Consumer adoption and use of mobile banking: A cross-national, multigroup empirical analysis

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of Philosophy

By

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Abstract

Ubiquitous technology usage and an increasing reliance on digital services is a hallmark of the modern world. Mobile banking provides users with a seamless, simple platform to complete routine financial activities securely at their convenience. Despite this, unsatisfactory adoption rates have been frequently observed, with distinct variations in mobile banking acceptance noted across different regional contexts. The determinants of mobile banking adoption and actual usage have been described in Information Systems (IS) literature to be noteworthy in their influence, with distinct variations in different contexts. That being said, the role and interplay between different adoption and the IS success constructs remains poorly understood in developing countries such as Lebanon, particularly when considering mobile banking.

The present study thus undertook the cross-national examination of mobile banking customers' adoption intentions and usage behaviour and their variation across two contexts. This provided insights into their predictors in a developed (UK) and developing (Lebanon) country. The proposed conceptual framework, which extends the unified theory of acceptance and use of technology (UTAUT2) model with trust, security and privacy, while also integrating IS success constructs (information quality, service quality and system quality) served for the explanation of user intentions. The research model was additionally employed to reflect the moderating influence of several factors relevant in mobile banking adoption such as age, gender, education, experience and income.

A survey was distributed and a total of 478 and 419 completed questionnaires were collected from Lebanon and UK, respectively and were analysed by partial least squares structural equation modelling (PLS-SEM). Findings revealed that habit, perceived security and performance expectancy consistently predicted behavioural intention to adopt mobile banking across both examined contexts. Lebanese respondents were additionally concerned about the availability of facilitating conditions as well as trust when formulating their intentions to adopt this channel. Conversely, perceived privacy, price value and service quality concerns were more evident in the UK sample. However, contrary to the proposed hypothesis, social influences, hedonic motivations, effort expectancy, system quality and information quality failed to significantly explain adoption behaviour in both Lebanon and UK. Notable differences were observed on the level of the moderating influence of age, gender, experience and income between Lebanon and the UK, as opposed to education, which remained insignificant in both.

The findings suggest the importance of establishing secure and useful mobile banking applications and the implementations of habit-forming elements regardless of the examined context. That being said, banks should still account for country-specific variations in users' mobile banking adoption intentions when designing their platforms and campaigns. Careful consideration and specific targeting of potential mobile banking users according to age groups and income range could favour its adoption in the UK, while a gender- and experience-oriented approach could be more appropriate in Lebanon.

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Declaration

The papers listed below report findings from the research presented in this thesis and were published or are under consideration for publication.

Merhi, M., Hone, K., & Tarhini, A. (2019). A cross-cultural study of the intention to use mobile banking between Lebanese and British consumers: Extending UTAUT2 with security, privacy and trust. *Technology in Society*, *59*, 101151.

Merhi, M., Hone, K., Tarhini, A., & Ameen, N (Accepted). An empirical examination of the moderating role of age and gender in mobile banking use: a cross-national, quantitative study. *Journal of Enterprise Information Management.*

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Merhi, M., Hone, K. (2020). An empirical examination of mobile banking use: a cross-national, quantitative study. *The Computer Science Brunel PhD Symposium 2020*. (Winning best mature extended abstract).

Merhi, M., Hone, K., Tarhini, A., & Ameen, N (Conference cancelled this year). Consumer use of mobile banking: A proposed cross national gender-based model. *Academy of Marketing Conference 2020.*

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Chapter 1 - **Introduction**

1.1 Rationale for the Current Research

The evolution of internet services and information technologies has affected the operation and management of most commercial and non-commercial systems within finance, an example of which is evidenced by the revolutionisation of banking services (Sharma, Govindaluri, Al-Muharrami, & Tarhini, 2017; Priya, Gandhi, & Shaikh, 2018). Providing financial services has changed dramatically from traditional and physical to digitally delivered services. This exerted a great deal of pressure on banks to be more competitive globally by designing and delivering cutting edge yet secure platforms to deliver their financial services. In response, banks, supported by technological development, implemented strategies to exceed customers' satisfaction whilst minimising operational costs. The evolution of e-banking has become one of the main successful business-to-consumer applications (Brodmann & Wuthisatian, 2019). While traditional banking services were restricted to physical channels such as bank branches, telephones, or automated teller machines (ATMs), the recent adoption of mobile banking has removed the physical limitation from daily banking transactions. Mobile banking amalgamates banking transactions such as fund transfers, investments, payments as well as regular account information check-ups with bank websites (Hanafizadeh, Keating, & Khedmatgozar, 2014b; Chawla & Joshi, 2017), thereby providing a fast and efficient alternative for person-to-person banking services. Mobile banking is an innovative service that is advantageous to banks and customers alike (Agwu & Carter, 2018; Shaikh, Hanafizadeh, & Karjaluoto, 2017), while sharing some properties with traditional banking in terms of services offered through both channels. It provides a cost-effective and profitable banking platform which offers customers higher quality banking services (Yousafzai, 2012). More importantly, mobile banking achieves a far superior processing speed and a higher degree of privacy and accuracy, when compared to human-mediated services. Furthermore, mobile banking applications ensures a regular and systematic diffusion of banks' various services, events, promotions and updates.

The Lebanese Information Technology sector is a fast-growing sector, which was estimated to reach USD 543.5 million by 2019. According to the Compounded Annual Growth Rate (CAGR), the market has been constantly growing from 7% between 2014 and 2016, to 9.7% from 2016 to 2019. However, despite the significant increase in the Lebanese population's internet use from 13.3% in 2005 to 75.9% in 2016 (Internet World Stats, 2016) and the

extensive bank investments in the internet banking field (Association of Banks in Lebanon, 2016), the adoption of mobile banking reportedly remains very low in Lebanon (Elhajjar & Ouaida, 2019; Jibai, Alaaraj, & Issa, 2018; Tarhini et al., 2016; Koksal, 2016).

Moreover, the differential effect of factors such as social norms and cultural influences on the adoption of e-services in dissimilar cultural settings, such as Lebanon and the UK, have been previously demonstrated (Tarhini, Hone, & Liu, 2015). In fact, the critical effect of social and organisational factors in the Lebanese sample, which was not reflected in its British counterpart, emphasises the importance of adapting a Western (developed country) technological model to the setting of a developing country. The potential benefits of mobile banking coupled with its problematic adoption rates in developing countries demands further cross-cultural studies to improve its prospects in such countries. Therefore, elucidating determinants of mobile banking adoption in Lebanon remains of the utmost importance to improve mobile banking penetration and potentially prevent or mitigate financial losses.

A number of theories and models have been proposed for the elucidation of user beliefs and their influence on behavioural intentions (BI) towards using certain technologies. Examples include innovation diffusion theory (IDT) (Rogers, 1995), theory of reasoned action (TRA) (Fishbein & Ajzen, 1975), theory of planned behaviour (TPB) (Ajzen, 1991), the social cognitive theory (SCT) (Bandura, 1986), the motivational model (MM) (Davis, Bagozzi, & Warshaw, 1992), the model of personal computer (PC) utilisation (MPCU) (Thompson Higgins, & Howell, 1991), the technology acceptance model (TAM) (Davis, 1989) and a hybrid model combining constructs from TAM and TPB. A review and synthesis of these eight models of technology usage resulted in the unified theory of acceptance and use of technology (UTAUT) (Venkatesh, Morris, Davis, & Davis, 2003). This model included four key factors, which are performance expectancy, effort expectancy, social influence and facilitating conditions. In 2012, the UTAUT was extended with three additional constructs namely; habit (HB), hedonic motivation (HM) and price value (PV) (Venkatesh, Thong, & Xu, 2012).

Even though UTAUT allowed researchers in different fields to assess the usage and the adoption of technology, additional exploration remains necessary, such as the implementation of the various factors that relate to different scenarios for consumer technology use (Venkatesh et al., 2012). Moreover, the applicability of the UTAUT2 model in voluntary contexts remains debated seeing as the original study by Venkatesh et al. (2012) had tailored the model constructs in order to reflect the acceptance of new technology in large

organisations. Therefore, the UTAUT model was later adopted in a business setting in IS literature. Furthermore, the study by Venkatesh et al. (2012) stressed the importance of accounting for cultural, social, as well as technological factors. These factors are actually invariably different in developed and developing countries, making the extrapolation of results obtained from one to the other impracticable.

The Hofstede model's cultural dimensions scores for Lebanon and the UK showed the striking difference between these two countries, a fact that was reflected in their distinctive adoption of e-services (Hofstede Insight, 2019). While Lebanon was found to be a collectivist, hierarchical, normative, cynical and pessimistic society, contrarily the UK was a non-hierarchical, highly individualistic and private society, comfortable in ambiguous situations (Hofstede Insight, 2019), see Figure 1-1. Additionally, Lebanon remains a country with relatively limited human and financial resources (Khoury, Mbayed, Salloum, Monmasson, & Guerrero, 2016). When combined with the modest investments dedicated to its technological development, these factors likely contribute to its infantile technology adoption rates, which contrast significantly with those of developed western countries (Audi, 2015; Koksal, 2016; Tarhini, El-Masri, Ali, & Serrano, 2016; Sujud & Hashem, 2017).

The sensitivity of financial transactions naturally carries notable concerns of security and privacy among potential and actual adopters of platforms that offer them. This was applicable to mobile banking, whose adoption remains the siege of security risks as well as concerns of its ease of use and effectiveness (Yousafzai & Yani-de-Soriano, 2012; Kuisma, Laukkanen, & Hiltunen, 2007; Raza, Umer, & Shah, 2017; Mullan, Bradley, & Loane, 2017). It became evident that mobile banking customers were cautious of this technology and reluctant to adopt it despite its striking advantages (Dwivedi, Tamilmani, Williams, & Lal, 2014; Alalwan, Dwivedi, & Rana, 2017). The Federal Reserve Bank reflected this in a US-based survey, where security concerns were reported by an alarming 65% of mobile phone owners, who also failed to recognise the usefulness of this service (Federal Reserve Board, 2016).

Besides, internet banking's perceived credibility was found to be a significant predictor of Lebanese internet banking users' intention to use this service (Tarhini et al., 2015). Security and trust remain major consumer concerns and have greatly affected their adoption of novel technologies. Lebanese consumers were actually found to lack trust in mobile banking (Arabnet Business Intelligence, 2016a). This was evidenced in their reported privacy concerns, with 47% preferring to deal with banks directly (Arabnet Business Intelligence, 2016). Trust was also

found to significantly impact the adoption of mobile banking by Jordanian consumers (Alalwan et al., 2017), while a technology's perceived risk, such as privacy and data breaches, was demonstrated to significantly hinder the use of mobile payments in the UK (Slade, Williams, Dwivedi, & Piercy, 2015). Therefore, the need for additional research validating the importance of addressing security, privacy and trust issues is clear and necessary in order to improve technology adoption rates.

Quality considerations were also considered when examining technology acceptance and success. Such attempts undertook the incorporation of various quality variables, such as system quality, information quality and service quality. The DeLone McLean information systems success model incorporates these variables and was established in 1992 through the analysis of all previous models and studies (DeLone & McLean, 1992) and later modified. The modified model has since been used for the measurement of many information systems' success such as e-commerce (DeLone & McLean, 2004) as well as mobile banking (Tam & Oliveira, 2017).

The combination of the DeLone-McLean dimensions with those of the UTAUT model was previously attempted and proved successful in the determination of mobile banking success and usage (Albashrawi & Motiwalla, 2017; Baabdullah, Alalwan, Rana, Kizgin, & Patil, 2019). However, the applicability and validity of combining both models' constructs and further extending them with perceived privacy, perceived security and trust was not previously undertaken in the Arab region. Moreover, the moderating role of various demographic variables was not accounted for in previous investigations of UTAUT2- DeLone-McLean combinatory models, particularly in a cross-cultural setting including an Arab country. The United Kingdom and Lebanon are culturally distinct countries, as reflected by the differences in Hofstede culture dimension shown in the Figure 1-1 below.

Based on the above, the present study extended the original UTAUT2 model with three constructs: security, privacy and trust, while integrating quality factors from the IS success model.

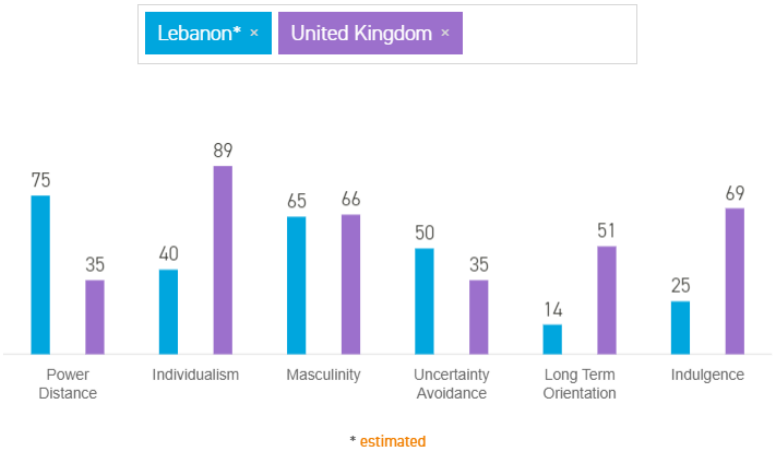

Figure 1-1: Hofstede culture dimensions comparison between Lebanon and the UK

1.2 Research Aims and Objectives

This study aims to examine the key factors that may hinder or facilitate the adoption and usage of mobile banking services in the context of developing countries (Lebanon) and developed countries (UK) by formulating and validating a conceptual model that integrate unified theory of acceptance and use of technology (UTAUT) 2 with the DeLone-McLean model of IS success along with three additional constructs namely; trust (TR), security (PS), privacy (PP).

Based on the research aim, the following objectives are formulated:

- Objective 1: To contribute to the literature pertaining to technology adoption and acceptance models and theories by proposing a conceptual model based on the relevant factors and formulating hypotheses to examine the behavioural intentions towards mobile banking adoption in Lebanon and the UK.
- Objective 2: To test the validity and fitness of the integration of DeLone-McLean model of IS success constructs into a UTAUT2 model extended with three constructs, namely trust, perceived security and perceived privacy and empirically demonstrate its applicability and validity in a cross-national setting of developing countries (Lebanon) and developed countries (UK).
- Objective 3: To contribute to existing literature through the development and validation of a context-specific survey instrument.

- Objective 4: To study the similarities and differences between mobile banking adoption behaviour among consumers in the context of a developed (UK) as well as a developing (Lebanon) country.
- Objective 5: To examine the moderating effect of demographic variables (age, gender, educational level, experience and income) on the proposed model relationship between the predictors and the behavioural intention towards mobile banking.
- Objective 6: To contribute to PLS structural equation modelling (PlS-SEM) literature by employing it for the examination of a conceptual model in a cross-national context, particularly one including an Arab country such as Lebanon.
- Objective 7: To contribute to IS research methodology through the employment of Multi-group analysis (MGA).
- Objective 8: To propose recommendations to the bank managers and policymakers for the formulation of targeted and adequate strategies to guide the design, implementation and deployment of mobile banking applications and to encourage the adoption of mobile banking activities by Lebanese and UK consumers.

1.3 Scope of the Study

The aim of this study is to develop a conceptual model to examine the key factors that facilitate the adoption of mobile banking services. Based on the aim and objectives defined above, it is essential to define the scope of this research:

Firstly, mobile banking is understood in this research to incorporate banking services that are accessed through mobile devices with the use of data. This includes the use of applications downloaded and installed on mobile devices, excluding alternative mobile banking platforms such as messaging, online and internet banking through mobile phone or computer browsers as well as other services (e.g., telebanking and interactive voice response).

Secondly, in its validation and analysis of the proposed conceptual model, this research is limited to two countries with different characteristics, Lebanon as a developing country and the UK as a developed country. Therefore, the results can only be generalised in other countries with similar characteristics to Lebanon (e.g., collectivist, masculine, normative) or the UK (e.g. individualist, indulgent). The choice of location is justified in the Chapter 2.

Thirdly, this research targets only those consumers that have mobile devices and use mobile banking services. This research did not take into consideration other mobile banking users such as policymakers, mobile banking administrators and mobile banking developers.

1.4 Contributions of the Study

This study extends the theoretical underpinning of technology adoption and acceptance models and theories. Additionally, it contributes to the extension of the unified theory of acceptance and use of technology (UTAUT2) model in new settings, as previously recommended (e.g. Venkatesh et al., 2012). Through this, the present research contributes to the advancement of the UTAUT2 by investigating it among consumers of different cultural backgrounds in a mobile banking setting (Lankton, McKnight, & Thatcher, 2012). As such, the study enhances the generalisability and validity of the UTAUT2 while also exploring where differences may lie between the cultures involved.

Moreover, this study contributes to the existing literature on mobile banking and its adoption in developed and developing countries. This research also presents its findings for bank managers and policymakers in Lebanon and the UK to formulate strategies to encourage the adoption of mobile banking activities by Lebanese and UK consumers. To the extent of the

author's knowledge, this is one of the first studies that examines the similarities and dissimilarities between mobile banking consumers in developed (UK) as well as less developed (Lebanon) contexts. In addition, it is one of the first studies that extends UTAUT2 with IS success model constructs, as well as security, privacy and trust to assess the key factors that facilitate the adoption of mobile banking services. This research also contributes to the literature in social science that uses Partial Least Squares - Structural Equation Modelling (PLS-SEM) technique for data analysis. This is ensured through the provision of provides a clear description and guidelines for the application of PLS-SEM in contexts where this approach remains relatively uncommon, namely examining mobile banking adoption intentions in a cross-national setting.

1.5 Research Approach

The researcher has deemed a positivist quantitative approach to be the most appropriate for the undertaken analysis (Bernard, 2017; Zhang & Wildemuth, 2016; Bhattacherjee, 2012; Orlikowski & Baroudi, 1991). This approach will ensure the examination of the theoretical construct's proposed relationships in the studied setting, namely mobile banking consumers, without the inclusion of the investigator. Such considerations were established to be suitable for testing theoretical models as opposed to constructing them (Bhattacherjee, 2012). Whereby the aim of this study is to test the hypotheses that are based on a well-defined theoretical framework, the proposed constructs within the model were thoroughly validated in the literature related to the adoption of technology in general and to mobile banking adoption specifically.

The current study sought to determine and elucidate Lebanese and UK consumers' intention to use mobile banking services. To this end, the collection of an adequate data sample was crucial, followed by advanced statistical analysis in order to test the proposed hypotheses (Bhattacherjee, 2012). Moreover, a survey was adopted due to it being a quantitative positivist data collection method suitable for the current study. Interpretive approaches' instruments, such as interviews or observations, were deemed ill-suited for the purposes of this research (Bernard, 2017; Zhang & Wildemuth, 2016; Bhattacherjee, 2012; Bryman & Bell, 2015). In fact, a survey allowed the fast collection of data from a large number of participants in their normal setting, regardless of physical location and distance, all in a cost-effective manner (Heeringa, West, & Berglund, 2017; Ott & Longnecker, 2015; Zhang & Wildemuth, 2016).

Data collection was achieved through a survey and a self-administered questionnaire, which ensured quantitative data gathering in an efficient, economically acceptable and feasible manner. Moreover, self-administered questionnaires provide homogenous data due to the use standardised answers supplied by respondents at their convenience (Bhattacherjee, 2012; Orlikowski & Baroudi, 1991; Heeringa et al., 2017; Ott & Longnecker, 2015). Furthermore, the survey and self-administered questionnaires ensured the objective collection of data without the influence of the researcher's beliefs or opinion (Sekaran, 2003), thereby representing the studied concept in an honest and untarnished way. More importantly, survey and self-administered questionnaires were appropriately designed, were affordable and bypassed any privacy-related issues through the anonymity adopted in this type of data collection. Through this, higher response rates were ensured, especially considering the fast collection of the completed questionnaires (Sekaran & Bougie, 2011).

Due to bank privacy laws, convenience sampling was found to be the most suitable sampling technique. The latter provides the required data from a homogenous sample of available Lebanese and UK consumers in a cost-effective manner not limited by respondents' physical location (Bhattacherjee, 2012; Tham, Yazid, Khatibi, & Azam, 2017; Baabdullah et al., 2019). Additionally, convenience sampling allowed researchers to use available financial resources to their full potential and thereby ensure adequate data collection. Before launching the survey, a pilot test was also conducted with the participation of field experts as well as potential respondents in order to ensure test validity and reliability.

Two-stage Partial Least Squares - Structural Equation Modelling (PLS-SEM) was used as it allowed the testing of the proposed hypotheses and moderators as well as the comparison of large groups of participants, as is the case of the current study (Anderson and Gerbing, 1988). Following this, Multiple Group Analysis (MGA) technique was used in order to assess the impact of moderators on the conceptual framework.

Chapter 1 thus introduced the current research, which investigated the factors affecting mobile banking adoption in a cross-national context. To that end, a discussion of the rationale behind this research was provided in this section. An overview of mobile banking, its advantages and the factors hindering its adoption, are presented with a focus on the Lebanese financial sector. Mobile banking is then explored within the scope of available technology adoption models and associated concepts, providing a justification of the chosen theoretical framework in the Lebanese and the UK setting. This is followed by the delineation of research aims and

objectives in Section 1.2 and the advancement of the study's scope in Section 1.3. Sections 1.4, 1.5 and 1.6 then respectively present the contributions of the study, the proposed research approach, and finally, an overview of the thesis outline.

1.6 Thesis Outline

The current study is presented in seven chapters starting with a general introduction, followed by a literature review, the study's theoretical framework, the methodology adopted, data analysis, study results and finally their discussion and research conclusions.

Chapter 1: This chapter briefly covers the theoretical background of the present study in addition to research problems. The aims and objectives of this research are then elucidated followed by the presentation of the study's scope as well as its expected contribution to the research field.

Chapter 2: In this chapter, the extensive research of the study's key themes is presented through elucidating term definitions and historical relevance, in addition to an evaluation of the situational context pertaining to the current study. Furthermore, a critical evaluation of the various available behavioural and technology adoption models was included along with a comprehensive review of mobile banking and its evolution. The extended unified technology acceptance and use of technology (UTAUT2) and the DeLone-McLean model of information systems success is then thoroughly evaluated. This was followed by the presentation and justification of the chosen models and added constructs, namely security, privacy and trust.

Chapter 3: This chapter presents the study's theoretical framework with which it attempted to elucidate the behavioural intention and use of mobile banking of Lebanese and UK consumers. The researcher's extensive review of the main framework's factors on which the conceptual model was based is then included. A theoretical framework is subsequently proposed, consisting of key determinants and their respective moderators. These constructs are believed to affect Lebanese and UK consumers' mobile banking adoption and usage. The study's research hypotheses are then proposed, followed by operational definitions for each of the model constructs.

Chapter 4: This chapter explored and justified the study's chosen paradigm, namely the positivist quantitative approach. Additionally, the adopted data collection instrument and questionnaire type were presented and thoroughly explained. Finally, the chosen sampling technique was elucidated, followed by the presentation of the data analysis model used.

Chapter 5: This chapter presents the pilot study results, through which the validity and reliability of the research instrument in terms of measuring the proposed hypotheses was undertaken. Moreover, SPSS (Statistical Package for the Social Sciences) was used for the extensive analysis of the obtained data, which will be also be presented in this section and will mainly address the influence of different factors on the adoption of mobile banking by Lebanese and UK consumers.

This is followed by the delineation of the results of the model-testing phase, in addition to an extensive two-step analysis of the relationships between the research model's constructs. Firstly, the model fit and the construct's validity will be tested and assessed respectively, followed by the testing of the potential associations between the independent and dependent variables as well as different characteristics of the proposed models.

Chapter 6: This chapter includes a general discussion of the study's results presented in Chapter 5. Through this, the correspondence of research findings to extant literature was undertaken in an effort to account for the manner in which the present research has advanced its aims and objectives.

Chapter 7: The final chapter concludes the thesis with an overview of the main implications of the presented study through a delineation of its theoretical, methodological, and practical contributions. This is followed by the discussion of the study's limitations and finally, future recommendations.

Chapter 2 - **Literature Review**

Chapter 2 provides an overview of banking Section 2.1.1 and the role of innovation in the overhaul of traditional banking systems and the improvement of banking services Section 2.1.3. The implication of internet and mobile banking in this regard is then delineated in Sections 2.1.4 and 2.1.5, respectively. This is followed by the presentation of their services, their advantages and the impediments to their adoption as indicated by empirical evidence. Chapter 2 continues by outlining the characteristics of Lebanon and the UK's population as well as their mobile banking sectors Sections 2.1.6 and 2.1.7, respectively. A brief review of available technology acceptance and behavioural models is then undertaken in Section 2.2. The chapter is concluded with the justification of the choice of UTAUT2 in the present research Section 2.2.15, followed by the presentation of the DeLone and McLean IS success model's theoretical framework Section 2.2.16.

2.1 **Mobile banking**

2.1.1 Banking History

Industrialisation began in the UK through the innovation of the steam engine. Since then, technology has been progressing rapidly, forcing radical changes in society and economy. Industrial revolution has ever since evolved into four major eras with the fourth revolution dubbed "Industry 4.0." Essentially, these industrial revolutions have led to growth in economy, enhanced productivity and advanced welfare (Morrar, Arman, & Mousa, 2017). In alignment with these developments, a radical shift from industry to service has been evident. According to OECD, the service sector has a key role in economies accounting for more than 70% of the OECD gross domestic products and over 60% of total economic activity, with an increasing trend (World Bank national accounts data, 2017). Undoubtedly, services are considered important factors in industrialised economies and contribute vitally to economic growth and employment. The financial service industry comprises a range of businesses that deal with money management. This industry is a crucial pillar of the national economy for many countries where it immensely contributes to the gross domestic product (Fasnacht, 2009)

Banking has evolved from its primitive roots in goods exchange to the modern-day complex banking systems. Banks are defined as *"a firm with permission to carry on the regulated activity of accepting deposits and is a credit institution*" (Rulebook Glossary, 2017). These

activities were traditionally carried out from the brick-and-mortar premises of banking institutions. Banking systems also existed as a mediator between sellers and buyers, effectively simplifying their transactions and ensuring their completion without the need for physical contact between the two parties (Wilson, Toms, De Jong, & Buchnea, 2016). Banks were therefore engaged in providing customers with fast, efficient and convenient ways to complete their financial transactions. The advent of modern technologies, as well as the increase in consumer demand for better commerce delivery, propelled banks to further simplify banking transactions in order to meet customer needs as well as compete with other banks (Shi & Lee, 2008).

2.1.2 Triggers for Banking innovation

Amidst the financial crisis that the world witnessed in 2008, the former chairperson of the Federal Reserve warned bankers of the negative influence of innovation on the financial sector by asking them to 'wake up'. Volcker berated: "*I wish somebody would give me some shred of evidence linking financial innovation with a benefit to the economy*" (FT, 2013). Volcker commented that the ATM is the greatest innovation witnessed in banking. Essentially, Volcker was right. The way banking was operated did not change for hundreds of years. Mention and Torkkeli (2014) described the attitude of financial services as risk-averse and conservative in regard to innovation.

Similarly, Paul Krugman, an economist, declared the same attitude by stating "…*hard to think of any major recent financial innovations that actually aided society*" (The New York Times, 2009). Collectively, these emphasised the critical need for profound change in the processes, principles and systems of the financial sector. King (2014) stated that the nineteenth-century form of banking was practised mainly up until the emergence of the internet. Chou and Chou (2000) pointed to the dynamic and global characteristics of banks. They affirmed that the use of the internet in banking demonstrates the most significant revolution after the invention of the ATM.

The need for radical changes was triggered by the failure of the worldwide financial system. Following the financial crisis in 2007/8, a desperate attempt to re-establish the banking sector emerged. These changes were led by developments and trends in information and communication technologies (ICT), risk strategies and business intelligence (Campanella, Peruta, & Giudice, 2017). The key was not just about refining operations and processes, but to redefine the relationship with customers through driving customer-centric approach within the

financial sector and to rebuild the trust of both customers and regulators through the adoption of customer enhancing digital technology (Mention and Torkkeli, 2014). Moreover, Goddard et al. (2007), Rossignoli and Arnaboldi (2009) and Mention and Torkkeli (2014) identified several regulatory and technological change-driven aspects. These are listed as follows:

- The macroeconomic conditions
- The accrued automation of processes
- The increasing role of information and communication technologies
- The concomitant wide-scale digitalisation and dematerialisation
- The drastic changes in service design and delivery according to customers' preferences
- Increase competition and the need for competitive advantage
- The emergence of branchless banks
- The shift towards 'do it yourself' attitude in transactions
- Globalisation and increased cross-border trade

Collectively, these aspects assisted in transforming the product range, the development, as well as the channels, types and packaging of banking services (Campanella, Peruta, & Giudice, 2017). Essentially, these had led to radical alterations in and a greater predilection for innovations within the banking sector.

2.1.3 Innovation in the banking sector

Pellé (2017) affirmed that the term innovation is considered as one of the key concepts of the modern economy. Innovation in its heart is recognised as any new idea or concept which ultimately aims at making things better and more efficient (Vaughan, 2013). Garcia and Calantone (2002, p. 113) stressed the essence of "newness" as a main element of innovativeness stating that it "*is the capacity of a new innovation to influence the firm's existing marketing resources, technological resources, skills, knowledge, capabilities, or strategy*."

Pellé (2017) viewed innovation as a response to a current or future stimulus aiming at sustaining organisational existence through the creation of value. Accordingly, innovation is not limited to the introduction of new products or services. Gopalakrishnan and Damanpour (1997) identified three typologies for innovation as administrative vs technical, product vs process and radical vs incremental. Administrative innovations are management-oriented

processes, while technical innovations are more geared towards products and services process technology. Product innovations involve constructing new products or services to match the needs of customers or the market, whereas process innovations consist of the reconstruction of the internal elements of organisational operations. Radical innovations refer to change that occurs drastically and influences social structures or organisational practices, whilst incremental innovations are more of an organic type of change that emerges from gradual variations in existing practices and products. At an organisational level, innovation encompasses any new product, service, or technology. When assessing innovations in the workplace, efforts should consider their generation, as well as their implementation and consequent acceptance and adoption (Damanpour, 1991; Damanpour & Schneider, 2006).

Pellé (2017) identified several aspects involved in achieving the goal of innovation. These are summarised in the figure 2-1 below as the process of innovation:

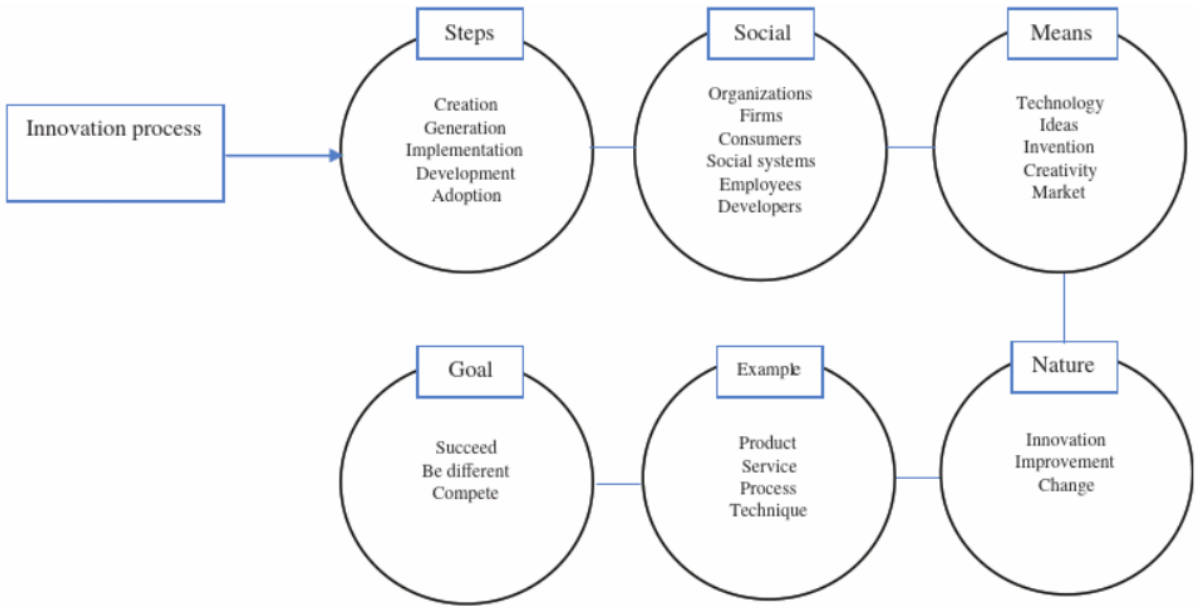

Figure 2-1: Pellé (2017), p: 73

For the service industry, innovation at its core is about improving customers' experience and their ability to emerge into new markets (Agarwal, Selen, Roos, & Green, 2015). However, innovation within the banking sector is intangible. It could be argued that the definition of innovation and its perception is very time and location oriented. What was considered as innovation yesterday might not be viewed as one in the future. This was explained by Edwards, Barry, and Jonathan (2006) who divided the retail banking revolution into three eras. The first, or the old revolution, began in the 1950s. Innovation during this era consisted of changing the

attitude of commercial banks towards the personal sector. The second era started in the 1960s and was called the modern era. In that era, regulations and competitions were the drivers of change as well as the evolution of technology. The final era was after the 1970s when banks became increasingly more marketing oriented. During this era, banks recognised the importance of customers in their survival and growth and attempted to act proactively in meeting their needs through customer services and quality-related strategies. However, in today's era, banking institutions, like other industries, have been deeply affected by the technological revolution. In fact, the banking industry relies on the exchange of information, which itself depends heavily on ICT to obtain, analyse and communicate information with different stakeholders.

Mention and Torkkeli (2014) described banking innovation as changes in the offering of banks as well as "*modifications to internal structures and processes, managerial practices, new ways of interacting with customers and distribution channels*." Solans (2003) described the innovation in banking as *"an act of innovation to create and deploy new financial tools, techniques, institutions and markets that facilitate access to information, and trade and means of payment*.". Mention and Torkkeli (2014) argue that beneficial innovation must contribute to growth of individuals, businesses and the government, which in turn will contribute positively to society as a whole. Innovation is a main engine of growth achieved by exceeding customers' expectations through new, differentiated and relevant benefits.

Bátiz-Lazo and Woldesenbet (2006) recognised that financial innovations carry many advantages, which have fuelled their growth in the modern world. Financial technology guarantees tax benefits, reduced organisational and bankruptcy costs as well as transparency. The success of an innovation could be attributed to high volatility and dynamism in a specific environment. The latter was shown to enhance performance through the inducement of a certain degree of rivalry between organisations, thereby leading to the natural development of competitive advantage (Roberts & Amit, 2003). Maintaining innovative productivity and constant product or service improvement is critical for the development of satisfactory or superior performance (Porter, 2004).

The design and development rates of new financial tools overtakes those of market infrastructures, which remain inadequately equipped for the implementation and effective deployment of these systems. The interplay between changes in monetary measures and financial innovation pushes banks to modify or change their instruments, goals and operational

procedures from time to time to keep up with innovation and ensure the continuity of the financial system (Byrd, 2019). Today, significant shifts in banking are witnessed in accordance with the banks' product and service distribution methods. These dramatic changes in the bank's offerings are wrought by technologies like the internet and mobile banking (King, 2014).

2.1.4 Internet Banking

The widespread use of the internet allowed most businesses, banks included, to utilise this technology as a delivery channel for their innovative new services. Therefore, banks exploited the internet's capability of facilitating banking transactions through its bypass of spatio-temporal limitations. Through the internet, financial organisations allowed the completion of banking transactions from any internet-enabled device at any time or location (Tung et al., 2014; Tung, Lee, Chen, & Hsu, 2009). This practice became known as internet banking, which was defined by Liao, Shao, Wang, and Chen (1999, p.69) as "*conducting banking transactions through the Internet*".

Internet banking enabled customers to complete financial transactions with great convenience using the internet without being limited to the bank branch's operating hours (Shih & Fan, 2004). Services usually offered through digital banking platforms include the ability to deposit checks, text alerts, online bill payment, account checking as well as the procurement of eStatements. Internet banking, also referred to as electronic banking, online banking and virtual banking therefore involves the use of electronic devices and telecommunications networks for the delivery of banking services and the completion of various financial transactions. Such internet banking platforms are referred to as transactional websites, which differ markedly from informational and communicative websites. Informational websites involve the use of internet servers for the delivery of product and services information, while communicative websites allow simple transactions such as sending inquiries and filling applications (Sarma & Singh, 2010).

By incorporating Information Technology in their day-to-day operations through the computerisation of simple procedures such as withdrawal and deposits, banks reduced operational costs while simultaneously improving customer-banking experience (Humphrey, Pulley, & Vesala, 2000). The implementation of internet banking reduces the propensity for human error while facilitating paperwork through the use of digital records. The spillover between internet banking advantages from banks to customers thus becomes evident. Internet banking is a convenient, low-cost, easily accessible banking channel presenting with no time

and geographical restrictions. Customers who adopt internet banking were actually found to have increased banking activity, profitability and productivity, as evidenced by their superior performance of transactions and product acquisition (Xue, Hitt, & Chen, 2011). Improving digital offerings has been suggested as an important avenue for the enhancement of customer engagement in banking activities. This is due to the higher use and interaction frequency of consumers with digital banking platforms when compared to traditional ones (Accelerating digital transformation in banking, 2020).

Digital banking channels were forecast to garner two billion users in 2018 (Fintech & Payments - Retail Banking, 2018). In the United States alone, more than 161 million digital users were expected following a 40% growth from 2014's 133.5 million users (Statista, 2019). The growth of internet banking and other digital platforms was predicted to reach as much as 40% of the global adult population (Statista, 2019). Banks continue to pour significant investments in internet banking systems, which exhibit superior non-generational usage rates when compared to those of mobile banking. Interestingly, global data showed that internet banking remains the preferred platform for the completion of sensitive and complex transactions (e.g., international money transfers), even among mobile banking users (Deloitte, 2020).

However, a survey of more than 17,000 global banking users revealed notable customer demands for banks to improve digital banking channels' security in order to enhance and encourage the actual use of this technology (Deloitte, 2020). The degree of sensitivity of the services handled through a banking website determines its associated riskiness. Naturally, transactional websites carry the highest risk, considering the capacity of customers to manipulate funds and transfer large sums of money from one's own account. This entails the possibility of data and account breaches, and by extension, significant financial losses. As such, the intrinsic convenience and advantage of internet banking seem to reflect negatively on its acceptance should it not pass customer scrutiny and by extension, fail to promote trust.

Studies have shown that the perceived security and perceived privacy of internet banking platforms significantly determine customers' intentions to use these platforms through their effect on their perceptions of its trustworthiness (Sarma & Singh, 2010). Customer trust in internet banking influences their attitude and intentions towards this channel (Chaouali, Yahia, & Souiden, 2016; Wu, Lin, Li, & Lin, 2010), whose perceived risk directly impacts actual consumer usage (Marakarkandy, Yajnik, & Dasgupta, 2017) as well as behavioural intentions (Martins, Oliveira, & Popovič, 2014). Perceived system reliability becomes a noteworthy

impediment to internet banking adoption among new users, while current users exhibit higher confidence and trust towards the platform (Rotchanakitumnuai & Speece, 2003).

Considering the advantages internet banking carries to all implicated parties, be it customers, businesses, or the bank itself, financial institutions have exhibited constant efforts to understand and optimise this platform's adoption. This is especially important considering the higher customer loyalty and retention among online banking adopters (Xue et al., 2011). IS studies provide important practical insights through their attempts to characterise the drivers and barriers of internet banking adoption through various approaches, namely descriptive, relational and comparative research (Hanafizadeh et al., 2014b).

