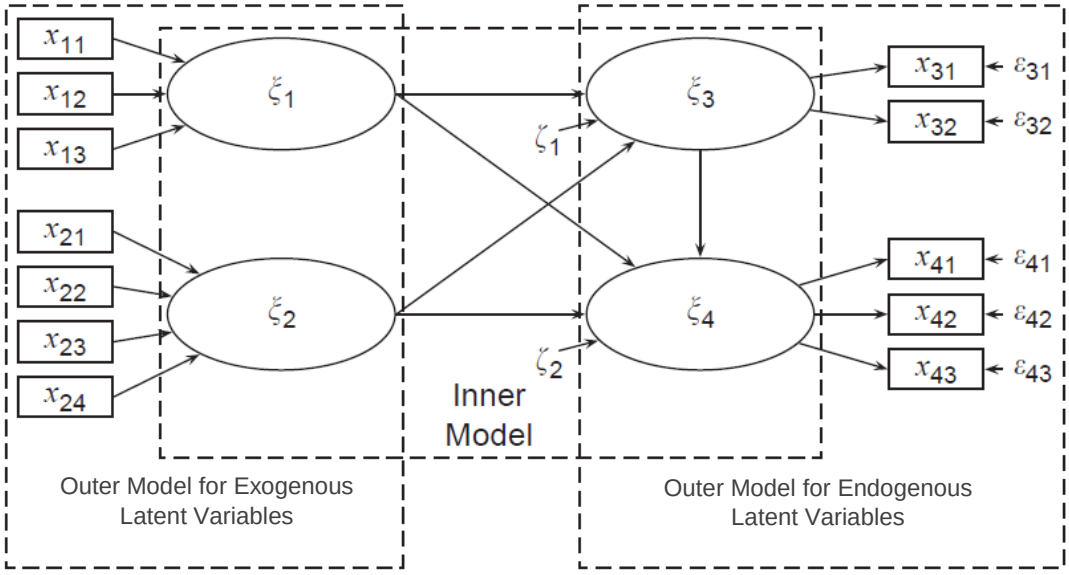
In order to select the most appropriate technique between variance and covariance based SEM, the objectives of the study has to be considered. If the objective is theory testing and confirmation, SEM is appropriate. If the objective is prediction and theory development or extension of an existing structural theory, PLS is rather the recommendation (Hair, Ringle, & Sarstedt, 2011, 2012, 2013, 2014). Moreover, the limitations of each technique also has to be considered. However, since this study concentrates on theory development by extending an existing structural model, PLS was selected to be the most appropriate technique.

3.9.2 Statistical Software

As per the recommendations made by Hair, Ringle, & Sarstedt (2011, 2012, 2013, 2014) SmartPLS was selected to use as the analytical software for this study.

3.9.3 PLS-SEM path models

Within a PLS path model, two sets of linear equations can be identified: the measurement model (also called outer model) and the structural model (also called inner model). The structural model specifies the relationships between latent variables, whereas the measurement model specifies the relationships between a latent variable and respective observed variables (Henseler et al., 2016) (Figure 3.1). Moreover, the measurement model of a PLS path model could be either formative or reflective in nature. However, in this study, it was considered to be reflective in nature (as explained in section 3.8.3)



Source: Henseler, Ringle, & Sinkovics (2009, p. 285)

Figure 3.1 Structure of a PLS path diagram

3.9.4 Bootstrapping

Normality of data is not an assumption in PLS-SEM. However, it relies on a nonparametric bootstrap procedure to test the significance of estimated path coefficients. “Bootstrapping treats the observed sample as if it represents the

population. The procedure creates a large, pre-specified number of bootstrap samples (e.g., 5,000). Each bootstrap sample should have the same number of cases as the original sample. Bootstrap samples are created by randomly drawing cases with replacement from the original sample" (Hair et al., 2012). The subsample is then used to estimate the PLS path model. This process is repeated until a large number of random subsamples has been created, typically about 5,000 (Efron & Tibshirani, 1986; Hair et al., 2012; Kushary, Davison, & Hinkley, 1997; Sarstedt et al., 2014). Thus, in line with previous studies, number of subsamples in consistent bootstrapping procedure were set to be 5000 for each model.

3.9.5 Assessing PLS path models

Chin (1998) proposed a twostep process to analyze PLS models. The two steps are: (1) the measurement model evaluation and (2) the structural model evaluation. These steps has been further recommended by Hair et. al.(2012). Therefore, in line with those studies, this study has also adopted the same process.

3.9.5.1 Measurement model evaluation

Chin (1998), states that the measurement model of the PLS path models should be assessed with regard to reliability and validity.

1. **Reliability**

Three criteria have been used to assess the internal consistence reliability: (1) Cronbach's Alpha, (2) Composite reliability, and (3) the loadings of reflective indicators. Cronbach's Alpha (Cronbach, 1951) has been the classic indicator of the internal consistency reliability. Previous literature noted that, an Alpha value of 0.7 or above for each latent variable indicate the internal consistence reliability (Nunnally & Bernstein, 1994; Hair, Ringle, & Sarstedt, 2011, 2012, 2013, 2014).

On the other hand, composite reliability (Werts, Linn, & Jöreskog, 1974) is also a measure of internal consistency and the indicator must not be lower than 0.6. However, in relation to PLS models, this measurement is recommended over Cronbach's Alpha method (Nunnally & Bernstein, 1994; Hair, Ringle, & Sarstedt, 2011, 2012, 2013, 2014).

Further to these measures, previous literature indicate that, to become reliable, the individual loadings of outer model should be greater than 0.5 and the individual item loadings with a value lessor than 0.40 should be eliminated from the model (Nunnally & Bernstein, 1994; Hair, Ringle, & Sarstedt, 2011, 2012, 2013, 2014).

2. Validity

In assessing the validity, two validity subtypes are usually examined: the convergent validity and the discriminant validity. Convergent validity signifies that a set of indicators represents one and the same underlying construct, which can be demonstrated through their unidimensionality. In line with the previous studies, the Average Variance Extracted (AVE) was used to determine the convergent validity where AVEs higher than 0.5 depicts an adequate level of convergent validity (Nunnally & Bernstein, 1994; Hair, Ringle, & Sarstedt, 2011, 2012, 2013, 2014).

Further to that, the discriminant validity has been assessed using Heterotrait-Monotrait (HTMT) ratio. HTMT is a new method for assessing discriminant validity in partial least squares structural equation modeling, which outperforms classic approaches to discriminant validity assessment such as Fornell-Larcker criterion and cross-loadings (Hair, Hult, Ringle, & Sarstedt, 2017). For an adequate level of discriminant validity, all the HTMT measures related to latent variables should be smaller than 1 (J. F. Hair et al., 2017; Henseler, Ringle, & Sarstedt, 2014).

3. Testing for Common Method Variance (CMV)

CMV is the "variance that is attributable to the measurement method rather than to the constructs the measures are assumed to represent" (Podsakoff, MacKenzie, Lee, & Podsakoff, 2003) In order to determine that the measurement instrument is free of any CMV, Harman's single factor score was calculated in which, all observed items are loaded into one common factor. If the total variance extracted using the common factor is less than 50%, it suggests that CMV does not affect the data (MacKenzie & Podsakoff, 2012; Podsakoff et al., 2003).

3.9.5.2 Structural model evaluation

1. Assessing the overall goodness-of-fit (GoF) of a model

As per the previous studies, GoF should be the first criteria to consider in model assessment. Because if the model does not fit the data, the data contains more information than the model conveys. Thus, the estimates and the conclusions drawn from them become questionable (Henseler et al., 2016).

Currently, the only approximate model fit criterion implemented for PLS path modeling is the Standardized Root Mean Square Residual (SRMR) (Henseler et al., 2016; Hu & Bentler, 1998, 1999). The SRMR is the square root of the sum of the squared differences between the model-implied and the empirical correlation matrix. Hu & Bentler (1999) indicated that a value of 0 for SRMR would indicate a perfect fit and generally, a cut-off value of 0.08 would be more adequate for PLS path models.

Other model fit measures such as Bentler-Bonett index or normed fit index is rarely used by the researches due to the weaknesses inherent to them. For example, NFI does not penalize for adding parameters and certain threshold values are still to be researched and determined (Henseler et al., 2016). Therefore, for this study SRMR criterion has been used to determine the model fit with a cutoff value of 0.08.

2. Assessing the effects between variables

Within the PLS path models, the effects caused by one variable on another has been assessed using the significance of the path coefficients. Path coefficients can be consider as the standardized regression coefficients, which can be assessed with regard to their sign and their absolute size (Hair, Ringle, & Sarstedt, 2011, 2012, 2013, 2014). However, since these values are generated by bootstrapping, the magnitudes may not be generalizable to the population. Therefore, as per the objectives of this research, the effects were mainly interpreted using the sign and the p value (Kushary et al., 1997).

CHAPTER 4
RESULTS AND DISCUSSION

4.1 Objective

The aim of this chapter is to report the results of the analysis of the data and provide interpretations. At the beginning, the descriptive statistic of the sample is presented followed by results of reliability of the scales, and PLS path model development and testing procedure.

4.2 Demographic statistics of the sample

As per the research design, the data collection process was designed to cover all the faculties (9 in total) of University of Peradeniya. A total of 272 responses received from the users of Mobile Cash services were used in the analysis. Initially, the sample is analyzed to get a demographic profile of it. The descriptive phase of the analysis was performed using the SPSS statistical software (version 23)

4.2.1 Study level wise distribution

Table 4.1 Study level wise distribution

Level of study	Frequency	Percentage
100 Level	44	16.2
200 Level	62	22.8
300 Level	89	32.7
400 Level	73	26.8
500 Level	4	1.5
Total	272	100.0

The descriptive analysis further revealed that the respondents represent all five levels of the undergraduate study programs. Results presented in Table 4.1 reveals that the highest number of responses from a single level of study was 89 (32.7%) from the 300 level while 4 (1.5%) received from the 500 level was the lowest.