Internet banking usage can be predicted by the behavioural intentions of customers. Customers were shown to be influenced by various factors when formulating their intentions to use internet banking. These include performance expectancy, effort expectancy and social influence (Martins et al., 2014; Wu et al., 2010). The adoption of internet banking seems to increase concomitantly with the social pressure to do so, as reflected by the significant role of social influences when assessing customer behavioural intentions (Martins et al., 2014). In fact, faster internet banking adoption and higher usage frequency was observed in regions with a greater density of internet banking users (Xue et al., 2011). Social influences encourage perceptions of internet banking trustworthiness, thereby exercising an indirect effect on the intentions to adopt this platform (Chaouali, Yahia, & Souiden, 2016).

Otherwise, customers seem to show higher motivations towards internet banking channels should they be perceived to be useful and productive. Moreover, internet banking needs to exhibit an easily accessible and understandable interface through which reliable and relevant content and services are delivered.

Through the enhancement of internet banking's usefulness and benefit, banks can alleviate the perceived financial risk of this platform. This could serve to improve customer attitudes towards internet banking channels and increase adoption intentions among potential users (Lee, 2009). To achieve this, the delivery of high service quality should be targeted by bank managers and internet banking website designers alike. This holds particularly true in light of the positive influence of service quality attributes (fulfilment, efficiency, reliability, website attributes, responsiveness and privacy) on the perceived usefulness and ease of use, and by extension, the behavioural intention to adopt internet banking (George, 2018).

2.1.5 Mobile Banking

There has been a dramatic increase in the use of smartphones in recent years. According to Statista (2019), the number of smartphone users exceeded five billion, and smartphone penetration is marked with a continuous increase. Today around two-thirds of the world are equipped with mobile telephones. The penetration rates exceed 100% in developed countries and are around 60% in developing countries (Ashta, 2017). Combined with the increased value in mobile business, banks realised the crucial role of mobile in the future of banking. This led them to invest in mobile banking applications (Thakur, 2014).

Mobile banking is a form of m-commerce provided by financial institutions to enable their customers to remotely complete routine banking activities, namely fund transfers, payments, account information checks etc., through their mobile phones or bank websites (Hanafizadeh, Behboudi, Koshksaray, & Tabar, 2014a; Chawla & Joshi, 2017).

The advancements in m-commerce has attracted conventional banking's interest, mainly due to increasing demands of bank customers for convenient services and the consequent improvement of bank offerings (Luo, Li, Zhang & Shim, 2010). This convenience was converged by the internet, wireless technology and smart mobile devices. Mobile banking is defined as "*an interaction in which a customer is connected to a bank via a mobile device such as cell phone, smartphone or personal digital assistant (PDA)"* (Laukkanen & Kiviniemi, 2010, p. 373).

Mobile banking has naturally gained widespread use in the modern mobile-cantered world. Its penetration saw a drastic increase in just 5 years, rising from 9% of the global population in 2010 to 30% in 2015 (Statista, 2015). Mobile banking users in the US were expected to reach 57 million users by 2016 (Statista, 2016), with recent reports indicating the use of mobile banking by half of the American adult population in 2017 (Federal Reserve Board, 2013).

Mobile banking can be distinguished from similar financial services, such as mobile payments and internet banking. Mobile payment platforms provide an alternative for credit or debit card use by utilising mobile phones for the purchase of goods or services (Chandran, 2014). While both mobile and internet banking represent revolutionary banking platforms, the two present distinct differences in terms of their functionality, the services they deliver, access channels used to deliver their services, in addition to other important aspects. Unlike internet banking, mobile banking does not require the availability of personal computer and internet-powered

browsers for system access and gaining functionality. Moreover, mobile banking applications present with the capacity to push notifications to its users without the need to access the system, a functionality that is not available in internet banking. This allows customers to remain knowledgeable of profitable offers and deals they could benefit from. It is important to note that internet banking generally offers customers with more transaction facilities, without the need to download specialised software or programs. That being said, mobile banking applications provide constant improvements to the services and facilities offered therein in an effort to bridge the gap between it and internet banking. Mobile banking necessitates the installation of a system-compatible mobile app in order to access the mobile banking system. Another slight inconvenience to mobile banking is the necessity of completing and submitting individual application in one's bank in order to gain access to the system, which adopts different credentials than those of internet banking.

Regardless, mobile banking offers its customers a number of remarkable advantages. The use of mobile banking enables consumers to conveniently complete financial transactions such as checking bank accounts, transferring money and making transactions (Nicoletti, 2014). This can be achieved through one's smartphone without the need to physically attend the bank branch or use telebanking and e-banking services.

The availability of mobile banking systems emphasises their relative superiority to other platforms, particularly through the speed, immediateness and constant accessibility of their services (Zainol, 2011; Tiwari, Buse, & Herstatt, 2006). Mobile banking is thus a cost- and time-saving banking channel, whose security constitutes another of its assets. Mobile banking allows customers to safely and securely conduct banking transactions through their mobile phones (Cope, Rock, & Schmeiser, 2013). More importantly, accessing financial services through mobile banking does not require the availability of an internet connection, which constitutes an important distinguishing feature of mobile banking in comparison to internet banking. Moreover, mobile banking applications take advantage of operators' telecommunication networks to provide customers with the functionality and financial services they need (Dass & Pal, 2010). The superior and distinct system quality, information quality and service quality offered by mobile banking applications were also recognised (Baabdullah et al., 2019).

In addition to the convenience and increased productivity conferred by mobile banking, the use of this banking channel significantly alleviates the financial fees and costs of banking (e.g.,

overdraft charges); by up to 7 billion pounds a year (International money transfer service Azimo, 2019). Ashta (2017) confirmed that due to the low cost of acquiring mobile phones and the lower costs of mobile broadband, the number of unbanked individuals has decreased from 2.7 billion adults in 2010 to 2 billion adults in 2014. This is ultimately because mobile banking can aid in cost savings in delivering financial services to consumers. Furthermore, mobile banking facilities can considerably reduce the costs of using conventional methods. For instance, by making mobile payments compared to dispensing cash as a method of transaction, consumers will save time travelling to the payment point, queuing and going through several identity checks at the time of each payment. In addition, this would eliminate some overheads incurred in creating payment points and staffing them.

Mobile banking also allows users a greater degree of control over their accounts and financial decisions, as evidenced by an evaluation of exclusively mobile banks (Van Der Boor, Oliveira, & Veloso, 2014). However, this banking channel presents a few drawbacks. Mobile banking users are subject to various scamming and hacking attempts, including receiving fake SMSs (Kadušić, Bojović, & Žgalj, 2011), and having password or data encryption compromised (Akhlaq & Ahmed, 2013). The security and privacy of mobile banking applications thus remains one of the main barriers to its acceptance and use (Alkhaldi, 2016). The drawbacks of mobile technologies are naturally reflected in mobile banking applications (Oluoch & Mwangi, 2012; Vermaas, Tervonen, Zhang, & Siljee, 2013), whose security also suffers from the lack of compatibility between mobile phones and anti-virus software. This limits the protective layers that could impede the digital attempts of identity thieves, who could also gain unauthorised access to sensitive mobile banking information through physical manipulation of a misplaced or stolen mobile phone. Another pitfall of mobile banking use is the notable absence of technical support for the optimal functioning of this system. Modern technologically advanced mobile devices are usually required for customers to access all or any of the financial services offered by mobile banking applications (Chandran, 2014; Wonglimpiyarat, 2014), which could limit its diffusion.

Nicoletti (2014) demonstrated the challenges faced by banks in adapting mobile banking as the six Cs. These are:

- Cultural through ensuring that MB is stakeholders-centric
- Customers through making sure that customers are empowered

- Competition through ensuring its multinational identity
- Computers through being continuously connected and is based on new technologies
- Compliances with regulations and legislations
- Costs reduction method

Above all, Krishnan (2014) asserted that mobile banking must not be regarded as a technological phenomenon; rather it must be regarded as a psychological and sociological one. In other words, mobile banking is about change, recognising it and most importantly, the ability to embrace it is crucial for its success. Therefore, banks must equip their operational expertise to encompass mobile banking. Banks must adapt their processes and products to achieve success through devising strategies and models positioning mobile as the main priority instead of an afterthought.

IS literature provides comprehensive critical insights into the drivers of mobile banking adoption among consumers of different cultural and demographic profiles. Tradition and image barriers have been reported to influence mobile banking usage (Chaouali & Souiden, 2019). Other factors, such as performance expectancy, effort expectancy, social influence, hedonic motivations, price value and habit also seem to modulate both intentions towards and actual usage of mobile banking regardless of the study setting (Baabdullah et al., 2019; Farah et al., 2018; Maulana, Suryana, Kartini, & Febrian, 2019; Priya et al., 2018; Alalwan, Dwivedi, Rana, & Algharabat, 2018; Kwateng et al., 2019). Security and privacy concerns remain prevalent among mobile banking users, as evidenced by the significant role that perceived risk and trust play when considering adoption intentions (Chaouali & Souiden, 2019; Sharma & Sharma, 2019; Thaker, Pitchay, Thaker, & Amin, 2019; Chawla & Joshi, 2019; Farah et al., 2018). Enhancing the security and trustworthiness of mobile banking as well as the quality of the services and information delivered within its channels could allow banks to ensure customer satisfaction and actual adoption of this technology (Sharma & Sharma, 2019; Sharma, 2019; Maulana et al., 2019; Thaker et al., 2019). Table 2-1 provides an overview of recent studies examining the adoption and usage of mobile banking in different settings within the scope of various theoretical models. While many studies undertook the investigation of the factors that could contribute to mobile banking adoption, none integrated security, privacy and trust with variables from the UTAUT2 model and the D&M IS model. Moreover, only a few studies adopting an extensive extended model were conducted between developing and developed

settings, with very limited studies shedding insights on Lebanese respondents' intentions towards mobile banking.

Table 2-1: recent studies examining the adoption and usage of mobile banking

Author(s)	**Country**	**Conceptual Model**	**Methodology**	**Findings**
Asongu and Odhiambo (2019)	A range of developing and developed countries.	Correlations between mobile banking and inclusive development (quality of growth, inequality and poverty)	Interactive quantile regressions were employed for the determination of The correlations between individual mobile banking and inclusive development. The study was conducted in 93 developing countries in 2011.	An increase in the quality of growth was demonstrated in response to that of mobile banking dynamics up to a certain extent. This effect was observed at the high-end of inclusive development distributions.
Hassan and Wood (2020)	Egypt and US	extended TAM	online self-administered survey 132 Egyptian, 366 American, and 119 Egyptian bank customers living in the US structural equation modeling	Customer perceptions are affected by primary and secondary culture. perceived usefulness and trust, but not perceived risk, have a significant influence on behavioural intentions across all contexts. perceived ease of use and social influence exhibited varying correlation in each context.
Chaouali and Souiden (2019)	France	Mobile banking resistance and cognitive age as moderating role	A questionnaire was distributed. 425 elder mobile banking non-users completed the questionnaire.	Mobile banking usage was influenced by tradition and image barriers, which also affected value and risk barriers. The latter subsequently affect resistance behaviour. The moderating influence of cognitive age was also demonstrated.

Avornyo, Fang, Odai, Vondee, & Nartey (2019)	Ghana	Integrating some dimensions of TAM and ECM and two personality traits namely, Perceived Enjoyment and Perceived Innovativeness.	Questionnaires were distributed. 1112 questionnaires were used in the analysis.	The study outcome indicated a firm positive influence of optimum stimulation level on intention.
Kwateng et al. (2019)	Ghana	UTAUT2 age, educational level, user experience and gender as moderators	300 users of m-banking services responded to a questionnaire survey distributed in Ghana.	Mobile banking adoption and use were significantly affected by habit, price value and trust.
Chawla and Joshi (2019)	India	TAM	A mixed-methods approach was used.	Ease of use, attitude, lifestyle, convenience, efficiency and trust affect behavioural intention.
Priya et al. (2018)	India	Perceived usefulness Perceived ease of use perceived credibility structural assurance Perceived risk	Empirical cross-sectional examination of mobile banking adoption among 269 surveyed young (23 to 30 years old) Indian respondents.	Significant influence of perceived usefulness, perceived ease of use, perceived credibility and structural assurance on user satisfaction and behavioural intention

Maulana et al. (2019)	Indonesia	Perceived Usefulness Perceived Ease of Use Trust Social Influence System Quality	Questionnaires were distributed. 126 questionnaires were used in the analysis.	Perceived usefulness, perceived ease of use, Trust, social influence and system quality affect actual use of mobile banking.
Alalwan, et al. (2018)	Jordan	UTAUT2	Field survey 348 potential and actual users of internet banking Structural Equation Modelling	Significant influence of performance expectancy, effort expectancy, hedonic motivation, price value and perceived risk on behavioural intention. No significant influence associated with social influence.
Gharaibeh and Arshad (2018)	Jordan	UTAUT2 extended with mass media and trust	Survey 579 banking customers linear regression analysis	Mass media, trust, effort expectancy, performance expectancy, social influence, facilitating conditions and hedonic motivations directly influence the intention to use mobile banking.
Ashraf (2019)	Lebanon	UTAUT2 and 3M model	self-administered questionnaire Lebanese banking customers structural equation modelling	Factors influencing mobile banking use were reported to be effort expectancy, facilitating conditions, hedonic motivation, need for cognition, need for structure, need for affiliation, proactive personality, neuroticism, and agreeableness, but not performance expectancy, social influence, general self-efficacy, extraversion, conscientiousness and openness to experience.

Thaker et al. (2019)	Malaysia	TAM relative advantage perceived risk	A survey provided data from 250 customers.	Customer satisfaction and trust were found to affect both mobile banking adoption and the mediating influence of services continuance adoption. Mobile banking adoption was also influenced by providing customer service in Islamic banks.
Thaker et al. (2019)	Malaysia	TAM relative advantage perceived risk	Partial least squares approach was employed to determine 250 current users of Islamic mobile banking services' intentions to adopt mobile banking services	Perceived usefulness and risk significantly influence current Islamic banking users' intentions to adopt mobile banking
Lwin, Ameen, and Nusari (2019)	Myanmar	Extended TAM	A sample of 200 users was selected randomly	Positive influence of perceived usefulness and perceived ease of use, but not perceived Risk and perceived transaction costs, on user adoption of mobile banking technology Adoption of mobile banking technology.
Sharma and Sharma (2019)	Oman	DeLone & McLean information systems and Trust	A survey provided data from 227 Omani residents.	Actual mobile banking usage was predicted by satisfaction and intention to use mobile banking. The relationship of the latter with trust, service quality and information quality were moderated by satisfaction.
Sharma (2019)	Oman	TAM Autonomous motivation Controlled motivation Trust	225 mobile banking users provided data which was analysed by means of an innovative two-stage research methodology.	Mobile banking acceptance can be explained by trust and autonomous motivation.

Farah, Hasni, & Abbas (2018)	Pakistan	UTAUT2 Trust Perceived Risk	Data from 490 respondents recruited by convenience sampling in Pakistan was obtained through a questionnaire. Data analysis was completed using AMOS and SPSS	Significant influence of perceived value, performance expectancy, habit, social influence, effort expectancy, hedonic motivation, perceived risk and trust
Abbas et al. (2018)	Pakistan	TAM Social Influence Perceived Risk Relative Advantage Perceived Trust Ubiquitous Finance Control	Data collected from 446 respondents through a structured questionnaire and recruited by the Snowball sampling technique from Lahore, Islamabad and Karachi.	Significant influence of all examined variables, but not ubiquitous financial service, on consumer intentions
Afshan and Sharif (2016)	Pakistan	UTAUT, TTF, ITM	online questionnaire 198 higher education students CFA and SEM	Task technology fit is facilitated by task and technology characteristics, while structural assurance and familiarity with bank facilitate initial trust. The intention to adopt mobile banking is correlated with initial trust, task technology fit and facilitating conditions.
Baabdullah et al. (2019)	Saudi Arabia	UTAUT2 and the D&M IS Success Model)	A questionnaire was distributed. 429 completed questionnaires were used in the analysis.	Actual mobile banking usage behaviour was influenced significantly by performance expectancy, price value, facilitating conditions, hedonic motivation and habit.

Boonsiritomachai and Pitchayadejanant (2017)	Thailand	UTAUT and TAM	survey 480 Generation Y mobile banking users structural equation modeling	Hedonic motivations emerged as the most important motivator of mobile banking adoption. hedonic motivations were negatively correlated with mobile banking system security.

2.1.6 Lebanon

2.1.6.1 *The country and population*

Lebanon is a small democratic Arab republic located in the Middle East with an estimated population of 6,092,047 (Lebanon Population - Worldometer, 2020). As characterised by Hofstede's cultural dimensions, Lebanon is a hierarchical, collectivist, masculine, normative, cynical and pessimistic society (Hofstede Insight, 2019). As such, Lebanon's culture was distinctively different from that of developed countries such as the UK and the US, among others.

2.1.6.2 *Internet and mobile usage*

Lebanon boasts high internet penetration, with around 75% of the population (4.6 million) reportedly using the internet by 2016. These high numbers reflect the growth and increased adoption of the internet in developing countries such as Lebanon, which had only 1.9 million internet users, representing 44% of the population, in 2010 (Statistics, 2019). Mobile phone usage was similarly reported to be high in Lebanon, with an estimated 4.8 million mobile cellular telephone subscriptions in 2016 (Measuring the Information Society Report, 2017). A survey conducted by the Pew Research Centre showed that 52% of Lebanese consumers owned a smartphone, while 36% owned a mobile phone, reflecting the significant penetration of mobile phones in 88% of the Lebanese population by 2015 (Poushter, Researcher & Stewart, 2016), rates which are expected to grow in the upcoming years.

2.1.6.3 *Banking in Lebanon*

The current position of the banking sector in Lebanon has been shaped immensely by the continual volatile political and economic conditions. This was advocated by a quote by the Lebanese central bank governor Mr Salamé to a special report to the Financial Times stating "*My only wish is that when you analyse Lebanon, you analyse it in this environment and these realities and not as if we were a normal, peaceful country*" (FT, 2017).

The 1990s are considered the resurgence of the banking sector after the end of 15 years of civil war (1975-1990). Lebanese banks have managed to recapitalise, consolidate, and re-invent themselves as a crucial pillar of the country's national economy (Azar, Bolbol, & Mouradian, 2016). Paradoxically, this had forced the Lebanese banks to undergo drastic changes such as consolidating the institutional and regulatory framework of their activities. Additionally, post-civil war the Lebanese banks had tailored credentials that strengthened their position through enabling them to manage under conditions of high uncertainty and risks. This overhaul was also accompanied by increasing banking competition (Saad & El-Moussawi, 2012).

Following the restoration of the Lebanese financial sector, many foreign banks invested in opening offshore branches on Lebanese grounds (Chahine & Safieddine, 2011). Examples include Citibank, Bank of Nova Scotia and ING Bank. In fact, 17 out of 59 commercial banks operating in Lebanon in 2004 were not local but constituted a subsidisation of foreign banks.

This number rose to 65 by the year 2017, as indicated by Lebanon's governing bank (Banque Du Liban, 2017). Creane, Goyal, Mobarak, and Sab (2004) recognised the superiority of Lebanese banking system compared to its counterparts in the Middle East and North Africa region in terms of refinement. Lebanon's banking sector is highly advanced, ensuring more than triple of the country's gross domestic product (GDP) in total deposits. Sujud and Hashem (2017) identified the main characteristics of the banking system in Lebanon. Firstly, online banking services are provided by almost all Lebanese banks. In fact, only 5 of 65 banks operating under the legal auspice of the Lebanese central bank were expected to abstain from offering digital banking services by 2016 (Blominvest Bank S.A.L., 2016). Secondly, it is sound, stable and controls the financial system of the country in addition to be the primary source of funds for businesses and individuals alike. The Lebanese banking sector is the country's most profitable industry (Peters, Raad, & Sinkey, 2004; Ragab & Hegazy, 2018).

Furthermore, the Lebanese banking sector exercises banking discretion, which protects the confidentiality of their client's names, assets or holdings. As such, disclosure of any information can only be disclosed on the client's written consent. According to the FT (2019), the banking secrecy law made Lebanon a playground for the Middle East's wealthy. Additionally, the Lebanese banking system was a free exchange system where capital and earnings can be moved and exchanged freely. These characteristics, along with the availability of both traditional and modern services such as electronic and mobile banking, ATMs, card

services, as well as retail, private, corporate and Islamic banking promoted Lebanon as a regional financial centre.

However, in October 2019, the country's banks, which remained open throughout the years of its bloody civil war, closed for two weeks. This was the result of several austerity measures taken by the government, ultimately causing a revolution (FT, 2019). S&P Global (2019) highlighted the resemblance of the Lebanese banking sector to those of Greece before the crisis.

2.1.6.4 *Mobile Banking in Lebanon*

Being a crucial component of the Lebanese industry, the Lebanese banks have had to upgrade their marketing strategies to satisfy their customers' needs. To that end, they turned to information technology in order to improve efficiency, service quality and attract new customers. The growth and penetration of mobile technologies have exceeded that of the internet in Lebanon. In fact, mobile penetration rates reached almost 90% by 2015, which far exceeded the 50% internet penetration rate reported among the Lebanese population (Blominvest Bank S.A.L., 2016).

Banks naturally turned to mobile platforms for the introduction of innovative services and products. Mobile banking was thus offered by 14 different banks in Lebanon. This banking platform was utilised to gain a competitive edge while reducing operational expenses and promoting customer satisfaction and loyalty (Audi, 2015). Lebanese banks' mobile banking applications were made available on the virtual market under unique names and constitute a reliable platform offering consumers different types of financial services.

However, the distinct advantages of mobile banking and the noteworthy investments poured into this sector failed to guarantee high adoption rates. Actual mobile banking adoption remains subpar in Lebanon (Blominvest Bank S.A.L., 2015), a fact that was reflected in a survey done by ArabNet in 2016 examining the adoption of digital banking in the MENA region. In fact, Lebanon exhibits the second-lowest digital banking adoption rate at 54%, while other countries such as Saudi Arabia stood at 75% digital banking adoption (Figure 2-2). It is important to note that the low digital banking adoption rate in Lebanon does not necessarily denote this platform's poor performance, as evidenced by the 38% increase in adoption rates from 2016 to 2017 (IDAL, 2017).

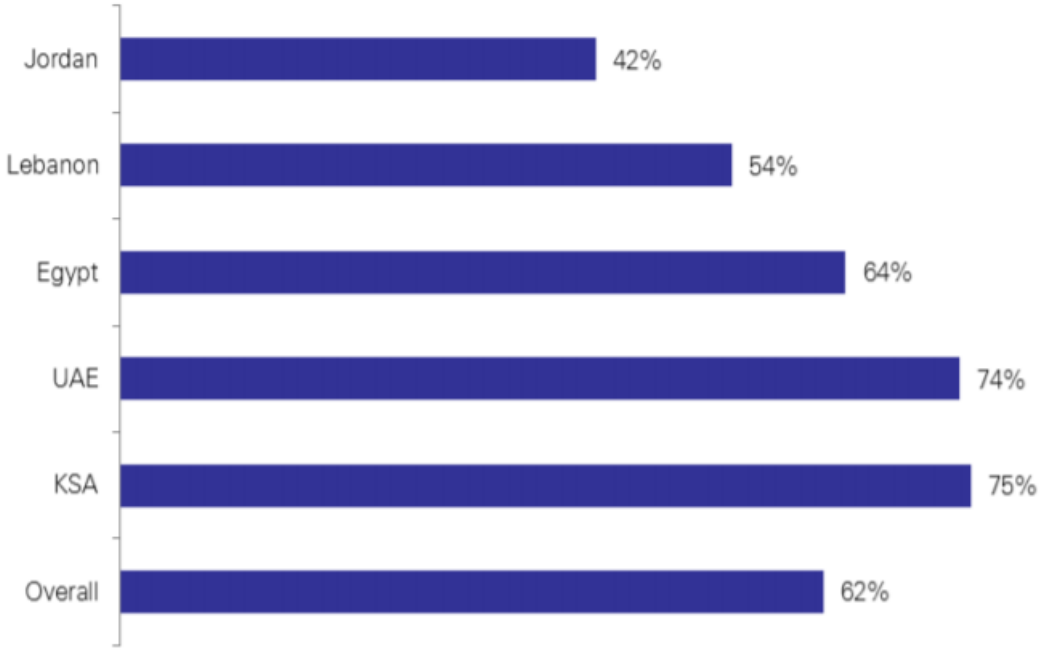

Figure 2-2: Digital banking adoption rates in the MENA region. ArabNet Business Intelligence (2016)

As shown in the figure 2-3, the usage patterns of digital banking show distinct variability amongst Lebanese banking clients. Regular bank visits are still exercised by the majority of Lebanese customers, with very few considering the use of online banking channels as an alternative to traditional banking. A clear apprehension towards complete or partial digital banking adoption can thus be observed among Lebanese banking customers (Arabnet Business Intelligence, 2016). However, the rate of customers who have abstained from using any digital banking platforms has become inferior to the rate of customers who incorporate both mobile and online banking in their financial habits (Arabnet Business Intelligence, 2016). Therefore, mobile banking adoption rates remain disappointing in Lebanon, but exhibit promise for future improvement.

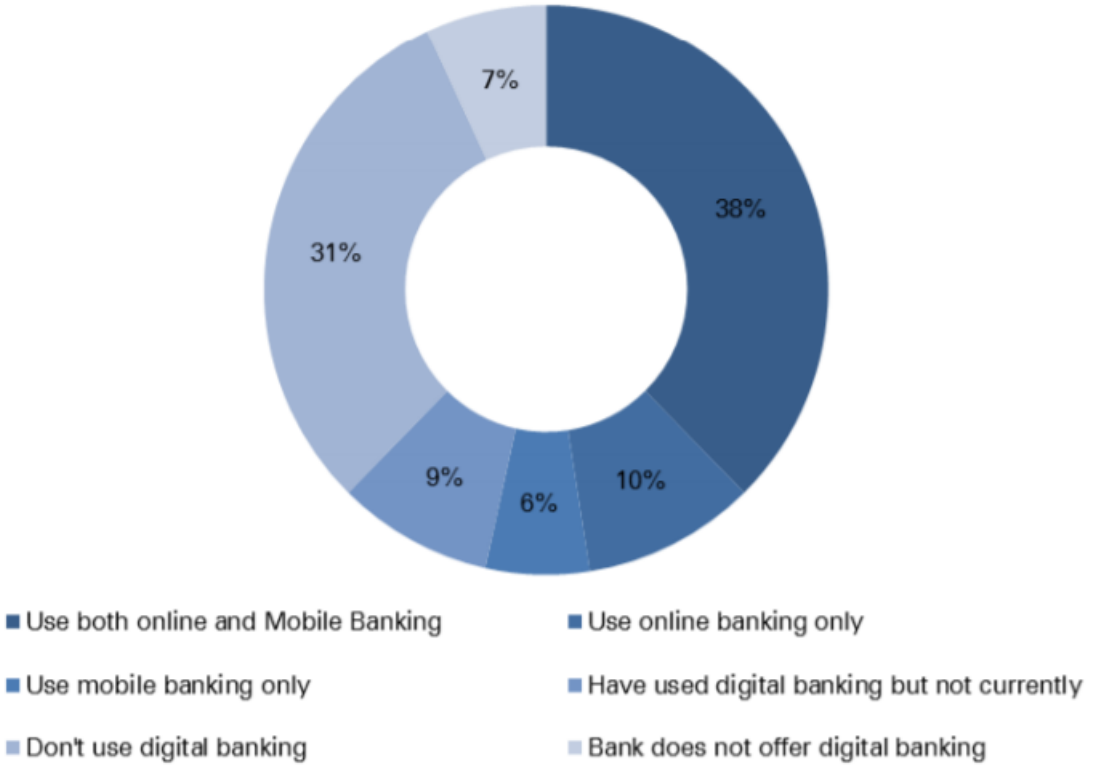

Figure 2-3: Digital Banking adoption in Lebanon ArabNet (2016)

Researchers have attempted to characterise the digital banking sector through the study of its adoption. Understanding the determinants of Lebanese users' satisfaction with internet banking systems is important for the formulation of adequate strategies to enhance its acceptance and use. Hammoud, Bizri and El Baba (2018) reported that the quality of internet banking services significantly predicts customer satisfaction with them. In fact, reliability was the most prevalent concern among Lebanese customers, in addition to other quality-related constructs (e.g. efficiency, ease of use, responsiveness and communication) (Hammoud, Bizri, & El Baba, 2018).

The relative advantage of internet banking systems is implicated in the modulation of its adoption behaviour among Lebanese individuals (Toufaily, Daghfous, & Toffoli, 2009). In fact, performance expectancy most strongly predicted behavioural intentions to adopt internet banking, and by extension, actual usage in the Lebanese context (Tarhini et al., 2016). Other important antecedents to internet banking acceptance include facilitating conditions and social influence, which positively influence actual usage and intentions to adopt internet banking, respectively (Tarhini et al., 2016). While Tarhini et al. (2016) reported the insignificance of effort expectancy in the context of internet banking, Ali (2016) demonstrated the significant

influence of ease of use along with that of perceived usefulness, perceived enjoyment and information about internet banking in this context.

The privacy and security of internet banking evidently exhibited a direct and positive impact on satisfaction with the system in Lebanon (Hammoud, Bizri, & El Baba, 2018). Intentions to adopt internet-banking increase along with perceptions of its credibility, as demonstrated in a study by Tarhini et al. (2016).

Technology- and individual-related factors were not the only predictors of internet banking adoption behaviour. Organisational variables, such as bank size, technical human resources and infrastructure, as well as the forbearance of decision-makers towards risk, were shown to play a significant role in a Lebanese population (Toufaily et al., 2009). On the other hand, Ali (2016) revealed that the quality of users' internet connection does not seem to significantly influence the acceptance of internet banking.

In their study, Jibai et al. (2018) emphasised the importance of bank commitment to providing technologically advanced and high-quality services to their customers in the Lebanese internet-banking sector. Moreover, higher e-banking adoption could be expected when banks have a higher degree of international operations, in addition to a satisfactory internal technological environment (Toufaily et al., 2009).

Mobile banking research remains limited in Lebanon considering the relative novelty of this platform. Regardless, the perceived usefulness and ease of use of mobile banking applications have been reported to be significant drivers of the attitude of Lebanese participants towards this technology (Elhajjar & Ouaida, 2019; Audi, 2015). Perceived ease of use was shown to enhance the perceived usefulness and trustworthiness of mobile banking in Lebanon, which falls in line with its positive modulation of customer attitude towards the platform (Sankari, Ghazzawi, El Danawi, El Nemar, & Arnaout, 2015). The attitude, in turn, was shown to influence behavioural intention, which is positively affected by perceived behavioural control and perceived usefulness (Sankari et al., 2015). High-adoption mobile banking users can be distinguished through their positive perceptions of the application's usefulness and ease of use (Koksal, 2016).

Subjective norms seem to play an important role among Lebanese users, whose intentions to adopt mobile banking proved to be positively affected by this construct (Sankari et al., 2015). Moreover, subjective norms were found to moderate the influence of mobile banking

usefulness and ease of use on user attitudes, and that in conjunction with personal innovativeness (Elhajjar & Ouaida, 2019).

Perceived risk was an important consideration among Lebanese users formulating their attitudes towards mobile banking (Elhajjar & Ouaida, 2019). This is consistent with the positive correlation evidenced between trust and both the attitude and intentions towards adopting mobile banking in Lebanon (Sankari et al., 2015; Audi, 2015). Moreover, trust moderates the influence of subjective norms and perceived behavioural control on mobile banking intentions (Sankari et al., 2015). It thus makes sense that users with high mobile banking adoption are those who trust mobile banking and believe it to be credible (Koksal, 2016).

Personal factors influencing mobile banking intentions and attitudes have been shown to include digital literacy and resistance to change (Elhajjar & Ouaida, 2019). The perceived compatibility and trialability of mobile banking predict high adoption among Lebanese users, who were more willing to adopt this platform when they exhibited satisfactory perceptions of self-efficacy (Koksal, 2016). A study by Audi (2015) supported the important role of innovation-related constructs, such as compatibility, in the modulation of Lebanese customers' attitudes toward mobile banking, while demonstrating the negative connotation carried by communicability. The interplay between mobile banking adoption and personal, organisational, and technological aspects prevalent in the Lebanese context is evident. However, mobile banking remains relatively immature and studies in Lebanon continue to lag behind their counterparts in developed countries, such as the UK. The following section will explore the banking sector in the UK, providing a valuable comparative overview of digital banking in a more developed setting.

2.1.7 UK

2.1.7.1 *The country and population*

The United Kingdom is home to around 65.6 million people (Data Worldbank, 2019), and is known as an individualist, masculine and indulgent society that is comfortable with uncertainties but aims to reduce inequalities among people of different social status (Hofstede Insight, 2019). The UK is also a highly developed country with one of the world's highest gross domestic products (Data Worldbank, 2019) and is one of the top ten technologically advanced countries in the world. In fact, reports have demonstrated British businesses' superiority in utilising the internet in both consumer interactions as well as production (Baller, Dutta, & Lanvin, 2016).

2.1.7.2 *Internet and mobile usage*

The UK boasts significantly high internet adoption rates, with 88% of the British population reported to use the internet in 2016. As for delivery channels related to the internet, 92% of British consumers were found to own cell phones, of which 68% owned smartphones (Poushter, Researcher & Stewart, 2016).

2.1.7.3 *Banking in the UK*

The UK exhibits what can be considered as the world's largest financial centre. The UK has a relatively low rank on the bank secrecy index, but in fact controls and supports many offshore jurisdictions that adopt banking secrecy laws. When considered, these jurisdictions would confer the UK with the highest rank on the bank secrecy index, bypassing even Switzerland (Meinzer, 2016).

Technology has irrevocably and undeniably influenced many aspects of modern society, including banking behaviour. According to the Guardian, Jolly (2019), mobile banking use is expected to exceed that of physical bank branches in 2021. Data from CACI, a digital consultancy firm, indicates that the number of mobile banking users will surpass the number of banking customers regularly visiting branches. Unlike Lebanon, both internet and mobile banking are mature sectors in the UK presenting with high penetration rates. Almost half of the adult British population was reported to have used mobile banking in 2018, while the use of internet banking touched more than two-thirds of this population as reported by the UK Finance. This 41% increase in the span of one year affirms the constant and noteworthy growth of digital banking in the UK (Jolly, 2019).

As shown in figure 2-4, online banking has steadily gained foot in the UK's population over the years, rising from a 30% penetration rate in 2007 to 73% in 2019 (Statista, 2019). This reflects banking and financial sectors' readiness to implement new technology and innovative services into their services, as evidenced by the adoption of the automated teller machines (ATMs) and credit cards. Internet banking is among the fastest spreading internet activities, possibly due to the convenient services it offers (i.e. bank account access, investments, establish or pay off credit, transfer money). Considering the prevalent preference of smartphones for the access of online banking systems, this growth is expected to be transferred to mobile-based technologies, such as digital wallets and mobile banking (Statista, 2019).

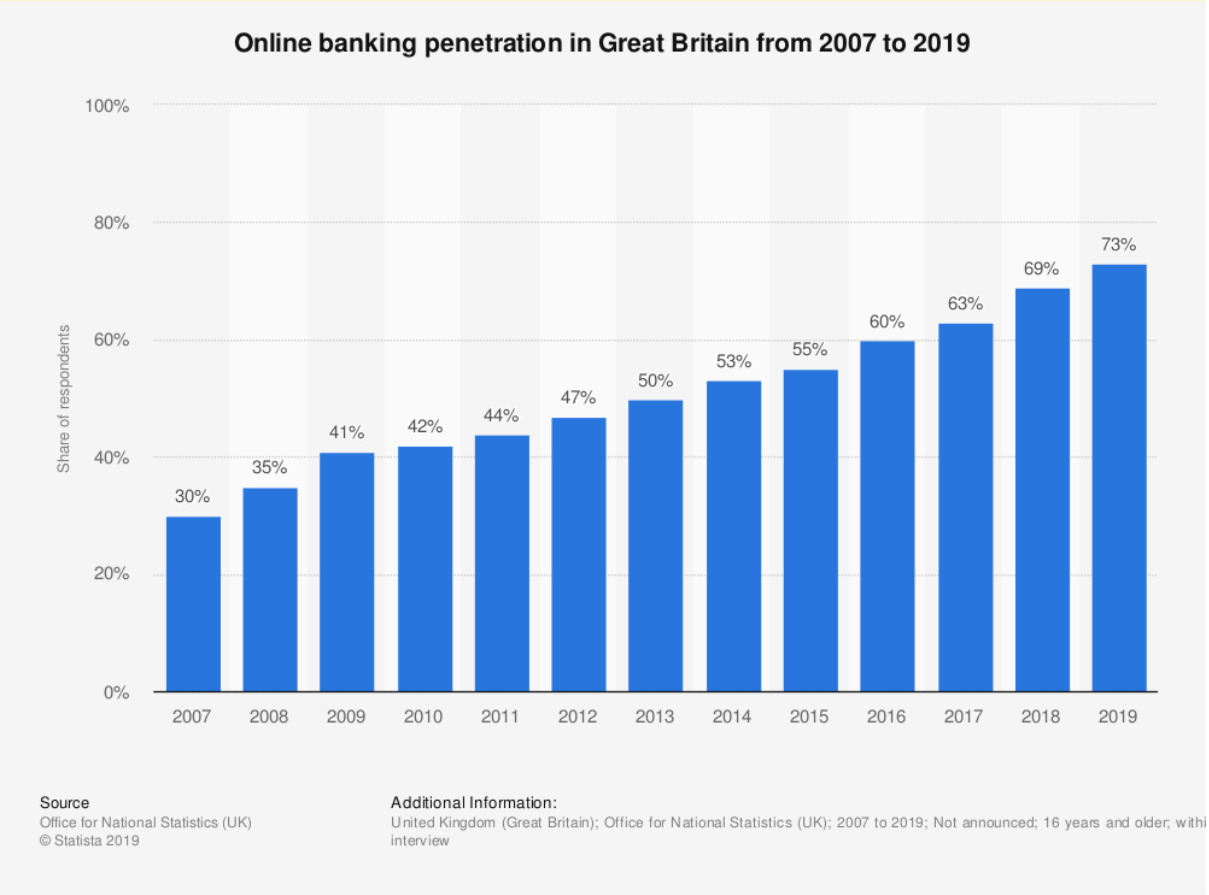

Figure 2-4: Online banking penetration in Great Britain from 2007 to 2019 (Statista, 2019)

In 2014, one in six customers made use of mobile banking applications, making this platform the fourth most preferable banking channel in the UK. As of 2019, mobile banking users have reached almost half of the British population. Banking through mobile platforms has thus far exceeded internet banking utilisation and its growth is expected to continue and overshadow

traditional branches by 2021 (CACI, 2019). When examining the evolution of British customers' use of available banking channels in terms of account access, mobile banking usage was actually predicted to implicate 71% of customers by 2024 at the expense of traditional branch banking, which will decline to around 55% (CACI, 2019). A survey by Finder (2020) revealed that almost 12 million British adults (i.e. a quarter of the adult population) have opted for digital-only banks. The 165% increase in a digital-exclusive bank account in 2019 further emphasises digital and mobile banking prosperity in the UK.

The unrelenting growth of mobile banking can be attributed to its penetration to older aged banking customers. Mobile banking also seems to be intimately associated with digital savings accounts, with banking customers gradually but surely shelving traditional services in favour of digital channels (CACI, 2019).

That is not to say that street banking will fall off the banking map. Despite the slight steady decrease in traditional banking use, this platform will still attract more than half of banking customers by 2024. Moreover, multi-channel banking behaviour reflects the symbiotic relationship that seems to exist between traditional and digital banking, which exist in a complementary, and not elimination, state.

As delineated above, mobile banking is a well-established channel in the UK, with very high penetration rates and acceptance. This could account for the paucity of academic research examining the determinants of mobile banking in British populations. Nevertheless, few studies could be found, such as that of Daniel (1999), which reported that internet banking adoption could be predicted in its implementation stages by the bank's future visions, their prediction of customer acceptance, as well as an organisational culture of innovation. Research that is more recent compared internet-banking services between Turkey and the UK found that British banks offered a more restricted range of services (Sayar & Wolfe, 2007). Moreover, British banks seemed to rely on conventional methods, such as passwords and the use of memorable data, to circumvent fraud and other security issues (Sayar & Wolfe, 2007). Regardless, it was evident that internet banking eliminates the role of time and location when completing banking transactions, which significantly empowers customers while guaranteeing reduced cost and increased efficiency (Jayawardhena & Foley, 2000).

2.2 Technology Acceptance Theories and Models

Technology acceptance models have been widely used to develop and support the theoretical framework of technology adoption studies. The present section will therefore critically explore prevalent technology acceptance models in IS literature in an attempt to determine their suitability to the purposes of the present research.

2.2.1 Theory of Reasoned Action (TRA)

The foundation of technology acceptance models can be traced back to social psychology research, which was developed in an effort to explain individual behaviour in conjunction with the influence of attitude (Fishbein & Ajzen, 1975). Fishbein and Ajzen attempted to advance a theory capable of predicting and explaining human behaviour, based on previous research into the determinants of attitude (Ajzen & Fishbein, 1980). Following its initial proposal, the theory of reasoned action (TRA) was later improved and tested in various contexts. The TRA assumed that an individual's behavioural decision-making process is rational and depends on behavioural intentions, which are influenced by attitude. Based on this theory, individuals are thought to precede the initiation of any behaviour by the careful and systematic synthesis of the available information in order to elucidate the possible implications of their actions (Ajzen & Fishbein, 1980). The intention to complete a certain behaviour is, therefore, the main antecedent of actual individual behaviour.

Behavioural Intention (BI) is defined in Ajzen and Fishbein (1980, p.8) as "*The person's belief that the behaviour leads to certain outcomes and his/her evaluations of these outcomes*." BI was advanced as the main predictor of behaviour among individuals and was proposed to be directly influenced by attitude and subjective norms (Figure 2-5).

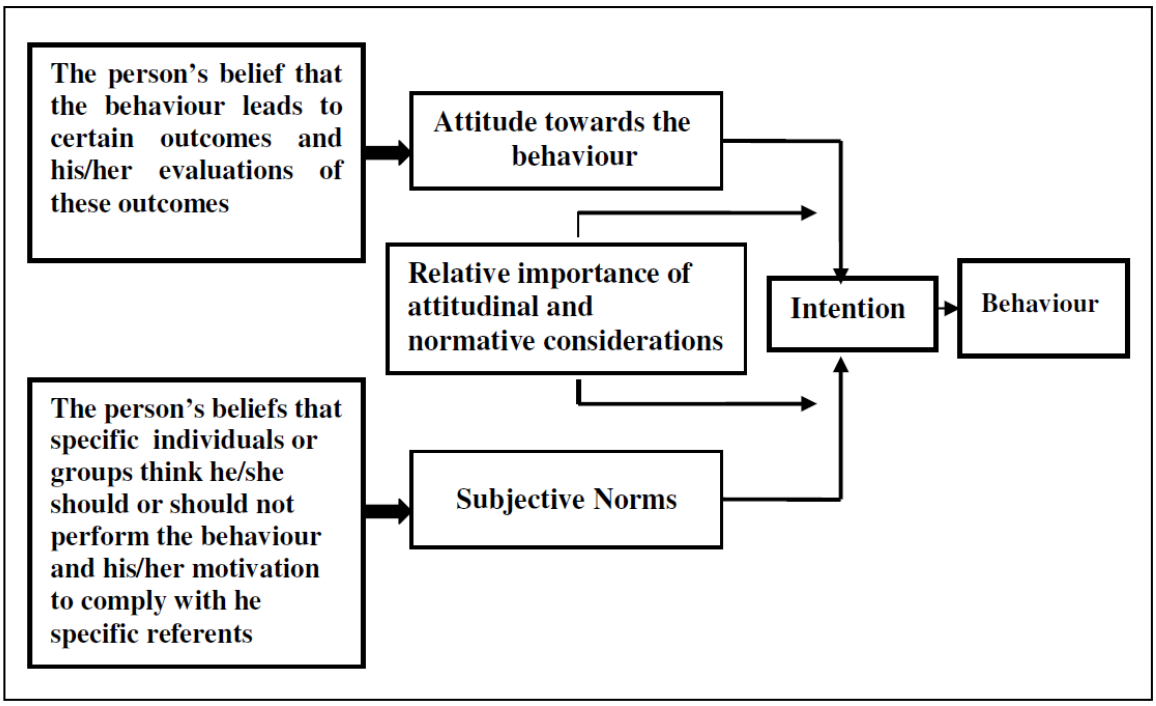

Figure 2-5:Factors determining a person's behaviour

While intention reflects an individual's readiness to perform certain behaviours, attitude denotes an individual's perception of the planned behaviour and reflects the degree to which completing it is perceived negatively or positively. Individual beliefs and their respective evaluation aspect were recognised as the main driver of individual attitude (Ajzen & Fishbein, 1980) and manifest to various degrees on the level of technology adoption. As such, individuals' beliefs of mobile banking riskiness benefit or manageability would affect adoption behaviour depending on how strongly these beliefs are held, and on the individual's evaluation of these attributes.

As for subjective norms, they refer to an individual's perception of societal influences and the conviction of one's immediate or important entourage that he/she should complete a specific behaviour. The perceived expectations of certain pivotal individuals or groups thus affect an individual's behaviour, albeit to various extents depending on the latter's willingness to satisfy their expectations.

2.2.1.1 *Limitations of the TRA:*

Despite its demonstrated effectiveness (Godin, 1994), the TRA presents with the noteworthy limitation of 'correspondence' (Ajzen, 1985). The TRA can only predict volitional, conscious behaviour and is unable to account for habitual, irrational, or unexpected actions (Sheppard Hartwick, & Warshaw, 1988). As such, individual behaviour cannot be explained using the

TRA should it be affected by surrounding environmental factors that remain out of the individual's control (Sarosa, 2013). Moreover, the TRA does not account for personality-culture- and demographic-mediated variations in individual behaviour, which further supports its unsuitability in the context of the present research.

2.2.2 Theory of Planned Behaviour (TPB)

The theory of planned behaviour (TPB) was proposed by Ajzen (1985) in order to address the theory of reasoned action's main limitation. This was achieved through the extension of the theory of reasoned action by perceived behavioural control (PBC), a construct accounting for situations with limited or no volitional control that may affect individual behaviour. PBC was reported to affect both intention and behaviour (Ajzen, 2006), albeit with variable significance according to the situation and action being considered (Ajzen, 1991).

The TPB is recognised as a fundamental theory for the prediction of human behaviour, with the capacity to explain at least 30% of the variance in behaviour and intention (Morris, Oliver, Kroll, & MacGillivray, 2012). The TPB maintains the fundamental concept of the theory of reasoned action, in which intention is the primary driver of performed behaviour in completely volitional situations. However, when the individual is only afforded partial or no control over behavioural performance, behaviour cannot be predicted solely by intentions. In such cases, perceived behavioural control emerges as an independent predictor of behaviour, which can only be moderately explained by behavioural intentions alone (Ajzen, 1991). Through its direct and indirect influence on behaviour, PBC can thus expedite the translation of behavioural intentions into action. Moreover, PBC, along with behavioural intention, can play a role in the direct prediction of actual individual behaviour (Armitage & Conner, 2001).

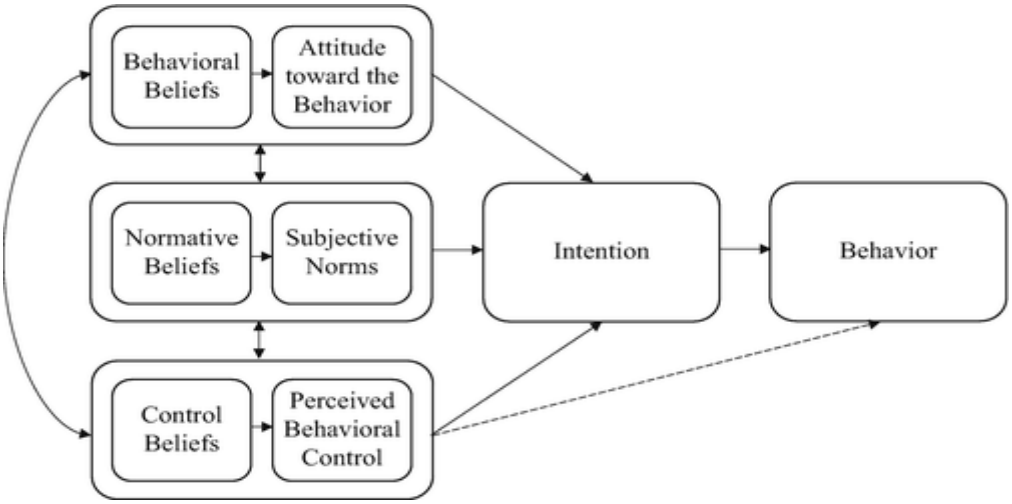

Figure 2-6: Theory of Planned Behaviour

As shown in Figure 2.6, the behaviour is predicted by intention and its antecedents, namely attitude, subjective norm, and PBC. According to the TPB, an individual's intentions to perform a certain behaviour are determined by their salient beliefs towards this behaviour. Salient beliefs include normative beliefs, control beliefs and behavioural beliefs, which influence intention indirectly through subjective norm, PBC, and attitude, respectively. Behavioural beliefs refer to the subjective probability of the occurrence of positive or negative consequences and outcomes following the performance of the behaviour in question. Normative beliefs combine the influence of perceived behavioural expectations of pivotal groups or referents in an individual's environment with said individual's inclination to comply with the expected conduct. As for control beliefs, they refer to the perceived availability and presence of factors facilitating or obstructing the performance of a specific behaviour. Finally, the TPB advanced actual behaviour control, or the extent of skills, resources, and facilities possessed by an individual in order to perform a certain behaviour. The model showed that both PBC and behaviour could be predicted by actual behavioural control.

2.2.2.1 *Limitations of the TPB:*

Several studies have applied the TPB (e.g., Taylor & Todd, 1995b; Alam & Sayuti, 2011; Ramayah, Yusoff, Jamaludin, & Ibrahim, 2009) which is a broad framework presenting with several limitations. In fact, the indefinite and vague definition of PBC and the factors contributing to it have been raised by researchers as an important issue facing the TPB (Davis, Ajzen, Saunders, & Williams, 2002). While the limited number of constructs proposed in the TPB and the ease of their measurement within the model advance its advantages Abraham and Sheeran (2003), the concept of PBC presents with potential bias due to the lack of definite specification of the elements represented by this construct (Taylor & Todd 1995a; Bagozzi & Kimmel, 1995). Moreover, the assumption that individuals always present with the motivation to perform a task is essential in the TPB but may prove impracticable. In a similar vein, the rationality and predictability of behaviour remain a fundamental concept in both the TRA and TPB but might not always be applicable (Sarosa, 2012).

Researchers have questioned the practical relevance of the TPB when examining consumer behaviour or technology adoption (Benbasat & Zmud, 1999; Taylor & Todd, 1995a). Various constructs and variables remain unaccounted for in the TPB, including personality and demographic variables (Godin & Kok, 1996), habit, perceived moral obligation and self-identity Eagly & Chaiken (1993), as well as external factors with unmistakable and substantial

influence on behaviour (Ajzen, 1991). The inadequate number of included constructs in both the TRA and TPB could thus account for the moderate explanatory power of these theories, which did not exceed 40% as indicated by Sarosa (2012).

2.2.3 Decomposed Theory of Planned Behaviour (DTPB)

While the TPB afforded a marked improvement to the TRA model, the indistinctiveness of the factors and situations incorporated by TPB constructs remained an important issue. Decomposing these constructs into more detailed ones was thus undertaken in two distinct efforts, as proposed in the studies of Taylor and Todd (1995a)

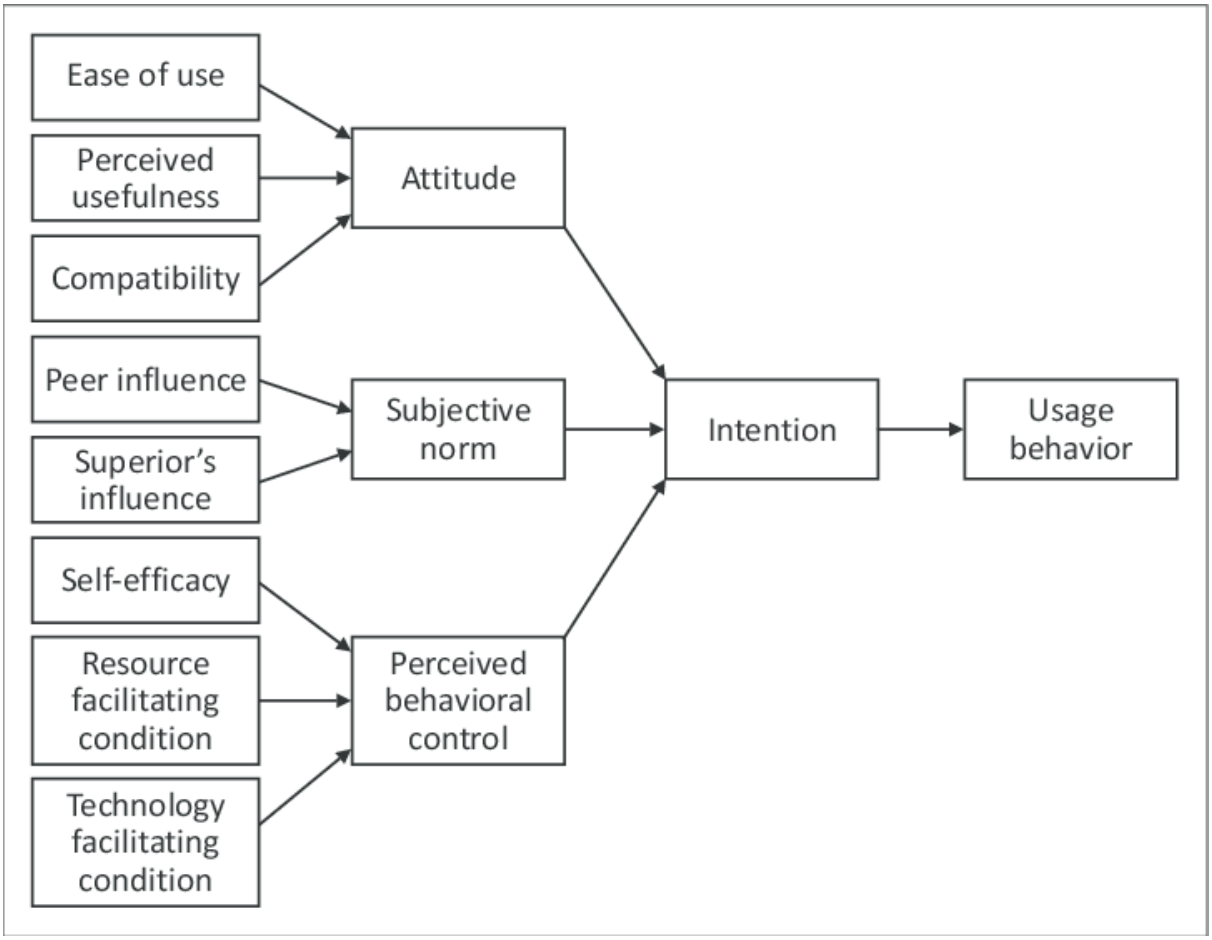

Figure 2-7: Theory of Planned Behaviour with beliefs decomposed

Taylor & Todd (1995a) advanced an extended version of the TPB, the decomposed theory of planned behaviour (DTPB), in which the original TPB constructs were decomposed into detailed components. This decomposition mainly occurred on the level of the salient beliefs predicting behaviour in the TPB model as can be seen in Figure 2-7. In their first model, Taylor

& Todd (1995a) integrated constructs from the diffusion of innovations theory, namely Relative Advantage, Complexity, and Compatibility. The latter three were proposed as antecedents of attitude, while normative influences were maintained in relation to subjective norms. As for PBC, efficacy and facilitating conditions served as determinants of this construct and contributed in addition to the decomposition of Attitude to improve the efficiency and explanatory power of the DTPB to predict consumer behaviour in comparison with the TRA and original TPB (Taylor & Todd, 1995a).

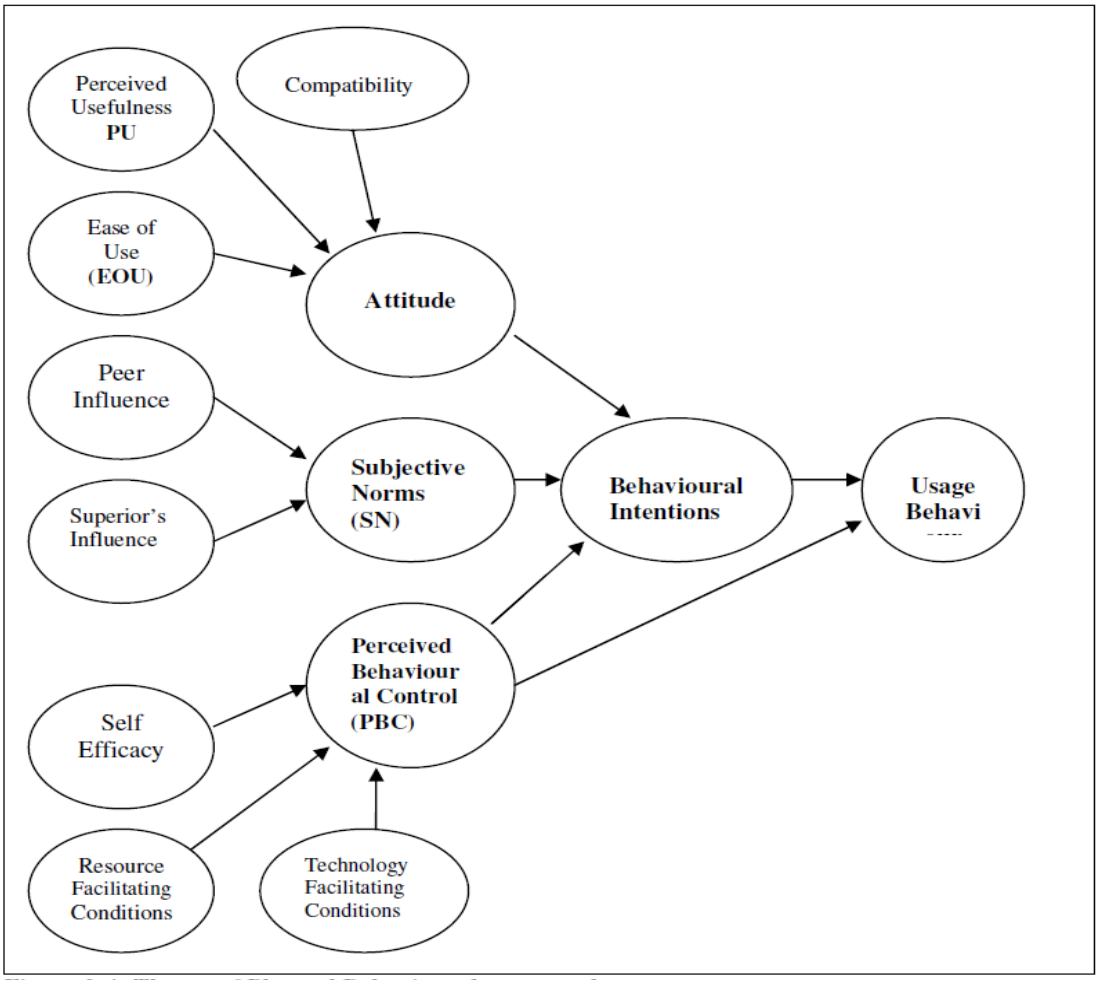

Figure 2-8: Theory of Planned Behaviour Decomposed: Taylor and Todd (1995b)

Shortly after formulating the DTPB, Taylor & Todd (1995b) proposed a second model in which variables from the Technology Acceptance Model (TAM) which is presented in section 2.2.6, supplemented those previously integrated from the DOI theory for the measurement of the attitude construct. Measurements common to both DOI and TAM were combined prior to the analysis of data obtained in the context of IT usage. This resulted in the advancement of ease of use and perceived usefulness in the DTPB model, which corresponds to DOI's complexity

and relative advantage, respectively. In their study, (Taylor & Todd, 1995b) proved that the proposed DTPB improved explanatory power in terms of behavioural intention in the original and decomposed TPB relative to TAM, albeit with all three models showing comparable power when predicting IT usage behaviour. That being said, the DTPB had better predictive power than both the TAM and original TPB model. This was possibly due to the integration of various belief constructs in the model, thereby better defining their underlying concepts. As a result, the DTPB offers better predictive power with relevant practical implications allowing managers to single out specific beliefs implicated in system usage.

2.2.3.1 *Limitations of the DTPB:*

Despite the distinct advantage offered by the decomposition of the TPB, the proposed models do not account for the moderating influence of variables such as demographic variables, enjoyment, or experience.

2.2.4 Diffusion of Innovation theory (DOI)

The diffusion of innovation (DOI) theory was developed by Rogers (1983; 2003) and provides the means to elucidate technology, or innovation, diffusion among different types of users. Diffusion is a term referring to "*the process in which an innovation is communicated through certain channels over time among the members of a social system*" (Rogers, 2003, p.5). Four elements could be discerned based on the definition of diffusion, namely the innovation itself, time, communication channels, and social systems. With the understanding that innovation refers to a novel item as per an individual's perception, the DOI is applicable for the measurement and investigation of the rate of acceptance of emerging technologies, such as smartphones and mobile phone applications.

Underlying the adoption of an innovation is a multi-stage decision process through which, knowledge regarding the innovation itself, its basic principle, and optimal handling will be sought (Rogers, 2003). Based on the gathered knowledge, the formulation of an attitude be it positive or negative ensues in what is referred to as the persuasion stage. The latter ultimately culminates in the decision stage, in which the individual makes the choice of adopting or rejecting the innovation based on certain pre-emptive activities, such as a short-term trial of the technology. Should the individual decide in favour of the innovation, the implementation stage is observed in which actual innovation use occurs, and by extension, the potential complexity of this innovation emerges. While this could lead to the rejection of the innovation, positive changes could also occur following exposure to system complexity and would be

characterised by gaining a deeper understanding of the innovation at hand. Finally, individuals pass through the confirmation stage, where they seek reinforcement of their decision to adopt an innovation, which could be questioned and revoked.

The adoption of an innovation can be predicted by the individual's perception of its attributes. Five Innovation attributes were advanced by Rogers (2003) and were defined as follows:

1. Relative advantage is the degree to which an innovation is perceived as better than what it supersedes.

2. Compatibility is the degree to which an innovation is perceived as consistent with existing values, past experiences, and the needs of potential adopters.

3. Complexity is the degree to which an innovation is perceived as relatively difficult to understand and use.

4. Trialability is the degree to which an innovation may be experimented with but on a limited basis.

5. Observability is the degree to which the results of an innovation are visible to others.

The adoption of an innovation does not exclusively depend on its perceived attributes, which account for 49 to 87% of the variance in adoption rate. Innovation can be optional, collective or authoritative, and the type of innovation was reported as an influencer of its adoption. This was evident along with the role of social systems' nature, the choice of communication channel, and the extent of a change agent's promotion effort. It is also important to note that the number of individuals involved in the decision process significantly affects the speed of adoption. In other words, rapid adoption rates are usually observed in individual settings, as opposed to organisational settings, where a great number of people are implicated in the innovation-decision process (Rogers, 2003).

2.2.4.1 *Characteristics of Innovators*

The speed of innovation adoption was emphasised by Rogers (2003) and was used to categorise and characterise innovators (Figure 2-9). Based on adoption patterns, the first 2.5% called the innovators can be recognised as individuals with vast resources that they willingly and happily expend on innovations. Moreover, innovators possess the capacity to comprehend and apply complex knowledge, as well as to adapt to the high uncertainty associated with innovations. As a result, innovators serve as gatekeeper mediating the introduction of an innovation in a given social system.

The next 13.5% called, early adopters, on the other hand, refers to individuals with considerable resources that are in a position to advise and guide potential adopters. Early adopters are thus opinion leaders and role models providing information and holding the trigger to promote innovation adoption among the masses through their personal adoption of it.

Then, the early majority, 34% are individuals with a faster than average adoption of innovations, relative to members of the same social system. They deliberately consider a new idea prior to its adoption, which they do willingly, albeit without spearheading adoption behaviour in others.

By contrast, the late majority, 34% are those adopting a new idea slower than a system's average, most likely due to perceived social pressure or economic need. While the early majority are characterised as being deliberate, the late majority are sceptical and cautious. These individuals' limited resources could contribute to their uncertainty towards new ideas and limit their adoption to a stage where such behaviour is perceived to be safe.

Finally, laggards, 16%, conclude the train of adopters in any social system. They are traditional individuals relying on past deeds for the formulation of their actual decisions. As such, laggard groups are relatively devoid of opinion leaders and are suspicious of change agents. Moreover, laggards present with marked resistance towards innovative ideas, which may fall beyond the bounds of their limited resources (Rogers, 2003).

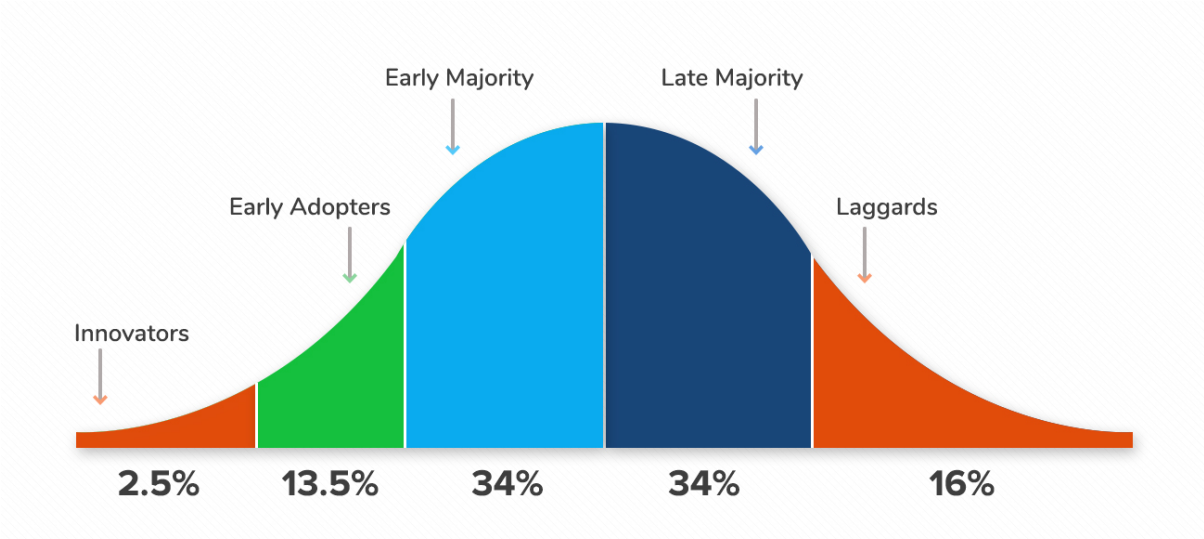

Figure 2-9: DoI

2.2.4.2 *The Limitations of the DoI theory*

Through the DOI model, the innovation-decision process can be elucidated, in addition to the factors affecting the rate of adoption. Moreover, adopter categories can be determined, and the probability of innovation adoption can be predicted. While the DOI theory presents these distinct advantages, it fails to delineate the involvement of attitude in the decision to accept or reject an innovation, or the implication of innovation characteristics (Karahanna, Straub, & Chervany, 1999; Ntemana & Olatokun, 2012). Further studies and extensions of the DOI theory are thus required in order to address these gaps within the bounds of practicability. This is especially important considering the difficulty of formulating a single model to explain the formation of attitudes in relation to innovation attributes, stages of adoption and categories of adopters

2.2.5 Social Cognitive Theory (SCT)

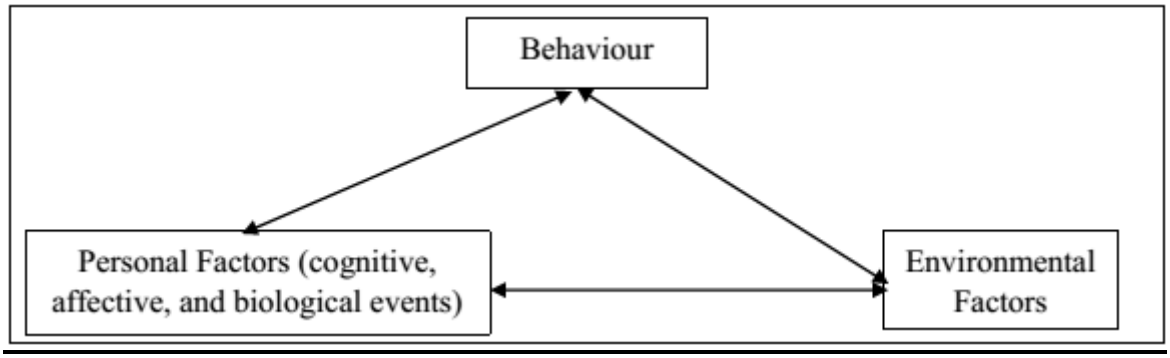

Figure 2-10: Social Cognitive Theory (SCT)

The Social Cognitive Theory (SCT) was developed by Bandura (1986) based on Miller and Dollard (1941)'s Social Learning Theory (SLT). The latter advanced three major elements suggested governing learning, namely feedback on learning, observation, and identification. SLT was actually used as a fundamental guiding concept in various studies, of which Bandura's development of the SCT model. Through the SCT, the influence of communication, as well as external and internal factors on human behaviour can be elucidated. In the SCT, the concept of self-efficacy was introduced along with behaviour modelling and modifications in relation to an individual's experience and ambient factors. The theory emphasised the weight of intrinsic factors in the modulation of individual behaviour in conjunction with external factors frequently highlighted in previous models.

As such, the SCT addresses a significant gap in previous efforts characterising adoption behaviour by recognising the suggested influence of gender, culture, state of health, social structure, and other intrinsic variables on cognition (Lent, Brown, & Hackett, 1994). In the SCT, Bandura (1986) proposed a conceptual framework integrating self-organisation, reactiveness, self-reflection and self-regulation in order to understand the human learning process and by extension, technology adoption. This was achieved by means of three interrelated variables with a triadic structure, namely personal determinants, behavioural determinants and environmental determinants (Figure 2-10).

In the SCT, the significant role of personal and cognitive factors was recognised to be a critical prerequisite for the faithful examination and characterisation of complex human behaviour (Bandura, 1986). That being said, the influence of environmental factors should not be disregarded, particularly in the context of technology-based products where such interactions can overshadow the effect of personal variables (Bussey & Bandura, 1999). Regardless, self-efficacy was shown to be an essential determinant of individual behaviour through its influence on self-regulation, that is, the self-modulation of decisions, thoughts, and behaviour. Within the scope of SCT, Self-Efficacy refers to "*people's judgments of their capabilities to organize and execute courses of action required to attain designed types of performance*" Bandura (1986, p.391).

Empirical evidence supported the applicability of the SCT for the prediction of computer use and individual behaviour (Igbaria & Iivari, 1995; Compeau & Higgins, 1995). The integration of both personal and performance-related outcomes in relation to computer use allowed the explanation of human behaviour in this context. To that end, various factors were added to technology acceptance studies, such as Self-Efficacy, outcomes related to professional and personal expectations. This was observed in addition to the incorporation of effect and anxiety, which reflected the enjoyment or negative feelings associated with the studied behaviour, i.e. computer use (Compeau & Higgins, 1995). Through an SCT-based technology acceptance model, Outcome expectations and Self-Efficacy were demonstrated to be significant predictors of individuals' response to information technology (Compeau, Higgins, & Huff, 1999). In other words, Self-Efficacy seemed to play a significant role in the formulation of individual expectations from the use of technology in terms of performance and perceived usage-related benefit and achievement.

While SCT's constructs present with notable similarities to those advanced by other models (e.g. the comparability of outcome expectations to Perceived Usefulness in TAM (Davis, 1989), Relative Advantage in DoI (Rogers, 2003) and Performance Expectancy in UTAUT (Venkatesh et al., 2003), the dominant role of self-efficacy and personal factors emphasised by SCT waned following their integration in other models and their examination in the context of behavioural intentions (and not usage behaviour) (Venkatesh et al., 2003). In fact, computer self-efficacy exercised a decreasing effect over time on user intentions, which were not significantly influenced by this construct. Similarly, negative results were observed when examining the effect of SCT's anxiety and attitude on behavioural intentions (Venkatesh et al., 2003). However, the importance of accounting for emotional factors in IS research has been recognised (Carillo, 2010) and was reflected in the integration of SCT concepts in different technology acceptance theories, such as the UTAUT (discussed in Section 2.2.12), albeit to various extents (Venkatesh et al., 2003).

2.2.5.1 *Limitations of the SCT:*

One of the many limitations of the Social Cognitive Theory is its assumption of the occurrence of changes in an individual in direct consequence to changes in the environment. However, this assumption might not always be applicable, as individuals could change irrespective of environmental alterations. Moreover, the social cognitive theory does not clearly define or characterise the factors involved in the interactions between the individual, the environment, and the behaviour in question. The directionality of inter-factor associations thus remains ambiguous, which in addition to the learning-based approach of the social cognitive theory, distinctly limits its operability in technology adoption studies. More importantly, the social cognitive theory does not take into account the effect of biological, hormonal, emotional, or motivational variations when attempting to explain behaviour.

2.2.6 Technology Acceptance Model (TAM)

The technology acceptance model (TAM) was introduced by Davis in 1986 for the explanation of information technology acceptance. TAM is an extension of the TRA, whose original model was modified in order to better predict computer acceptance among users. To that end, two constructs, Perceived usefulness (PU), and Perceived ease of use (PEOU) were advanced as a replacement to TRA's attitude beliefs, while subjective norms were excluded from the model. Another noteworthy omission in the final TAM model is the attitude construct, which was found to only partially mediate the relationship between PEOU and intention (Davis, Bagozzi,

& Warshaw, 1989). That being said, TAM maintains TRA's assumption of the indirect influence of external factors on intentions through PEOU and PU. Such factors include objective system design characteristics, training, and computer self-efficacy, among others (Davis, 1996). The evolution and increased application of TAM saw the context-dependent implementation of additional external factors to the theoretical model, such as system quality, compatibility, computer anxiety, enjoyment, computing support, and experience (May & Finch, 2009).

In its original conceptual framework, see Figure 2-11, TAM advanced PEOU as a significant predictor of both intentions and PU. PEOU represents the extent to which a particular system's usage is perceived to be effortless, and PU is the degree to which this usage is believed to enhance individual job performance (Davis, 1989). The expected relationship between PU and PEOU was based on the assumption of an increase in a technology's perceived usefulness along with that of its ease of use. PU can thus be conceived as both a dependent and independent variable considering its direct effect on BI and its prediction by PEOU. Moreover, technology adoption was found to be more strongly influenced by PU than PEOU.

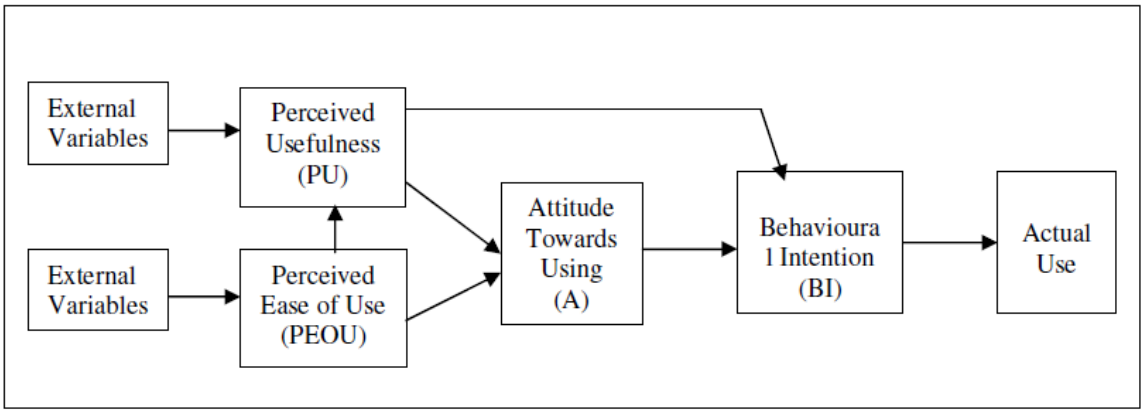

Figure 2-11: Technology Acceptance Model (TAM)

Through empirical studies, TAM emerged as one of the most robust technology adoption models (Baptista & Oliveira, 2015) and was capable of explaining approximately 40% of the variance in technology acceptance in various settings (Taylor & Todd 1995a; Venkatesh & Davis, 2000). The widespread use and acceptance of TAM by researchers further emphasised its applicability in different settings for the elucidation of adoption behaviour (Jan & Contreras, 2011; Tsai, Egelman, Cranor, & Acquisti, 2011). More importantly, TAM was effectively applied in different cultural and ethical backgrounds, and successfully explained the adoption

behaviour of various technologies, in different contexts and among users of different experience levels. As such, TAM became the most widely accepted and applied model in Information technology (Davis, 1989; McCoy, Galletta, & King, 2007; Shiau & Chau, 2015).

The extensive use of TAM naturally incurred a substantial development phase starting from its adoption, validation and ending with its extension (Han, 2003). The latter primarily occurred in three different forms, namely the integration of factors from related models such as the TPB, the introduction of beliefs to the model (e.g. trialability, visibility, or other concepts from the DOI theory) and the investigation of external variables' effect on PU and PEOU (e.g. personality traits, age, gender, income, etc.) (Wixom & Todd, 2005). When comparing TAM to similar models, it was found that TAM offered a less complex and less costly alternative to the TRA and the TPB (Davis et al., 1989; Mathieson, 1991). Moreover, TAM was arguably superior to TRA in the prediction of intentions in the context of technology adoption (Davis et al., 1989), while remaining inferior to the more complex conceptual model of the TPB and the DTPB (Mathieson, 1991; Taylor and Todd, 1995b).

Limitations of TAM:

Despite its noteworthy advantages, TAM was criticised for its lack of consideration of the effect of system and organisation-related variables when attempting to explain technology usage behaviour. Such factors include system characteristics, training, financial cost to the individual, management, and technical support (Handy, Whiddett, & Hunter, 2001) and are critical to provide a deeper understanding of adoption behaviour. Not including external factors such as time, cost and experience was also indicated by Dishaw and Strong (1999), which in addition to the generality of TAM's conceptual framework and its disregard of variance sources (Mathieson, Peacock, & Chin, 2001), represents an important gap in the scope of TAM. In a similar vein, the use of a specific type of respondents to validate TAM, such as students or professional users, significantly limits the generalisability of obtained results (Legris, Ingham, & Collerette, 2003). Regardless, it was pointed out that findings extracted by the application of TAM provide insights into the PU and PEOU of a technology but does not indicate potential avenues of improvement that might improve a technology's design, implementation, quality, and by extension, its adoption (Taylor & Todd, 1995a; Venkatesh et al., 2003).