4.2.2 Gender wise distribution

As per the results presented in Table 4.2, 39.7% (108 out of 272) of the received responses were from males while 60.3% (164 out of 272) of the responses were from females.

Table 4.2 Gender wise distribution

Gender	Frequency	Percentage
Male	108	39.7
Female	164	60.3
Total	272	100.0

4.2.3 Residential district wise distribution

The residential districts of the respondents were analyzed and the results are presented in Table 4.3. The results revealed that the respondents represent 22 districts out of 25 where there were no responses received from the residents of Mannar, Mullaitivu and Puttalam Districts. However, the highest number of respondents were residents of Kandy District (41 out of 272) followed by Colombo (36 out of 272) and Gampaha (33 out of 272). On the other hand the lowest number of responses received from Kilinochchi District (i.e. 1 out of 272). However, it is revealed that, despite of collecting data focusing on a single Higher Education Institute, the respondents represent all the Districts of the country except 3 Districts with lessor population density.

Table 4.3 Residential district wise distribution

Residential District	Frequency	Percentage
Ampara	7	2.6
Anuradhapura	12	4.4
Badulla	23	8.5
Batticaloa	4	1.5
Colombo	36	13.2
Galle	6	2.2
Gampaha	33	12.1
Hambantota	3	1.1
Jaffna	8	2.9
Kalutara	10	3.7
Kandy	41	15.1
Kegalle	6	2.2
Kilinochchi	1	0.4
Kurunegala	16	5.9
Mannar	0	0
Matale	13	4.8
Matara	15	5.5
Moneragala	3	1.1
Mullaitivu	0	0
Nuwara Eliya	8	2.9
Polonnaruwa	11	4
Puttalam	0	0
Ratnapura	4	1.5
Trincomalee	9	3.3
Vavuniya	3	1.1
Total	272	100

4.3 Descriptive statistics of the observed variables

In addition to the demographic questions, as explained in section 3.7.3, the questionnaire consisted of 57 items to measure 15 latent variables. Each item was analyzed to identify the number of missing values, mean and standard deviation (Table 4.4). The results indicate that, there are missing values against some variables which had been automatically replaced with the mean values by the SmartPLS software during the analysis.

Table 4.4 Descriptive Statistics of the observed variables

Observed Variables	Missing Values	Mean	Standard Deviation
Rel1	0	4.235	1.537
Rel2	0	4.614	1.634
Rel3	2	4.352	1.626
Rel4	2	4.578	1.897
Res1	0	4.853	1.385
Res2	0	4.846	1.613
Res3	0	4.478	1.689
Res4	0	4.926	1.612
Asu1	0	5.18	1.579
Asu2	0	4.798	1.497
Asu3	2	4.885	1.507
Asu4	0	5.044	1.439
Emp1	2	4.248	1.627
Emp2	0	4.397	1.783
Emp3	0	4.632	1.502
Emp4	2	4.596	1.569
Tan1	2	4.644	1.453
Tan2	0	4.812	1.429
Tan3	2	4.615	1.575
Con1	0	4.893	1.548
Con2	0	4.511	1.531
Con3	2	4.544	1.607
Con4	0	4.754	1.451
Nqt1	0	4.438	1.489
Nqt2	2	4.511	1.403
Nqt3	0	4.805	1.493
Nqt4	2	4.859	1.514
PE1	0	4.529	1.807
PE2	0	4.662	1.775

Observed Variables	Missing Values	Mean	Standard Deviation
PE3	2	4.852	1.702
PE4	2	4.681	1.663
EE1	0	4.941	1.489
EE2	2	4.622	1.6
EE3	2	4.719	1.627
EE4	2	4.793	1.597
SI1	0	4.254	1.583
SI2	2	4.111	1.576
SI3	2	4.159	1.662
FC1	0	4.467	1.546
FC2	2	4.304	1.63
FC3	2	4.489	1.468
FC4	0	4.301	1.571
HM1	0	4.029	1.557
HM2	0	4.125	1.647
HM3	0	4.044	1.599
PV1	0	4.228	1.424
PV2	0	4.301	1.421
PV3	1	4.369	1.454
PV4	0	4.463	1.46
HB1	0	3.846	1.68
HB2	4	3.44	1.756
HB3	0	3.809	1.73
HB4	4	3.791	1.593
UI1	0	4.625	1.447
UI2	0	4.342	1.571
UI3	0	4.228	1.586
UI4	0	4.596	0.965

4.4 Measurement model assessment

4.4.1 Reliability

Three criteria have been used to assess the internal consistence reliability: (1) Cronbach's Alpha, (2) Composite reliability, and (3) the loadings of reflective indicators. The Cronbach's Alpha values presented in Table 4.5 reveals that Alpha values for each latent variable has a value greater than 0.7 (Lowest value: 0.818 against REL). Moreover, the Composite Reliability statistics for each latent variable (Table 4.5) has a value above 0.8 (Lowest value: 0.818 against REL) (Nunnally & Bernstein, 1994; Hair, Ringle, & Sarstedt, 2011, 2012, 2013, 2014).

Table 4.5 Cronbach's Alpha, Composite Reliability and AVE values

Latent Variable	Cronbach's Alpha	Composite Reliability	Average Variance Extracted (AVE)
UI	0.867	0.863	0.619
ASU	0.859	0.858	0.602
CON	0.842	0.843	0.579
EE	0.924	0.924	0.754
EMP	0.820	0.823	0.544
FC	0.890	0.889	0.667
HB	0.856	0.856	0.604
HM	0.941	0.941	0.842
NQT	0.821	0.825	0.550
PE	0.945	0.945	0.811
PV	0.852	0.855	0.598
REL	0.818	0.818	0.531
RES	0.865	0.858	0.610
SI	0.918	0.920	0.793
TAN	0.864	0.863	0.679

In addition to those, all the loadings of reflective indicators in to respective latent variables are greater than 0.5 (Table 4.6). Moreover, none of the item loadings reported values lower than 0.40. Thus, none of the variables should be eliminated from further analysis. It can be further concluded that, the reliability and the internal consistency of

the measurement scale is adequate to proceed with the analysis (Nunnally & Bernstein, 1994; Hair, Ringle, & Sarstedt, 2011, 2012, 2013, 2014).

Table 4.6 Loadings of reflective indicators in to each latent variable

	UI
UI1	0.691
UI2	0.686
UI3	0.743
UI4	0.987

	PE
PE1	0.87
PE2	0.951
PE3	0.858
PE4	0.92

	EE
EE1	0.812
EE2	0.866
EE3	0.877
EE4	0.916

	FC
FC1	0.817
FC2	0.743
FC3	0.873
FC4	0.829

	HB
HB1	0.913
HB2	0.602
HB3	0.676
HB4	0.874

	HM
HM1	0.921
HM2	0.926
HM3	0.905

	PV
PV1	0.684
PV2	0.793
PV3	0.853
PV4	0.754

	SI
SI1	0.931
SI2	0.929
SI3	0.805

	CON
Con1	0.713
Con2	0.632
Con3	0.737
Con4	0.93

	EMP
Emp1	0.605
Emp2	0.849
Emp3	0.834
Emp4	0.628

	ASU
Asu1	0.689
Asu2	0.758
Asu3	0.841
Asu4	0.808

	NQT
Nqt1	0.909
Nqt2	0.662
Nqt3	0.81
Nqt4	0.53

	RES
Res1	0.821
Res2	0.914
Res3	0.507
Res4	0.822

	TAN
Tan1	0.934
Tan2	0.79
Tan3	0.734

	REL
Rel1	0.635
Rel2	0.792
Rel3	0.807
Rel4	0.666

4.4.2 Validity

In assessing the validity, two validity subtypes are usually examined: the convergent validity and the discriminant validity. It is evident that the AVEs (Table 4.5) of all the variables are higher than 0.5. Thus, it can be concluded that the instrument used in this study has adequate convergent validity so that the indicators represents one and the same underlying construct, therefore, unidimensional in nature (Nunnally & Bernstein, 1994; Hair, Ringle, & Sarstedt, 2011, 2012, 2013, 2014).

Moreover, the discriminant validity has been assessed using Heterotrait-Monotrait (HTMT) ratios presented in Table 4.7. The results revealed that, all the measures are smaller than the critical value of 1 (the highest value is 0.883 between SI and UI) (J. F. Hair et al., 2017; Henseler et al., 2014). Thus, it can be concluded that the instrument has an adequate level of discriminant validity.