Cultural and social variables were also omitted from TAM and were suggested as a notable limitation of this model (Van Biljon, Kotze, & Marsden, 2006). Moreover, the formulation and empirical validation of later models, such as TAM2, TAM3, and UTAUT have proved the

inability of TAM to identify acceptance determinants other than user behaviour. TAM actually does not include subjective norms (SN) in its conceptual model (Davis et al., 1989), and does not account for individual differences (e.g. gender, age, experience) in relation to attitude towards technology acceptance (Agarwal & Prasad, 1999). This could have contributed to the stated shortcoming of TAM on the level of its explanatory power, which was found to be relatively low and inconsistent when examined in different contexts (Sun & Zhang, 2006; Venkatesh et al., 2003).

2.2.7 Extension of the Technology Acceptance Model (TAM 2)

The extension of the TAM theory was a natural outcome of the emergence of the original model's limitations. In TAM2, Venkatesh and Davis (2000) integrated various determinants of the original model's main constructs, PU and PEOU, in order to account for the change in adoption behaviour in relation to gained experience over a period of time. To that end, SN was implemented in the proposed conceptual model and examined to determine its influence in both a voluntary and mandatory organisational setting. Empirical evidence showed SN to be a significant predictor of intention in a mandatory, but not voluntary context. Moreover, SN exhibited a decreasing influence when individual experience increased (Venkatesh & Davis, 2000).

In order to provide a deeper understanding of the drivers of technology acceptance, different constructs were added, thereby contributing to the elucidation of social and cognitive processes that affect a user's perception of the system's usefulness. Integrated PU predictor variables included Subjective Norms, Voluntariness, and Image, which reflected social influences, while cognitive influences were represented by Job Relevance, Output Quality, Result Demonstrability, and PEOU. Moreover, TAM2 addressed another of the gaps in the original TAM model by integrating moderators such as voluntariness and experience. Although TAM2 was formulated in an organisational setting, the voluntariness construct, allowed the reflection of the possible influence of voluntary or mandatory compliance on individual behaviour. As for experience, it was expected to influence PU and BI through the moderation of their relationship with SN. The proposed TAM2 model is shown in figure 2-12, and its constructs can be understood as follows:

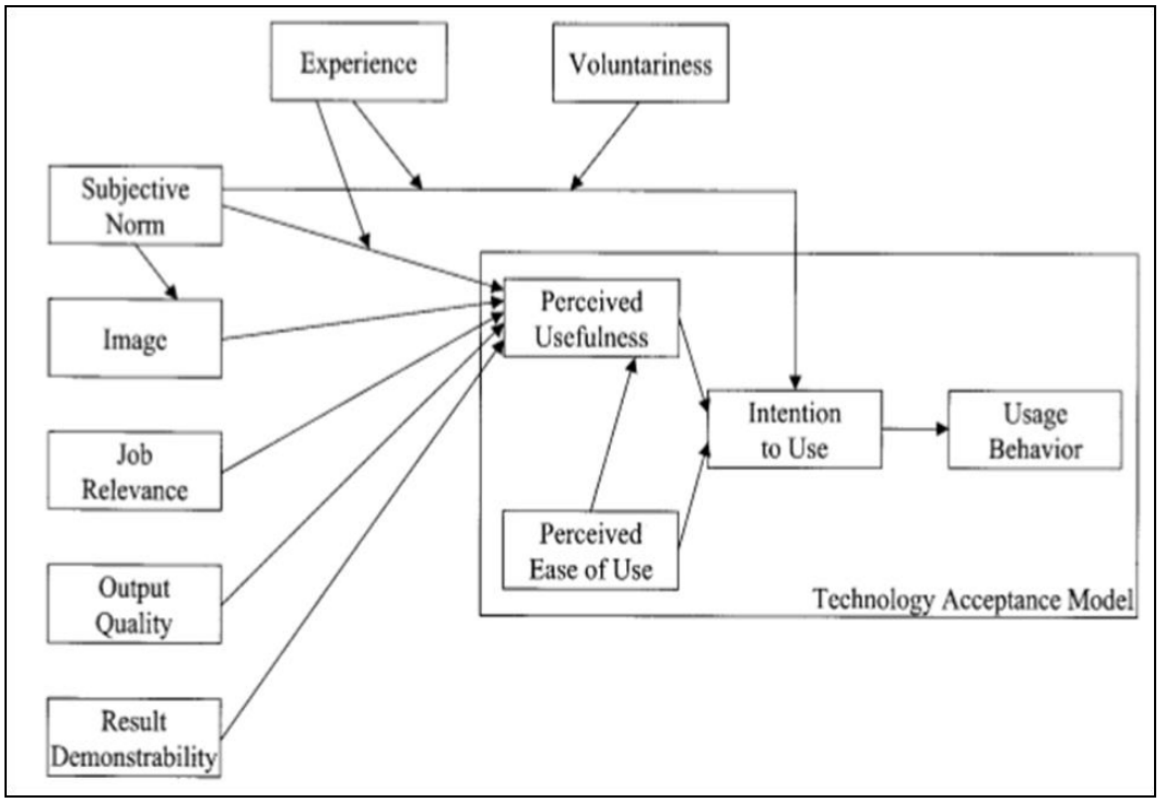

Figure 2-12: The Extended Technology Acceptance Model

Voluntariness can be defined as the extent to which potential adopters perceive the adoption decision to be non-mandatory. Image can be defined as the degree to which the use of an innovation is perceived to enhance one's status in one's social system. Job Relevance is the reference to an individual's perception regarding the degree to which the target system is relevant to his or her job. Output Quality is the degree to which an individual believes that the system performs his or her work tasks well. Result demonstrability is the Tangibility of the results of using the innovation. Subjective norm is a person's perception that most people who are important to him think he should or should not perform the behaviour in question.

The process of internalisation was suggested to modulate the indirect effect of SN on BI through PU (Venkatesh & Davis, 2000). In fact, it was postulated that internalisation, and not compliance, occurs in both voluntary and mandatory settings. In other words, an individual's acceptance of a particular technology or system is due to the congruence between the system and the user's values, or "internalisation," and not the expected outcome (i.e. reward or punishment) of system usage, or "compliance" (Kelman, 1958, p.54). Social influences could thus affect a user's perception of system usefulness and by extension, promote usage intentions even in the context of mandated system use.

Venkatesh and Davis' (2000) TAM2 framework greatly improved the explanatory power of the original TAM. In fact, TAM2 could explain up to 60% of the variance in PU and 34 to 52% of the variance in usage intention. More importantly, TAM2 was successfully adopted and applied in various settings, such as the health sector field (Chismar & Patton, 2003), on-line analytical processing technology (Hart & Porter, 2004), as well as various mobile technologies (Rouibah, Abbas, & Rouibah, 2011; Ducey & Coovert, 2016; Trakulmaykee & Benrit, 2014).

2.2.7.1 *Limitations of TAM2:*

Despite its marked improvement, the limitations of the original TAM model, including the issue of self-reporting, could be discerned in TAM2. Moreover, TAM2 still assumed BI to be the only predictor of actual use despite the possibility of non-volitional factors affecting this construct. It is also important to note that while added constructs contributed to the elucidation of PU's antecedents, TAM2 neglected to examine their possible direct relationship with BI.

2.2.8 Technology Acceptance Model 3 (TAM 3)

Building on previous research, TAM and TAM2 were further extended and developed into a more comprehensive model known as TAM3 (Venkatesh & Bala, 2008). TAM3 combined the determinants of PEOU (i.e. (Computer Self-Efficacy, Perceptions of External Control, Computer Anxiety, Computer Playfulness, Perceived Enjoyment, and Objective Usability) proposed in the work of Venkatesh (2000) with the TAM2 model advanced by Venkatesh and Davis (2000).

While TAM3 exhibited high similarity to its predecessor TAM2, two external variables were added to the previous model, namely anchor and adjustment. As shown in Figure 2-14, PEOU could be explained by anchor, which included computer self-efficacy, perceptions of external control, computer playfulness, and computer anxiety. Moreover, it can be predicted by adjustment, which included objective usability and perceived enjoyment (Venkatesh & Bala 2008). TAM3 also accounted for the moderating influence of experience between constructs from the anchor and adjustment categories in an effort to better explain the adoption behaviour among employees. These extensions and modifications of the TAM model were suggested to ensure a comprehensive nomological network (integrated model) affording managers with valuable insights into the determinants of technology adoption and use on an individual level.

2.2.8.1 *Limitations of TAM3:*

While theoretically sound, TAM3 remains a relatively new theory with a limited number of studies validating its applicability in different contexts. The model was empirically validated among non-academic participants from an organisational setting, such as financial services companies, accounting service companies, manufacturing companies, and international investment banking firms.

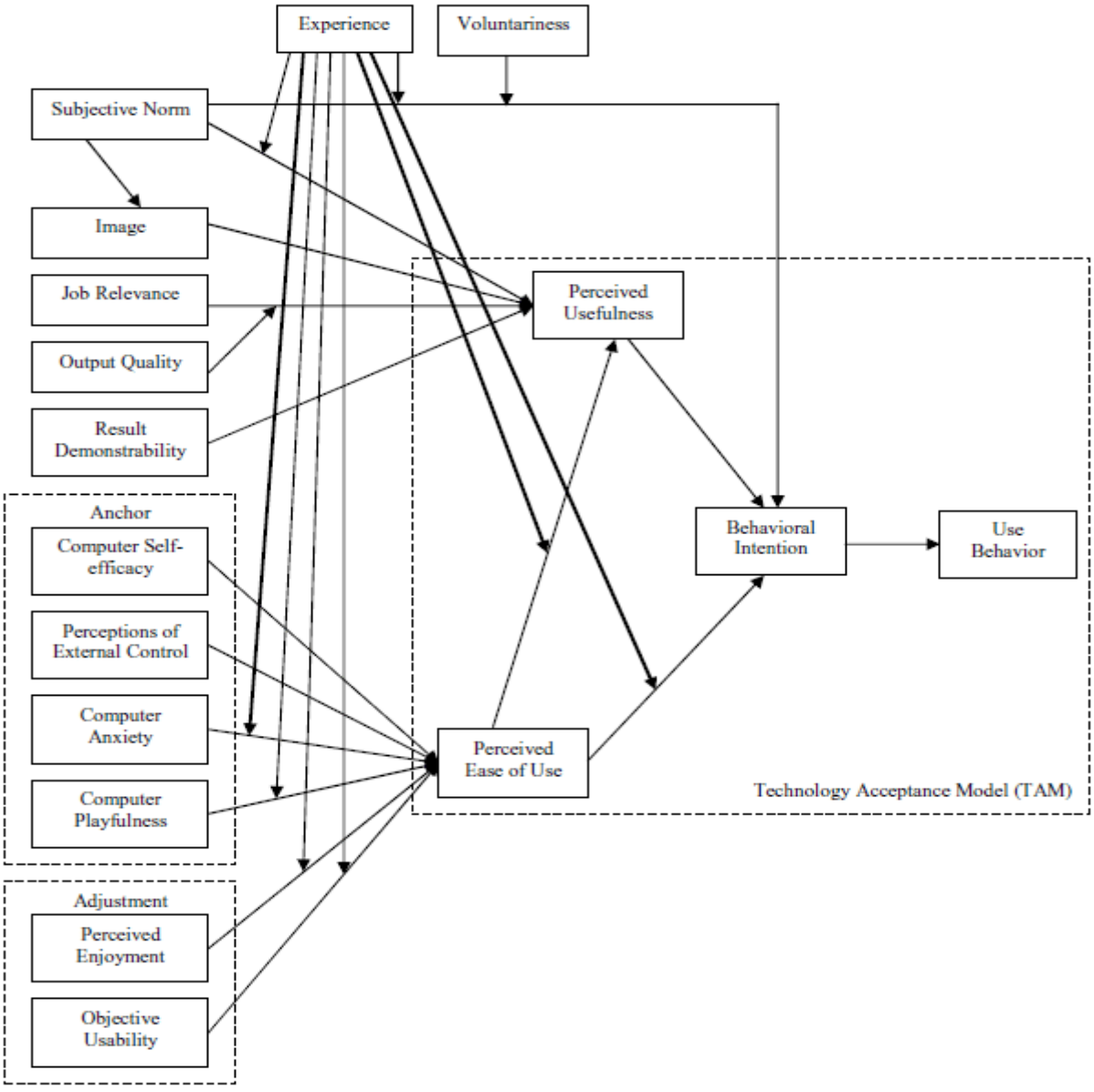

Figure 2-13: Technology Acceptance Model 3 (TAM3).

2.2.9 Augmented TAM (A-TAM)

Following their examination of the decomposed model of TPB as well as its comparison to TAM Taylor and Todd (1995a and b), Taylor and Todd (1995c) undertook the combination of the TPB (Ajzen, 1985; 1991) and TAM (Davis, 1989) in what became known as the Augmented TAM (A-TAM). The latter was developed in order to bridge the gap in previous literature, which predominantly investigated the predictors of technology usage among experienced users and neglected to account for the significant influences of SN and PBC (Moore & Benbasat, 1991; Taylor & Todd, 1995b).

As such, A-TAM was empirically validated among both experienced and inexperienced users of information technology. While applicable in predicting the behaviour of potential users and those familiar with the technology, noticeably different behavioural patterns were evidenced between the two groups. Experience, or past behaviour, can thus significantly modulate current behaviour and BI, which were higher among experienced users. Conversely, the influence of PU and PEOU was more powerful among inexperienced users, while the effect of SN on BI and the relationship between PEOU and PU were comparable between both groups (Taylor & Todd, 1995c).

Experience thus provides valuable insights for the prediction of future behaviour (Bajaj & Nidumolu, 1998), even in individuals lacking familiarity and previous usage of a particular technology (Taylor & Todd, 1995c). The moderating effect of experience could be attributed to the alleviation of the burden of uncertainty by increasing education and knowledge (Pappas, Pateli, Giannakos, & Chrissikopoulos, 2014). Consistently, a higher familiarity with technology directly limits the influence of its perceived ease of use by users (Wu & Wang, 2005), including individuals from developing countries (Park, Roman, Lee, & Chung, 2009).

2.2.9.1 *Limitations of A-TAM:*

While A-TAM emphasises the importance of accounting for differences in experience levels when predicting technology acceptance, the empirical validation of this model remains limited to a particular population, namely students. Moreover, A-TAM does not consider the influence of other potentially significant moderating factors in the context of adoption behaviour, such as age, gender, and education.

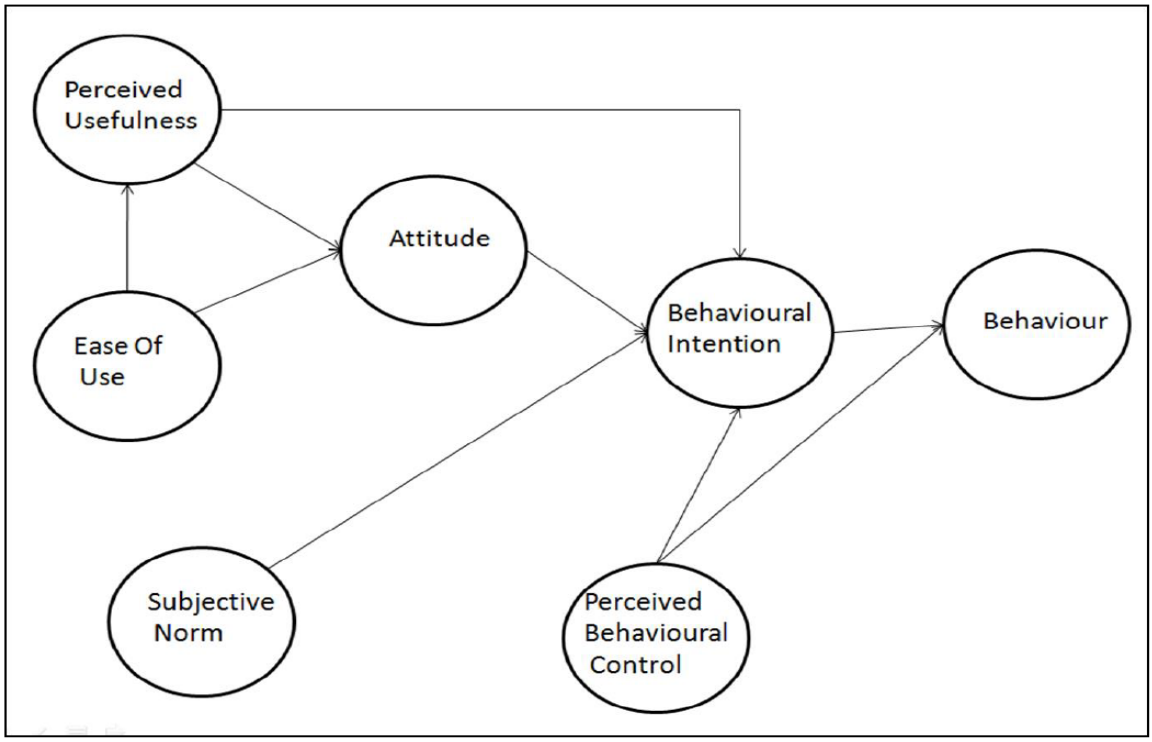

Figure 2-14: A-TAM

2.2.10 The Model of PC Utilization (MPCU)

Thompson et al. (1991) improved upon the Theory of human behaviour proposed by Triandis' (1977; 1979) and thus formulated the Model of PC Utilisation (MPCU). This model was intended to predict usage of personal computers (PC) as opposed to behavioural intentions, which distinguished the MPCU to other theories. As shown in figure 2-15, the MPCU examines a number of constructs in relation to PC utilisation, including Job fit, complexity, long-term consequences, affect towards use, social factors and facilitating conditions. Job fit was used to reflect the degree of support PC utilisation offers an individual in his or her performance of a particular task, while long-term consequences accounted for the outcomes of system usage. The latter were recognised to decrease in power with the increase in the time of system use, which was also negatively affected by the complexity of the task. As for the 'affect towards use' construct, it represents the array of emotions experienced during usage and includes both positive (e.g. joy, pleasure), or negative (e.g. hatred) emotions. Moreover, the MPCU recognised the influence of habit on PC utilisation albeit without the inclusion of this factor in their analysis due to measurement difficulties (Thompson et al., 1991).

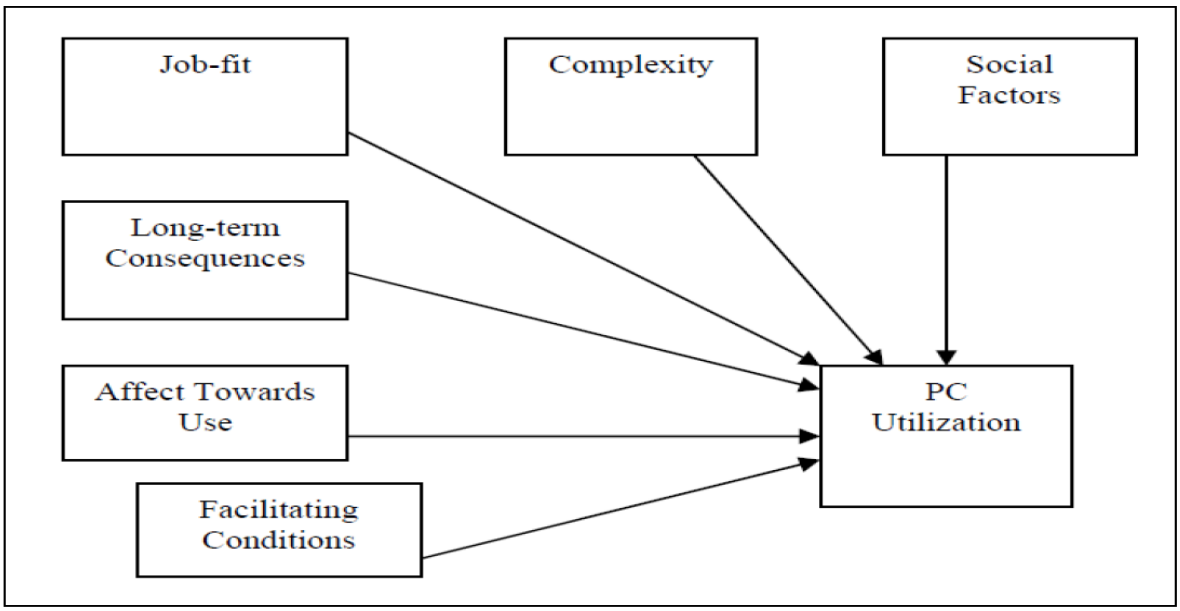

Figure 2-15: The Model of PC Utilisation

The investigation of Thompson et al. (1991) revealed that PC utilisation was most strongly predicted by Job fit, whose influence superseded that of complexity. Conversely, not all proposed model constructs were demonstrated to be significant for PC users, with facilitating conditions and affect failing to account for system usage in the studied framework. That being said, the mediating effect of facilitating conditions and effect on PC usage was later demonstrated via an extended MPCU, which accounted for and highlighted the importance of prior experience with PCs when characterising usage behaviour (Thompson, Higgins, & Howell, 1994). This was observed along with the significant role of social factors, complexity, long-term consequences, and job fit on PC usage, all of which modulated the relationship between experience and actual PC utilisation.

2.2.10.1 *Limitations of the MPCU:*

The applicability of the MPCU is evident in different information technology areas (Marques, Villate, & Carvalho, 2011). However, the model was primarily formulated to predict usage in relation to personal computers. Moreover, it was recognised that the MPCU does not account for individual effort, price value and behavioural competencies implicated in the adoption of mobile banking. These notable limitations render the MPCU less suitable for the purposes of the present research

2.2.11 The Motivational Model (MM)

The Motivational Model (MM) was proposed by Davis et al. (1992) for the explanation of technology adoption in terms of intrinsic and extrinsic motivations. The latter are concepts advanced in the work of Deci (1971; 1972) and Deci, Cascio, & Krusell (1975), and were later defined by Davis et al. (1992) in their formulation of the MM. User perceptions leading to the performance of activity were referred to as extrinsic motivations. These include perceptions of the activity being "*instrumental in achieving valued outcomes that are distinct from the activity itself, such as improved job performance, pay, or promotions*" (Davis et al., 1992, p.1112). Extrinsic motivations involve expected outcomes and benefits to be obtained from the considered activity. Conversely, intrinsic motivations are dependent on a user's perceptions of enjoyment, particularly that which is expected to be derived simply from performing the activity itself (Davis et al., 1992). While fundamentally different, extrinsic and intrinsic motivations both exhibited a significant influence on behavioural intention.

The concept of the MM advanced by Davis et al. (1992) was later tested and extended by researchers, such as Igbaria et al. (1997), and Venkatesh and Speier (1999). The latter demonstrated the importance of intrinsic motivation in the early stages of training in an organisational setting. Particularly, intrinsic motivations were mood-dependent, which emphasised the importance of maintaining a positive mood in order to promote intrinsic motivations and intentions towards technology use. The MM and its existing applications demonstrate the role of intrinsic motivations, or enjoyment, and extrinsic motivations, or usefulness, in the determination of intentions towards a particular system. While investigated primarily in an organisational context, the findings of the MM remain arguably applicable on an individual level and should be investigated when predicting technology usage behaviour, as intended in the present research.

2.2.12 Unified Theory of Acceptance and Use of Technology (UTAUT)

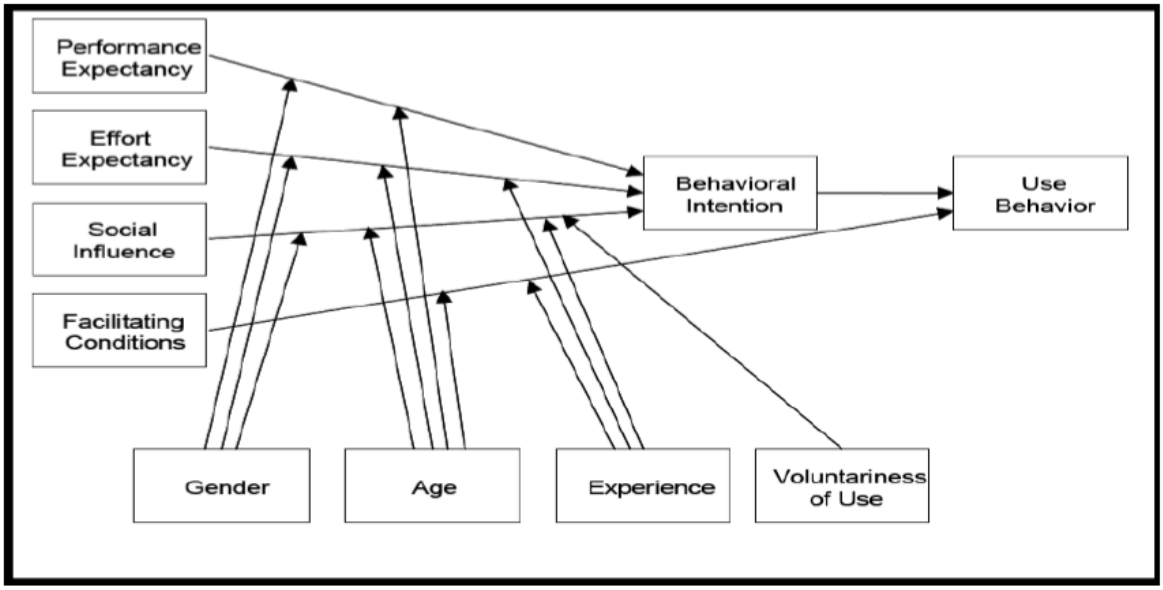

Figure 2-16: UTAUT model

The Unified Theory of Acceptance and Use of Technology was formulated by Venkatesh et al. (2003) in an effort to provide a comprehensive model incorporating constructs from available technology acceptance models. Following a review of eight models predominantly used in research investigating technology acceptance behaviour, the limitations of these frameworks were recognised, and their relevant constructs were synthesised into the proposed UTAUT model. The latter thus included constructs from the TRA, TPB, TAM, combined TAM - TPB, DOI, SCT, MM, and MPCU.

Four longitudinal studies served for the comparison of the eight models in an organisational context. Individuals included in the studies were those who had been introduced to a particular technology in the workplace, and their acceptance behaviour was subsequently examined at three time points. In other words, the UTAUT model examined potential, and not familiarised, users' intentions prior to technology acceptance or rejection (directly after training), then at one and three months after implementation. As for actual usage behaviour, the measurement was undertaken later, that is, six months after implementation, with the distinction made in the UTAUT study between voluntary and mandatory settings. It was consequently found that the majority of the examined models' predictive power was improved by the addition of moderating variables (i.e. experience, voluntariness, age, and gender).

Based on this study, 4 constructs were advanced as significant direct determinants of user acceptance and usage behaviour towards a particular technology. These factors were performance expectancy, effort expectancy, social influence, and facilitating conditions, while attitude, computer self-efficacy, and anxiety were dropped from the model (Figure 2-16).

Performance expectancy (PE) refers to the extent to which system usage is perceived by an individual to ensure benefit on the level of job performance. This construct effectively incorporates its counterparts from previous models, such as perceived usefulness from TAM, and combined TAM-TPB, extrinsic motivation from the MM, job-fit from the MPCU, relative advantage from the DOI, and outcome expectancy from the SCT. More importantly, PE was the most important predictor of behavioural intention towards technology use. This association persisted when examined directly post technology introduction, as well as several months after implementation. The model also reflected that the influence of PE was relevant when system use was voluntary or mandatory, with a notable variation in its role depending on gender and age in such a way that young and male workers were more susceptible to its effect.

As for effort expectancy (EE), it represents the perceived ease of system usage, much like TAM's perceived ease of use and DOI's and MPCU's complexity. Similar to PE, EE was a valid predictor of intentions regardless of voluntariness, significantly reflecting behavioural intentions in voluntary and mandatory system use, albeit at only one-time point (directly after training). In direct opposition to PE, EE's influence was highest among young women and older workers, with the additional moderating role of experience observed in this construct.

Social influence (SI) was defined as the extent of an individual's perception of other individual's belief in the necessity of system usage. SI incorporates subjective norms, originally proposed in the TRA, TAM2, TPB/DTPB, and combined TAM-TPB, social factors from the MPCU, and image from the DOI. SI was suggested to be relevant in mandatory and not voluntary contexts, considering its influence on early-stage compliance and individual technology perception in terms of reward and punishment. Moreover, all proposed moderators played an important role in SI's influence on behavioural intentions, as indicated by this construct's superior effect among women, older workers, and relatively inexperienced users.

Facilitating conditions (FC) reflects individual perceptions of available infrastructures, be they organisation or technical, for the support of system use. Through this construct, similar concepts from prevalent models were integrated, namely perceived behavioural control (TPB/DTPB and combined TAM-TPB), facilitating conditions (MPCU), and compatibility

(DOI). FC were suggested to play a significant role in the prediction of individual intentions towards voluntary and mandatory technology use, but only in the early adoption stages. This could be attributed to the contributing influence of EE and PE, which together limit the role of FC, despite the latter, is a direct influence on actual technology usage. As for moderating variables, FC had a stronger effect among older workers and users with higher experience levels.

While the UTAUT presented with some limitations, such as content validity measurement issues and the limitation of its findings to the organisational context, this model provided a vast improvement in the prediction capability of technology acceptance studies. In fact, UTAUT accounted for 70% of the variance in usage intentions, thus surpassing previous models whose explanatory power did not exceed 40%. Moreover, the UTAUT emphasised the importance of accounting for individual differences, such as gender, age, and experience, when examining adoption behaviour (Venkatesh et al., 2003).

2.2.12.1 *Limitations of the UTAUT:*

While the UTAUT model has provided researchers with a robust theoretical framework for the explanation of consumer intentions towards a technology since 2003, its proposed relationships could not be consistently demonstrated in existing literature (Williams, Rana, & Dwivedi, 2015) and do not account for the influence of individual factors (e.g. self-motivation, perceived playfulness). Moreover, existing studies offer limited evidence in terms of representability and practicality due to the predominant use of students in UTAUT studies (Williams et al., 2015). Further studies are required for the satisfactory validation of the constructs and robustness of the UTAUT, especially considering its relatively recent introduction to technology acceptance theories (Straub, 2009). The limitations of the UTAUT have been recognised by researchers (Negahban, & Chung, 2014), who also suggested the assessment of this model in different technological areas in order to enhance its explanatory power (Baptista & Oliveira, 2015).

2.2.13 Extended Unified Theory of Acceptance and Use of Technology (UTAUT2)

In order to address its limitation, the UTAUT was later extended in 2012 in an effort to explain consumer intentions towards IT (Venkatesh et al., 2012). To that end, the original UTAUT model constructs (PE, EE, SI and FC) (Venkatesh et al., 2003) were extended with three others, namely Hedonic Motivation (HM), Price Value (PV) and Habit, thereby enhancing the model's applicability to a consumer context (Figure 2-17). The UTAUT2 was tested among mobile phone users in China, attempting to explain their behavioural intentions and usage behaviour,

which constituted the model's two dependent variables. Owing to the inherent voluntariness of consumer technology adoption behaviour, voluntariness of use was eliminated as a moderating variable in the UTAUT2 model, which thus incorporated only age, gender and experience as moderators of model relationships.

Hedonic Motivation (HM) refers to the "*the fun or pleasure derived from using a technology*" (Venkatesh et al., 2012, p.161) and constitutes a significant antecedent of technology acceptance and use (Brown & Venkatesh, 2005), particularly among individuals (Hong, Thong, & Tam, 2006). Previous IS literature has contributed to the understanding of hedonic motivations, or perceived enjoyment, which were accounted for in the Motivational Model as "Intrinsic Motivation" and in the MPCU as "Affect". When examined in the conceptual framework of the UTAUT2, hedonic motivations predicted behavioural intentions more strongly than original UTAUT constructs, such as PE. Its role was also found to be moderated by age, gender and experience, seeing as it exhibited a stronger influence among younger users, with low experience and belonging to the male gender (Venkatesh et al., 2012).

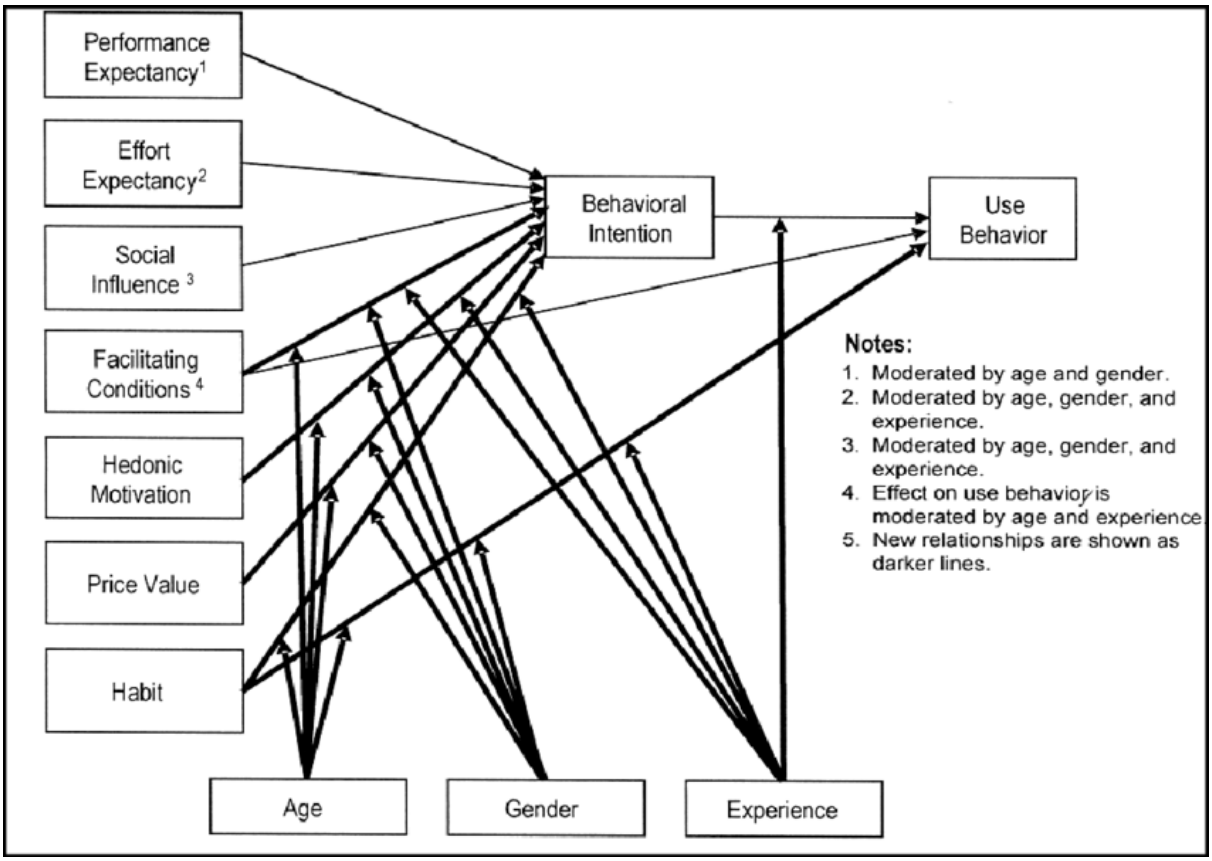

Figure 2-17: Extended UTAUT

The cost of using technology was recognised as an important consideration among consumers formulating their intentions towards adopting the system in question (Mallenius, Rossi, &

Tuunainen, 2007). Price value was thus defined as "consumers' cognitive trade-off between the perceived benefits of the applications and the monetary cost for using them" (Venkatesh et al., 2012, p.161). Positive price value reflects favourably and strongly on behavioural intentions, indicating higher perceived benefits to technology usage than its associated costs. Venkatesh et al. (2012) also showed that older women showed a prevailing susceptibility to the effect of price value.

The adoption of mobile technologies was shown to be dependent upon their price. This was reported in the context of m-commerce (Alkhunaizan & Love, 2012) as well as mobile phone technology penetration in the MENA (Middle East and North Africa) region (Hakim and Neaime, 2014). While cultural variables and GDP play an indisputable role in the determination of the extent to which a technology's cost affects its acceptance among consumers (Alrawabdeh, Salloum, & Mingers, 2012), adoption behaviour of users from developing countries remains more strongly predicted by price (Kalba, 2008).

In their development of the UTAUT2 model, Venkatesh et al. (2012) based their definition of habit on Limayem, Hirt, and Cheung's (2007) study and proposed this construct to represent "the extent to which people tend to perform behaviours automatically because of learning" Venkatesh et al. (2012, p.161). Repeated technology use over a chronological period results in the establishment of automatic behaviours, or habits, which significantly predict subsequent usage (Kim, Malhotra, & Narasimhan, 2005).

As explained by Venkatesh et al. (2012) Habits can be formed in following a repetitive performance of the behaviour, leading to the formulation of attitudes and intentions, albeit within the bounds of a stable environment. This was understood as Instant Activation Perspective (IAP), which can be distinguished from Habit/Automaticity Perspective (HAP) where the performance of behaviour becomes independent of the cognitive processes underlying intentions. These results in a direct effect on user behaviour and performance, particularly in the dynamic context of mobile devices where environment stability cannot be established (Venkatesh et al., 2012). Regardless, the role of habit as a direct predictor of both consumer behavioural intentions and use of mobile devices could be distinguished, with a superior effect among older, highly experienced men (Venkatesh et al., 2012).

2.2.14 Limitations of UTAUT2

The UTAUT2 remains a relatively new model. It thus cannot be expected that studies conducted within the short period since its publication in 2012 have managed to provide an

empirical validation of this model in various contexts, particularly cross-national and cross-cultural ones. A notable gap thus remains in UTAUT2 literature, especially pertaining to Arab consumers' intentions and usage of various ICTs.

2.2.15 Why UTAUT2

The UTAUT2 presents with several advantages when compared to its predecessors. This model exhibits significantly higher explanatory power when examining both consumer behavioural intentions and usage (74% and 52%, respectively); as compared to the original UTAUT model (56% and 40%, respectively). The UTAUT successfully consolidated eight technology acceptance models and behavioural theories while overcoming the limitations of its predecessors (i.e. the motivational model (MM) (Davis et al., 1992), the PC utilisation model (MPCU) (Thompson et al., 1991), the social cognitive theory (SCT) (Bandura, 1986), the integrated model of technology acceptance and planned behaviour (TAM-TPB) (Taylor & Todd, 1995b), the innovation diffusion theory (IDT) (Rogers, 1995), the theory of reasoned action (TRA) (Fishbein & Ajzen, 1975), the theory of planned behaviour (TPB) (Ajzen, 1991), and the technology acceptance model (TAM) (Davis, 1989). Technology usage and intentions could be explained through the scope of the UTAUT model while accounting for the influence of various moderating variables (Venkatesh et al., 2003; Venkatesh & Zhang, 2010).

Both the original and extended UTAUT models have been proven to have satisfactory capacity for the explanation of intentions towards different technologies in various cultural contexts. In the case of the UTAUT model, studied technologies include Internet Technology (Servidio, 2014; Touray, Salminen, & Mursu, 2013), Internet Banking (Tarhini et al., 2016; Martins et al., 2014), E-government (Faaeq, Alqasa, & Al-Matari, 2014) and Mobile Banking (Yu, 2012; Bhatiasevi, 2016; Raza, Shah, & Ali, 2019).

As for the UTAUT2, the model proved applicable in both organisational and consumer settings and have been employed to predict user behaviour in regards to e-services (Fakhoury & Aubert, 2017), Mobile banking (Baptista & Oliveira, 2015; Alalwan et al., 2017), Online shopping (Tarhini, Alalwan, Al-Qirim, & Algharabat, 2018; Singh & Matsui, 2018) Internet banking (Alalwan et al., 2014), smartphone (Ameen, Willis, & Shah, 2018) and e-learning (Raman & Don, 2013; El-Masri & Tarhini, 2017). Moreover, IS literature validated the applicability of the UTAUT2 in settings dissimilar to the one in which it was conceived, particularly that of Arab countries. In this distinct cultural setting, researchers have actually successfully applied UTAUT2 in the context of various technologies, such as Internet banking and mobile banking

(Kwateng et al., 2019; Alalwan et al., 2018; Baabdullah et al., 2019; Alalwan et al., 2018) mobile and e-commerce (Al-Sahouly, 2015; Alkhunaizan & Love, 2012), as well as mobile and e-learning services (Jawad & Hassan, 2015; Obeidat & Tarhini, 2016). Therefore, the UTAUT2 model was adopted in this research for the determination of mobile banking acceptance behaviour in a cross-national study design.

The following table 2-2 present examples of recent studies extending and applying the UTAUT2 with new constructs in different contexts, as shown in the researcher's recent publication.

Table 2-2: Recent studies extending and applying the UTAUT2

Authors	**Country**	**Domain**	**Extended constructs**	**Research method**	**Main findings**
Tavares and Oliveira (2016)	-	Electronic Health Record Patient Portal Adoption	Self-perception	A survey was completed by 360 health care consumers	Significant influence of performance expectancy, effort expectancy, habit, self-perception on behavioural intention. Habit and behavioural intention are significant predictors of use behaviour.
Mahfuz, Hu & Khanam (2016)	Bangladesh	m-banking Services	Website Quality Cultural dimension	220 samples collected through questionnaires were analysed by applied partial least squares (PLS)	Behavioural intention could be explained by performance expectancy, facilitating condition, and price value. Conversely, masculinity and uncertainty avoidance had no influence on this construct. The determinants of mobile banking adoption included power distance, but not effort expectancy.
Shaw & Sergueeva (2019)	Canada	mobile commerce	Perceived calculus	287 of 526 completed questionnaires analysed.	Perceived expectancy and perceived privacy concerns are significant antecedents of perceived value. Intention to use mobile commerce could be predicted by Hedonic motivation and perceived value.

Lee, Sung and Jeon (2019)	China	Food delivery software applications	Information quality	340 respondents using the delivery application for food purchases were surveyed and obtained data was analysed.	Information quality, performance expectancy, habit, and social influence are significant antecedents of users' continuous use intention towards food delivery apps
Talukder, Sorwar, Bao, Ahmed, and Palash (2020)	China	wearable healthcare technology	Wearable healthcare technology	325 experienced elderly wearable healthcare technology users were targeted through a cross sectional survey. Data was collected through questionnaires and online surveys and was analysed by the Artificial Neural Network (ANN) approach in addition to PLS-SEM.	Behavioural intentions were positively influenced by social influence, performance expectancy, functional congruence, self-actualization, and hedonic motivation while technology anxiety and resistance to change consisted negative predictors. effort expectancy and facilitating conditions were insignificant factors in this context.
Weinhard (2017)	Germany	Pervasive retail systems	Perceived privacy Risk Trust Willingness to provide personal information	A survey was completed by 252 University students	Usage intention was most significantly influenced by the willingness to provide personal information and hedonic motivation. Willingness to provide personal information most predicted by Personal interest and trust.
Dhiman, Arora, Dogra, & Gupta (2019)	India	Smartphone fitness apps	Self-efficacy and personal innovativeness	324 samples collected through an online survey and subjected to statistical analysis.	Effort expectancy, social influence, perceived value, habit, and personal innovativeness (strongest predictor) directly explain the adoption intention of smartphone fitness app, as opposed to performance expectancy, facilitating conditions and hedonic motivation.

					Interco struct relationships include that between personal innovativeness and habit, self-efficacy and effort expectancy as well as effort expectancy and performance expectation.
Soodan & Rana (2020)	India	e-wallet	Perceived security general privacy perceived savings	613 students provided data through a survey which was then subjected to confirmatory factor analysis	The intention to adopt e-wallets was positively predicted by hedonic motivation, followed by perceived security, general privacy, facilitating conditions, performance expectancy, perceived savings, social influence, and price value. Habit and effort expectancy emerged as negative predictors.
Singh, Alryalat, Alzubi, and Sarma (2017)	Jordan	Consumers' Online Purchase Intentions	Trust	A survey was completed by 284 university students and staff	Performance expectancy, social influence, facilitating conditions significantly influence consumer perceived trust. Effort expectancy, perceived trust, and perceived value significantly influence online purchase intentions.
Alalwan, et al. (2018)	Jordan	Customers' intentions and adoption of internet banking	Risk	A survey was completed by 348 potential and actual users of internet banking	Significant influence of performance expectancy, effort expectancy, hedonic motivation, price value, and perceived risk on behavioural intention. No significant influence associated with social influence.
Gharaibeh & Arshad (2018)	Jordan	Intention to use mobile banking	Media Trust	A survey was completed by 579 banking customers	Significant influence of mass media, trust performance expectancy, effort expectancy, social influence, facilitating conditions, hedonic motivation on intention to adopt mobile banking.

Eneizan, Mohammed, Alnoor, Alabboodi, & Enaizan (2019)	Jordan	Mobile marketing	Trust Risk	321 respondents provided data included in the analysis	Performance expectancy, effort expectancy, hedonic motivation, social influence, price value, facilitating conditions, habit and risk, but not Trust, predict adoption intentions towards mobile marketing.
Warsame and Ireri (2018)	Kenya	Mobile microfinance services	Trust	A survey was completed by 400 shopping centre business owners	Gender age and religion established as significant moderators of the relationship between PE and behavioural intention. No significant moderating effect of gender, religion, and age on the relationship between trust and loan services usage.
Merhi, Hone & Tarhini (2019)	Lebanon and England	Mobile banking	Security, privacy and trust	901 mobile banking users from Lebanon or England completed an online survey and a self-administrated questionnaire.	Behavioural intention towards adoption of mobile banking services could be predicted by habit (HB), perceived security (PS), perceived privacy (PP) and trust (TR) in both contexts. Performance expectancy (PE) played a significant role in Lebanon but not in England; whereas the opposite held true in the case of price value (PV).
Ain, Kaur and Waheed (2016)	Malaysia	learning management system (LMS)	learning value	A quantitative examination of the intentions of LMS users using a closed-ended questionnaire.	performance expectancy, social influence, facilitating conditions and learning value play an important role in determining students' intention towards LMS
Beh, Ganesan, Iranmanesh, and Foroughi (2019)	Malaysia	Smartwatches for fitness and health monitoring	Perceived vulnerability perceived security	271 users and non-users of smartwatches were surveyed using a printed questionnaire. collected data was analysed using PLS-SEM.	Behavioural intentions were positively influenced by performance expectancy, effort expectancy, facilitating conditions. Perceived vulnerability was a positive moderator of effort expectancy. Perceived abstract severity was a positive moderator of social influence's effect and a negative moderator of hedonic motivation's influence.

Abushakra & Nikbin (2019)	Oman	IoT	IT Knowledge	Data collected from 110 entrepreneurs via a survey.	Performance Expectancy, Social Influence, Facilitating Conditions, Hedonic Motivations, Habit, and IT Knowledge are significant antecedents of acceptance and adoption of Internet of Things.
Arain, Hussain, Rizvi, and Vighio (2019)	Pakistan	Mobile learning	Ubiquity information quality system quality appearance quality satisfaction	A cross-sectional survey questionnaire yielded data from 730 engineering students. data was analysed using SEM.	Behavioural intentions influenced by performance expectancy, hedonic motivation, habit, ubiquity and satisfaction. satisfaction was in turn affected by information quality, system quality and appearance quality.
Alasmari & Zhang (2019)	Saudi Arabia	Mobile learning	Mobile learning technology characteristics	Explanatory sequential mixed-method empirical study among college students. 1203 online survey and 15 individual interview participants.	Significant influence of learning expectancy, effort expectancy, social influence, and characteristics of mobile learning on behavioural intention as opposed to facilitating conditions and self-management of mobile learning. Significant moderating effect of gender on social influence with men exhibiting higher behavioural intention to use mobile learning.
Baabdullah et al. (2019)	Saudi Arabia	Mobile government	Perceived risk Innovativeness	A survey was completed by 418 bank customers from three cities	Performance expectancy, effort expectancy, social influence, facilitating conditions, Hedonic motivation, price value, innovativeness, and behavioural intention were significant predictors of actual customer usage.

Palau-Saumell, Forgas-Coll, Sánchez-García, & Robres (2019)	Spain	mobile applications for restaurant searches and/or reservations (MARSR)	Perceived credibility and the social norm	Data from 1200 users of MARSR from Spain was collected and analysed by structural equation modelling (SEM).	MARSR use could be significantly predicted by habit, perceived credibility, hedonic motivation, price-saving orientation, effort expectancy, performance expectancy, social influence, and facilitating conditions. Habit, facilitating conditions, and intentions to use. Multi-group analysis revealed the moderating role of different variables, namely gender, age, and experience.
Chea and Luo (2019)	United States	Use software applications	Activation Pleasantness	Online survey 80 experienced and 76 inexperienced college students.	Activation significantly higher influence on intention to use in inexperienced users compared to experienced users. Pleasantness exhibited comparable influence in both groups.

2.2.16 DeLone and McLean IS Success Model

DeLone and McLean's IS success Model provides a comprehensive framework for the measurement of six dimensions of IS success, namely system quality, information quality, use, satisfaction, individual impact, and organisational impact. The latter were suggested following synthesis of previous work conducted on communication (Shannon & Weaver, 1949), information influence (Mason, 1978), and other determinants of a system's success. Through their model, DeLone and McLean suggest IS success to present with three distinct aspects. Technical success is reflected by system quality or the desired characteristics of the system in question. Semantic success is indicated by information quality, which is understood as the quality of information output from a particular system. As for a system's effectiveness, it is indicated by the use, satisfaction, individual impact, and organisational impact of this technology. As shown in Figure 2-18, DeLone and McLean (1992) also recognised the existence of a certain degree of interplay between the different dimensions of IS success. In fact, use and user satisfaction seem to mediate the relationship between the various components of information systems (i.e. the system itself, its output and its users) and individual and organisational performance.

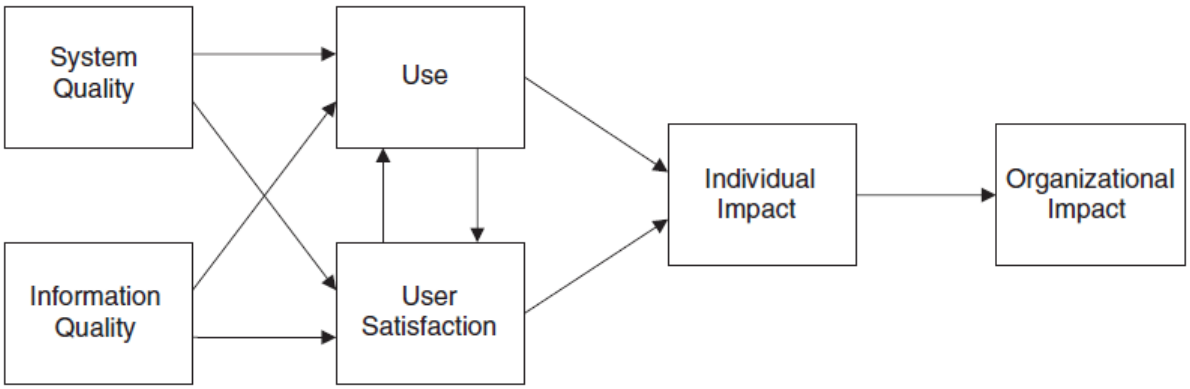

Figure 2-18: The D&M model

The model was later revised with the addition of service quality as a measure of IS success DeLone and McLean (2003). When examining the success of a single system, information quality or system quality are suggested to be the most adequate and consequential measures. While of less import in the investigation of individual systems, service quality could be the most indicative of the overall success of an IS department. The addition of the service quality construct was not the only modification to the original IS success model, as can be seen in Figure 2-19. The 'use' measure was replaced in the updated IS success model with 'intention to use', while individual impacts and organisational impact were combined into 'net benefits.

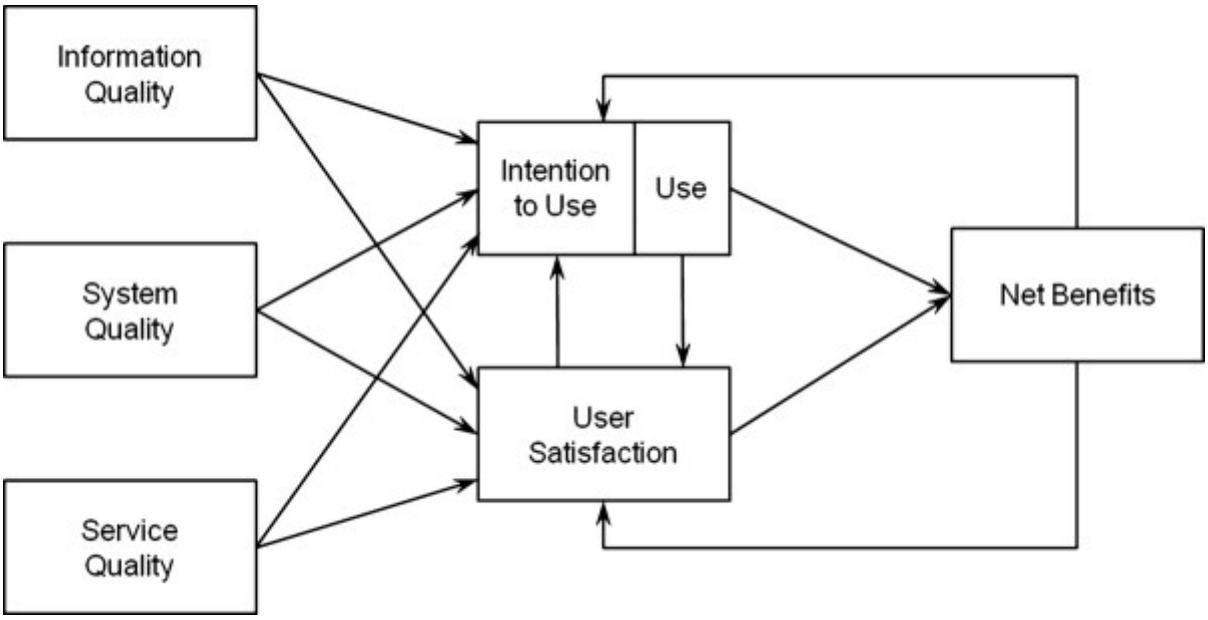

Figure 2-19: IS success framework, DeLone & McLean (2003)

Since its introduction, the DeLone and McLean IS success model (1992, 2003) has seen many applications in various technological fields, through which the validity of the relationships proposed therein, were reported. In the context of web-based decision support systems,

information and system quality, but not information presentation, were significant determinants of decision-making satisfaction Bharati and Chaudhury (2004). The framework of the IS success model has been employed individually in order to reflect the success of various technologies such as electronic health record (EHR) (Bossen, Jensen, & Udsen, 2013), learning success systems (Lin, 2007), online group-buying (Hsu, Chang, Chu, & Lee, 2014), implementation success of enterprise resource planning (Tsai, Lee, Liu, Lin, & Chou, 2012), and assessing call centres' success (Baraka, Baraka, & El-Gamily, 2013). Moreover, the DeLone and McLean model was successfully combined with existing theories for the investigation of satisfaction in m-banking (Tam & Oliveira, 2016; Damabi, Firoozbakht, & Ahmadyan, 2018), continuance intention of mobile payment service (Zhou, 2013), and electronic patient records acceptance behaviour (Maillet, Mathieu, & Sicotte, 2015).

However, few studies have non-selectively examined all the proposed relationships of the IS success model, despite the recognised need for the validation of this multidimensional construct (DeLone & McLean, 1992; 2003). One such example is the study of Chong, Cates, & Rauniar (2010), in which all DeLone and McLean model relationships were tested, albeit without the inclusion of the feedback loops from net benefits to use and satisfaction. In the context of Business to Customer (B2C) student loan industry, system quality could not be established to play a significant role in determining use or satisfaction. Moreover, net benefit was more strongly influenced by satisfaction than use, both of which remain interdependent (Chong, Cates, & Rauniar, 2010).

The DeLone and McLean model was otherwise modified in an effort to enhance its applicability to the technological setting of interest. When considering e-commerce, quality constructs and user satisfaction were supplemented with an additional measure, namely relationship quality (Wu, 2007). In the context of knowledge management systems, researchers saw fit to incorporate knowledge quality into the DeLone McLean IS success model as a replacement of information quality and net benefits Halawi and McCarthy (2007). Net benefits represent another IS success model construct that has received multiple modifications, such as its representation by member loyalty when assessing virtual community effectiveness (Lin, 2008), or perceived value and intention to continue using the system (Wang, 2008).

Regardless, extant literature supports the use of the DeLone and McLean IS success model for the investigation of the determinants of mobile banking applications success in the present research. To that end, three dimensions of IS success, namely information quality, system

quality, and service quality, will be integrated into an extended UTAUT2 model and tested in a cross-national context.

2.3 Chapter conclusion

Chapter 2 presented a review of banking history (Section 2.1.1), the drivers of its overhaul (Section 2.1.2), and expounded the concept of innovation, particularly in the context of financial services (Section 2.1.3). The evolution of Internet banking was then delineated in addition to its many advantages and drawbacks, as reflected by extant literature (Section 2.1.4). A similar approach was adopted for mobile banking (Section 2.1.5), followed by an examination of Lebanon and the UK in order to assess their corresponding banking sectors as well as mobile banking reality (Sections 2.1.6 and 2.1.7, respectively). Chapter 2 then continues with a brief review of the theoretical underpinning of available technology acceptance models and theories, which included the TRA, the TPB, the DTPB, the DOI, the SCT, the MM, the MPCU, TAM, TAM2, TAM3, A-TAM, the UTAUT, the UTAUT2 and the DeLone and McLean IS success model (Section 2.2).

2.4 Chapter 3 will provide an overview of the present study's theoretical framework.

Chapter 3 - **Theoretical Framework**

3.1 **Introduction**

This chapter presents an overview of the theoretical framework supporting the current research. Hypotheses were formulated based on empirical evidence reported by extant IS studies. The theoretical underpinning of UTAUT2 constructs, particularly in the context of mobile banking, was presented in Sections 3.2 through 3.8. The role of trust, perceived privacy and perceived security was developed in Section 3.9, Section 3.10 and Section 3.11, respectively. This was followed by the evaluation of IS success model constructs in Sections 3.12 through 3.14. The rationalisation of the chosen model constructs was complemented with that of chosen moderators, which were concisely touched upon in this chapter, particularly in the context of mobile banking in Section 3.16.

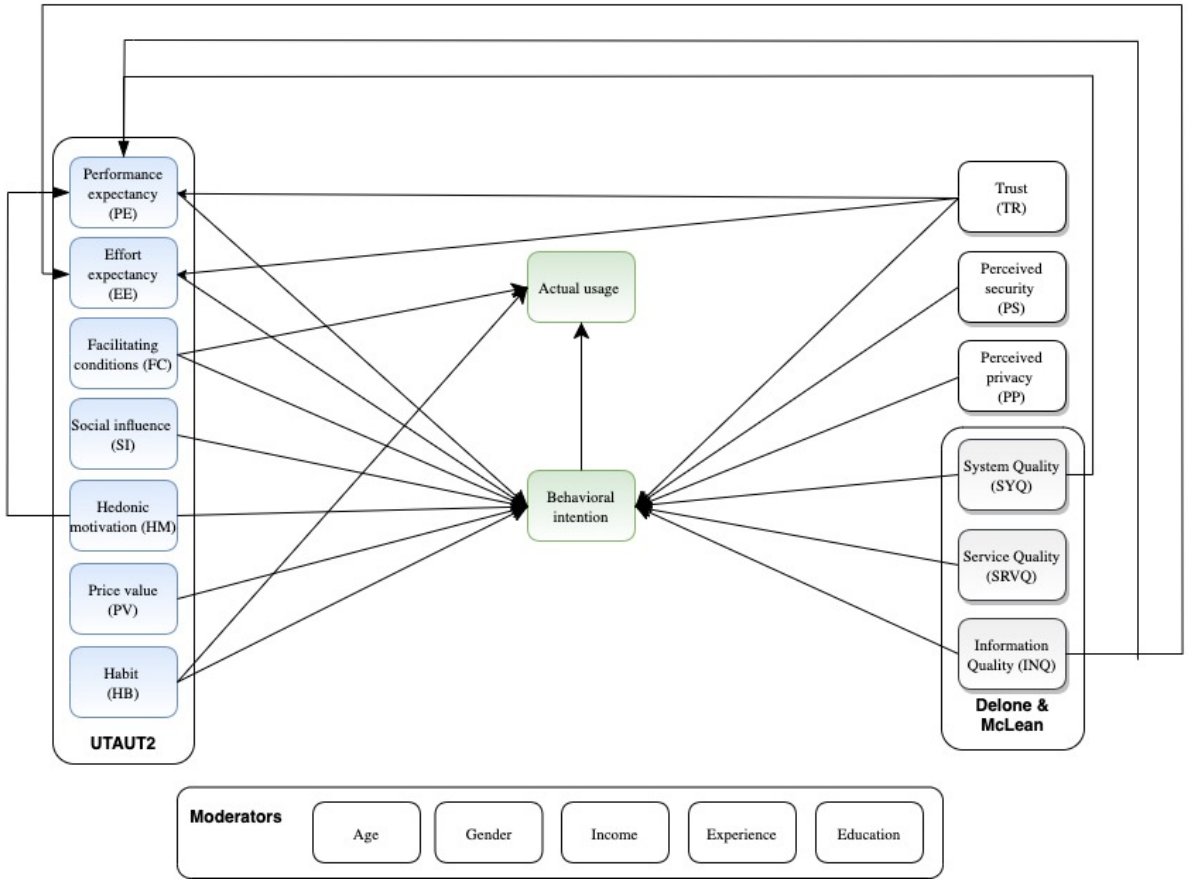

Figure 3-1: The proposed conceptual framework.

3.2 Performance Expectancy (PE)

Performance expectancy (PE) is the extent to which users of a technology perceive its use to confer added benefits and advantages to the performance of certain activities (Venkatesh et al., 2003). Individuals are more likely to adopt a technology that offers improved outcomes. Within the framework of our research, the performance expectancy of mobile banking could be understood as expedited and convenient completion of banking services (e.g. bank account access, money transfer, bill payment) without time or location restrictions. Empirical evidence supports PE as a significant predictor of behavioural intentions towards technology use and adoption (Ameen, 2017). This was demonstrated through the scope of prevailing technology adoption models and theories such as TAM, extended TAM (TAM2) and the UTAUT through their applications in various settings, (Venkatesh et al., 2003; Tarhini et al., 2016; Wong, Teo, & Russo, 2013; AlSoufi & Ali, 2014; Teo, 2011; Terzis & Economides, 2011; Venkatesh & Zhang, 2010; Yu, 2012).

The influence of PE on user intentions often supersedes that of other considerations, such as effort expectancy (Venkatesh et al., 2003). Researchers previously reported the significant role of PE in the formulation of user intentions towards various technologies, such as e-learning (Chu & Chen, 2016), mobile banking (Farah et al., 2018) and mobile marketing (Eneizan, et al., 2019). Through their study, Tarhini et al. (2016) reflected the predominant concerns of performance expectancy among Lebanese users, whose adoption of internet banking was enhanced when perceptions of its benefit improved.

Based on the above, more frequent mobile banking usage could be assumed should users believe they are benefiting from this activity, as reflected in the following hypothesis:

H1a, b: PE will significantly and positively influence the users' intention to adopt mobile banking in Lebanon (H1a) and the UK (H1b).

3.3 Effort Expectancy (EE)

Initially, Davis (1989) introduced perceived ease of use as a determining factor of user behaviour in his Technology Acceptance Model (TAM). Venkatesh et al. (2012) later defined Effort Expectancy (EE) as the degree of ease associated with the consumers' use of technology (Venkatesh et al., 2003). EE exhibits a significant influence on behavioural intentions to adopt a technology both directly (Venkatesh et al., 2003) and indirectly through its modulation of the system's perceived usefulness (Venkatesh & Zhang, 2010; Lin, Chen, & Nien, 2014).

Empirical applications of the UTAUT2 model validated this correlation, with users exhibiting positive attitudes and intentions towards technology adoption and perceiving it to be easy to use (e.g., Alalwan et al., 2017; Venkatesh et al., 2003, 2012).

EE thus seems to constitute a precise predictive factor of intentions to adopt new technology (Miltgen, Popovič, & Oliveira, 2013). In an academic setting, EE was an important determinant of student intentions towards electronic-based technologies (Al-Gahtani, 2016). Decreased adoption intentions were evidenced among Lebanese participants when the use of the system in question (e.g. e-learning and e-services technologies) was complex and difficult to navigate (Fakhoury & Aubert, 2017).

In a similar vein, a significant body of evidence supports its validity in the context of mobile banking and reflects its positive influence on the development of the initial willingness to use this technology (Abrahão, Moriguchi, & Andrade, 2016; Gharaibeh & Arshad, 2018; Farah et al., 2018). This was reported in Lebanon, where user motivations and intentions to use mobile banking technology were enhanced when it was perceived to be easy to use (Koksal, 2016).

Mobile service systems provide an efficient productive platform for the uncomplicated and accelerated completion of routine transactions, which reflects positively on the adoption of technologies such as mobile banking (Raza et al., 2017; Mutahar, Daud, Thurasamy, Isaac, & Abdulsalam, 2018). The prevalence of ease of use concerns could be attributed to the fact that mobile banking applications are inherently self-service-oriented, thus requiring a certain level of technology literacy and skills for the effective and unassisted navigation of their interfaces (Mutahar et al., 2018; Alalwan et al., 2017).

In addition to its positive modulation of perceived technology performance and quality, effort expectancy positively influences consumer attitudes through its alleviation of the perceived risk of innovative banking services, particularly among users from a developing country (Shaikh, Glavee-Geo, & Karjaluoto, 2018). Mobile banking applications thus seem to acquire heightened usefulness and require little effort to be used advantageously (Shaikh et al., 2018; Alalwan et al., 2017). These observations are consistent with extant IS literature (Davis et al., 1989; Eriksson, Kerem, & Nilsson, 2005), thus leading to the proposition of the following hypotheses:

H2a, b: Effort expectancy will significantly affect customers' BI to use Mobile Banking in Lebanon (H2a) and the UK (H2b).

3.4 **Social Influence (SI)**

The UTAUT model defines social influence (SI) as "*the extent to which an individual perceives that important others believe he or she should apply the new system*" (Venkatesh et al., 2003, p.450). Social pressure exerted from important referents surrounding an individual (e.g. friends, family, co-workers, media and social media), constitutes an undeniable driver of system or technology usage behaviour. This was evidenced in the context of various technologies (Talukder, Quazi, & Sathye, 2014; Baabdullah, 2018), examples of which include mobile banking (Sharma et al., 2017; Hassan & Wood, 2020) and Telebanking (Alalwan, Dwivedi, Rana, & Simintiras, 2016).

That being said, the role of social influence remains inconsistent in mobile and internet banking studies. Emerging as both a significant (Tarhini et al., 2016; Martins et al., 2014; Wingo, Ivankova, & Moss, 2017; Talukder et al., 2014) and inconsequential (Alalwan et al., 2017; Baptista & Oliveira, 2015) predictor of users' adoption behaviour. Conflicting evidence was reported even when examining user intentions within the bounds of the same population. In fact, Lebanese respondents exhibited a significant susceptibility to social influences when formulating their intentions towards internet banking adoption (Tarhini et al., 2016). Respondents concurrently presented with a degree of immunity to the role of normative pressure in the context of mobile banking (Koksal, 2016). Accounting for cultural variables, such as Hofstede's cultural moderators, could explain the fluctuating role of social influences. behavioural intentions towards mobile banking were shown to be the result of a population's cultural characteristics, such as individualism/collectivism, uncertainty avoidance and power distance (Baptista & Oliveira, 2015). Consistently, Lebanon presents with a distinct cultural profile distinguishing it from the UK, a high degree of collectivism, normativism and hierarchism (Hofstede Insight, 2019). These cultural variables could serve to predict the magnitude of social influences on the moderation of the adoption behaviour of e-learning (Tarhini et al., 2015) and internet banking users (Sankari et al., 2015). Such reasoning would imply that the impact of social influence would be more pronounced in Lebanese respondents. Regardless, social influence cannot be disregarded in the UK, where power distance and individualism levels still allow for the social environment to exert its influence. A study examining remote mobile payments in the UK actually found that social influence was a significant predictor of nonusers' adoption intentions (Slade et al., 2015). When looking at countries with a relatively similar profile to the UK in terms of power distance and

individualism, e.g. the US (Country Comparison - Hofstede Insights, 2020), the role of social influence as a significant driver of mobile banking usage intentions can be discerned (Hassan & Wood, 2020). Based on the above, the following hypothesis is proposed:

H3a, b: Social influence positively influences the behavioural intention to adopt mobile banking in Lebanon (H3a) and the UK (H3b).

3.5 Facilitating conditions (FC)

Venkatesh et al. (2003, p.453) in the UTAUT model defines the Facilitating Conditions (FC) as "*the degree to which an individual believes that an organizational and technical infrastructure exists to support the use of the system".* Literature affirms the core need of FC particularly in the formulation of intentions to use a technology (Onaolapo & Oyewole, 2018; Blaise Halloran, & Muchnick, 2018; Ameen & Willis, 2018; Baptista & Oliveira, 2015).

Mobile banking applications are no exception. The effective and uncomplicated use of these channels requires the availability of a robust technological infrastructure, as well as the various resources necessary to access mobile banking services (e.g. a fast and reliable internet connection, smartphone ownership). The pervasiveness of smartphones and social media use among Middle Eastern citizens reflected superior digitisation initiative when compared to their American counterparts (Digital McKinsey, 2016). However, shifting the digitisation charge to include businesses and governments has been met with great reluctance in the Middle East, which remains significantly out of the pace of benchmark countries such as the UK. Customers' enthusiasm for digital technology predict strong growth in this domain, consequently business efforts to increase ICT patent applications and enhance organisational infrastructure and innovation performance (Artz, Norman, Hatfield, & Cardinal, 2010).

Facilitating conditions were reported to be significant determinants of users' actual usage behaviour and intentions towards different digital technologies, such as internet banking (Tarhini et al., 2016), smartphones (Choudrie, Pheeraphuttharangkoon, Zamani, & Giaglis, 2014), e-learning services (Tarhini et al., 2015) and mobile learning (Iqbal & Qureshi, 2012). Based on this, the role of facilitating conditions could be expected to persist when investigating the antecedents of mobile banking adoption, thereby leading to the following hypotheses:

H4a, b: Facilitating conditions will have a positive influence on the behavioural intention to use mobile banking in Lebanon (H4a) and the UK (H4b).

H4c, d: Facilitating conditions will have a positive influence on the consumer use of mobile banking in Lebanon (H4c) and the UK (H4d).

3.6 Hedonic Motivations (HM)

According to Venkatesh et al. (2012), hedonic motivation, also referred to perceived enjoyment, is conceptualised as the feeling of cheerfulness, joy and enjoyment stimulated when using technology. HM is thus the fun or pleasure gained from using a particular technology with studies reflect higher intentions for prolonged technology use when the system was perceived to be enjoyable and playful (Celik, 2008). Incorporating hedonic elements in technological designs thus seem to promote the perceived ease of use, perceived usefulness and the price value of the system (Barua, Chellappa, & Whinston, 1995; Cheng, Sheen, & Lou, 2006; Venkatesh at al., 2000). In other words, technology exhibits enhanced usefulness, (i.e. better performance expectancy) when it was associated with playfulness and enjoyment (Alalwan et al., 2016; Koenig-Lewis, Marquet, Palmer, & Zhao, 2015; Cheng et al., 2006). This further supports the role of hedonic motivators such as playfulness and other intrinsic stimuli in the determination of the perceived productivity and value of a given technology (Barua et al., 1995). Most likely through the alleviation of the incidence and the burden of technology anxiety and perceived risk among its users.

Mobile phones are inherently entertaining and enjoyable technologies presenting a high degree of association with fun and pleasure among users (Hanudin, 2012). It makes sense that mobile banking adoption would be positively influenced by the incorporation of mobile phones' enjoyment characteristics into these applications' design (Slade et al., 2015; Alalwan et al., 2017; Ramírez-Correa, Rondán-Cataluña, Arenas-Gaitán, & Martín-Velicia, 2019). Kargin and Basoglu (2006) prioritise the HM element of using many mobile services, suggesting stronger adoption intentions among customers when these services are enjoyable. This explains the growing integration of HM in many mobile commerce adoption models in recent years. In the context of a developing country, hedonic technology elements positively influenced customers' perception of the performance and advantages of telebanking (Alalwan et al., 2016), as well as trust in internet banking (Sharif & Raza, 2017). This could explain the higher motivations of users towards internet and mobile banking use, particularly when fun and enjoyment could be derived from the technology (Alalwan et al., 2017; 2018).

The following hypotheses are thus proposed:

H5a, b: Hedonic motivation positively influences the behavioural intention to adopt mobile banking in Lebanon (H5a) and the UK (H5b).

H5c, d: Hedonic motivation positively influences performance expectancy in Lebanon (H5c) and the UK (H5d).

3.7 Price Value (PV)

Price value refers to the appraisal of a technology's perceived benefits in relation to the cost of using it (Dodds et al., 1991). PV was incorporated into the UTAUT model, through which the critical relationship between the price and the adoption of new technology was demonstrated (Venkatesh et al., 2012). It seems that increasingly positive price value improved consumer intentions and willingness to adopt the service or technology desired (Maillet et al., 2015). Using a technology incurs both direct and indirect costs on its users, through the cost of purchasing the service itself or associated gadgets and resources necessary for its use (e.g. smartphone, internet connection, data bundles).

However, mobile banking services are free services generally, delivered through readily available platforms while taking advantage of existing widely accessible IT infrastructures. As such, the role of price value seems to fluctuate with some studies reporting its insignificance in predicting consumer intentions towards mobile banking (Baptista & Oliveira, 2015), while others report its critical role in this context (Alalwan et al., 2017). The latter is consistent with empirical evidence from China; validating technology cost as a significant barrier to mobile payment acceptance (Hongxia, Xianhao, & Weidan, 2011). Low monetary costs, such as reduced fees and charges, enhance the perceived value of mobile banking, which by extension improves the sustained use of this technology (Kang, Lee, & Lee, 2012; Owusu Kwateng, Osei Atiemo, & Appiah, 2019).

The influence of price value on customer intentions and behaviour seems to depend on individual and population-wide perceptions of mobile banking cost. Data from both the UK and Lebanon have demonstrated price value as an inconsequential driver of mobile payment channels (Slade et al., 2015; Koksal, 2016), such as mobile banking. In Lebanon, mobile banking remains relatively novel and the cost of its usage could remain unrecognised among potential users, which could explain its failure to significantly modulate adoption behaviour (Koksal, 2016). Mobile banking costs include smart device ownership and any applicable data charges. Both of these resources are readily adopted by the Lebanese consumers, greatly

limiting the additional resources needed to access mobile banking services. That being said, the price value of mobile banking services is expected to be of increasing consequence as awareness of this technology and its associated expenses improves, thereby leading to the following hypotheses:

H6a, b: Price value positively influences the behavioural intention to adopt mobile banking in Lebanon (H6a) and the UK (H6b).

3.8 Habit (H)

Repeated use of a technology or a service induces accumulated learning, which is later exhibited by individuals as involuntary automatic behaviour, or habits (Venkatesh et al., 2012). Within the scope of the UTAUT2, empirical evidence demonstrated habit as a significant predictor of behavioural intentions towards new technologies (Wang, Harris, & Patterson, 2016; Yen & Wu 2016; Farah et al., 2018; Tarhini, Alalwan, Cao, & Al-Qirim, 2019), including internet banking (Gaitán et al., 2015).

Habits are learned behaviours and are considered an unconscious behavioural stimulus to achieve pleasing outcomes. Once customers use a particular technology more frequently, habits will be formed. It therefore makes sense that mobile devices are considered habit-forming gadgets, particularly in light of the brief repetitive usage sessions, checking behaviour and dynamic content involved in their use (Oulasvirta, Rattenbury, Ma, & Raita, 2012). This was supported in mobile technology literature where habit was found to significantly modulate consumer intention in contexts such as mobile financial services (Morosan & DeFranco, 2016) and mobile banking (Baptista & Oliveira, 2015).

The penetration of smartphones is established in the UK and is increasing among the Lebanese population. This could carry important implications regarding understanding mobile application usage, particularly due to the inevitable formation of mobile phone-induced habits. Habit seems to be an important consideration, particularly when examining the acceptance of a mobile-based technology such as mobile banking. Empirical evidence demonstrates the significant role of habit in the prediction of intentions towards a technology (Venkatesh et al., 2012; Wang, Malthouse, & Krishnamurthi, 2015) as well as e-learning services used in an English population (Tarhini et al., 2016). Consistently, the adoption behaviour of users utilising Lebanese e-government services provides support for the significant role of habit in Lebanon,

suggesting that technology implementation efforts should build upon established habits among targeted users (Fakhoury & Aubert, 2017).

Based on the above, the following hypotheses are proposed:

H7a, b: Habit will have a positive influence on the behavioural intention use of mobile banking in Lebanon (H7a) and the UK (H7b).

H7c, d: Habit will have a positive influence on the consumer use of mobile banking in Lebanon (H7c) and the UK (H7d).

3.9 Trust (T)

Trust is considered a subjective willingness to believe that an action will occur consistently with positive expectations (Köksal & Penez, 2015). This requires that a specific system exhibits a sufficient level of ability, benevolence and integrity (Gefen & Straub, 2003). Köksal and Penez (2015) distinguished between two types of trust in relation to mobile banking adoption; institutional trust and trust in the channel and technology. Institutional trust refers to the trust between users and the financial service providers (Chiu, Chiu, & Mansumitrchai, 2016) due to prior experience or good reputation. However, customers cannot rely on previous experience or knowledge-based trust when banks introduce a new financial innovation. Therefore, potential adopters' initial trust would be based on certain perceptions, emotional and irrational forces such as cognitive cues (Kim, Ferrin, & Rao, 2008).

Literature relating to technology acceptance and adoption found that trust is a crucial antecedent of BI (Yadav, Sharma, & Tarhini, 2016; Tarhini, Alalwan, & Algharabat, 2019; Hanafizadeh et al., 2014b; Luo, Li, Zhang, & Shim, 2010; Zhou, 2011; 2012, Venkatesh et al., 2012; Malaquias & Hwang, 2016). This was reflected in mobile banking studies, where initial trust significantly and positively affected the adoption of mobile banking (Alalwan et al., 2017; Hanafizadeh et al., 2014a; Akhtar, Irfan, Kanwal, & Pitafi, 2019; Sharma, 2019; Merhi et al., 2019). The influence of trust could be attributed to its inverse association with perceived mobile banking risk (Munoz-Leiva, Climent-Climent, & Liébana-Cabanillas, 2017), thereby implicating both trust and risk as key factors for decision-making. More importantly, the significant role of trust persisted in a cross-cultural context, strongly predicting mobile banking usage between a developing and developed country; Egypt and the United States, respectively (Hassan & Wood, 2020).