Table 4.7 Heterotrait-Monotrait (HTMT) ratios

	UI	ASU	CON	EE	EMP	FC	HB	HM	NQT	PE	PV	REL	RES	SI	TAN
UI															
ASU	0.71														
CON	0.737	0.797													
EE	0.697	0.578	0.566												
EMP	0.638	0.641	0.698	0.389											
FC	0.843	0.581	0.587	0.76	0.534										
HB	0.836	0.394	0.455	0.508	0.497	0.679									
HM	0.662	0.469	0.57	0.498	0.308	0.567	0.61								
NQT	0.541	0.592	0.717	0.442	0.611	0.501	0.245	0.414							
PE	0.73	0.701	0.645	0.753	0.425	0.669	0.404	0.464	0.456						
PV	0.841	0.631	0.623	0.608	0.657	0.699	0.691	0.659	0.47	0.567					
REL	0.693	0.714	0.666	0.487	0.673	0.506	0.466	0.376	0.565	0.496	0.655				
RES	0.517	0.697	0.6	0.308	0.646	0.383	0.356	0.33	0.496	0.378	0.447	0.687			
SI	0.883	0.558	0.659	0.648	0.55	0.753	0.688	0.599	0.449	0.619	0.771	0.554	0.41		
TAN	0.661	0.659	0.831	0.59	0.603	0.621	0.371	0.498	0.681	0.531	0.562	0.661	0.509	0.557	

4.4.3 Testing for CMV

CMV is the "variance that is attributable to the measurement method rather than to the constructs the measures are assumed to represent" (Podsakoff et al., 2003). In order to determine that the measurement instrument is free of any CMV, Harman's single factor score was calculated in which, all observed items were loaded into one common factor. The total variance extracted using the common factor (40.12%) (Table 4.8) was lower than 50%. Thus it can be concluded that CMV does not affect the data (MacKenzie & Podsakoff, 2012; Podsakoff et al., 2003).

Table 4.8 Harman's Single Factor Score

Total Variance Explained						
	Initial Eigenvalues			Extraction Sums of Squared Loadings		
Component	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	22.870	40.123	40.123	22.870	40.123	40.123
2	3.957	6.942	47.065			
3	3.019	5.297	52.362			
4	2.259	3.963	56.325			
5	2.044	3.585	59.910			
6	1.660	2.912	62.822			
7	1.419	2.489	65.311			
8	1.352	2.372	67.683			
9	1.306	2.292	69.975			
10	1.197	2.099	72.074			
11	1.123	1.970	74.044			
12	.911	1.598	75.642			
13	.858	1.505	77.147			
14	.853	1.497	78.644			
15	.796	1.397	80.041			
16	.748	1.311	81.352			
17	.693	1.215	82.567			
18	.636	1.116	83.684			
19	.605	1.061	84.745			
20	.598	1.048	85.793			
21	.576	1.010	86.803			

Table 4.8 Continuation

22	.502	.880	87.683			
23	.470	.825	88.509			
24	.446	.782	89.291			
25	.430	.754	90.045			
26	.389	.683	90.728			
27	.376	.659	91.387			
28	.360	.632	92.019			
29	.330	.579	92.598			
30	.320	.562	93.159			
31	.293	.513	93.673			
32	.287	.503	94.176			
33	.267	.469	94.645			
34	.250	.438	95.083			
35	.223	.391	95.474			
36	.214	.376	95.850			
37	.199	.349	96.199			
38	.186	.326	96.524			
39	.177	.311	96.836			
40	.171	.300	97.135			
41	.158	.278	97.414			
42	.155	.273	97.686			
43	.139	.243	97.929			
44	.136	.238	98.168			
45	.127	.223	98.391			
46	.118	.207	98.598			
47	.113	.199	98.797			
48	.103	.181	98.978			
49	.098	.171	99.149			
50	.092	.161	99.310			
51	.082	.145	99.455			
52	.076	.134	99.589			
53	.061	.107	99.696			
54	.060	.104	99.800			
55	.041	.072	99.872			
56	.037	.065	99.938			
57	.036	.062	100.000			
Extraction Method: Principal Component Analysis.						

4.5 Structural model testing with PLS-SEM

In relation to formulation of structural models, previous literature suggest that, the analysis should start with less complex models with less complexities then the complexity should increase by adding indirect associations (Hair et al., 2011; Henseler et al., 2016, 2009). In line with these suggestions, before analyzing complex models with indirect effects, three basic models comprising only with direct effects have been formulated and tested.

The measurement model (outer model) was displayed only in the first 2 models (Figure 4.1 and Figure 4.2) to present the reflective indicators of each latent variable. It was not indicated in other models to maintain the clarity of the figures.

4.5.1 Model 1 – Direct effects from variables in UTAUT2 model

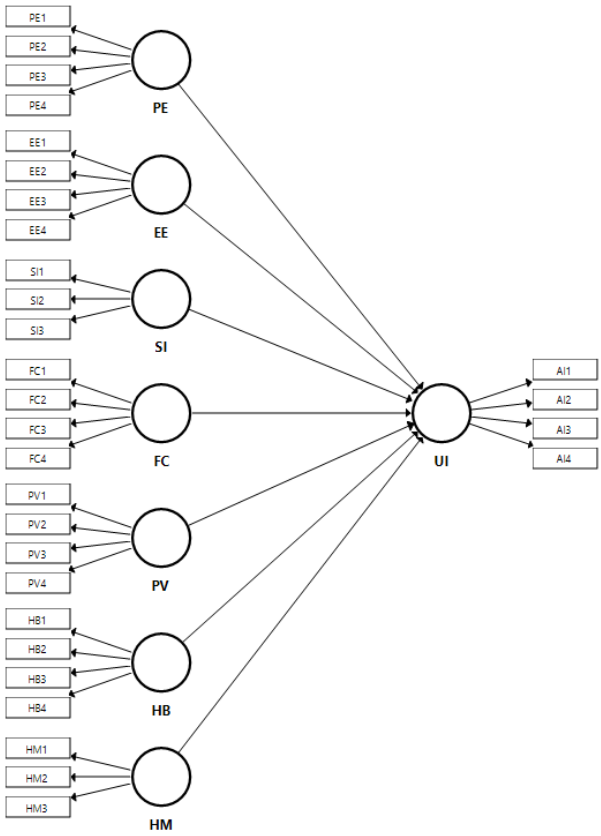


Figure 4.1 Model 1 – Direct effects from UTAUT2 variables

Firstly, the variables of the theoretical base of the study i.e. UTAUT2 was fitted in a model (Figure 4.1). The SRMR statistic of the estimated model (0.055) was smaller than the critical value of 0.08 (Table 4.9). Thus, it can be concluded that the model indicates an adequate model fit.

In addition to that, the results presented in Table 4.10 reveals that all the variables except EE (p=0.157) showed significant direct effects on UI. Moreover, Table 4.11 reveals the adjusted R^2 value indicating that the model can explain 96.6% of the variability of UI.

Table 4.9 Model fit of Model 1

Criteria	Statistic
SRMR	0.055

Table 4.10 Path Coefficients of Model 1

Path	Path Coefficient	Standard Deviation	T Statistics	P Values
EE -> UI	-0.107	0.073	1.416	0.157
FC -> UI	0.187	0.080	2.252	0.025
HB -> UI	0.346	0.064	5.434	0.000
PE -> UI	0.281	0.063	4.501	0.000
PV -> UI	0.184	0.070	2.664	0.008
SI -> UI	0.258	0.068	3.786	0.000

Table 4.11 Adjusted R square value of Model 1

Variable	Adjusted R^2
UI	0.966

4.5.2 Model 2 – Direct effects from the dimensions of Service Quality

Once the dimensions of service quality was fitted in a model (Figure 4.2), it is evident that, the SRMR statistic of the model (0.06) (Table 4.12) is smaller than the critical value of 0.08. Thus, the model shows an adequate model fit. However, the results presented in Table 4.13 revealed that none of the variables have significant direct effects on UI. Therefore, further analysis on Model 2 has been restrained.

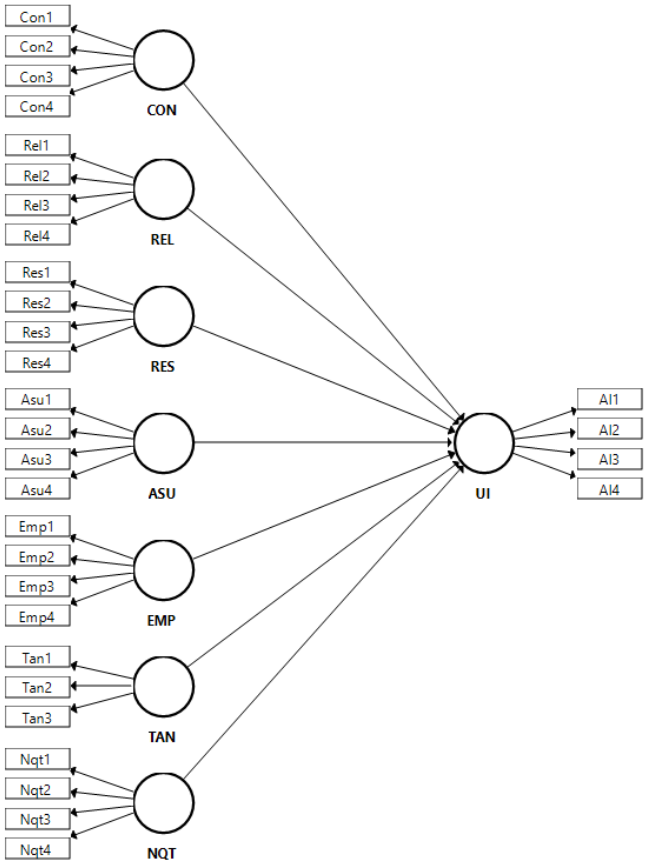


Figure 4.2 Model 2 - Direct effects from the dimensions of Service Quality (SQ)

Table 4.12 Model fit of Model 2

Criteria	Statistic
SRMR	0.06

Table 4.13 Path Coefficients of Model 2

Path	Path Coefficient	Standard Deviation	T Statistics	P Values
ASU -> UI	0.243	0.165	1.450	0.147
CON -> UI	0.294	0.233	1.235	0.217
EMP -> UI	0.152	0.124	1.154	0.249
NQT -> UI	-0.016	0.078	0.174	0.862
REL -> UI	0.256	0.106	1.887	0.059
RES -> UI	-0.089	0.095	0.837	0.403
TAN -> UI	0.070	0.141	0.533	0.594