Trust was also found to indirectly and positively affect behavioural intentions through different constructs such as PE and EE (Chaouali et al., 2016; Luo et al., 2010; Alalwan et al., 2017) in view of its enhancement of perceived system advantages and efficiency. Digital banking studies reflected this relationship (Sharma, 2019; Maulana et al., 2019) with trust emerging as both a direct and indirect driver of consumer intentions of this risk-associated technology (Riffai, Grant, & Edgar, 2012). When electronic banking systems fail or users experience technical errors during technology usage, perceptions of system performance and ease of use become notably impaired (Lee & Wan, 2010). Trust thus seems to be intimately implicated in the acceptance of risky technology that provides financial services (Riffai et al., 2012).

Evidence from Lebanon indicates increasing mobile banking adoption when this technology was perceived to be trustworthy by consumers (Koksal, 2016). This is consistent with the positive correlation between trust and consumer attitude towards internet banking in Lebanon, both directly and indirectly through subjective norms (Sankari et al., 2015). Empirical evidence further supports the role of trust in mobile banking adoption intentions, which were most strongly predicted by this construct (Alalwan et al., 2017). Hence, the following hypotheses are advanced:

H8a, b: Trust will have a positive impact on users' intention to adopt mobile banking in Lebanon (H8a) and the UK (H8b).

H8c, d: Trust will have a positive impact on performance expectancy in Lebanon (H8c) and the UK (H8d)

H8e, f: Trust will have a positive impact on effort expectancy in Lebanon (H8e) and the UK (H8f).

3.10 **Perceived Privacy (PP)**

Westin (1968) defined privacy as the right to prevent the disclosure of personal information to others without explicit consent and prior approval. Privacy refers to an individual's right to control the collection and use of their personal information, its distribution and how it can be released. The concept of privacy is applicable in the context of digital and non-digital information. Modern societies greatly depend on electronic data, digital communication and technologies in daily activities. Privacy concerns have increased accordingly, particularly considering the sensitivity and the ethical implications of data disclosure in the modern age where information is highly sensitive and valuable (Wiesner, Zowalla, Suleder, Westers, &

Pobiruchin, 2018; Ali et al., 2019). Users are understandably apprehensive towards disclosing personal information in light of rising privacy issues as well as possible data misuse and personal information compromise by service providers and organisations (Khalil, Zia, & Abdallah, 2019).

Privacy concerns are prevalent and significantly influence user attitudes towards digital technologies, often leading to the rejection of the system in question as was shown in the case of e-commerce (Harris, 2004). This negative modulation of behavioural intentions could be attributed to the increased perceptions of risk when considering the use of a technology associated with privacy issues (Miltgen et al., 2013). Research from various settings has validated this association, supporting the prevalent role of privacy in m-commerce (Nassuora, 2013), e-health (Wilkowska & Ziefle, 2012) as well as mobile banking (Albashrawi & Motiwalla, 2019; Zhang, Lu, & Kizildag, 2018).

Data protection laws emerged as a natural response to growing privacy concerns and issues facing the optimal implementation of digital platforms. In the UK, the data protection act and the General Data Protection Regulation (GDPR) (Regulation (EU) 2016/679) (adopted in 1998 and 2018, respectively) control and regulate the manipulation of personal information by organisations and companies to ensure user privacy and fair data usage (General Data Protection Regulation - GOV.UK, 2018). However, according to the Universal Periodic Review Stakeholder Report, 23rd session, no laws exist in Lebanon for the regulation or the protection of personal data (The right to privacy in Lebanon, 2015). Nevertheless, the bank secrecy law legally binds Lebanese banks to refrain from sharing clients' personal data or account information with third parties.

Considering the prevalence of privacy concerns across various settings, technology adoption studies should consider the influence of perceived privacy when investigating the determinants of consumer behaviour. This holds particularly true in the context of mobile banking and mobile payment platforms, the prevailing concerns of data breaches and private information hacking associated to them (Eriksson et al., 2005; Mullan et al., 2017; Raza et al., 2017; Yousafzai & Yani-de-Soriano, 2012).

Therefore, the following hypothesis is advanced:

H9a, b: Perceived Privacy will influence on consumer's behavioural intention to adopt mobile banking in Lebanon (H9a) and the UK (H9b).

3.11 **Perceived Security (PS)**

Any threat creating a circumstance, condition, or event with the potential to cause economic hardship to data or network resources in the form of destruction, disclosure, modification of data, denial of service, and/or fraud, waste and abuse compromises the perceived security of the system in question (Kalakota & Whinston, 1996). Perceived security is a level of belief and trust in a web channel to handle and store sensitive information (Ameen, Raza, Shah, & Matilo 2019; Boonsiritomachai & Pitchayadejanant, 2017). Indeed, security breaches have been shown to be one of the prevailing barriers to the access of sensitive information by consumers on online or electronic channels, significantly influencing the adoption of various systems such as mobile technologies (Boonsiritomachai & Pitchayadejanant, 2017). One such example is that of m-commerce, the perceived security of which was a significant antecedent of adoption behaviour and intentions among its users (Wu & Wang, 2005).

Essentially, keeping sensitive information within mobile banking applications secure and safe from theft, vulnerability and data leakage must be diligently ensured seeing as any data breach results in customer financial losses. However, data theft and account breaches through hacking remain a definite possibility. It thus stands to reason that security concerns are prevailing impediments to mobile banking acceptance and growth, as reported in various studies (Maduku, 2016; Sun, Sun, Liu, & Gui, 2017). The role of perceived security remained consistent regardless of mobile banking usage frequency. This further emphasises the negative influence of a technology's associated financial risks on the formulation of usage intentions (Chen, 2013).

Enhancing user perceptions of mobile banking channels' security would further serve to promote trust in the technology, particularly in developing countries (Sharma & Sharma, 2019). In fact, Lebanese users exhibited some of the lowest intentions to adopt digital banking among Middle Eastern respondents, predominantly due to security concerns (Arabnet Business Intelligence, 2016). By ensuring digital banking security, both Lebanese and British users are expected to associate higher credibility when formulating their intentions to use internet banking (Tarhini et al., 2016) or similar technologies, such as mobile banking. Therefore, it can be assumed that:

H10a, b. Perceived Security positively influences the behavioural intention to adopt mobile banking in Lebanon (H10a) and the UK (H10b).

3.12 **Service Quality (SRVQ)**

Service quality is a crucial strategic competitive factor. Gronroos (1984), a pioneer on service quality research, identified two distinct service dimensions: technical and functional qualities. Technical quality is the extent to how well the service meets the customers' expectations, whereas functional quality is the extent to which service production and delivery process are perceived. Praeg (2010) indicated that service quality is perceived from a customer point of view through five quality dimensions namely; reliability, assurance, responsiveness, empathy as well as security and trust.

The SERVQUAL model, originally developed by Parasuraman, Zeithaml, and Berry (1988), allows the assessment of service quality through the determination of the degree of congruence between customers' expectations and the perceived service. Studies have shown that adequate service quality enhances customer satisfaction (Zhao, Lu, Zhang, & Chau, 2012) and trust in websites (Gao, Greenwood, Agarwal, & McCullough, 2015). This association persists when considering mobile-based technologies. In fact, service quality exhibits a significant indirect influence on mobile services usage intentions through its role as a strong predictor of customer satisfaction with these technologies (Lien, Cao, & Zhou, 2017; Arcand, PromTep, Brun, & Rajaobelina, 2017).

Electronic banking channels are not exempt from quality considerations, with service quality validated as one of the main determinants of continuance intentions towards internet banking services (Rahi & Ghani, 2019). Similar observations could be expected in the context of mobile banking, where service quality was demonstrated to significantly and positively predict mobile banking use through its effect on user satisfaction (Tam & Oliveira, 2016). Therefore, the following hypothesis propositions are advanced:

H11a, b: Service Quality will have a positive impact on the customer's intention to adopt mobile banking in Lebanon (H11a) and the UK (H11b).

3.13 **System Quality (SYQ)**

Petter, DeLone, and McLean (2008) identified system quality as the desirable characteristics of an information system. These characteristics comprise of ease of use, system flexibility, system reliability, ease of learning, intuitiveness, sophistication and response time (Petter, DeLone, & McLean, 2008; Ameen et al., 2018). Therefore, system quality corresponds to the quality of information processing by means of a system offering specific functions and features,

and a software that is user-friendly, easy to learn and provides ease of maintainability (Peters, Isik, Tonac, & Popovic, 2016).

By guaranteeing the organisational system and information quality, the acceptance of the system, as well as the efficiency and effectiveness of the organisational performance, is enhanced (Al-Mamary, Shamsuddin, & Aziati, 2014). Users exhibit higher inclinations to reuse e-commerce technologies when it is presented with good system quality owing to the latter's enhancement of customer satisfaction and perceived system value (Wang & Liao, 2008).

Mobile banking studies reflected similar correlations between system quality and improved consumer performance. This was evident on the level of user satisfaction and system usage (Baabdullah et al., 2019; Tam & Oliveira, 2016), as well as system ease of use (Tam & Oliveira, 2017). Van Deventer (2019) demonstrated that mobile banking system quality significantly predicted the technology's perceived usefulness, which then contributes to mobile banking usage intentions. Subpar system quality thus seems to complicate system use and hinder the completion of financial tasks, which along with its effect on user satisfaction and trust (Tam & Oliveira, 2017) could account for the modulation of mobile banking usage (Tam & Oliveira, 2017).

Based on the above, the following hypotheses are suggested:

H12a, b: System quality will influence customer's intention to use mobile banking positively in Lebanon (H12a) and the UK (H12b).

H12c, d: System quality positively influences performance expectancy in Lebanon (H12c) and the UK (H12d).

3.14 Information quality (INQ)

Information quality is identified by the quality of information system outputs. These are end-users' perspectives on characteristics such as relevance for decision making, understandability, accuracy, conciseness, completeness, currency, timeliness and usability (Al-Mamary, Shamsuddin, & Aziati, 2014). Lee and Baskerville (2003) affirmed the significance of information quality for organisations and information systems research.

Many studies proposed information system quality as one of the most important elements for organisations, as it leads to higher value creation with a markedly positive influence on system use (Petter & McLean, 2009; Tarhini, Alalwan, Shammout, & Al-Badi, 2019). High-quality

information systems seem to facilitate systematic user decision-making and boost productivity whilst reducing the time and effort required to complete a particular task (Peters et al., 2016).

Through the DeLone and McLean model, customer satisfaction could be predicted by high service and information quality, which thus indirectly ensures organisational benefits (Wang & Yang, 2016). This relationship was not reflected on the level of information presented (Lee & Chung, 2009), while information quality persisted as a significant antecedent of customer satisfaction in other contexts. The latter includes those pertaining to sensitive technology offering financial services, such as mobile banking, where information quality positively influenced customer trust in addition to their satisfaction with the system (Tam & Oliveira, 2017). Evidence thus suggests the need to provide customers with a smooth uncomplicated mobile banking experience through adequate information quality, accessibility and relevance in order to boost user satisfaction with the system.

The role of information quality was also evidenced on the level of behavioural intentions, where its influence on intentions towards e-government systems exceeded that of traditional technology adoption constructs (e.g. Performance expectancy, effort expectancy, social influence and facilitating conditions) (Alshehri, Drew, Alhussain, & Alghamdi, 2012). The influence of information quality on consumer intentions to adopt e-government systems and food purchasing was shown to be mediated by other constructs, such as perceived usefulness and ease of use (Lin, Fofanah, & Liang, 2011; Kang & Namkung, 2019). Information quality was demonstrated to also enhance perceptions of mobile banking usefulness (Zhou, 2011), in addition to internet banking continuance intentions (Rahi & Ghani, 2019).

In light of empirical evidence demonstrating the implication of performance expectancy and effort expectancy in the modulation of consumer intentions by information quality within the theoretical framework of UTAUT2, the following hypotheses are proposed:

H13a, b: Information quality will influence customer's intention to use mobile banking positively in Lebanon (H13a) and the UK (H13b).

H13c, d: Information quality positively influences performance expectancy in Lebanon (H13c) and the UK (H13d).

H13e, f: Information quality positively influences effort expectancy in Lebanon (H13e) and the UK (H13f).

3.15 **Behavioural Intention (BI)**

Behavioural intention (BI) was proposed as a reflective measure of behaviour towards a technology (Venkatesh et al., 2003, 2012), as well as actual system usage (Ajzen, 1991; Venkatesh et al., 2012). In information systems literature, behavioural intentions are indicative of an individual's motivation or inclination towards the execution of a specific behaviour or task. This correlation could predict actual technology use and behaviour as was reported in various studies investigating the determinants of the adoption of electronic-based technologies, such as e-government (Alzahrani & Goodwin, 2012; Nasri, 2014; Fakhoury & Aubert, 2015), e-learning systems (Tan, 2013) internet banking (Tung, Yu, & Yu, 2014) and mobile banking (Bhatiasevi, 2016; Farah et al., 2018; Merhi et al., 2019). As such, it is proposed that:

H14a, b: Behavioural intention will influence the consumer use of mobile banking in Lebanon (H14a) and the UK (H14b).

3.16 **Moderators**

Factors affecting the strength and direction of a correlation between two variables are referred to as moderators (Khan, Hameed, & Khan, 2017; Abubakar & Ahmad, 2013; Serenko, Turel, & Yol, 2006; Venkatesh et al., 2003). Accounting for the influence of moderators, such as demographic variables (e.g. age, gender, income, education), is a critical consideration in IS literature, with robust evidence conceptualising moderators in different studies (Khan et al., 2017; Schaper & Pervan, 2007; Venkatesh et al., 2003). The original UTAUT actually included age, gender and voluntariness in its theoretical framework, with experience later replacing voluntariness as a moderator of the extended UTAUT model (UTAUT2) (Baptista & Oliveira, 2015; Venkatesh et al., 2012). In the present research, the moderating role of age, gender, experience, education and income will be examined.

3.16.1 Age

Compelling evidence supports the role of age when examining the antecedents of user behaviour. Characterising age-mediated behavioural changes was suggested to support and potentiate efforts to enhance technology adoption and continued usage (Morris & Venkatesh, 2000). Technology adoption shows distinct demographic stratification, with younger age, higher educational attainment, as well as social and economic statuses found to be prevailing among early adopters (Rogers, 2010).

Age was integrated into the original UTAUT model as a moderating variable and demonstrated to exhibit a significant and direct influence on facilitating conditions, performance expectancy, social influence and self-efficacy (Venkatesh et al., 2003). Within the theoretical framework of the extended UTAUT model (UTAUT2), the moderating role of age was also evidenced at the level of hedonic motivations (Venkatesh et al., 2012) and could be explained by distinct differences in attitude towards technology between users of various age groups. The complexity of novel technologies naturally carries negative implications on behavioural intentions towards adopting it due to the stress and overload associated with it (Arenas-Gaitán, Peral-Peral, & Ramón-Jerónimo, 2015). This effect is dampened among younger users, who show a higher inclination towards internet-based technologies and skills (Morris & Venkatesh, 2000). The low technological literacy or experience of older users and their characteristic resistance to change (Trocchia & Janda, 2000) could account for the observed differences in adoption behaviour. This was shown in mobile technology and mobile banking studies, where older more mature respondents exhibited lower adoption and usage intentions when compared to individuals between 18 and 35 years of age.

The moderating role of age on the adoption or rejection behaviour of consumers translates to actual mobile banking adoption, which was markedly higher in younger users (Laukkanen, 2016). Internet banking researches also reported similar correlations between age and behavioural intentions towards current and future technologies (Talafha & Abu-Shanab, 2015). The novelty of mobile banking in Lebanon supports the possible moderating role of age in the formulation of consumer intentions. Evidence from similar contexts (e.g. Oman), reported that age was the most important antecedent of mobile banking adoption (Sharma et al., 2017). In an Arab context, younger users exhibit higher levels of comfort and technology literacy when compared to older customers (50 years and above) who struggle with the navigation of mobile banking applications that significantly limits their intentions and willingness towards system usage (Alalwan et al., 2017). That being said, the influence of age seems to be time-dependent, with the highest influence of this factor evidenced in the initial stages of adoption (Venkatesh, 2000). As time passes, older users gain experience and exhibit comparable technology adoption decisions to their younger counterparts (Venkatesh, 2000). This was supported by Hernández, Jiménez, and Martín (2011), albeit with an emphasis on the necessity of considering factors other than age when examining technology reluctance among older users. It can be argued that older users were previously young individuals inclined towards new technologies and had consequently amassed experience in their usage. This explains the comparable perceptions,

attitudes and adoption behaviour of older and younger users towards Information Technology (Hernández et al., 2011; Al-Somali, Gholami, & Clegg, 2009).

As such, IS studies have further explored the relationships underlying the moderating influence of age. When examining the acceptance of wireless financial services, perceived usefulness and perceived ease of use could be correlated to age (Kleijnen, Wetzels, & De Ruyter, 2004). This is consistent with reports of older users' higher concerns of effort expectancy and monetary cost when compared to younger users, who were particularly subjected to social influences (Venkataesh et al., 2003; Venkatesh & Zhang, 2010; Foon & Fah, 2011). Evidence from the UAE placed age as an important consideration when examining the use and intentions towards smartphones, particularly in terms of enjoyment (comparable to hedonic motivations), habit as well as price value despite relatively high income among respondents (Ameen & Willis, 2018). The superior influence of price value among older individuals suggests their adoption of a practical approach when considering technology adoption, as demonstrated in the context of Facebook commerce. Conversely, younger respondents seem to be more concerned about enjoyment as shown in different settings such as phone purchases (Trojanowski & Kułak, 2017) and mobile shopping (San-Martín, Prodanova, & Jiménez, 2015). In terms of habit, literature supports Ameen's findings in that older users are more susceptible to the influence of habit when formulating their intentions to us mobile purchases (Trojanowski & Kułak, 2017).

With increasing age, the complexities and financial risks of electronic banking technologies become significant barriers to technology acceptance and user satisfaction. Older users struggle to perceive the advantages of internet banking channels (Falk, Schepers, Hammerschmidt, & Bauer, 2007) considering their domineering apprehensions of risk and internet security (Hill, Beynon-Davies, & Williams, 2008). Mature users over 50 years of age seem to exhibit significant concerns regarding the disclosure of financial and personal information (Leppel & McCloskey, 2011) and report more difficulties in the navigation of reportedly confusing and complex online banking websites due to user-declared inadequate training (Gatsou, Politis, & Zevgolis, 2017). This was reflected in the level of trust, where influence on mobile banking user attitudes was significantly and negatively moderated by age (Chawla & Joshi, 2018). In another study, Internet Banking acceptance was more strongly affected by trust among younger users, while older users were more influenced by their perceptions of the technology's risks, security and privacy (Aboobucker & Bao, 2018). It is therefore critical that studies examine

the determinants of older users' intentions in order to guide age-appropriate design, development and delivery of technologies (Gatsou et al., 2017).

In regard to quality, perceptions of service quality and the importance it is accorded in the determination of technology adoption intentions seems to increase along with age (Ganesan-Lim, Russell-Bennett, and Dagger (2008). The opposite association was reported in the context of online community sites, where the perceived quality of the system and the information or services it provides was more evident among younger users in light of their higher technological capacities (Chung et al., 2010).

Based on the above, we aim to investigate the moderating, and not the direct, influence of age on model variables, as proposed in the original UTAUT2 model and late validated in various studies. Consistently, this logic is extended to the additional factors in our model, namely security, privacy, trust, service quality, system quality, information quality) we hypothesise that:

H1a1, H2a1, H3a1, H4a1, H5a1, H6a1, H7a1, H8a1, H9a1, H10a1, H11a1, H12a1, H13a1: **Age** moderates the relationship between (performance expectancy, effort expectancy, social influence, facilitating conditions, hedonic motivations, price value, habit, trust, perceived privacy, perceived security, service quality, system quality, information quality) and Behavioural Intention in the Lebanese context.

H1b1, H2b1, H3b1, H4b1, H5b1, H6b1, H7b1, H8b1, H9b1, H10b1, H11b1, H12b1, H13b1:

Age moderates the relationship between (performance expectancy, effort expectancy, social influence, facilitating conditions, hedonic motivations, price value, habit, trust, perceived privacy, perceived security, service quality, system quality, information quality) and Behavioural Intention in the British context.

H7c1, H7d1: Age moderates the influence of habit on USE in Lebanon and the UK.

H14a1, H14b1: Age moderates the influence of BI on USE in Lebanon and the UK.

3.16.2 Gender

Empirical evidence supports gender differences in the relationship between beliefs and the actual usage and the intentions towards technology and the internet (Venkatesh et al., 2003; Muscanell & Guadagno, 2012; Karjaluoto, Riquelme, & Rios, 2010). While both men and women are implicated in economic development (Robertson, Newell, Swan, Mathiassen, &

Bjerknes, 2001; Arora, 2012), distinguishable gender roles can be discerned in the technological aspects of this environment (Karjaluoto et al., 2010; Robertson et al., 2001).

In fact, men exhibit higher concerns about a technology's usefulness in light of their pragmatic nature (Sun & Zhang, 2006). This was evidenced in the context of web and online-based technologies, such as internet banking (Shih, 2008) and e-commerce (Rodgers & Harris, 2003). Men seem to be more task-oriented than women (Lynott & McCandless, 2000; Venkatesh et al., 2012) and were observed to predominate over the female gender in terms of online shopping usage and e-commerce activities (Hui & Wan, 2007; Zhang et al., 2011). Moreover, technology innovativeness significantly varies among users according to gender (Lee, Cho, Xu, & Fairhurst, 2010), with a higher propensity towards innovativeness evidenced among men (Lee, Cho, Xu, & Fairhurst, 2010).

On the other hand, women seek a technology that is easy to use owing to their susceptibility to social influences and its associated anxiety (Sun & Zhang, 2006). Similar associations were noted in a mobile learning setting (Wang, Wu, & Wang, 2009), which indicates that women are more reliant on external supporting variables such as facilitating conditions and social influences when compared to men (Venkatesh et al., 2012). The superior performance of men was previously noted in the context of computer usage, with researchers noting the dependence of women's confident IT use on their computer anxiety (Karjaluoto, Mattila, & Pento, 2002).

It is thus evident that gender moderates user motivations and beliefs towards online-based platforms (Sangwan, Siguaw, & Guan, 2009). The observed differences in technology perception and adoption behaviour emphasise the need to consider gender roles when implementing or marketing any given technology (Karjaluoto et al., 2010). Accounting for gender-mediated factors, such as perceived usefulness, subjective norms, ease of use and experience is particularly important in the short-term, where gender exhibits its highest influence (Venkatesh et al., 2000). The moderating role of gender was examined within the UTAUT2 framework, which extended its hypothesised influence to facilitating conditions, performance expectancy and price value (Venkatesh et al., 2012). Moreover, gender was demonstrated as a moderator of hedonic motivations' role in the original UTAUT2 framework (Venkatesh et al., 2012), as well as later studies in the context of e-commerce (Hwang, 2010), mobile shopping (Madan & Yadav, 2018). The influence of gender as a moderating variable was also shown to extend to both price value and habit in regard to the intention to use smartphone-mediated purchases (Trojanowski & Kułak, 2017). Women were more likely to

disregard technology price while men were more reliant on habits when establishing their intentions towards purchasing through their mobile phones (Trojanowski & Kułak, 2017). On the other hand, the adoption intentions of females were demonstrated to be more susceptible to privacy and security risks when considering both online and mobile payments (Lee, Lee, & Rha, 2019; Janda, 2008). In an internet banking context, a slight moderating effect places perceived trust as a more prevalence concern among male consumers when compared to females (Aboobuckera & Bao, 2018). Quality considerations have also shown gender-specific variations in IS studies, with women reported to be attentive towards information and service or product quality when compared to men (Juwaheer, 2011). Males emerge to be less detail-oriented than women when considering a product or technology, which could explain their lower quality requisites (Karatepe, 2011). Regardless, evidence shows that males are more concerned about functional service quality, which differs from the relational aspect that female satisfaction is susceptible to (Sánchez-Hernández, Martínez-Tur, Peiró, & Moliner, 2011). In addition to the hotel industry, the moderating influence of gender on user satisfaction was reflected when examining service, design and information quality in different settings such as banking (Karatepe, 2011), e-shopping (Heinrichs, Al-Aali, Lim, & Lim, 2016) and tourism (Kwok, Jusoh, & Khalifah, 2016).

While contradictory, the influence of gender seems to wane occasionally, particularly in the wake of the drastic changes in societal and technological behaviour (Bigne, Ruiz, & Sanz, 2005). The gender gap is rapidly closing in terms of technology usage, which has become comparable between men and women due to the pervasiveness of technologies in modern societies (Zhou & Xu, 2007). This suggests gender to be an irrelevant consideration when examining the adoption and the perception of new technologies (Shin, 2009; Kim, 2016; Bigne et al., 2005; Lip-Sam & Hock-Eam, 2011). In fact, empirical evidence supports comparable intentions and satisfaction with electronic- and mobile-based technologies between both genders (Lip-Sam & Hock-Eam, 2011; Lee, Cho, Xu, & Fairhurst, 2010; Marinković, Đorđević, & Kalinić, 2020). This could be attributed to the fact that mobile technology devices and applications have garnered a wide user base comprised of both genders (Faqih & Jaradat, 2015). Regardless, meta-analysis of available literature in the past decades showed that while decreasing, gender differences in attitude towards technology use still persist (Cai, Fan, & Du, 2017). Recent evidence actually supports gender as a moderator of multimedia technology for learning in a developed country such as the US (Park, Kim, Cho, & Han, 2019). As such, gender-mediated variations in user behavior cannot be completely disregarded.

However, Middle Eastern societies remain predominantly patriarchal with gender inequalities remaining characteristic of them from a socio-economic standpoint (Glas, Spierings, & Scheepers, 2018). Certain countries, such as Lebanon, Algeria and Tunisia, have shown marked improvements in gender equality when compared to other Arab nations (Glas, Spierings, Lubbers, & Scheepers, 2019). Examining the current role of gender in moderating behavioural intentions towards mobile banking in Lebanon would thus provide valuable insights into the influence of gender-related societal changes on technology adoption, particularly in comparison to the UK where the gender gap is practically non-existent. The following hypotheses are thus advanced:

H1a2, H2a2, H3a2, H4a2, H5a2, H6a2, H7a2, H8a2, H9a2, H10a2, H11a2, H12a2, H13a2:

Gender moderates the relationship between (performance expectancy, effort expectancy, social influence, facilitating conditions, hedonic motivations, price value, habit, trust, perceived privacy, perceived security, service quality, system quality, information quality) and behavioural intention in the Lebanese context.

H1b2, H2b2, H3b2, H4b2, H5b2, H6b2, H7b2, H8b2, H9b2, H10b2, H11b2, H12b2, H13b2: **Gender** moderates the relationship between (performance expectancy, effort expectancy, social influence, facilitating conditions, hedonic motivations, price value, habit, trust, perceived privacy, perceived security, service quality, system quality, information quality) and Behavioural Intention in the British context.

H7c2, H7d2: Gender moderates the influence of habit on USE in Lebanon and the UK.

H14a2, H14b2: Gender moderates the influence of BI on USE in Lebanon and the UK.

3.16.3 Experience

Experience has been conceptualised as the duration of use of a particular technology, which is often reflected in user familiarity and knowledge of the technology (Sun & Zhang, 2006). Researchers have expanded on this, defining experience as "*the cumulative experience that the person gains while working on a specific job, role, position, or project*". Studies previously noted distinct experience-dependent variations in technology usage, which was less significant for inexperienced users (Taylor & Todd, 1995a). The implication of experience in the formulation of user intentions towards technology was recognised in the UTAUT2 through the incorporation of experience as a moderating variable. Through the scope of the UTAUT2 model, experience emerged as a significant moderator of the relationship between various

model constructs (e.g. habit, facilitating conditions and behavioural intentions as well as actual usage).

Experience was found to act concomitantly with gender and age on the relationship between facilitating conditions and behavioural intention (Venkatesh et al., 2012). This is consistent with previous reports of these three variable's importance as moderates of technology adoption (Hall & Mansfield, 1975). It thus seems that users show a lesser dependency on facilitating conditions when their familiarity and knowledge of a particular technology increases in light of gained experience (Alba & Hutchinson, 1987).

Similarly, the TAM2 model included experience in its conceptual framework as a moderator, thereby incorporating the variation of a particular behaviour or task over time (Venkatesh & Davis, 2000). Researchers have proven experience to be directly correlated with behavioural, normative and control beliefs in addition to its role as a moderating variable (Igbaria & Chakrabarti, 1990; Taylor & Todd, 1995b; Venkatesh & Davis, 2000; Venkatesh et al., 2003; Venkatesh & Morris, 2000; Venkatesh & Bala, 2008). With increasing user experience, the implication of constructs such as perceived usefulness (Davis, et al. 1989; Davis, 1989; Igbaria, Zinatelli, Cragg, & Cavaye, 1997; Burton-Jones & Hubona, 2006), perceived ease of use (Venkatesh et al., 2003; Agarwal & Prasad, 1999), subjective norms (Taylor & Todd, 1995a, 1995b; Venkatesh & Davis, 2000; Venkatesh & Morris, 2000; Venkatesh et al., 2000) and perceived behavioural control (e.g., Taylor & Todd, 1995b; Venkatesh et al., 2000) in behavioural intentions and system usage decreases significantly. More importantly, experience enhances the association between behavioural intentions and actual usage (Davis et al., 1989; Taylor & Todd, 1995b; Mathieson, 1991; Venkatesh & Davis, 2000), leading to a marked increase in the influence of usage (Taylor & Todd, 1995b; Venkatesh & Davis, 2000).

When considering online purchases, experience was found to moderate the relationship between performance expectancy and satisfaction, which in turn affected purchase intentions (Pappas et al., 2014). The variation of the behavioural intention to adopt a technology (e.g. e-books, online hotel booking) in relation with price value, habit, facilitating conditions and hedonic motivations was also found to be dependent on user experience (Martins, Farias, Albuquerque, & Pereira, 2018; Chang et al., 2019). In the context of mobile banking, years of experience with the technology positively predicts satisfaction with the platform. That being said, user satisfaction with mobile banking was shown to stabilise over time before waning at high experience levels (more than 9 years) (Mkpojiogu, Hashim, & Adamu, 2016). Chawla and

Joshi (2018) showed higher concerns of perceived ease of use among inexperienced users, while experienced users were more confident in the platform and were less likely to perceive notable risks and distrust mobile banking when considering its adoption. As such, experience could play a significant role in determining the influence of perceived security, privacy and trust on mobile banking adoption and use. Some studies fail to establish the significant moderating influence of experience concerning perceived ease of use and adoption intention (Im, Kim, & Han, 2008).

The role of user experience in the modulation of their perceptions towards mobile banking could be explained by the application's nature. Mobile banking is inherently a self-service technology, which implies a high reliance on the user's capacity to autonomously and effectively navigate its interface and complexities in order to deliver its services. Subsequently it stands to reason that experience level predicts the willingness to adopt and the actual adoption of mobile banking (Alalwan et al., 2017). Based on the above, we advance the following hypotheses:

H1a3, H2a3, H3a3, H4a3, H5a3, H6a3, H7a3, H8a3, H9a3, H10a3:

Experience moderates the relationship between (performance expectancy, effort expectancy, social influence, facilitating conditions, hedonic motivations, price value, habit, trust, perceived privacy, perceived security) and Behavioural Intention in the Lebanese context.

H1b3, H2b3, H3b3, H4b3, H5b3, H6b3, H7b3, H8b3, H9b4, H10b3:

Experience moderates the relationship between (performance expectancy, effort expectancy, social influence, facilitating conditions, hedonic motivations, price value, habit, trust, perceived privacy, perceived security) and Behavioural Intention in the British context.

H7c3, H7d3: Experience moderates the influence of habit on USE in Lebanon and the UK.

H14a3, H14b3: Experience moderates the influence of BI on USE in Lebanon and the UK.

3.16.4 Education

IS literature has provided empirical evidence both supporting and denying the role of education as a driver of consumer intentions towards technology. Users with lower educational levels were shown to exhibit positive attitudes and computer confidence to a lesser extent than their more educated counterparts (Sun & Zhang, 2006). Higher susceptibility to the influence of perceived ease of use could be predicted by educational attainment. Lower levels of education reflect higher concerns of effort expectancy but not performance expectancy among users

(Agarwal & Prasad, 1999). When educational levels increase, users are expected to have less anxiety towards technology usage. This is probably due to the alleviation of the impact of social influence on their behaviour, thereby enhancing their perceptions of the system's usefulness and ease of use (Burton-Jones & Hubona, 2006).

Rogers (2003) argued that education constitutes one of the innovators' characteristics along with young age, wealthiness and resourcefulness. Educated individuals are thus more likely to be early adopters of risky technologies and to possess the capacity and the necessary principle-knowledge to effectively understand and use the system Rogers (1995). This could translate into the alleviation of the impact of risks inherent to mobile banking use, particularly privacy and security.

In the context of electronic banking platforms, education predicted both the adoption and the usage of telebanking in an Arab population (Al-Ashban & Burney, 2001). Customer attitudes towards internet banking were shown to be modulated by education (Porter & Donthu, 2006), which also exhibited a significant effect on the impact of several variables (e.g. performance expectancy, self-efficacy and locus of control) on behavioural intentions in the same setting (Abu-Shanab, 2011). The superior adoption of e-banking systems by individuals with higher educational attainment (Talafha & Abu-Shanab, 2015; Izogo, Nnaemeka, Onuoha, & Ezema, 2012) could be due to their higher computer literacy, easier internet navigation and better information processing skills, when compared to less educated users (Nasri, 2011). Users with a lower educational level were previously shown to be more influenced by the price value of using smartphone-based technology (Ameen, 2017) and the perceived trust as well as the perceived usefulness of internet banking (Abu-shanab, 2011) when formulating their intentions towards the technology.

While contradictory findings have been reported, in which mobile banking users exhibited comparable educational levels (Talafha & Abu-Shanab, 2015), the moderating role of education cannot be disregarded. We thus hypothesise that:

H1a4, H2a4, H6a4, H8a4, H9a4, H10a4:

Education moderates the relationship between (performance expectancy, effort expectancy, price value, trust, perceived privacy, perceived security) and Behavioural Intention in the Lebanese context.

H1b4, H2b4, H6b4, H8b4, H9b4, H10b4:

Education moderates the relationship between (performance expectancy, effort expectancy, price value, trust, perceived privacy, perceived security) and Behavioural Intention in the British context.

H14a4, H14b4: Education moderates the influence of BI on USE in Lebanon and the UK.

3.16.5 Income

IS studies have explored the relationship between an individual's earnings and their attitude and behaviour towards new technology. Individuals who earn less exhibit higher concerns regarding the cost of system usage, which often overshadows its potential advantages (Porter & Donthu, 2006; Chawla & Joshi, 2018). Higher income implies more extensive access to resources, such as modern technological platforms and adequate internet connections. These reflect positively on users' confidence in using the technology needed (Lee et al., 2010) and could alleviate the influence or the need for facilitating conditions.

The moderating influence of income could be most significant in initial user-technology contact. Higher income users perceive less risk when considering the use of novel technologies (Hubona & Kennick, 1996; Hernández, Jiménez, & Martín, 2011) and are by consequence more likely to adopt them despite potential security, privacy or trust issues. However, the role of income in modulating user behaviour becomes insignificant as they acquire knowledge and experience with the technology. This was evidenced by the independence of experienced users' perceptions and attitudes from the level of their earnings (Al-Somali et al., 2009).

Regardless, previous studies have established the modulation of consumer purchase behaviour in terms of educational and income levels. Individuals with higher income lean towards modern payment methods (Jonker, 2007), such as credit and debit card payments. The latter were less frequently evidenced and used among lower income households (Marinković, Đorđević, & Kalinić, 2020; Valaei, Nikhashemi, Bressolles, & Jin, 2019), in an effect mirroring that of educational attainment (Borzekowski, Elizabeth, & Shaista, 2008). In other words, highly educated individuals with a high income are more likely to own and use various payment methods such as debit and credit cards (See-To, Papagiannidis, & Westland, 2014).

Income thus seems to influence users in their formulation of intentions and attitudes towards accepting a technology or behaviour, including shopping and e-commerce activities (Miyazaki & Fernandez, 2001; Al-Somali et al., 2009). While inconsistent, the role of income in determining user attitudes towards applications such as digital payments and financial transactions could be due to its alleviation of the perceived risk of such behaviour (Lu et al.,

2003). Higher income users are more confident in their capacity to manage financial losses that might arise from online payment use (Hernández et al., 2011) and are more likely to be familiarised with IT through their professional environment. As such, high-income individuals exhibit higher self-efficacy and perceptions of a technology's usefulness and ease of use when compared to lower-income users (Ma, Chan, & Chen, 2016; Porter & Donthu, 2006).

Income was widely established as a predictor of the behaviour and intentions of users towards digital payment platforms. When examining banking channels, online banking platforms were more frequently accessed by individuals belonging to higher income groups when compared to middle-income users (Juwaheer, Pudaruth, & Ramdin, 2012) which could lead to greater habit formation and consequently, increased adoption. This is in line with the assumption of Rogers (2003) that wealthier individuals seek innovations and more readily adopt them. Visiting the branch for the completion of financial transactions was particularly evident among low-income households (Wan, Luk, & Chow, 2005), while middle-income individuals exhibited a higher adoption of internet banking (Wan et al., 2005). Conversely, Wan et al (2005) revealed that the adoption behaviour of high-income users was not restricted to any banking channel, with a marked preference towards branch banking in the event of complex transactions. Income was also shown to positively predict adoption (Lassar, Manolis, & Lassar, 2005; Kolodinsky, Hogarth, & Hilgert, 2004) and customer satisfaction with e-banking (Kolodinsky, Hogarth, & Hilgert, 2004; Seyal & Rahim, 2011).

Based on the above, the following hypotheses are advanced:

H1a5, H2a5, H4a5, H6a5, H7a5, H8a5, H9a5, H10a5:

Income moderates the relationship between (performance expectancy, effort expectancy, facilitating conditions, price value, habit, trust, perceived privacy, perceived security) and Behavioural Intention in the Lebanese context.

H1b5, H2b5, H4b5, H6b5, H7b5, H8b5, H9b5, H10b5:

Income moderates the relationship between (performance expectancy, effort expectancy, facilitating conditions, price value, habit, trust, perceived privacy, perceived security) and Behavioural Intention in the British context.

H7c5, H7d5: Income moderates the influence of habit on USE in Lebanon and the UK.

H14a5, H14b5: Income moderates the influence of BI on USE in Lebanon and the UK.

3.17 **Conclusion:**

The present research aimed to investigate the interplay between UTAUT2 constructs and behavioural intention through a model extended with factors critical in mobile banking adoption considerations. These include trust, perceived privacy and perceived security, along with constructs from the IS success model (i.e., service quality, system quality and information quality).

To that end, 22 hypotheses for each country were advanced in this chapter in an effort to determine the causal relationships existing in the proposed theoretical framework. The theoretical and empirical underpinning of each construct were explored, thereby justifying the choice of research hypotheses. Finally, the chapter concluded with an overview of evidence supporting the hypothesised moderating role of age, gender, education, experience and income within the framework of this research.