4.5.3 Model 3 – Amalgamation of Models 1 and 2

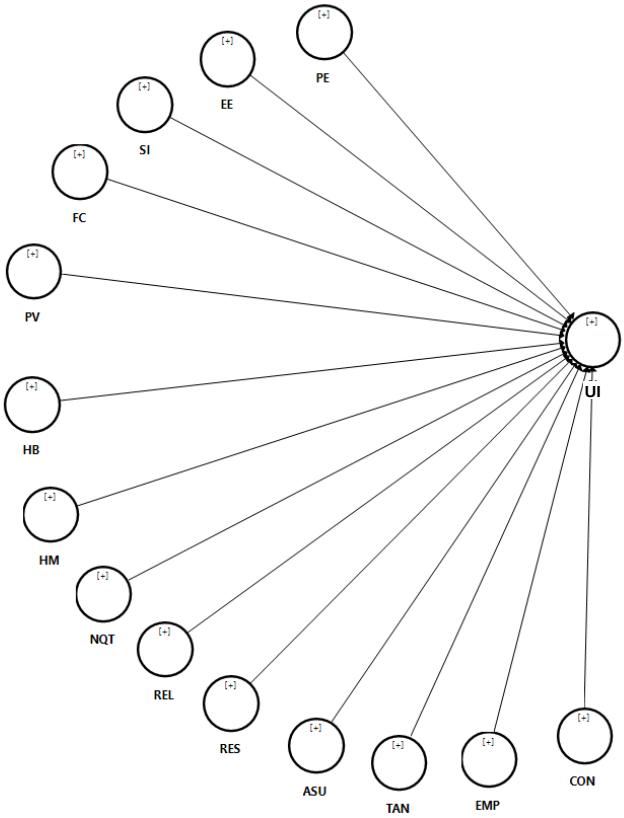


Figure 4.3 Amalgamation of Models 1 and 2

Once both the dimensions of SQ and variables of UTAUT2 were amalgamated and fitted in a model to investigate direct effects (Figure 4.3 Amalgamation of Models 1 and 2), the results indicated that, the SRMR statistic of the model (0.058) (Table 4.14) is smaller than the critical value of 0.08. Thus, the model shows an adequate model fit. However, the results presented in Table 4.15 reveals that all the variables of the model except HB (p=0.020) do not have significant direct effects on UI. Therefore, further analysis on Model 3 has been restrained.

Table 4.14 Model fit of Model 3

Criteria	Statistic
SRMR	0.058

Table 4.15 Path Coefficients of Model 3

Path	Path Coefficient	Standard Deviation	T Statistics	P Values
ASU -> UI	0.165	0.391	0.323	0.747
CON -> UI	-0.073	0.820	0.024	0.981
EE -> UI	-0.179	0.158	0.905	0.366
EMP -> UI	-0.160	0.270	0.453	0.650
FC -> UI	0.115	0.300	0.436	0.663
HB -> UI	0.465	0.181	2.340	0.020
HM -> UI	-0.087	0.194	0.341	0.733
NQT -> UI	0.113	0.168	0.557	0.578
PE -> UI	0.239	0.193	1.123	0.262
PV -> UI	0.155	0.308	0.470	0.639
REL -> UI	0.040	0.190	0.323	0.747
RES -> UI	0.018	0.181	0.071	0.944
SI -> UI	0.253	0.249	0.990	0.322
TAN -> UI	0.160	0.447	0.248	0.804

4.5.4 Model 4 – All direct and indirect effects

Once both the dimensions of SQ and variables of UTAUT2 was amalgamated and fitted in a model to investigate direct and indirect effects (Figure 4.4). The results indicated inadequate model fit since the SRMR statistic of the model (0.100) (Table 4.16) is greater than the critical value of 0.08. However, the results presented in Table 4.17 revealed that, below mentioned path coefficients have shown significance despite of the fact that none of the variables having significant effects on UI.

- ASU (p=0.000) and RES (p=0.025) on PE
- EMP (p=0.007) and REL (p=0.009) on PV
- ASU (p=0.011), RES (p=0.036) and (p=0.042) on EE
- TAN (p=0.013) on FC
- EMP (p=0.015) and NQT (p=0.031) on HB
- CON (p=0.021) on SI

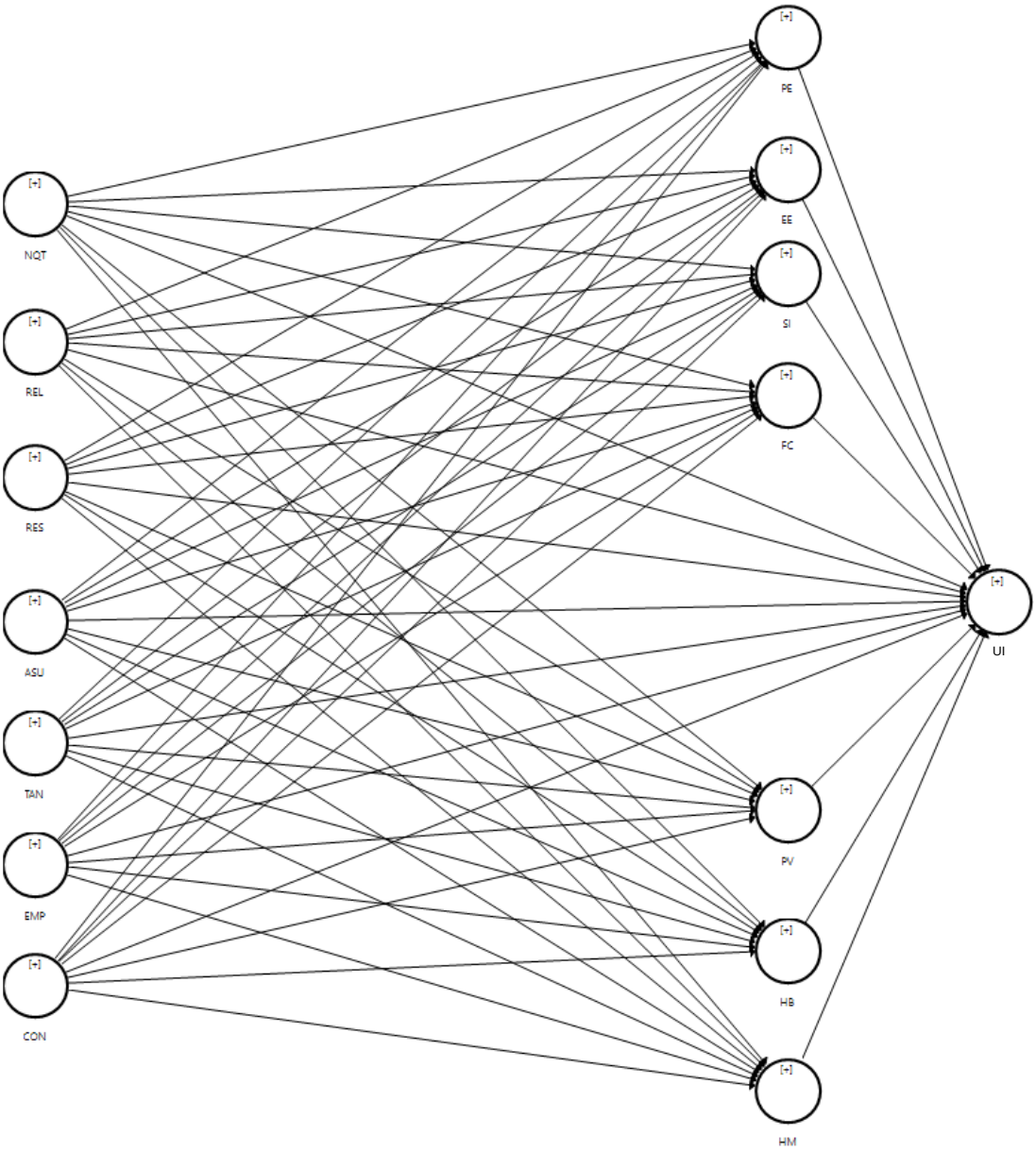


Figure 4.4 Model 4 – All direct and indirect effects

Table 4.16 Model fit of Model 4

Criteria	Statistic
SRMR	0.100

Table 4.17 Path Coefficients of Model 4

Path	Path Coefficient	Standard Deviation	T Statistics	P Values
ASU -> PE	0.649	0.134	4.703	0.000
EMP -> PV	0.401	0.139	2.726	0.007
REL -> PV	0.359	0.136	2.616	0.009
ASU -> EE	0.443	0.167	2.533	0.011
TAN -> FC	0.395	0.156	2.497	0.013
EMP -> HB	0.359	0.143	2.428	0.015
CON -> SI	0.506	0.214	2.310	0.021
RES -> PE	-0.233	0.099	2.250	0.025
NQT -> HB	-0.229	0.105	2.159	0.031
RES -> EE	-0.250	0.115	2.099	0.036
TAN -> EE	0.328	0.165	2.032	0.042
REL -> HB	0.305	0.154	1.921	0.055
CON -> HM	0.545	0.264	1.887	0.059
RES -> PV	-0.278	0.140	1.862	0.063
ASU -> FC	0.349	0.175	1.806	0.071
REL -> SI	0.230	0.133	1.664	0.096
EMP -> FC	0.232	0.139	1.527	0.127
ASU -> PV	0.255	0.167	1.486	0.138
EMP -> HM	-0.219	0.139	1.413	0.158
CON -> HB	0.355	0.238	1.385	0.166
CON -> PE	0.274	0.217	1.301	0.194
HB -> UI	0.407	0.311	1.243	0.214
RES -> FC	-0.177	0.133	1.161	0.246
PE -> UI	0.222	0.178	1.146	0.252
RES -> SI	-0.129	0.103	1.114	0.266
EMP -> SI	0.185	0.146	1.105	0.269
EE -> UI	-0.166	0.130	1.021	0.308
SI -> UI	0.252	0.306	0.808	0.419
REL -> EE	0.135	0.155	0.801	0.423
RES -> HB	-0.099	0.126	0.652	0.515
TAN -> HM	0.087	0.177	0.586	0.558
EMP -> PE	-0.057	0.097	0.580	0.562
NQT -> SI	-0.075	0.107	0.574	0.566
CON -> PV	0.115	0.203	0.543	0.587
ASU -> HM	0.070	0.179	0.480	0.631
NQT -> PV	-0.071	0.116	0.463	0.643
REL -> PE	0.057	0.123	0.408	0.683

Table 4.17 Continuation

Path	Path Coefficient	Standard Deviation	T Statistics	P Values
ASU -> HB	-0.073	0.194	0.348	0.728
NQT -> UI	0.103	0.257	0.346	0.729
EMP -> EE	-0.043	0.115	0.342	0.733
NQT -> FC	0.037	0.118	0.336	0.737
NQT -> HM	0.029	0.108	0.332	0.740
FC -> UI	0.147	0.433	0.332	0.740
CON -> FC	-0.097	0.218	0.316	0.752
TAN -> HB	-0.070	0.162	0.311	0.756
PV -> UI	0.137	0.537	0.252	0.801
ASU -> UI	0.145	0.491	0.247	0.805
NQT -> EE	0.032	0.119	0.246	0.806
EMP -> UI	-0.135	0.457	0.237	0.813
ASU -> SI	0.034	0.157	0.220	0.826
TAN -> UI	0.120	0.492	0.189	0.850
REL -> HM	0.020	0.147	0.163	0.871
REL -> UI	0.057	0.402	0.157	0.876
CON -> EE	0.021	0.221	0.140	0.889
HM -> UI	-0.055	0.364	0.126	0.900
RES -> HM	0.035	0.123	0.123	0.902
TAN -> PV	0.013	0.159	0.121	0.904
REL -> FC	0.014	0.156	0.109	0.913
RES -> UI	0.032	0.261	0.100	0.920
TAN -> SI	-0.033	0.159	0.075	0.941
NQT -> PE	0.006	0.112	0.047	0.963
CON -> UI	-0.043	0.685	0.010	0.992
TAN -> PE	-0.004	0.149	0.003	0.998

4.5.5 Model 5 – Exclusion of direct effects between the dimensions of SQ and UI

Once the direct effects from the dimensions of SQ were removed from the Model 4 (Figure 4.5), it is evident that, the SRMR statistic of the model (0.105) (Table 4.18) is greater than the critical value of 0.08 indicating an inadequate model fit. In addition to that, the results presented in Table 4.19 reveals that HB (p=0.000), PE (p=0.0000), SI

(p=0.000), PV (p= 0.012) and FC (p=0.017) have significant direct effects on UI. Moreover, the results revealed following significant effects;

- ASU (p=0.000) and RES (p=0.027) on PE
- EMP (p=0.006) and REL (p=0.007) on PV
- TAN (p=0.014) on FC
- ASU (p=0.017), RES (p=0.036) and TAN (p=0.037) on EE
- EMP (p=0.019), NQT (p=0.035) and REL (p=0.049) on HB
- CON (p=0.028) on SI

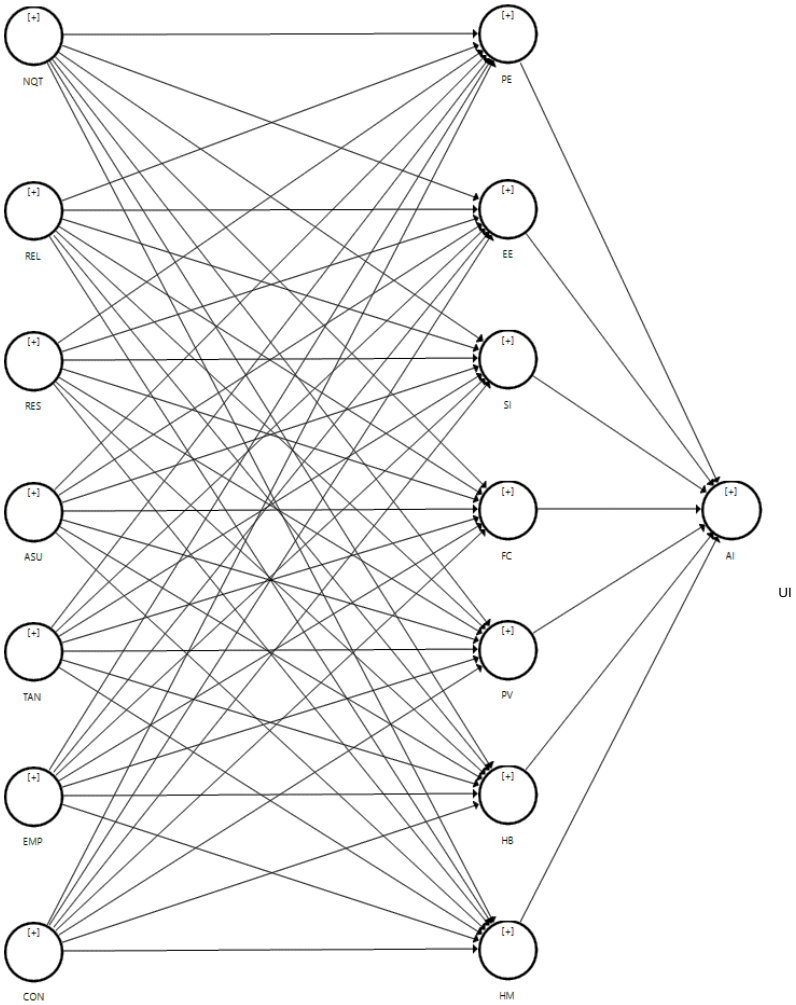


Figure 4.5 Model 5 – Exclusion of direct effects between the dimensions of SQ and UI

Table 4.18 Model fit of Model 5

Criteria	Statistic
SRMR	0.105

Table 4.19 Path Coefficients of Model 5

Path	Path Coefficient	Standard Deviation	T Statistics	P Values
HB -> UI	0.333	0.063	5.258	0.000
ASU -> PE	0.642	0.136	4.621	0.000
PE -> UI	0.279	0.063	4.373	0.000
SI -> UI	0.267	0.068	3.955	0.000
EMP -> PV	0.399	0.136	2.761	0.006
REL -> PV	0.364	0.131	2.727	0.007
PV -> UI	0.187	0.074	2.508	0.012
TAN -> FC	0.381	0.156	2.459	0.014
ASU -> EE	0.434	0.175	2.391	0.017
FC -> UI	0.191	0.078	2.384	0.017
EMP -> HB	0.367	0.148	2.351	0.019
RES -> PE	-0.228	0.099	2.221	0.027
CON -> SI	0.505	0.220	2.207	0.028
NQT -> HB	-0.223	0.106	2.105	0.035
RES -> EE	-0.245	0.114	2.095	0.036
TAN -> EE	0.314	0.158	2.088	0.037
REL -> HB	0.297	0.151	1.945	0.049
CON -> HM	0.522	0.251	1.955	0.051
RES -> PV	-0.280	0.145	1.779	0.076
ASU -> FC	0.334	0.188	1.656	0.098
REL -> SI	0.226	0.134	1.653	0.099
EMP -> FC	0.226	0.140	1.494	0.136
EE -> UI	-0.111	0.072	1.431	0.153
CON -> HB	0.346	0.228	1.420	0.156
CON -> PE	0.285	0.200	1.415	0.158
ASU -> PV	0.251	0.180	1.361	0.174
EMP -> HM	-0.209	0.147	1.321	0.187
EMP -> SI	0.186	0.144	1.119	0.263
RES -> FC	-0.170	0.138	1.103	0.270
RES -> SI	-0.126	0.103	1.089	0.276
REL -> EE	0.133	0.150	0.835	0.404
RES -> HB	-0.100	0.125	0.670	0.503

Table 4.19 Continuation

Path	Path Coefficient	Standard Deviation	T Statistics	P Values
TAN -> HM	0.096	0.175	0.618	0.537
EMP -> PE	-0.059	0.100	0.565	0.572
NQT -> SI	-0.065	0.103	0.556	0.578
CON -> PV	0.124	0.204	0.550	0.582
ASU -> HM	0.078	0.173	0.503	0.615
NQT -> PV	-0.062	0.114	0.472	0.637
REL -> PE	0.057	0.118	0.431	0.666
EMP -> EE	-0.049	0.117	0.351	0.725
ASU -> HB	-0.069	0.196	0.339	0.735
NQT -> HM	0.031	0.109	0.336	0.737
NQT -> FC	0.040	0.120	0.330	0.742
TAN -> HB	-0.067	0.160	0.296	0.767
CON -> FC	-0.069	0.216	0.278	0.781
NQT -> EE	0.040	0.119	0.259	0.796
ASU -> SI	0.033	0.163	0.219	0.826
CON -> EE	0.040	0.207	0.188	0.851
REL -> HM	0.026	0.143	0.185	0.854
REL -> FC	0.010	0.155	0.132	0.895
RES -> HM	0.030	0.127	0.122	0.903
TAN -> PV	0.004	0.156	0.119	0.906
HM -> UI	0.002	0.053	0.092	0.927
NQT -> PE	0.009	0.113	0.059	0.953
TAN -> SI	-0.036	0.161	0.057	0.954
TAN -> PE	-0.013	0.139	0.013	0.990

4.5.6 Model 6 – Exclusion of EE and HM

EE and HM were removed from Model 5 to formulate Model 6 (Figure 4.6). It is evident that, the SRMR statistic of the model (0.093) (Table 4.20) is greater than the critical value of 0.08 indicating an inadequate model fit. However, the results presented in Table 4.21 reveals that all UTAUT2 variables used in the model have significant direct effects on UI. In addition to that, below mentioned significant effects were also revealed;

- ASU (p=0.000) and RES (p=0.029) on PE
- EMP (p=0.005) and REL (p=0.005) on PV

- TAN (p=0.017) on FC
- EMP (p=0.017), NQT (p=0.031) and REL (p=0.036) on HB
- CON (p=0.026) on SI

Since these significant effects were common for both Model 5 and Model 6, Model 7 was formulated to have only these significant effects.