Chapter 4 - **Research Methodology**

4.1 **Introduction**

Chapter 4 presents the research methodology employed in the present study. Section 4.2 provides an overview of existing research assumptions. This was followed by the justification of the choice of positivism for the purposes of this research in Section 4.3. The constituents of research design are then explained in Section 4.4, while Section 4.5 provides an overview of data collection methods and rationalises the use of survey questionnaires in the present study (Section 4.5.1). In Section 4.5.2, the sampling process, its size and technique as well as the populations of choice in this research were delineated. This was followed by an explanation of instrument development, its design and pre-testing in Sections 4.5.3 and 4.5.4. As for Section 4.5.6, it provides an overview of the chosen data analysis technique (PLS-SEM). Chapter 4 then concludes with the presentation of the ethical considerations underpinning the present research 4.6, followed by a chapter summary in Section 4.7.

4.2 **Research Assumptions**

The Oxford English dictionary defines 'philosophy' in an academic context as the study of the fundamental nature of knowledge and reality (Oxford Dictionaries, 2019). As such, a researcher's perception of described reality, as well as its underlying association with knowledge, are implicated in the term 'philosophy'. Moreover, philosophy is the reflection of the manner with which reality was observed.

On the other hand, 'paradigm' represents a widely accepted worldview or model according to which science is practised (Oxford Dictionaries, 2019). The conceptual and methodological approaches to research are therefore an integral part of the research paradigm. In fact, the research paradigm provides researchers with a clear theoretical structure guiding research and defining acceptable boundaries for research work conduct (Guba & Lincoln, 1994).

Research philosophies are many and complex in nature but could be divided into three categories, as established by Guba and Lincoln (1994). Ontology concerns itself with the elucidation of the inherent attributes of the reality to be examined in a particular research. Epistemology examines the association between the researcher and the research problem, while

methodology represents the principles and techniques through which knowledge is collected and validated (Guba & Lincoln, 1994; Mingers, 2003; Orlikowski & Baroudi, 1991).

In their work in 1994 and 2000, Guba and Lincoln further suggested four schools of thought, namely positivism, post-positivism, critical theory and constructivism to be intrinsic to the three proposed philosophical paradigms (Guba & Lincoln, 1994; Lincoln & Guba, 2000).

4.2.1 Positivism

The study of social reality through objective procedures and practices generally characterises the positivist school of thought. In fact, positivist researchers undertake the study of a research object in an independent fashion to devoid of any interaction or influence between the two entities (Guba & Lincoln, 1994). As a result, positivist research assumes neutral methods for the measurement and elucidation of reality, which remains inherently objective (Gall, Borg, & Gall, 1996; Lichtman, 2012).

As mentioned above, positivism advocates neutrality towards and detachment from research subjects or objects. Researchers adopting the positivist school of thought must thus strive to be unbiased, impersonal and unemotional when interacting or studying objects or participants. The objectivity of positivist research thus confers with the reliability and validity required for the generalisation as well as the determination of veritable social research outcomes (Nagel, 1986).

For the measurement of reality or phenomena, positivist research employs a plethora of scientific methods and statistical techniques in order to generate and analyse numerical objective data (Orlikowski & Baroudi, 1991; Carson, Gilmore, Perry & Gronhaug, 2001). Scientific knowledge, therefore, constitutes an essential part of positivism (Collis & Hussey, 2013), providing the footing for research propositions. Research propositions are actually considered as one of the hallmarks of positivist research, in addition to the testing of hypotheses through quantitative measures and the subsequent generalisations of results to a specific population, as inferred from a sample (Orlikowski & Baroudi, 1991; Collis & Hussey, 2014).

Despite the relative disadvantage of positivism regarding its inability to provide a deep understanding of social phenomena, which it merely explains, this school of thought remains predominantly employed in IS research. In fact, positivist research accounts for a staggering 75% of IS studies, with 17 and 5% adopting an interpretivist and critical approach, respectively (Kankam, 2019).

4.2.2 Post-positivism

Post-positivism is a research approach that is highly similar to positivism through its maintenance of the necessity of independence between researchers and research objects (Bell, Bryman, & Harley, 2018). In other words, objectivism constitutes an integral characteristic of post-positivism, which differs from positivism through its negation of the ability of a researcher to be 'positive' about knowledge collected in the context of social studies (Creswell & Creswell, 2017). Meaning this school of thought, which was first introduced in the early 19th century, differs in degree but not in kind from positivism. Moreover, both positivist and post-positivist approaches measure variables empirically and quantitatively (Creswell & Creswell, 2017), with the limitation of the former to the verification of cause and law effect. On the other hand, post-positivist researchers further employ measurements and observations for the elucidation of objective reality and the validation or refutation of proposed hypotheses.

That being said, empirical and quantitative research concerned with the formulation and numerical measurement of hypotheses is generally represented by the positivist and post-positivist schools of thought (Creswell & Creswell, 2017). As will be discussed in the following sections, constructivist and interpretivist approaches emerge in direct opposition to positivism and post-positivism (Denzin & Lincoln, 2011), undertaking subjective and interpretive research for the exploration of research problems (Mertens, 1998).

4.2.3 Interpretivism

Interpretivism posits that reality can only be perceived as subjective due to it being a social construct and can be studied through the interpretation and induction of human behaviour and experiences (Bryman, 2016; Collis & Hussey, 2013). This school of thought emerged in the 1960s in direct opposition to the positivist approach, arguing the soundness of using subjective interpretation in social research for the veritable understanding of reality (Davison, 1998). In fact, social research is mainly concerned with the examination of reality, which remains accessible solely through social constructs such as language and consciousness (Myers, 1997). As such, a better understanding of personal perception could be achieved by means of the examination of social behaviour and experiences through the lens of adequate social contexts. This constitutes a fundamental cornerstone of interpretivism, which relies on qualitative research methods and consequently, qualitative data necessary for the development of social and cultural knowledge (Kaplan & Maxwell, 2005).

Interpretivist researchers generally rely on the collection of qualitative data, without resorting to predefined dependent and independent variables (Kaplan & Maxwell, 2005). The qualitative data obtained would then be extrapolated and translated into theories, providing a deep understanding of the studied social phenomena (Myers, 1997; Straub, Gefen & Boudreau, 2005).

4.2.4 Critical theory

Critical research falls into the realistic subjective school of thought. According to the latter, social reality is influenced by social actors' perception and knowledge of said reality, in addition to the social, ethnic, and political determinants of the actors' ability to shape their reality (Bryman & Bell, 2015; Myers, 1997). Being fundamentally subjective and interdependent, critical research is carried out by researchers whose perception remains limited and influenced by the research objectives (Guba & Lincoln, 1994). Critical studies generally employ interviews and observation for the collection of data (Guba & Lincoln, 1994; Bryman & Bell, 2015), albeit with no established theoretical foundation in the context of IS (Falconer, 2008; Kvasny & Richardson, 2006). However, few studies adopt this school of thought in IS, which precipitated its designation as a "missing paradigm" (Chen & Hirschheim, 2004; Richardson & Robinson, 2007).

4.3 Current Research Paradigm

For the present study, a positivist approach was deemed appropriate and was consequently adopted. Post-positivism, mainly apt for the exploration of the cause-and-effect relationships existing in the proposed model, was not suitable for the purpose of the current research. In fact, a post-positivist approach determines relationships through the conduction of interviews (Guba & Lincoln, 1994), which entails the unnecessary expenditure of effort, time and money for its application in the context of information systems acceptance studies. Moreover, post-positivism was deemed especially unsuitable due to its inability to unravel human behaviour, which is unpredictable in nature (Onweugbuzie, 2002).

Interpretivism was equally inadequate for the present quantitative research owing to its dependence on qualitative data for the understanding of human behaviour (Myers, 1997; Straub et al., 2005). Moreover, the required generalisation of research findings drawn from the present

study sample to a greater population could not be undertaken with an interpretivist approach (Winfield, 1991), allowing the researcher to disregard this epistemology.

Similarly, the subjective method of inquiry employed in critical theory rendered it inept for the purposes of the present objective quantitative study (Guba & Lincoln, 1994; Mertens, 2014). Moreover, critical epistemology was scarcely adopted in information systems research, rendering it a paradigm generally absent from IS studies (Chen & Hirschheim, 2004; Richardson & Robinson, 2007). Subsequently, the critical paradigm lacks an established and validated theoretical basis in this field (Falconer, 2008; Kvasny & Richardson, 2006).

This research aims to explore the moderating effect of the widely accepted model, UTAUT2, extended with privacy, trust, security and the DeLone-McLean model on mobile banking adoption and acceptance in two cultural contexts, namely that of a developing (Lebanon) and developed country (UK). To that end and based on the literature, a positivist approach was adopted in order to investigate the relationships existing in the proposed model. Deductive reasoning is characteristic of positivist research methodology (Bryman, 2016; Hirschheim & Klein, 1992) and consists of the objective interpretation of the generated quantitative data for the validation or rejection of the formulated hypotheses within the structural model (Chen & Hirschheim, 2004). Seeing as the research focuses on the quantitative measurement and analysis of the constructs proposed in the model, a positivist methodological approach was deemed appropriate.

Reviews of IS literature showed that the positivist paradigm was predominantly employed for the elucidation of technology acceptance and adoption (Mingers, 2003). This preference for positivism holds especially true in the case of studies investigating the adoption behaviour of individual users, which was generally completed through questionnaires or surveys (Choudrie & Dwivedi, 2005). Moreover, positivism is accepted as an adequate school of thought to guide cross-cultural studies (Straub, Loch, Evaristo, Karahanna, & Srite, 2002), such as the present research.

4.4 Research Design

Research design provides a practical and theoretical framework according to which research is conducted (Sekaran & Bougie, 2016). To that end, the researcher prioritises the investigation of specific dimensions by defining research problems and decides on the general principles

guiding the collection of data as well as its analysis. The research design undertakes the rational determination of study purpose, setting, timeframe and approach, as well as researcher role, among other considerations (Creswell & Creswell, 2017). This fundamental step in research remains critical for its success due to the inevitable implications of its design on the successive procedures employed in studies. As such, subpar design could hamper later research steps whose successful completion depends on that of previous processes or procedures (Collis & Hussey, 2013).

Although intrinsically connected, research design and research methods are occasionally distinguished. Research design denotes the theoretical backbone according to which research decisions are made and the data is collected and analysed. Whereas research methods refer to the practical aspect of research work, such as the techniques (surveys, interviews, questionnaires) used for the collection and analysis of data (Bell et al., 2018).

Research design can be classified as exploratory, descriptive or explanatory depending on the nature of the undertaken investigation (Blumberg, Cooper, & Schindler, 2008). This study aimed to develop a conceptual model investigating the factors facilitating or hindering the adoption and usage of mobile banking services in two different contexts, namely a developed (UK) and developing (Lebanon) country. A confirmatory research design characterised by the formulation of a theoretical model and hypotheses was adopted in this study (Jaeger & Halliday, 1998). The model was then empirically tested and validated using a positivist, or quantitative, approach. After the completion of the first step of research design through the establishment of a theoretical framework, the methodology, according to which study hypotheses would be tested, was developed in a series of rational decisions. Lastly, data was collected and empirically analysed and discussed, successfully providing valuable insights into the proposed research questions. A descriptive research design served for the representation of respondent characteristics, albeit without the elucidation of the relationships existing between the studied variables (Zikmund, 2003). The latter were investigated using a confirmatory research design.

As previously detailed in Section 4.3, a positivist research approach and its corresponding quantitative assumptions and techniques were deemed fit for the purposes of the current study. The study focused on the numerical examination and statistical analysis of human behaviour based on already established variables and hypotheses, consistent with Creswell's definition of quantitative research (Creswell, 1994).

The present research followed a cross-sectional design, which involves the collection of data at a single time point and the subsequent elucidation of the correlation, but not the underlying causes and links, between study variables. The in-depth investigation of said variables was beyond the scope of this research and would require a longitudinal approach with its characteristic data collection at various time points (Creswell & Creswell, 2017).

For the method of data collection, self-administered questionnaires and online surveys were used owing to their aptitude for the reflection of respondents' attitude and beliefs, as well as their ease of administration, cost and time effectiveness (Churchill & Iacobucci, 2006; Sekaran & Bougie, 2016; Zikmund, 2003). A detailed discussion of the advantages of surveys compared to other data collection techniques is undertaken in Section 4.5.1. Finally, the collected data was analysed according to the two-step analysis particular to structural equation modelling (SEM) technique, as delineated in Section 4.5.5. The research design adopted in the present study allowed the elucidation of the factors affecting respondent's mobile banking behaviour, as outlined in figure 4.1.

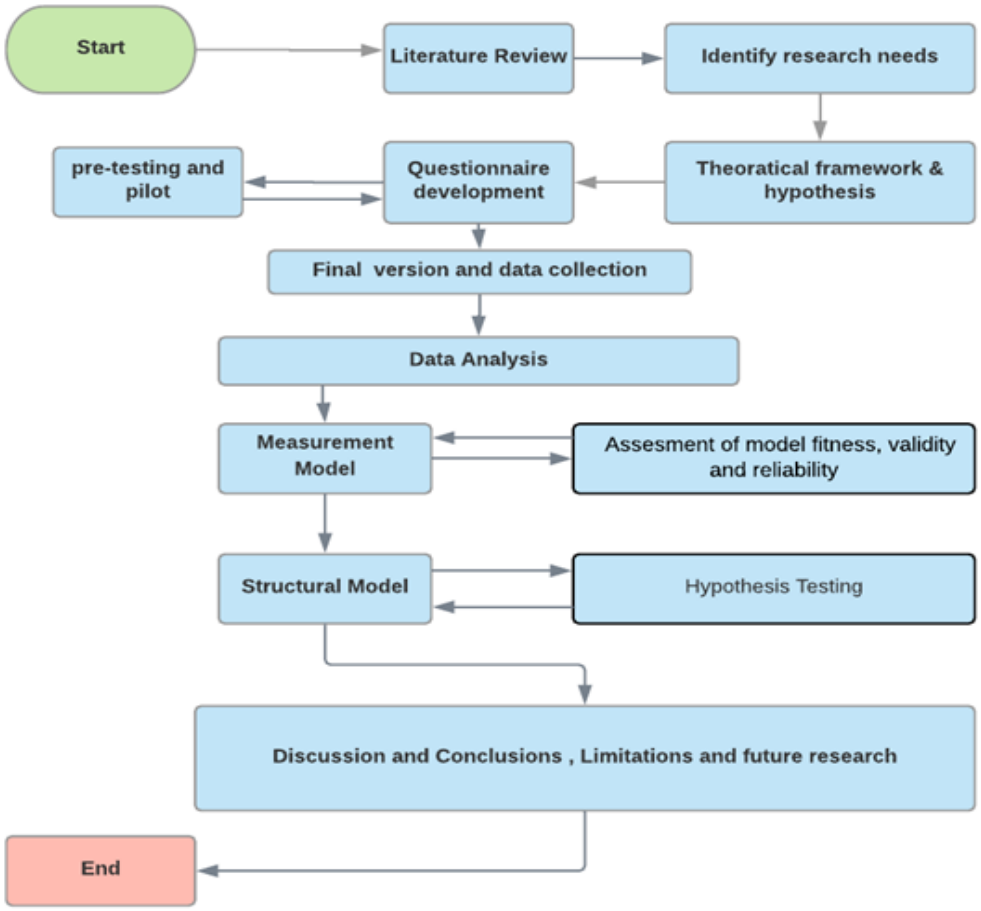

Figure 4-1: The research design

4.5 Data collection approach

The selection of research methodology is a critical step in designing any inquiry in social sciences. That being said, the choice of adopting a qualitative, quantitative, or a mixed approach does not conclude the research design process. The researcher is thus required to adopt a method of inquiry appropriate to the purposes of their work from the variety of extant research approaches. In social sciences, these methodologies include but are not limited to field experiments, survey methods, case studies, action research, grounded theory and mathematical modelling (Creswell & Creswell, 2017; Chen & Hirschheim, 2004).

There are many data collection techniques and each present with various advantages and drawbacks. Data could thus be collected through observation of respondents as well as in-depth interviews. However, these methods require the employment of highly skilled observers,

conduction of interviews and largely depend on the investigator's personal perception. This entails a significant risk of bias in addition to the higher cost associated with such approaches (Frechtling & Sharp, 1997). Researchers could also formulate structured interviews and questionnaires that could be administered in various formats such as face-to-face, electronically, or by mail. In addition to the uniformity of these inquiries, each of the possible formats offers a relative advantage be it from a cost, time or ease perspective (Sekaran & Bougie, 2016), which significantly impacts the ultimate choice of the data collection method.

4.5.1 Rationale for Using Survey

In the present research, the survey/questionnaire approach was deemed most appropriate following the reasoning detailed below. Despite the wide variety of available methodologies, the survey method was found to be the most prevalent data collection approach adopted in technology adoption studies (Choudrie & Dwivedi, 2005) as well as IS research (Palvia et al., 2004; Palvia, Pinjani & Sibley, 2007) and information technology studies (Munđar, Matotek & Jakuš, 2012). In fact, 49% of positivist information system studies between 1985 and 1989 adopted a survey approach for data collection (Orlikowski & Baroudi, 1991). Similar results were reported by Farhoomand and Drury (1999) and Chen and Hirschheim (2004), thereby denoting the prevalence of surveys in IS and IT journal articles. Extensive adoption of surveys was thus observed among technology acceptance and adoption studies, with as high as 74% of studies found to employ surveys (Mingers, 2003; Choudrie & Dwivedi, 2005).

The widespread use of quantitative research approaches such as surveys in the IS literature context could be attributed to the external validity and generalisability of this data collection method, despite its low internal validity (Palvia et al., 2007). Furthermore, the investigation of research problems in technology adoption studies requires the inclusion of a sizable sample size, highlighting the suitability of surveys considering their applicability in large populations (Nachmias & Nachmias, 2008).

More specifically, the present research undertakes the collection of data from a large sample of participants in both Lebanon and the UK. Self-administered surveys and questionnaires were deemed appropriate seeing as they allow the simultaneous, fast, inexpensive, easy and efficient collection of data from study participants (Zikmund, 2003; Bryman, 2016; Sekaran & Bougie, 2016). Furthermore, self-administered questionnaires ensure higher response rates (Sekaran & Bougie, 2016) while preserving respondent anonymity and privacy, a consideration which ensures more robust data (Sekaran, 2003).

The elucidation of technology acceptance requires the empirical testing of elaborated hypotheses within a proposed conceptual model. A survey approach thus emerges as a fitting data collection method in positivist-quantitative research (Saunders, 2011) suitable for the economical employment of structural equation modelling (SEM) data analysis technique (Hair Black, & Babin, 2010). The latter was actually prevalent in conjunction with surveys in previous studies employing the UTAUT (Williams et al., 2015), which further validates the choice of the survey method in the current study.

Surveys allow researchers to investigate the phenomena affecting IS behaviour in the natural setting of a large number of respondents (Pinsonneault & Kraemer, 1993), in order to empirically answer the proposed research questions (Chen & Hirschheim, 2004).

The adoption of a survey approach is consistent with previous studies investigating technology acceptance using the UTAUT/UTAUT2 models (Chea & Luo, 2019; Singh et al., 2017; Alalwan et al., 2018; Tavares & Oliveira, 2016) as well as the research method employed in the original UTAUT study (Venkatesh et al., 2012). This consistency is recommended and circumvents the need for devising a new data collection approach, especially when employing a model that was developed in a similar context (Venkatesh, Brown & Bala, 2013), namely mobile internet in a developing country (Venkatesh et al., 2012).

The employment of quantitative research methods (e.g., surveys, questionnaires) when considering cultural differences in IS studies was used (Straub, Loch, & Hill, 2001; Loch, Straub, & Kamel, 2003; Srite & Karahanna, 2006; Frigui, Rouibah, & Marzocchi, 2013) and recommended considering the individual as opposed to national aspect of culture variations (Straub et al., 2002).

4.5.2 Sampling

The impracticability of studying an entire given population in the context of social science studies drives researchers to consider reasonable substitutes. Sampling, therefore, emerges as a sound alternative allowing the circumvention of the extensive monetary, time and human cost of examining a large population (Bhattacherjee, 2012; Gay, Airasian & Mills, 1996; Zikmund & Babin, 2006). Sampling is understood as a statistical process involving the observation of a population subset, or sample, in order to make statistical inferences about the population itself (Bhattacherjee, 2012). As such, the soundness of this method primarily depends on the representativeness of the selected sample and its associated units, be they students, academics,

or full-time employees in regard to the targeted population (Gay et al., 1996). The sample must thus be selected in such a way as to reflect population size and characteristics and reduce sampling error and bias. This consideration will, in turn, allow the generalisation of the obtained results (in the sample) to the general population (Bhattacherjee, 2012; Sekaran & Bougie, 2016; Zikmund & Babin, 2006).

According to Bhattacherjee (2012), sampling consists of the identification of the target population, the selection of the sampling frame, followed by the identification of an adequate sampling technique.

4.5.2.1 *Population and sampling frame*

The success of research is in part dependent on the selection of the appropriate research context and by extension, the population to be studied (Baker, 1994).

The group in which researchers aim to investigate specific characteristics or behaviour is termed 'population'. The latter generally includes all individual units of analysis that could be extricated from the total population (Bhattacherjee, 2012; Sekaran & Bougie, 2016; Zikmund & Babin, 2006; Bell et al., 2018). The current study undertakes the examination of the factors hindering or facilitating the adoption and usage of mobile banking services in the context of a developed and developing country. As a result, the Lebanese and British populations were targeted, with adult individuals of both countries constituting the study's unit of analysis. However, as previously mentioned, the inclusion of the entire population of interest is not feasible, hence the necessity of choosing a sampling frame. Sampling frames are considered an easily accessible representative portion or sample of the units present in the target population (Bhattacherjee, 2012; Zikmund & Babin, 2006; Bell et al., 2018).

Considering the aim of the present study, individuals of the general Lebanese and British population belonging to no particular academic or professional field composed the adopted sampling frame. In order to avoid inconsistencies in computer and mobile literacy levels as well as allowing the generalisation of the results, the researchers refrained from specifically targeting students or academics.

The choice of Lebanon and the UK countries from which respondents were recruited in order to represent the developing and developed context will be presently explored. The two countries vary concerning culture and technological advancement, which is in turn reflected in technology adoption and penetration.

According to the 2018 GSMA report, Lebanon has one of the lowest mobile penetration rates in the Middle East and Africa region at 48%. However, it is projected that the fastest subscriber growth rate will occur in the MENA region between 2017 and 2025, leading to mobile subscription rates comparable to the global average of 71% (GSMA Association, 2018). That being said, despite the high percentage of internet use among the Lebanese population (Internet Web Stat, 2016), the significant resources invested in the banking sector and specifically, online banking, this technology remains in its infantile stages.

Furthermore, the implementation of internet banking in Lebanon was funded by approximately $150 million dollars (Tarhini et al., 2016). It should be noted, the Lebanese digital banking sector remains underperforming, with reportedly low adoption rates (Elhajjar & Ouaida, 2019; Jibai et al., 2018; Arabnet Business Intelligence, 2016). Recent studies asserted the non-fulfilment of the anticipated penetration of digital banking, with Lebanese respondents emerging as the least likely to use this technology (Arabnet Business Intelligence, 2016).

On the other hand, the UK is a global tech leader, with its ever-growing digital technology sector worth £184 billion (€208 billion) in 2017 (Tech Nation Report, 2018). Concomitantly, the UK boasts one of the largest mobile markets in Europe, accounting along with France for the majority of new unique subscribers in the region (GSMA Association, 2018). The digital commerce sector is well established in the UK, with approximately 38% and 42% of British smartphone users employing their devices for online banking and e-commerce, respectively (GSMA Association, 2018).

Mobile banking penetration among British customers was evident in recent reports, with 22 million customers employing mobile applications to manage their bank accounts. Moreover, based on observed trends, it is expected that the success of mobile banking will persist in the UK. Approximately 72% of the adult British population was actually projected to use this technology by 2023 (Morawiec, 2018).

4.5.2.2 *Sampling Technique*

The final step of the sampling process is the selection of an appropriate sampling method. Two main methods can be recognised, namely probability and non-probability sampling method (Bell et al., 2018). In probability or random sampling, each individual from a target population has a specific opportunity of being selected to be part of the sample (Bhattacherjee, 2012). Probability sampling techniques include simple random sampling, stratified sampling and

cluster sampling (i.e. Bhattacherjee, 2012; Fowler, 2013; Sekaran & Bougie, 2016). The adoption of probability sampling allows the generalisability of the results (Sekaran & Bougie, 2016) and circumvents sampling bias (Bhattacherjee, 2012). However, it requires the availability of various conditions, such as the updated and comprehensive list of the target population in order to identify an accurate zero-probability for each unit of analysis to be part of the sample (Bhattacherjee, 2012). Probability sampling was therefore not possible in the present study, especially considering the impracticability of obtaining personal information regarding the large and widespread British and Lebanese population (Dwivedi et al., 2006; Bhattacherjee, 2012). Considering the sensitivity and close-guarded nature of personal banking information, the application of probability sampling was not feasible in this study. Moreover, this research examined mobile banking adoption intention in addition to its usage, so a list of mobile banking users is not enough because the research included potential users who cannot be identified. Furthermore, obtaining a list of potential participants in Lebanon to calculate the zero-probability cannot be done due to the absence of needed databases..

In contrast, non-probability sampling is characterised by the inaccurate identified opportunity of unit selection or by the zero probability of some units to be selected in the sampling process (Bhattacherjee, 2012; Sekaran & Bougie, 2016). Non-probability sampling remains prone to sampling bias seeing as units are not randomly selected, which prevents the measurement of sampling errors (Bhattacherjee, 2012). Non-probability sampling methods include convenience sampling, expert sampling, snowball sampling and quota sampling.

Convenience sampling remains the cheapest, fastest and simplest alternative in the case of this research, which studies two populations across two different countries. By choosing convenience sampling, respondents were randomly contacted, which ensured both random sampling and the achievement of an adequate sample size. Moreover, the civil and geographical organization of Lebanon makes it physically impossible to adopt random sampling seeing as postal codes and clear regions are not established. Additionally, banks could not be approached directly to obtain user data seeing as this study examines both the adoption and the usage of mobile banking, so including only mobile banking users would not allow the investigation of adoption intentions.

Time and budget constraints as well as the impossibility of obtaining the required data for random sampling rendered probability sampling inappropriate for the current study. The researchers, therefore, deemed convenience sampling suitable owing to its convenience, cost-

effectiveness and ease. In fact, convenience or accidental sampling involves the sampling of individuals of a specific population based on their availability in a specific setting within the reach of researchers (Bhattacherjee, 2012; Champion, 2002; McDaniel, Gates, & Sivaramakrishnan, 2008). Convenience sampling was reportedly one of the most commonly used sampling methods in behavioural and social science studies Stangor (2014), both in the organisational and consumer contexts (Bell et al., 2018). In the current study, respondents were selected according to their willingness to partake in the study in the selected countries.

The study instrument was distributed both physically and digitally, through a paper questionnaire and an online survey, respectively. Questionnaires were distributed to willing participants randomly contacted in universities and shopping malls, in addition to family and friends. This allowed the inclusion of individuals with different demographic and background characteristics. The survey access link was shared through messaging applications (e.g. WhatsApp) and social media platforms, particularly through Twitter, where users were asked to disseminate the link. While this method increased respondent participation in the online survey, the collected data had to be sorted in order to eliminate responses from users outside of Lebanon and the UK. This was achieved through IP-based screening of submitted answers in order to identify Lebanese and British respondents prior to data analysis.

4.5.2.3 *Sample Size*

The determination of adequate sample size is critical in statistical analysis to prevent failure convergence and low parameter accuracy in the event of insufficient sample size (Hair et al., 2010; Comrey & Lee, 2013), as well as squandering resources for the inclusion of excess respondents (Bell et al., 2018; Zikmund & Babin, 2006; Hair et al., 2010).

Sample size varies according to the undertaken statistical analysis, which requires a larger sample as it becomes more sophisticated (Luck & Rubin, 1987). Seeing as the current study employed SEM for data analysis, sample size calculation should be adjusted to this statistical technique in order to ensure adequate size and subsequently, reliable estimates (Hair et al., 2010). The appropriate SEM sample size is not consistent across studies, with certain researchers suggesting a minimum sample size of 200 for robust SEM (Harris & Schaubroeck, 1990), while others propose a similar sample size in the case of very sophisticated statistical models only (Kline, 2015). Despite the heterogeneity of the literature, it could be inferred that a minimum sample size of 200 is sufficient to accurately estimate parameters (Gerbing & Anderson, 1993).

The current study calculated the minimum required sample size based on the formula suggested by Tabachnick and Fidell (2013). The latter proposed that the number of included participants should be 50 + 8m, where m is the number of independent variables. Abiding by this formula would ensure a higher ratio of participants to variables, which serves to prevent model over-fitting (Babyak, 2004; Harrell, 2015; Tabachnick & Fidell, 2013). Seeing as 13 predictor variables are included in the proposed research model, a minimum of 154 respondents are required for this study from each country. That being said, 478 valid questionnaires were collected from Lebanon and 416 from the UK, far exceeding the minimum required number of participants.

4.5.3 Instrument Development and Design

4.5.3.1 *Measures:*

The present study adopted 55 items from extant IS literature in order to examine the effect of different factors on the adoption of mobile banking in a developing and developed context. The construct items were preceded by nine nominally scaled close-ended questions pertaining to demographic variables, namely gender, age, education, occupation, mobile banking experience and usage frequency, among others.

The UTAUT2 model constructs (PE, EE, SI, FC, HM, PV, HB and BI) were included in this study and were adapted from Venkatesh et al. (2003; 2012), Alalwan et al. (2017) and Chawla and Joshi (2017).

Moreover, perceived Privacy (PP) and Perceived Security (PS) were adopted from Featherman and Pavlou (2003), Daniel and Jonathan (2013) and

Yu (2012). Additionally, Trust was also adopted from Kim, Ferrin and Rao (2009), Sharma et al. (2016) and Riffai et al. (2012).

As for System Quality (SYQ), Information Quality (INQ) and Service quality (SRVQ), the items were adopted from DeLone and McLean (2004), Sohail and Shaikh (2008), Sharma (2015) and Shih and Fang (2004).

Regarding the Behavioural Intention (BI) it was adapted from (Venkatesh et al., 2003, 2012) while the Demographic variables were adapted from (Chong, 2013).

HM, PV and BI were measured through three items, while PE, EE, SI, HB, SRVQ, SYQ, INQ, PP, PS were measured by four items while FC and TR5 had five. In addition, a 7-point Likert scale was employed for the measurement of the model constructs, owing to its suitability in the acquirement of accurate responses in the context of self-administered questionnaires (Hair, Bush, & Ortinau, 2006). The seven-point Likert scale was preferred over the five-point Likert scale seeing as it more accurately reflects respondent's agreement or disagreement with the proposed question (De Vaus, 2013) while ensuring superior reliability (Oppenheim, 2000; Preston & Colman, 2000). A list of all items adopted in this study is shown in Appendix E.

4.5.4 Questionnaire design and pre-testing

4.5.4.1 *Questionnaire design*

The design of a questionnaire is a crucial consideration in research. A questionnaire should be designed in such a way as to be easily accessible and understandable by respondents in order to ensure high response rates as well as the accuracy of obtained data (Bhattacherjee, 2012). As such, questions should be worded in a simple, consistent and concise way with no repetitions or contradictions (Bhattacherjee, 2012; Glewwe, 2005). This would ensure that questions are understood clearly and consistently by all respondents, which in turn would decrease the likelihood of obtaining illogical and inaccurate results (Bhattacherjee, 2012).

This study's self-administered questionnaire and online survey were preceded by a cover letter and a consent form. The former was issued orally in the case of the self-administered questionnaires and in the top of the web page the case of the online survey. The cover letter served to inform respondents of the study's purpose, introduced the researcher and delineated the effort expected from respondents. The questionnaire consisted of two parts, the first of which contained 9 nominally scaled close-ended questions exploring respondents' demographic variables. The second part involved 55 questions pertaining to the 14 constructs

included in the proposed model (PE, EE, SI, FC, HM, PV, HB, BI, TR, PP, PS, SRVQ, SYQ, INQ) and measured using a 7-point Likert scale. The questionnaire was distributed exclusively in its English version in the UK, while Lebanese respondents were offered the choice between the Arabic translation and the original English version. On the other hand, all participants completing the online survey could opt for either version of the questionnaire.

4.5.4.2 *Translation*

The current study targeted individuals of the general Lebanese and British population. Consequently, the questions included in both the self-administered questionnaire and the online survey should be adapted to the respondent's respective native languages (Arabic and English). In order to circumvent the effect of cultural and language differences, back-translation was deemed a suitable translation method (Brislin, 1976; Douglas & Craig, 2007; Malhotra, Agarwal, & Peterson, 1996; Mallinckrodt & Wang, 2004). This method is highly suggested due to its guarantee of high translation accuracy and quality. As such, back-translation was completed in two sequential steps. First, the questionnaire items, initially formulated in English, were translated into Arabic by a professional translator. The generated Arabic version was then re-translated into English by a separate credible translator and the provided English translation was then compared to the original questionnaire. The back-translation method thus allows researchers to avoid loss of content quality and consistency in the translated questionnaire (European Social Survey, 2012). This consideration is crucial for the generation of comparable data from the targeted populations.

4.5.4.3 *Pre-testing and pilot study:*

In order to determine the validity and suitability of the designed questionnaire, pre-testing should be undertaken. This process would allow the detection of any potential inconsistencies or issues in the wording of questions, along with the estimation of the time necessary to complete the questionnaire. Pre-testing will thus allow researchers to evaluate and modify the formulated questionnaire prior to the initiation of the study (Sekaran & Bougie, 2016; Creswell & Creswell, 2017).

The pre-testing was completed in two steps, the first of which depended on expert knowledge, while the second involved potential respondents. To that end, three information systems experts were engaged with the pre-testing of the Arabic and English version of the questionnaire. The experts' feedback reflected the content validity of the questionnaires and provided suggestions

for the improvement of the instrument's suitability to each cultural context (Saunders, 2011). The final version of the questionnaire was formulated in such a way as to address the expert comments provided in the feedback.

In addition to the expert pre-testing of the questionnaire, the assessment of the validity and reliability of the instrument in regard to the measurement of the model construct further required the completion of a pilot study (Bhattacherjee, 2012; Saunders, 2011; Sekaran & Bougie, 2016; Zikmund, 2003). A pilot study is vital for researchers to guarantee the suitability of the instrument and its conformity to the purpose it was originally designed for. Moreover, it reflects the necessity of modifying the instrument by allowing researchers to examine the entire research process, including data collection and data entry (Glewwe, 2005). The pilot study consisted of 22 participants representative of potential respondents, 13 of which were Lebanese and 9 from the UK. The distributed questionnaires or surveys were completed and analysed, providing preliminary evidence of the reliability and validity of the study's instrument (Brace, 2018; Sekaran & Bougie, 2016). Seeing as both the original English version and the Arabic translation were pilot tested, the wording of the questions was revisited in conjunction with the respondents' suggestions and feedback. This was done in order to eliminate any ambiguity and improve content appropriateness to the targeted populations. An example includes the modification of PE2 question "*Mobile banking services increase my effectiveness as a consumer*" to "*I am able to manage my banking tasks more effectively using Mobile banking*" Another example includes that of the TR2 question, which was reformulated based on expert feedback in order to reduce the perceived ambiguity of the misuse of personal information meant in the question. To that end, the question was changed from "*I am not concerned about misuse of my personal information*" to "*I am afraid of the misuse of personal information when using mobile banking*". Furthermore, questions were presented in such a way as to prevent page clustering, which would in turn reduces respondent boredom with the survey and the provision of inaccurate rushed answers. In order to reduce reported confusion by participants, coloured headers were excluded from the questionnaire design. The online survey was modified in such a way as to allow the submission of multiple answers when participants were asked to report their reasons for using mobile banking, which does not have to be restricted to a single answer. A copy of the final version of the survey questionnaire with the translated version is included in Appendix F.

4.5.5 Data Analysis (SEM)

Model testing was first undertaken in each country through the separate analysis of data collected from the Lebanese and British population. This was followed by the assessment of the applicability of a single model to explain mobile banking adoption behaviour in both contexts. To that end, group comparisons reflecting how comparable or dissimilar the study groups were completed by means of statistical tests. Statistical Package for the Social Sciences (SPSS) IBM statistics version 23 served for the initial stage of data analysis, namely the calculation of descriptive statistics. The researchers then proceeded with the data analysis process by testing the measurement and conceptual model through Partial Least Squares-Structural Equation Modelling (PLS-SEM) using SmartPLS 3.1 (Hair et al., 2019)

Extant literature presents a variety of data analysis methods that could be employed in social science research. The choice of a specific method largely depends on the nature of the studied variables and the generated data. As such, Dichotomous probit regression could be employed in the case of binary (dichotomous) outcome variables (Greene, 2011). The latter could take two values only, generally coded as 1 or 0 and corresponding to yes/no or true/false responses for example. As a result, a probit model could not be adopted in the present study seeing as a 7-point Likert scale was used to measure outcome variables and are therefore not binary in nature.

Another alternative for data analysis is multidimensional scaling, an exploratory method (Attneave, 1950; Torgerson, 1965; Ding, 2006) suitable for the simplification and reduction of large data and the existing interrelationships in order to render it more accessible and comprehensible. Multidimensional scaling thus involves the visualisation of data and the establishment of global similarity or dissimilarity of studied objects in the form of dimensional map coordinates (Wickelmaier, 2003) in a fashion similar to factor analysis (Ding, 2006). However, seeing as this study is confirmatory and not exploratory in nature, the application of multidimensional scaling for data analysis was not deemed appropriate. This choice was further endorsed by the subjectivity and complexity of the multidimensional scaling method, which does not fall in line with the objective orientation of the current research.

Non-parametric methods, such as the Mann-Whitney U Test, the Kruskal-Wallis test and the Binomial t-test are also available and could be employed for data analysis. These methods present distinct advantages, such as the suitability of the Mann-Whitney U test in the case of a study comparing data from two independent groups (Norušis, 2005; Pallant, 2013). A similar

method is the Kruskal-Wallis test, which allows researchers to compare the scores of continuous variables relative to more than two independent groups, unlike Mann-Whitney u test (Pallant, 2013). In the case of dichotomous variables, researchers can adopt the binomial t-test in order to establish a comparison of the frequencies of each variable category (Norušis, 2005). That being said, the proposed research model in the present study is complex, which renders the aforementioned non-parametric methods unsuitable.

This study's research model includes a notable number of variables and indicators, which confers it with a high level of complexity. As a result, PLS-SEM was deemed appropriate considering its capacity to test complex models (Henseler et al., 2012; Hair, Hult, Ringle, & Sarstedt, 2016). PLS-SEM allows the simultaneous assessment of theoretical constructs' reliability and validity while reflecting the correlations existing between them (Barclay, Higgins, & Thompson, 1995). PLS-SEM addresses the limitations of first-generation multivariate analysis techniques (e.g. standard regression-based analyses, such as multiple regression, discriminant analysis, logistic regression and analysis of variance) (Chin, 1998; Fornell, 1982; Hoyle, 1999) which therefore presents itself with distinct advantages. The PLS-SEM offers a robust framework for the analysis of path models that is unrestricted by the inclusion of latent variables possibly presenting with collinearity, skewed distributions and structural model misspecification (Brock & Zhou, 2005; Cassel, Claes, Hackl, & Westlund, 1999; Cassel, Claes M., Hackl, & Westlund, 2000).

Moreover, PLS-SEM was used for the testing of the original UTAUT and UTAUT2 models (Venkatesh et al., 2003; 2012) upon which the present research model was built. As a result, the statistical technique used in this study would be consistent with the original studies from which the model was derived. Furthermore, PLS-SEM was widely used in IS research employing both TAM and UTAUT (Williams et al., 2015), which allows the researchers to compare their results to those of extant studies.