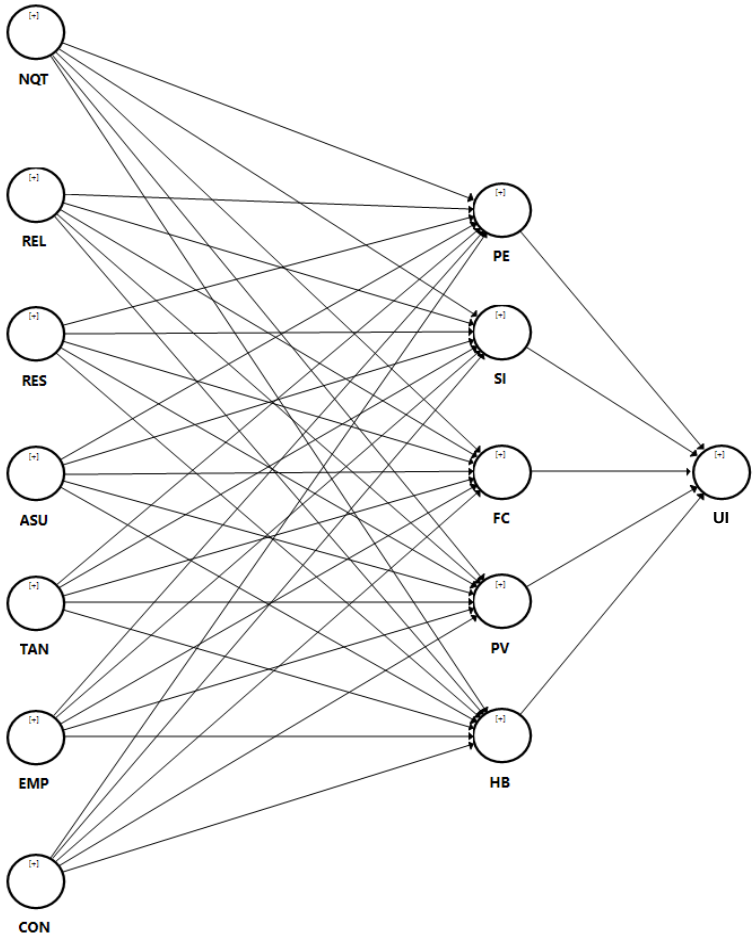


Figure 4.6 Model 6 – Exclusion of EE and HM

Table 4.20 Model fit of Model 6

Criteria	Statistic
SRMR	0.093

Table 4.21 Path Coefficients of Model 6

Path	Path Coefficient	Standard Deviation	T Statistics	P Values
ASU -> PE	0.651	0.135	4.668	0.000
HB -> UI	0.334	0.06	5.53	0.000
PE -> UI	0.23	0.053	4.458	0.000
SI -> UI	0.263	0.065	4.103	0.000
EMP -> PV	0.394	0.135	2.788	0.005
REL -> PV	0.361	0.127	2.825	0.005
PV -> UI	0.179	0.073	2.511	0.012
EMP -> HB	0.356	0.145	2.389	0.017
TAN -> FC	0.393	0.163	2.391	0.017
CON -> SI	0.502	0.218	2.224	0.026
RES -> PE	-0.23	0.1	2.185	0.029
NQT -> HB	-0.219	0.102	2.161	0.031
REL -> HB	0.305	0.142	2.095	0.036
FC -> UI	0.15	0.072	2.087	0.037
RES -> PV	-0.283	0.144	1.8	0.072
ASU -> FC	0.355	0.18	1.742	0.082
REL -> SI	0.222	0.131	1.678	0.094
EMP -> FC	0.225	0.138	1.526	0.127
CON -> HB	0.346	0.234	1.397	0.163
ASU -> PV	0.251	0.178	1.387	0.166
CON -> PE	0.265	0.213	1.31	0.191
RES -> FC	-0.18	0.131	1.168	0.243
EMP -> SI	0.173	0.144	1.106	0.269
RES -> SI	-0.123	0.102	1.091	0.276
RES -> HB	-0.099	0.125	0.678	0.498
EMP -> PE	-0.056	0.099	0.569	0.57
NQT -> SI	-0.061	0.101	0.554	0.58
CON -> PV	0.118	0.208	0.517	0.605
NQT -> PV	-0.057	0.112	0.449	0.654
REL -> PE	0.052	0.12	0.409	0.682
ASU -> HB	-0.066	0.188	0.356	0.722
NQT -> FC	0.043	0.116	0.356	0.722
TAN -> HB	-0.072	0.157	0.309	0.757
CON -> FC	-0.096	0.217	0.307	0.759
ASU -> SI	0.036	0.156	0.231	0.817
TAN -> PV	0.015	0.153	0.139	0.889
REL -> FC	0.015	0.156	0.116	0.908

Table 4.21 Continuation

Path	Path Coefficient	Standard Deviation	T Statistics	P Values
NQT -> PE	0.014	0.113	0.076	0.94
TAN -> SI	-0.026	0.17	0.051	0.959
TAN -> PE	0	0.15	0.003	0.997

4.5.7 Model 7 – Exclusion of non-significant paths

Once only the significant effects common for Model 5 and Model 6 were fitted in a model (Figure 4.7), it is evident that, the SRMR statistic of the model (0.068) (Table 4.22) is smaller than the critical value of 0.08 indicating an adequate model fit. Moreover, the results presented in Table 4.23 reveals that all the effects are significant ($p<0.05$) except the effect from NQT on HB ($p=0.193$). Thus, Model 8 was fitted excluding this association.

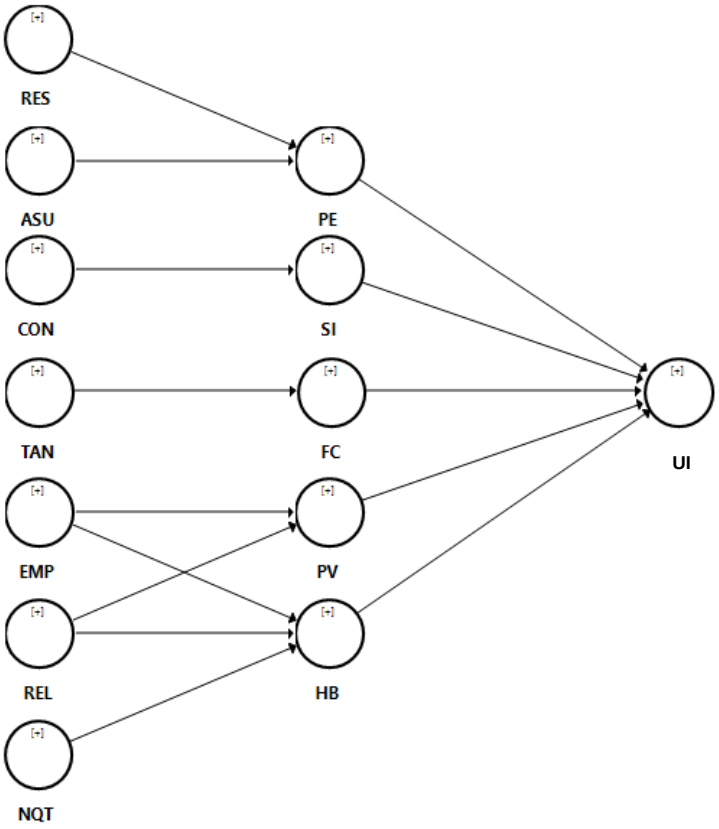


Figure 4.7 Model 7 – Exclusion of non-significant paths

Table 4.22 Model fit of Model 7

Criteria	Statistic
SRMR	0.068

Table 4.23 Path Coefficients of Model 7

Path	Path Coefficient	Standard Deviation	T Statistics	P Values
ASU -> PE	0.837	0.07	11.958	0.000
CON -> SI	0.659	0.048	13.635	0.000
EMP -> HB	0.388	0.119	3.233	0.001
EMP -> PV	0.402	0.098	3.983	0.000
FC -> UI	0.146	0.07	2.016	0.044
HB -> UI	0.337	0.061	5.52	0.000
NQT -> HB	-0.112	0.092	1.303	0.193
PE -> UI	0.23	0.053	4.461	0.000
PV -> UI	0.177	0.071	2.587	0.010
REL -> HB	0.291	0.125	2.33	0.020
REL -> PV	0.391	0.105	3.828	0.000
RES -> PE	-0.195	0.076	2.626	0.009
SI -> UI	0.267	0.069	3.808	0.000
TAN -> FC	0.628	0.044	14.191	0.000

4.5.8 Model 8 – Exclusion of NQT

Once the NQT was excluded from the model (Figure 4.8), the results of the analysis for model fit were presented in Table 4.24 and the SRMR statistic of the model (0.064) is smaller than the critical value of 0.08. Thus, the model indicate an adequate model fit. Moreover, the results presented in Table 4.25 revealed that all the effects indicated in the model are significant. Thus, this model was selected for the final interpretation.

It is further evident from the path coefficients presented in Table 4.25 that, RES has a negative effect PE (Path coefficient = -0.196) and highest effect of the model was between ASU and PE (Path coefficient = 0.839). Among the direct effects on UI, the highest effect was from HB (Path coefficient = 0.342) and the lowest effect was from HB (Path coefficient = 0.144)

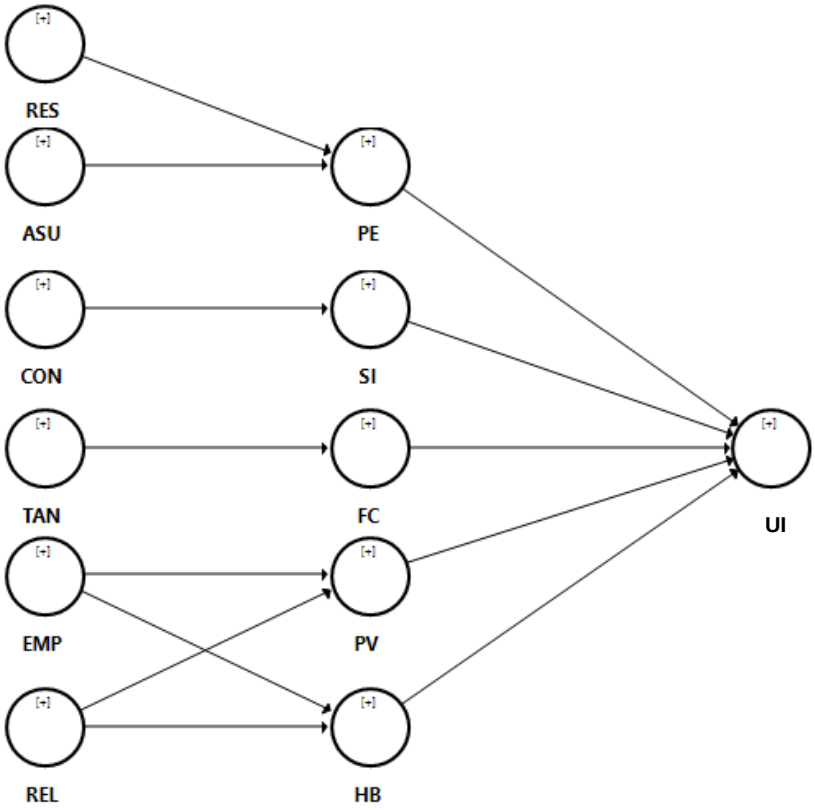


Figure 4.8 Model 8 – Exclusion of NQT

Table 4.24 Model fit of Model 8

Criteria	Statistic
SRMR	0.064

Table 4.25 Path Coefficients of Model 8

Path	Path Coefficient	Standard Deviation	T Statistics	P Values
ASU -> PE	0.839	0.074	11.349	0.000
CON -> SI	0.662	0.046	14.315	0.000
EMP -> HB	0.348	0.108	3.146	0.002
EMP -> PV	0.403	0.097	4.042	0.000
FC -> UI	0.144	0.069	2.028	0.042
HB -> UI	0.342	0.061	5.518	0.000
PE -> UI	0.232	0.052	4.545	0.000
PV -> UI	0.178	0.070	2.615	0.009
REL -> HB	0.251	0.121	2.099	0.036

Table 4.25 Continuation

Path	Path Coefficient	Standard Deviation	T Statistics	P Values
REL -> PV	0.390	0.104	3.866	0.000
RES -> PE	-0.196	0.078	2.562	0.010
SI -> UI	0.262	0.068	3.857	0.000
TAN -> FC	0.627	0.048	13.036	0.000

The adjusted R^2 values presented at Table 4.26 reveals that the Model 8 can explain 95.9% of the variability of UI. Moreover, TAN can explain 39.1% of the variability of FC and both RES and ASU together accountable for 50.08% of the variability of PE. Further to that, both EMP and REL together can explain 28.9% of the variability of HB and 51.5% of the variability of PV. In addition to that TAN can explain 43.5% of the variability of SI

Table 4.26 R square and Adjusted R square values of Model 8

	R^2	Adjusted R^2
UI	0.960	0.959
FC	0.394	0.391
HB	0.294	0.289
PE	0.511	0.508
PV	0.519	0.515
SI	0.437	0.435

4.5.8.1 Indirect effects on UI

Even though, the none of the dimensions of service quality managed to establish direct effect on UI, the results reveal six significant indirect effects (Table 4.27): ASU has a positive indirect effect on UI (Effect size = 0.195, p = 0.000) CON has a positive indirect effect on UI (Effect size = 0.174 p = 0.000) EMP has a positive indirect effect on UI (Effect size = 0.189, p = 0.001) REL has a positive indirect effect on UI (Effect size = 0.157, p = 0.005) RES has a negative indirect effect on UI (Effect size = -0.046, p = 0.025) TAN has a positive indirect effect on UI (Effect size = 0.091, p = 0.031)

Table 4.27 Indirect effects on UI

Indirect Effect	Effect Coefficient	Standard Deviation	T Statistics	P Values
ASU -> UI	0.195	0.047	4.216	0.000
CON -> UI	0.174	0.049	3.551	0.000
EMP -> UI	0.189	0.055	3.371	0.001
REL -> UI	0.157	0.057	2.804	0.005
RES -> UI	-0.046	0.021	2.244	0.025
TAN -> UI	0.091	0.045	2.021	0.031

4.6 Results on research hypothesis

In line with the research objectives, three broad hypothesis have been formulated (see Section 0) and indicated in a conceptual framework (see Section 0). Following conclusions has been made based on the results generated from analysis of Model 8 presented in Table 4.26.

- H_A: There is a significant direct effect from each of the predictor variable of UTAUT2 (i.e. PE, EE, SI, PV, HM, FC and HB) on UI

  As per the results presented in Table 4.26, following significant effects underlying in this hypothesis has been identified: PE has a positive effect on UI (Path Coefficient = 0.232, p = 0.000); SI has a positive effect on UI (Path Coefficient = 0.262, p = 0.000); PV has a positive effect on UI (Path Coefficient = 0.178, p = 0.009); FC has a positive effect on UI (Path Coefficient = 0.144, p = 0.042); HB has a positive effect on UI (Path Coefficient = 0.342, p = 0.000). However, EE and HM has been excluded from the final model since they did not indicate significant effects on UI

- H_B: There is a significant direct effect from each of the selected dimension of the mobile service quality (i.e. REL, RES, ASU, EMP, TAN, CON and NQT) on UI

  As per the results, none of the dimensions of mobile service quality has indicated direct effects on UI.

- H_C: There is a significant direct effect from each of the selected dimension of the mobile service quality (i.e. REL, RES, ASU, EMP, TAN, CON and NQT) on each predictor variable of UTAUT2 (i.e. PE, EE, SI, PV, HM, FC and HB)

  As per the results presented in Table 4.26, following significant effects underlying in this hypothesis has been identified: ASU has a positive effect on PE (Path Coefficient = 0.839, p = 0.000); CON has a positive effect on SI (Path Coefficient = 0.662, p = 0.000); EMP has a positive effect on HB (Path Coefficient = 0.348, p = 0.002); EMP has a positive effect on PV (Path Coefficient = 0.403, p = 0.000); REL has a positive effect on HB (Path Coefficient = 0.251, p = 0.036); REL has a positive effect on PV (Path Coefficient = 0.390, p = 0.000); RES has a negative effect on PE (Path Coefficient = -0.196, p = 0.010); and TAN has a positive effect on FC (Path Coefficient = 0.627, p = 0.000).

  In addition to above associations, all other associations underlying in this hypothesis have been excluded from the final model during different phases of the analysis. It is further evident that, while all the dimensions that represent functional quality has shown indirect effects on UI, the dimension that represent technical quality (i.e. NQT) did not indicate any significant effect on UI

4.7 Chapter summary

As per the research design, the data collection process was designed to cover all the faculties (9 in total) of the University of Peradeniya and total of 272 responses received from the users of the Mobile Cash services were used in the analysis. Initially, a descriptive analysis was carried out and the results revealed that the respondents represent all the nine faculties and all the levels of studies. It further revealed that, the respondents are representing 23 districts out of the 25 districts of the country. Next, the measurement model assessment was carried out. The results of this phase revealed that the measurement model had adequate level of reliability, convergent validity, and discriminant validity and free of common method variance.

Thereafter, during the structural model testing phase, eight models have been formulated and tested to identify a statistically significant model integrating the dimensions of service quality with user acceptance of Mobile Cash services.

It is evident that 5 of the UTAUT2 variables indicate significant effects on UI and the service quality dimensions that represent functional quality has shown indirect effects on UI, However, the dimension that represent technical quality did not indicate any significant effect on UI

CHAPTER 5
CONCLUSIONS AND RECOMMENDATIONS

5.1 Objective

This chapter is dedicated to report the key findings of the study based on the results of data analysis. In addition, the limitations of this study are acknowledged, and recommendations for industry and future research are presented.

5.2 Conclusions

After reviewing the existing literature, UTAUT2 has been identified as the suitable theoretical base since it is considered as a comprehensive theory specifically developed for the acceptance and use of technologies in the consumer context.

Among the variables identified in UTAUT2, only PE, SI, FC, PV and HB have shown direct association with UI and it was further evident that, none of the dimensions of the mobile service quality has shown significant direct effects on the UI.

However, ASU, EMP, TAN and CON have indicated significant positive indirect effects while RES has indicated a negative indirect effect on UI. It was further revealed that, NQT have not indicated any direct or indirect effect on UI under the proposed model. Thus, it can be concluded that only the dimensions of functional quality have indicated significant indirect effects on UI while the dimension of technical quality did not indicate any direct or indirect effect on UI.

5.3 Limitations of the study

One of the limitations of this research is the level at which its findings can be generalized, as in the studies like this could not derive a random sample (Sekaran & Bougie, 2013). Moreover, since the identification of the population is difficult, the sample size was uncontrollable and the sample for this study was limited to 272.

Therefore, the proposed model needs to be verified in a representative sample of the Sri Lankan population.

In addition to that, the research instrument used in this study, request people to report on themselves. Therefore, there might be a gap between the report and reality. Thus, there could be a potential self-report bias derives from the instrument and this can be identified as a limitation of this research.

Further to that, Usage Intention was used instead of Actual Usage of Mobile Cash services, due to the difficulty of measuring the actual usage of an electronic service. However, this has been justified by the previous studies claiming that usage intension is the closest indicator of actual usage of a technology (Venkatesh et al., 2003). Nevertheless, it can be identified as a weakness of this study too.

5.4 Suggestions and recommendations

Even though, the Mobile Cash services are offered as an additional service with mobile service package, the findings of this study indicated that, there are no direct effects from the dimensions of the mobile service quality on usage intention of Mobile Cash services. However, five of the UTAUT2 variables (PE, SI, FC, PV and HB) have indicated direct effects on usage intention of mobile cash services. Since these variables represent peoples' beliefs and other cognitive characteristics, the MSPs are not capable of directly changing or influencing these variables in relation to a customer. Therefore, they should plan their promotional campaigns and service delivery strategies in a way to indirectly influence above mentioned variables.

On the other hand, RES, ASU, CON, TAN, EMP and REL have indicated significant indirect effects on usage intension. Therefore, the improvements of these dimensions will influence PE, SI, FC, PV and HB related to the Mobile Cash services and that will result in higher usage of the services. Surprisingly, RES has a negative indirect effect on usage intension.

However, it can be recommended to the mobile service providers that, they should pay more attention to improve;

1. ASU by improving knowledge and courtesy of employees and their abilities to inspire trust and confidence which will cause higher PE from the mobile cash services. Thus, the customers' intention to use the service will improve.
2. CON by improving flexible and comfortable facilities to suit the customers' needs so that the users may feel a higher SI in relation to the mobile cash services.
3. TAN by improving appearance of physical facilities, equipment, personnel and communication materials resulting the users to feel a higher level of FC are available in relation to the mobile cash services.
4. EMP by providing a caring and personalized attention to each customer so that customer feels a higher PV and helps the customer to make the Mobile Cash usage a habit.
5. REL by performing the service accurately and dependably, as promised so that customer feels a higher PV and helps the customer to make the Mobile Cash usage a habit.

In addition to these, the MSPs are further recommended to pay a higher attention on improving the functional quality aspects of the mobile services rather than technical quality aspects. Therefore, MSPs should reassess their investment proportions on both these aspects and prioritize the investments on functional quality improvements.

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APPENDIX A: QUESTIONNAIRE

Questionnaire to Model the User Acceptance of Mobile Cash Services

Please note that the information provided in this questionnaire will strictly be used for education and research purposes only and no individual address or household will be identified in the survey.

Filter Question

1	Do you use mobile cash services?		Yes		No

This survey is targeting only the users of Mobile Cash services. Therefore, please proceed to the next questions only if your answer is YES for question1. Thank you for your valuable contribution.

Demographic Questions

2	Gender:		Male		Female
3	Residential District(Please Specify):				
4	Age (Please Specify):				
5	Faculty(Please Specify):				
6	Level of Study (Please Specify):				

Service Quality

Instructions: Please rate how strongly you disagree or agree with each of the following statements in relation to the **service provided by your mobile service provider** by circling the appropriate number.

[1 = strongly disagree; 2 = disagree; 3 = slightly disagree 4 = neither disagree nor agree; 5 = slightly agree; 6 = agree 7 = strongly agree]

Reliability

7	Contact employees perform the service right the first time	1	2	3	4	5	6	7
8	Provides the services at the promised time	1	2	3	4	5	6	7
9	You are kept well-informed about the progress of your complaints	1	2	3	4	5	6	7
10	Billing system is accurate and error free	1	2	3	4	5	6	7

Responsiveness

11	Contact employees gives you a prompt service	1	2	3	4	5	6	7
12	Your complaints/queries are taken seriously	1	2	3	4	5	6	7
13	Your complaints are resolved quickly	1	2	3	4	5	6	7
14	They are always willing to help you	1	2	3	4	5	6	7

Assurance

15	Contact employees are friendly and polite while handling your complaints/queries	1	2	3	4	5	6	7
16	They have the adequate knowledge of tariffs and plans of service providers	1	2	3	4	5	6	7
17	The behavior of contact employees instils confidence in you	1	2	3	4	5	6	7
18	You feel safe in your transactions with your service provider	1	2	3	4	5	6	7

Empathy

19	For lodging the complaints, service provider is easily accessible	1	2	3	4	5	6	7
20	Gives you individual attention	1	2	3	4	5	6	7
21	Understands your specific needs	1	2	3	4	5	6	7
22	Retailer network of your service provider is easily located	1	2	3	4	5	6	7

Tangibles

23	Service provider’s physical facilities are visually appealing	1	2	3	4	5	6	7
24	Contact employees appear neat	1	2	3	4	5	6	7
25	Materials associated with the service (such as pamphlets etc.) are visually appealing	1	2	3	4	5	6	7

Convenience

26	Convenient business hours	1	2	3	4	5	6	7
27	Ease of lodging the complaints/queries	1	2	3	4	5	6	7
28	Your service provider provides flexibility in the payment of bills	1	2	3	4	5	6	7
29	Application formalities are simple	1	2	3	4	5	6	7

Customer Perceived Network Quality

30	Your service provider provides sufficient geographical coverage (on highways, inside the buildings, and basement)	1	2	3	4	5	6	7
31	You experience minimum premature termination of calls during conversation (i.e., call drops)	1	2	3	4	5	6	7
32	You get clear and undisturbed voice	1	2	3	4	5	6	7
33	You are able to make calls at peak hours	1	2	3	4	5	6	7

UTAUT 2

Instructions: Please rate how strongly you disagree or agree with each of the following statements in relation to the mobile cash services by circling the appropriate number.

[1 = strongly disagree; 2 = disagree; 3 = slightly disagree 4 = neither disagree nor agree; 5 = slightly agree; 6 = agree 7 = strongly agree]

Performance Expectancy

34	I find mobile cash services will be useful in my daily life	1	2	3	4	5	6	7
35	Using mobile cash services will increase my productivity	1	2	3	4	5	6	7
36	Using mobile cash services will help me to accomplish things more quickly	1	2	3	4	5	6	7
37	Using mobile cash services will increase my chances of achieving things that are important to me	1	2	3	4	5	6	7

Effort Expectancy

38	Learning how to use mobile cash services will be easy for me	1	2	3	4	5	6	7
39	My interaction with mobile cash services will be clear and understandable	1	2	3	4	5	6	7
40	I will find mobile cash services easy to use	1	2	3	4	5	6	7
41	It will be easy for me to become skillful at using mobile cash services	1	2	3	4	5	6	7

Social Influence

42	People who are important to me think that I should use mobile cash services	1	2	3	4	5	6	7
43	People who influence my behavior think that I should use mobile cash services	1	2	3	4	5	6	7
44	Mobile cash services use is a status symbol in my environment	1	2	3	4	5	6	7

Facilitating conditions

45	I have the resources necessary to use mobile cash services	1	2	3	4	5	6	7
46	I have the knowledge necessary to use mobile cash services	1	2	3	4	5	6	7
47	Mobile cash is compatible with other technologies I use	1	2	3	4	5	6	7
48	I can get help from others when I have difficulties using mobile cash services	1	2	3	4	5	6	7

Hedonic motivation

49	Using mobile cash services will be fun	1	2	3	4	5	6	7
50	Using mobile cash services will be enjoyable	1	2	3	4	5	6	7
51	Using mobile cash services will be entertaining	1	2	3	4	5	6	7

Price Value

52	Mobile cash services are reasonably priced	1	2	3	4	5	6	7
53	Mobile cash services are reasonably priced comparing with other banking channels	1	2	3	4	5	6	7
54	Mobile cash services are a good value for the money	1	2	3	4	5	6	7
55	At the current price, mobile cash services provide a good value	1	2	3	4	5	6	7

Habit

56	The use of mobile cash services will become a habit for me	1	2	3	4	5	6	7
57	I will addict to using mobile cash services	1	2	3	4	5	6	7
58	I must use mobile cash services	1	2	3	4	5	6	7
59	Using mobile cash will become natural to me	1	2	3	4	5	6	7

Adoption Intention

60	I intend to continue using mobile cash services in the future	1	2	3	4	5	6	7
61	I will always try to use mobile cash services in my daily life	1	2	3	4	5	6	7
62	I plan to continue to use mobile cash services frequently	1	2	3	4	5	6	7
63	I expect that I would use mobile banking in future	1	2	3	4	5	6	7

Thank You!