Another advantage of PLS-SEM lies in its ability to handle small sample sizes as well as its high statistical power and maximisation of R2 values through the decrease of unexplained variance in the model (Hair et al., 2016). PLS-SEM additionally allows the inclusion of both formative and reflective indicators in the research model without the complexification of the model and the compromise of result validity. This could not be achieved with covariance-based SEM (CB-SEM) seeing as it differentiates between the formative and reflective factors (Petter, Straub, & Rai, 2007; Henseler et al., 2012; Hair et al., 2016). While certain measures could be

taken in order to include formative constructs in CB-SEM (Coltman, Devinney, Midgley, & Veniak, 2008), such measures could increase the complexity of the proposed model and decrease result validity. PLS-SEM thus remains most suitable seeing as it handles complex models better than CB-SEM while allowing the inclusion of single-item constructs (Hair, Sarstedt, Hopkins, & Kuppelwieser, 2014).

Moreover, PLS-SEM is applicable for the analysis of confirmatory as well as exploratory research (Gefen et al., 2000; Urbach & Ahlemann, 2010), in addition to data that does not assume a normal distribution (Henseler et al., 2012). The various attributes and advantages of PLS-SEM stated above, therefore led the researchers to favour it over CB-SEM and selected this method for the analysis of the data generated in the present confirmatory study.

After testing the proposed model, the moderating influences of select variables, namely age, gender, experience, income and education were assessed using Partial least squares- multi-group analysis (PLS-MGA). Path estimates generated from PLS-SEM testing of the research model are compared between groups using PLS-MGA (Hair et al., 2014). Through this non-parametric technique, differentiation in group parameter estimates can be assessed through separate bootstrap analyses without the need for the inclusion of large groups (>200 individuals). A cantered bootstrap serves to determine the preliminary comparability of group estimates. This is followed by the calculation of a p-value reflecting the significance of observed differences in favour of the second study group (Henseler, 2012). To that end, researchers divide the obtained group difference by the total number of bootstrap samples and infer statistical significance at p-values less than or equal to 0.05, or p-values equal to or greater than 0.95 (Henseler, Ringle & Sinkovics, 2009).

4.6 Ethical Considerations

The examination and study of human participants in research entails critical ethical considerations. This applies across different fields of study, including those concerned with the study of social behaviour (Hesse-Biber & Leavy, 2010). Ethical considerations are, in fact, paramount for the procurement of respondent cooperation, or compliance, as well as the collection of the required information (Zikmund, 2003; Sekaran & Bougie, 2016). Ethical research complications could, therefore, be addressed through securing participants' informed consent prior to the collection of data in all research including identifiable human subjects (Christians, 2000).

The ethical approach adopted by the current study was based on the Brunel Research Ethics Committee guidelines for the collection of data. Signed informed consent was therefore obtained from study participants. The informed consent form indicated participants' right to withdraw from the study at any moment and to abstain from answering any of the proposed questions. Moreover, the confidentiality and anonymity of the collected data, which was devoid of personal information, was guaranteed. This declaration aimed to reassure participants and secure their sincere answers. The integrity of data analysis and interpretation, i.e. researcher-centred ethical conduct (Sekaran & Bougie, 2016), was also stated in the informed consent form.

A cover letter delineating the study title, purpose as well as the approximate time allocation required for questionnaire completion was distributed to participants in conjunction with the online questionnaire. Furthermore, the contact information of the researcher, the supervisor and the Brunel University ethical community, who had approved this research, were provided should any participant have any concerns or inquiries arise at any point. a copy of the Brunel University ethical committee approval is presented in Appendix A, while a copy of the cover letter is included in Appendix B.

4.7 Summary and Conclusion

The current chapter critically reviewed extant research assumptions and explored the advantages and applications of each. The choice of the positivist research paradigm for this research was then rationalised through the delineation of this paradigm's advantages in comparison with other available research assumptions. The chapter then discussed the adopted research design, with an emphasis on the importance of each of its components. The data collection approach employed in this study was then outlined and justified based on available IS and social science literature. This was followed by the extensive exploration of the sampling procedure, including the rationale behind choosing the Lebanese and British population and the respective sampling frame, sample size and sampling technique (convenience sampling). The chapter continued with the detailed presentation of the data collection instrument design and development process, followed by the questionnaire pre-testing and pilot study phase of this research. An overview of data analysis methods was then undertaken in addition to the justification of PLS-SEM as the method of choice in this research. Finally, the ethical considerations and conduct of the researcher were outlined and discussed.

Chapter 5 - **Analysis**

5.1 Introduction

Chapter 5 provides details of the analysis through which the present research's findings were generated. First, a preliminary screening of survey data was conducted in Section 5.2, including an explanation of how missing data, outliers and normality were handled (Sections 5.2.1, 5.2.2 and 5.2.3, respectively). Section 5.3 included an overview of demographic information. The data analysis process and its findings were studied in Section 5.4 including assessing the reflective measurement models in Section 5.4.1, followed by assessing the formative measurement models in Section 5.4.2 as well as the structural model in Section 5.4.3. Finally, moderating variables was explored in Section 5.5. The chapter is then concluded in Section 5.6.

5.2 Main survey data screening

An initial data screen is critical prior to final analysis in order to detect missing values or outliers. This preliminary examination precedes the determination of data normality and subsequent eligibility for multivariate analyses such as PLS-SEM (Coakes, Steed, & Dzidic, 2006; Kline, 2005). To that end, SPSS was employed for the screening of collected questionnaires and the quantification of missing data in participant responses. Moreover, data accuracy was verified for each included item through the examination of its respective descriptive statistics and the investigation of values that fell out of range. The latter practice was completed through the assessment of the accuracy of out-of-range values in comparison with the original questionnaires.

5.2.1 Missing data

The calculation of the amount of missing data in participants' responses is a fundamental consideration in social science and marketing research. Participant responses to questionnaires occasionally fail to be comprehensive (Little & Rubin, 2014), especially when administered manually (Zikmund, 2003). As a result, the data analysis process is complicated by missing data, which are the result of one or more unanswered questionnaire items. Missing data remains a common occurrence (Tabachnick, Fidell, & Ullman, 2007) to which weakened statistical power and biased estimates are attributed. The biased estimates are suggested to be the result

of a decreased sample size (Enders, 2010) following the inevitable elimination of responses with a high level of missing values.

It is important for researchers to determine the degree of generated bias, as determined by the random or non-random occurrence of missing values (Pallant & Manual, 2010; Pallant, 2013). More specifically, biased estimates and by extension, decreased data generalisability, are inferred in the event of non-randomly distributed missing values (Tabachnick, Fidell, & Ullman, 2007), while no bias is generated with random missing data distribution.

Researchers have debated the acceptable threshold of missing data with 5% or fewer missing data following random patterns deemed acceptable by (Tabachnick, Fidell, & Ullman, 2007) and (Cohen, Cohen, West, & Aiken, 1983). The cut-off value of missing data was extended to 10%, in concordance with the suggestion of (Hair et al., 2019), who further recommended the remedy of questionnaires with more than 20% of missing data. Based on the above, low missing data percentages could be ignored by researchers or treated with an imputation method, including but not limited to hot or cold deck imputation, case substitution and mean substitution (Hair et al., 2019).

SPSS Software was used and 20 rows with more than 20% of missing data were eliminated from the study. In the present research, questionnaires with missing data were retained if this amount of missing data did not exceed 3% (Hair et al., 2014), with non-critical missing data addressed through statistical approaches. Eight questionnaires were found to have less than 3% of missing values and were replaced with the mean value of all responses to the respective categorical item in the preliminary data screening. As for nominal variables, the mean substitution imputation method was not applied and missing data were subsequently excluded during the multi-group analysis (Pallant & Manual, 2010; Byrne & Stewart, 2006; Arbuckle, 2009).

5.2.2 Outliers

Following the determination of missing data in the study samples, researchers must complete another precursory step to data analysis, namely the detection of multivariate outliers. To that end, data are examined for the occurrence of observations, or cases, presenting with unique characteristics as compared to other observations. Practically, outliers could be recognised as a single variable taking extreme values, or as a distinct pattern affecting multiple variables. The assessment of outliers is not limited to their detection but includes their characterisation as beneficial or problematic. Hair et al. (2019) suggested that outliers could be considered

beneficial should they reflect insights into the characteristics of the studied population. Conversely, problematic outliers fail to reflect the population, could contradict expected analysis outcomes and distort statistical tests.

The detection of multivariate outliers was undertaken in our study through the calculation of the Mahalanobis distance as well as the application of the Box and Whisker (Boxplot) approach (Pallant & Manual, 2010) using SPSS. This technique was used to calculate the distance separating observation from the centre of all other observations in the context of particular variables. Outliers are detected in SPSS should an observation exists more than 1.5 lengths from the edge of the box (Pallant & Manual, 2010). The occurrence of outliers in the data should be investigated considering its possible anticipation prior to data analysis or reflection of predetermined groups. As a result, outliers can be deleted or retained by researchers (Hair et al., 2019; Hair et al., 2014), as determined on a case-by-case basis.

As shown in Figure 5-1 and 5-2, the assessment of outliers in the present study was undertaken for the age, educational background, gender, monthly income and mobile experience variables. No outliers occurred in the last three variables in both the Lebanese and British samples. On the other hand, outliers followed a similar pattern in the study samples when examining the age and educational background. A total of seven and four cases presented outside the normal age range in Lebanon Figure 5-1 Outliers for Lebanon and the UK Figure 5-2, respectively. However, these cases were retained seeing as the participation of older respondents was expected following the use of convenience sampling. As for the educational background, at least three respondents were detected with PhDs or very low educational attainment in both samples. Following the same reasoning, outliers in the educational background variable were expected and were thus retained when no issues were attributed to their occurrence.

The existence of multivariate outliers, which occur in research studies involving more than two variables (Hair et al., 2019), was reflected by the Mahalanobis Distances D2 test (Mahalanobis, 1936). Mahalanobis D2 values were calculated indicating the distance of a particular case from the centre of all other clustered cases. The recommendations of (Hair et al., 2019) were followed and the statistically significant occurrence of multivariate outliers was assumed at ($p \leq 0.001$). Following analysis, no multivariate outliers were detected in the Lebanese and British samples.

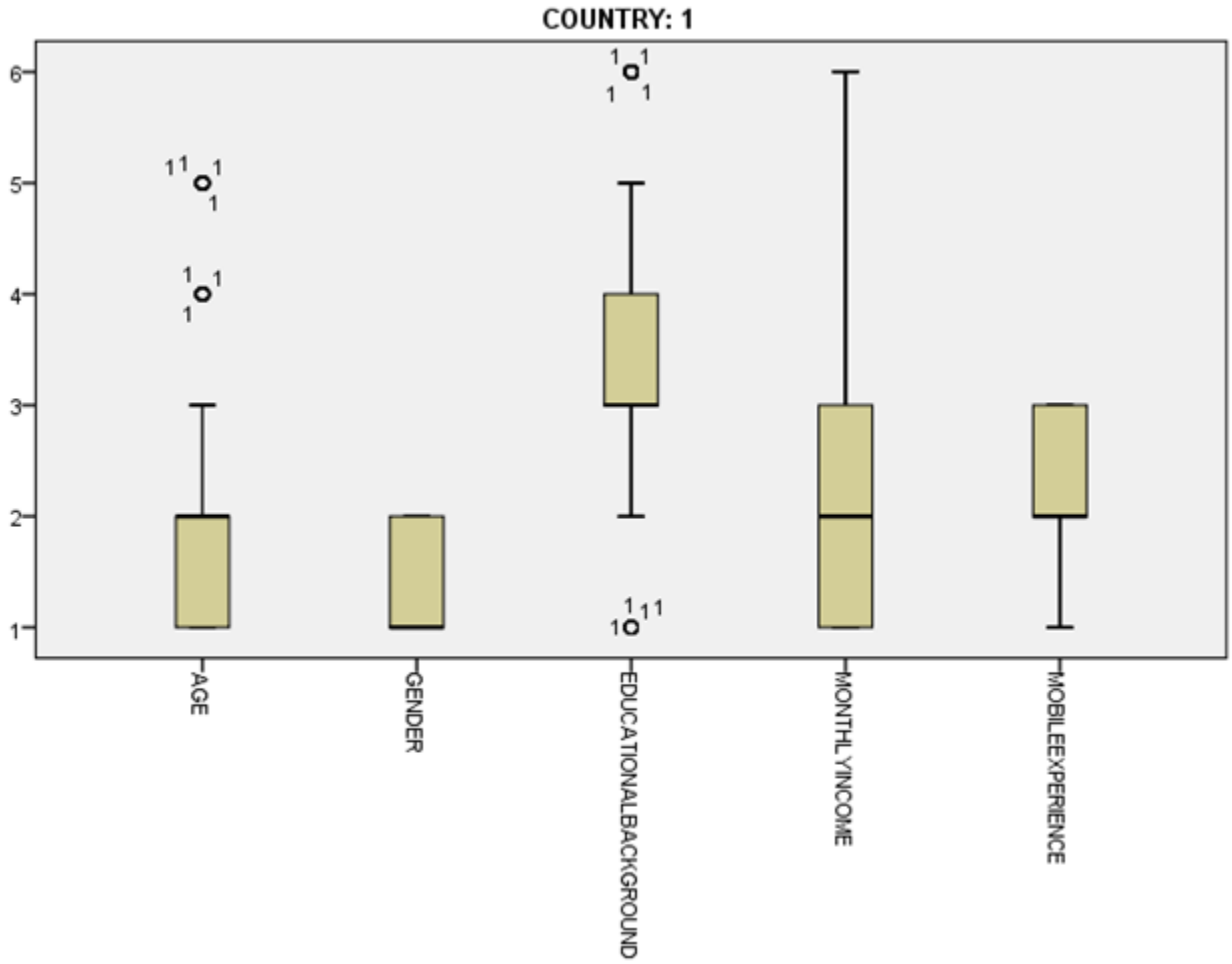

Figure 5-1:Outliers for the Lebanese sample

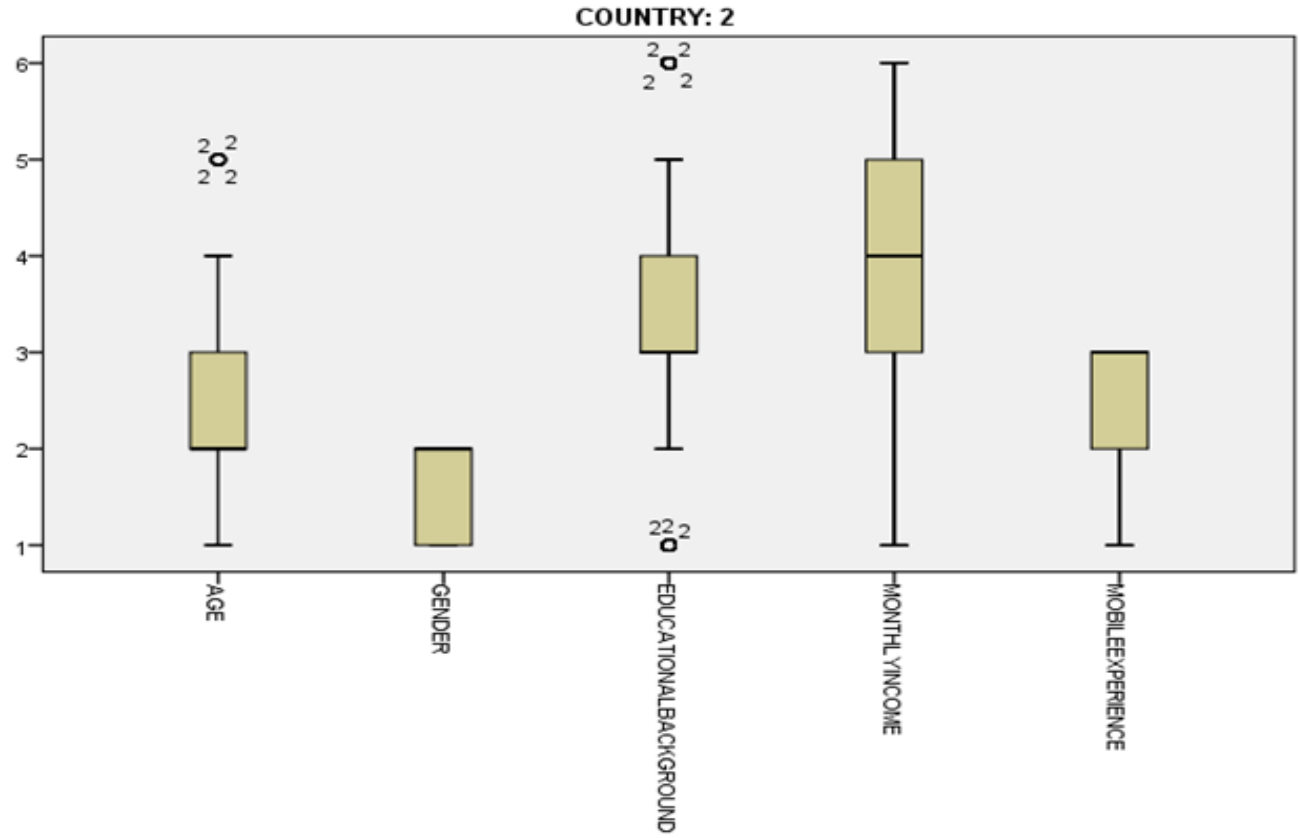

Figure 5-2: Outliers for the UK sample

5.2.3 Normality

When attempting multivariate data analysis, the determination of normality, more specifically, data compliance to adopted statistical inferences emerge as an important consideration. Although normality is essential for PLS analysis, it is a fundamental assumption in multivariate analysis as well as many statistical methods and was thus calculated in this study (Hair et al., 2018). Failure to assume normal data distribution, thus incurs a significant impact on the validity and reliability of multivariate analysis results. Normal data distribution exhibits the highest frequency of scores in the middle of a bell-shaped symmetrical curve (Gravetter & Wallnau, 2000), the extreme sides of which represent lower frequencies.

Both the sample size and the shape of the distribution should be considered when investigating the impact of data distribution in any given study. Two measures, skewness and Kurtosis, reflect data distribution (Hair et al., 2018) by indicating its asymmetry and peakedness (Pallant, 2013) or flatness (Kenny & Keeping, 1962), respectively. The values of these measures provide invaluable insights into the shape of data distribution within the study sample. A flat distribution could be inferred from negative kurtosis values, while positive values indicate a

peaked distribution. On the other hand, skewness is characterised by both direction and degree, with positive and negative values denoting a shift in distribution to the left and right, respectively. Moreover, the degree to which data distribution deviates from normality (Azzalini & Capitanio, 1999) is also reflected in the negative or positive variation of multivariate Kurtosis values (Tabachnick, Fidell, & Ullman, 2007). Many authors (West et al., 1995; Yuan & Bentler, 1999; Lei & Lomax, 2005) recommended absolute values of 3.0 for skewness and 7.0 for kurtosis.

As shown in Table 5-1, skewness and kurtosis values were within the recommended range of ±3 and ±7, respectively, in both the Lebanese and the British samples. A normal distribution could thus be inferred, with no issues of non-normality encountered in the data sets.

Table 5-1: Skewness and kurtosis values for Lebanon and the UK

		Lebanon		UK	
Constructs	**Variable**	**skew**	**kurtosis**	**skew**	**kurtosis**
Performance Expectancy	PE1	-1.341	1.439	-2.340	1.869
	PE2	-.996	.228	-1.637	2.484
	PE3	-1.354	1.274	-2.330	1.649
	PE4	-1.450	2.007	-2.282	1.585
Effort Expectancy	EE1	-1.150	1.258	-1.792	1.917
	EE2	-.771	-.001	-1.232	1.240
	EE3	-1.008	1.15	-1.483	2.479
	EE4	-1.107	1.560	-1.500	1.709
Social Influences	SI1	-.428	-.213	-.299	-.632
	SI2	-.293	-.330	-.284	-.698
	SI3	-.414	-.123	-.394	-.688
	SI4	-.622	-.068	-.359	-.359
Facilitating Conditions	FC1	-.804	.058	-1.991	.964
	FC2	-.978	.469	-1.844	3.976
	FC3	-1.143	1.554	-1.198	1.374
	FC4	-.770	-.139	-.1764	-.031
	FC5	-.646	-.134	-1.011	.873

Hedonic Motivation	HM1	-.759	.268	-.500	-.567
	HM2	-.743	.046	-.492	-.521
	HM3	-.544	-.112	-.110	-.741
Price Value	PV1	-.489	-.205	-.818	.072
	PV2	-.537	-.106	-.814	-.124
	PV3	-.436	-.021	-.713	-.125
Habit	HB1	-.418	-.828	-1.461	1.609
	HB2	.009	-1.149	.165	-1.160
	HB3	-.715	-.520	-.407	-1.034
	HB4	-.444	-.582	-.622	-.729
Behavioural Intention	BI1	-.900	.064	-1.533	2.288
	BI2	-.691	-.089	-.849	-.054
	BI3	-.644	-.370	-1.359	1.864
Trust	TR1	-.554	-.506	-.944	.575
	TR2	-.287	-.914	-.401	-.951
	TR3	-.419	-.725	-768	-.300
	TR4	-.571	-.106	-.699	-.098
	TR5	-.644	-.049	-.837	.604
Perceived Privacy	PP1	-.613	-.190	-.389	-.644
	PP2	-.802	.110	-.124	-1.099
	PP3	-.660	-.308	-.144	-1.138
	PP4	-.567	-.628	-.143	-1.329
Perceived Security	PS1	-.274	-.835	.623	-.886
	PS2	-.229	-.793	.315	-1.004
	PS3	-.545	-.481	.583	-.908
	PS4	-1.003	.616	-1.283	1.072
Service Quality	SRVQ1	-.245	-.623	-.358	-.653
	SRVQ2	-.596	-.012	-.956	.573
	SRVQ3	-.650	.39	-.555	-.196
	SRVQ4	-.743	.148	-1.240	1.810
System Quality	SYQ1	-.625	.021	-.934	.528

	SYQ2	-.622	-.184	-1.226	1.497
	SYQ3	-.449	-.005	-.780	.422
	SYQ4	-.730	.405	-1.491	2.336
Information Quality	INQ1	-.707	.525	-1.232	2.272
	INQ2	-.839	.699	-.983	1.399
	INQ3	-.910	.993	-.973	1.298
	INQ4	-.724	.181	-.832	.858

5.3 Demographic information

As shown in Table 5-2 and 5-3, approximately equal gender distribution and the predominance of student participants were evidenced in both the Lebanese and British samples. In the former, the majority of respondents belonged to the youngest age groups, with 79.2% of the Lebanese participants are below the age of 35. On the other hand, older users were more prevalent among British respondents, which exhibited equal distribution between the youngest age group (18-25) and for the (36-45) as age group. That being said, the British sample most frequently included respondents between 26 and 35 years of age, who accounted for 41.1% of the sample. The majority of participants in both samples reportedly had more than two years of mobile use history. The intermediate mobile experience was more prevalent among Lebanese respondents, as opposed to their British counterparts, 63.7% of whom considered themselves beginners. Educational attainment was variable in both samples, albeit with a consistently higher prevalence of bachelor's degrees, which were reported in approximately half of the Lebanese sample and 37.2% of the British one. Notable discrepancies were noted between the Lebanese and British samples on the level of income and mobile banking usage. Lebanese respondents generally reported low income, as evidenced by the fact that more than half of the respondents (approximately 60%) earned less than £1000. Alternatively, 46.8% of British participants earned between £1000 and £3000, while 16.5% reported an income higher than £4000.

Lebanese respondents were frequent and semi-frequent mobile banking users. Almost equal distribution was evidenced between the daily and monthly usage categories, with slightly less prevalent reports of mobile banking use multiple times a month. Interestingly, daily mobile banking use was reportedly rare among British respondents, where 44.4% of whom reported

never using mobile banking. On the other hand, 38.2% used mobile banking multiple times a month.

Table 5-2: Demographic profiles for the Lebanese participants

Variable	Category	Frequency	%
Gender	Male	246	51.5
	Female	232	48.5
Age	18-25	222	46.4
	26-35	157	32.8
	36-45	59	12.3
	46-55	20	4.2
	56 and above	20	4.2
Using mobile	Up to 1 year	108	22.6
	1 to 2 years	40	8.4
	More than 2 year	330	69
Mobile experience	Experienced	32	6.7
	Intermediate	232	48.5
	Beginner	214	44.8
Education	Secondary	6	1.3
	High School	50	10.5
	Bachelor's degree	252	52.7
	Master's degree	125	26.2
	PhD	25	5.2
	Others	20	4.2
Occupation	Academic/Teacher	57	11.9
	Clerical/Administrative	35	7.3
	Computer Technical/Engineering	50	10.5
	Executive/Manager	25	5.2
	Homemaker	18	3.8
	Other	34	7.1
	Professional	29	6.1

	Retired	7	1.5
	Sales/Marketing	18	3.8
	Self-employed/Own Company	28	5.9
	Service/Customer Support	2	0.4
	Student (College/University)	158	33.1
	Unemployed, looking for work	17	3.6
Income	Less than £500	176	36.8
	Between £501 to £1,000	110	23
	Between £1,001 to £2,000	91	19
	Between £2,001 to £3,000	52	10.9
	Between £3,001 to £4,000	14	2.9
	£4,000 and above	35	7.3
Mobile banking usage	Daily	118	24.7
	Once a week	66	13.8
	Once a month	123	25.7
	Many times, a month	103	21.5
	Never	68	14.2

Table 5-3: Demographic profiles for the UK participants

Variable	Category	Frequency	%
Gender	Male	205	48.9
	Female	214	51.1
Age	18-25	89	21.2
	26-35	172	41.1
	36-45	88	21
	46-55	51	12.2
	56 and above	19	4.5
sing mobile	Up to 1 year	29	6.9
	1 to 2 years	41	9.8
	More than 2 years	349	83.3
	Experienced	12	2.9

Mobile experience	Intermediate	140	33.4
	Beginner	267	63.7
Education	Secondary	34	8.1
	High School	69	16.5
	Bachelor's degree	156	37.2
	Master's degree	74	17.7
	PhD	34	8.1
	Others	52	12.4
Occupation	Academic/Teacher	28	6.7
	Clerical/Administrative	16	3.8
	Computer Technical/Engineering	36	8.6
	Executive/Manager	61	14.6
	Homemaker	6	1.4
	Other	20	4.8
	Professional	62	14.8
	Retired	8	1.9
	Sales/Marketing	25	6
	Self-employed/Own Company	31	7.4
	Service/Customer Support	21	5
	Student (College/University)	99	23.6
	Unemployed, looking for work	6	1.4
Income	Less than £500	51	12.2
	Between £501 to £1,000	49	11.7
	Between £1,001 to £2,000	105	25.1
	Between £2,001 to £3,000	91	21.7
	Between £3,001 to £4,000	54	12.9
	£4,000 and above	69	16.5
Mobile banking usage	Daily	8	1.9
	Once a week	17	4.1
	Once a month	48	11.5
	Many times, a month	160	38.2

	Never	186	44.4

5.4 Data Analysis and Findings

As proposed by (Hair, Risher, Sarstedt, & Christian, 2019), the examination of the measurement model is a fundamental step in PLS-SEM and involves the determination of measures' validity and reliability. These two measurements present distinct tests, albeit with marked similarities (Bollen, 1989). High reliability could be exhibited by a measure which lacks validity. The opposite also holds true, with measures able to present with high validity or accuracy, but low reliability (consistency) (Holmes-Smith, 2011). Differential criteria is used to reflect the validity and reliability of reflective and formative constructs (Hair et al., 2019). In general, context-specific guidelines direct the evaluation and interpretation of model results in PLS-SEM (Chin, 2010; Henseler et al., 2009; Roldán & Sánchez-Franco, 2012; Hair et al., 2017), in accordance with those reported with other statistical methods. Values reflecting reliability accommodate specific research contexts, with a minimum value of 0.6 recommended for exploratory research, as opposed to 0.7 or higher in research incorporating established measures (Hair et al., 2019). The research context (e.g. analysis objective and availability of data) thus determine the aptness of robustness checks, which constitute an essential last step on PLS-SEM result interpretation. The examination of the measurement model should satisfy all required criteria; the researchers proceed with the assessment of the structural model (Hair et al., 2017, Hair et al., 2019).

5.4.1 Assessing reflective measurement models

5.4.1.1 *Indicator loadings*

According to (Hair et al., 2019), the examination of indicator loadings constitutes the first step in the assessment of reflective measurement models. Satisfactory item reliability is suggested to be reflected by loadings explaining more than 50% of the indicator's variance, as evidenced by values superior to 0.708, with established significance at least at the level of 0.05. In this study, measurement items with loadings lower than 0.7 were deleted, while those exceeding 0.7 and loading significantly were retained (Table 5-4). As a result, four items, namely PP1 (0.222), PS4 (-0.42), FC4 (0.65) and SI4 (0.629) were deleted in Lebanon, while FC4 (0.417), SI4 (0.579), PS4 (-0.630), PP1 (0.628) and PP2 (0.664) were deleted in the UK. Retained items

had loadings ranging from 0.735 to 0.932 and loaded significantly at the 0.001 level with t-values larger than 1.96.

Table 5-4: Items loading in Lebanon and the UK

		Lebanon	UK	Lebanon	UK
Construct	**Items**	**Loadings**	**Loadings**	**rho_A**	
BI	BI1	0.91	0.842	0.904	0.823
	BI2	0.923	0.832		
	BI3	0.913	0.893		
EE	EE1	0.859	0.894	0.885	0.909
	EE2	0.86	0.897		
	EE3	0.876	0.89		
	EE4	0.822	0.766		
FC	FC1	0.86	0.794	0.855	0.827
	FC2	0.873	0.855		
	FC3	0.782	0.827		
	FC5	0.755	0.714		
HB	HB1	0.83	0.735	0.859	0.781
	HB2	0.795	0.776		
	HB3	0.735	0.718		
	HB4	0.898	0.825		
HM	HM1	0.881	0.922	0.849	0.907
	HM2	0.908	0.922		
	HM3	0.837	0.873		
INQ	INQ1	0.858	0.894	0.887	0.911
	INQ2	0.885	0.909		
	INQ3	0.866	0.852		
	INQ4	0.818	0.834		
PE	PE1	0.885	0.868	0.917	0.854
	PE2	0.904	0.846		
	PE3	0.903	0.873		
	PE4	0.873	0.749		
PP	PP2	0.932	-	1.104	1.04
	PP3	0.868	0.899		
	PP4	0.773	0.966		
PS	PS1	0.848	0.861	0.807	0.891
	PS2	0.885	0.866		
	PS3	0.741	0.908		
PV	PV1	0.861	0.917	0.802	0.879
	PV2	0.749	0.895		
	PV3	0.891	0.866		
SI	SI1	0.872	0.907	0.858	0.918
	SI2	0.863	0.948		

	SI3	0.88	0.925		
SRVQ	SRVQ1	0.804	0.722	0.849	0.837
	SRVQ2	0.879	0.857		
	SRVQ3	0.752	0.721		
	SRVQ4	0.836	0.844		
SYQ	SYQ1	0.843	0.864	0.877	0.902
	SYQ2	0.813	0.881		
	SYQ3	0.862	0.852		
	SYQ4	0.868	0.885		
TR	TR1	0.822	0.845	0.893	0.893
	TR2	0.816	0.717		
	TR3	0.838	0.789		
	TR4	0.798	0.83		
	TR5	0.877	0.864		

5.4.1.2 *Item reliability*

The indictor loadings step is followed by the assessment of the internal consistency reliability, which is positively reflected by the composite reliability measure suggested by Jöreskog's (1971). Satisfactory or good reliability values are suggested to fall between 0.70 and 0.90, as opposed to those superior to 0.95 (Hair et al., 2019). The latter is regarded as problematic and indicative of redundant items (Sarstedt, Ringle, & Hair, 2017; Drolet & Morrison, 2001), or undesirable response patterns and consequently, inflated correlations among the indicators' error terms (Hair et al., 2019). Composite reliability provides a higher precision than other measures of internal consistency reliability, such as Cronbach's alpha, due to its adoption of weighted items based on the construct indicators' individual loadings (Hair et al., 2019). As a result, composite reliability produces higher values than Cronbach's alpha, despite the assumption of similar thresholds in both measures. Cronbach's alpha was recognised to yield underestimated internal consistency reliability in PLS-SEM due to its assumption of equal reliability among indicators (Urbach & Ahlemann, 2010).

Composite reliability and Cronbach's alpha reflected satisfactory reliability, as evidenced by values exceeding the minimum threshold of 0.7 for both measures (Table 5-5). Cronbach's alpha ranged from 0.802 and 1.104 in Lebanon and 0.781 and 1.04 in the UK. As for the Composite reliability of reflective constructs, values ranged from 0.866 and 0.94 in Lebanon and 0.849 and 0.948 in the UK.

That being said, a construct's true reliability lies between the conservative estimates of Cronbach's alpha and the liberal values of composite reliability and is suggested to be reflected by RhoA (Dijkstra & Henseler, 2015). In the assumption of a correct factor model, Rho_A could constitute an approximately exact measure of construct reliability.

Bootstrap confidence intervals could be employed in order to detect significant variations in construct reliability as compared to the recommended minimum or maximum thresholds. The percentile method is suggested for the determination of bootstrap confidence intervals (Aguirre-Urreta & Rönkkö, 2018), albeit with the precedence of the bias corrected-accelerated (BCa) method when the bootstrap distribution of reliability coefficients is skewed.

5.4.1.3 *Convergent validity*

Thirdly, the convergent validity of individual constructs must be determined as part of the assessment of the measurement model. This serves to confirm that items reflect adequate, and not unintentional, latent variables. Convergent validity is defined as "*the extent to which the construct converges to explain the variance of its items*" (Hair et al., 2019) and is generally reflected by Average variance extracted (AVE). AVE incorporates all items in a construct and its value is calculated by squaring the loading of each indicator on a construct then computing the mean value (Hair et al., 2019). Values of 0.5 or higher are suggested to indicate acceptable convergent validity, with at least 50% of item variance explained by constructs. As shown in Table 5-5, AVE varied between 0.667 and 0.838 in the Lebanese sample, and between 0.584 and 0.859 in the British sample, indicating satisfactory convergent validity.

Table 5-5: Results of Cronbach's alpha and Composite Reliability in Lebanon and the UK

	Lebanon				**UK**			
Indicators	**Cronbach's Alpha**	**Composite Reliability**	**AVE**	**Rho_A**	**Cronbach's Alpha**	**Composite Reliability**	**AVE**	**Rho_A**
BI	0.903	0.940	0.838	0.904	0.817	0.891	0.733	0.823
EE	0.877	0.915	0.730	0.885	0.886	0.921	0.746	0.909
FC	0.837	0.890	0.671	0.855	0.811	0.876	0.639	0.827
HB	0.833	0.888	0.667	0.859	0.769	0.849	0.584	0.781

HM	0.884	0.928	0.812	0.849	0.891	0.932	0.821	0.907
INQ	0.880	0.917	0.734	0.887	0.896	0.927	0.762	0.911
PE	0.914	0.939	0.794	0.917	0.854	0.902	0.698	0.854
PP	0.840	0.894	0.740	1.104	0.86	0.931	0.87	1.04
PS	0.771	0.866	0.684	0.807	0.855	0.911	0.773	0.891
PV	0.783	0.874	0.699	0.802	0.873	0.922	0.797	0.879
SI	0.829	0.888	0.669	0.858	0.917	0.948	0.859	0.918
SRVQ	0.836	0.891	0.671	0.849	0.799	0.867	0.622	0.837
SYQ	0.869	0.910	0.717	0.877	0.894	0.926	0.758	0.902
TR	0.888	0.917	0.690	0.893	0.87	0.905	0.658	0.893

5.4.1.4 *Discriminant Validity*

The PLS-SEM's fourth step consists of the assessment of discriminant validity, defined by (Hair et al., 2019) as "*the extent to which a construct is empirically distinct from other constructs in the structural model*". Traditionally, discriminant validity was determined through the comparison of a construct's AVE to a measure of shared variance common to all reflective items in the structural model, such as the squared inter-construct correlation (Fornell & Larcker, 1981). AVE values are recommended to be superior to the shared variance of all model constructs. In the present study, the determination of a metric defined by Fornell and Larcker (1981) was preceded by the examination of each item's cross-loadings. The establishment of discriminant validity requires that the shared variance between a construct and its indicator (in bold) should exceed that between it and other constructs (Chin, 1998; Hair et al. 2017). As shown in tables 5-6 and 5-7, cross-loadings revealed satisfactory discriminant validity across all constructs proposed in this model.

Table 5-6: Results of Assessment of Discriminant Validity-Fornell-Larcker Lebanon

	BI	EE	FC	HB	HM	INQ	PE	PP	PS	PV	SI	SRVQ	SYQ	TR
BI	**0.916**													
EE	0.604	**0.855**												
FC	0.642	0.712	**0.819**											
HB	0.767	0.54	0.581	**0.817**										
HM	0.532	0.567	0.589	0.529	**0.901**									
INQ	0.577	0.576	0.591	0.548	0.525	**0.857**								
PE	0.709	0.774	0.68	0.611	0.567	0.6	**0.891**							

PP	-0.07	0.034	0.06	-0.025	-0.022	0.099	-0.011	**0.86**						
PS	-0.218	-0.06	-0.075	-0.085	-0.126	-0.019	-0.148	0.626	**0.827**					
PV	0.567	0.531	0.581	0.569	0.483	0.56	0.514	0.007	-0.009	**0.836**				
SI	0.516	0.571	0.519	0.484	0.489	0.543	0.519	0.016	-0.025	0.465	**0.892**			
SRVQ	0.629	0.517	0.565	0.616	0.505	0.684	0.537	0.006	-0.04	0.616	0.511	**0.819**		
SYQ	0.619	0.535	0.563	0.582	0.498	0.773	0.584	0.036	-0.027	0.575	0.524	0.769	**0.847**	
TR	0.635	0.496	0.531	0.592	0.529	0.543	0.572	-0.162	-0.172	0.659	0.496	0.638	0.628	**0.831**

Table 5-7: Results of Assessment of Discriminant Validity-Fornell-Larcker UK

	BI	EE	FC	HB	HM	INQ	PE	PP	PS	PV	SI	SRVQ	SYQ	TR
BI	**0.856**													
EE	0.578	**0.863**												
FC	0.506	0.686	**0.799**											
HB	0.679	0.442	0.305	**0.764**										
HM	0.357	0.2	0.165	0.443	**0.906**									
INQ	0.562	0.522	0.542	0.43	0.199	**0.873**								
PE	0.616	0.754	0.537	0.468	0.245	0.467	**0.835**							
PP	-0.139	-0.163	-0.186	-0.093	-0.067	-0.168	-0.158	**0.933**						
PS	-0.192	-0.199	-0.335	0.004	0.077	-0.247	-0.184	0.608	**0.879**					
PV	0.48	0.42	0.43	0.365	0.213	0.421	0.407	-0.249	-0.161	**0.893**				
SI	0.368	0.419	0.269	0.443	0.378	0.314	0.4	-0.085	0.092	0.3	**0.927**			
SRVQ	0.629	0.502	0.499	0.463	0.285	0.671	0.446	-0.171	-0.197	0.482	0.328	**0.789**		
SYQ	0.54	0.57	0.536	0.407	0.214	0.836	0.474	-0.162	-0.221	0.433	0.318	0.739	**0.871**	
TR	0.473	0.532	0.424	0.339	0.267	0.493	0.455	-0.414	-0.274	0.438	0.262	0.512	0.533	**0.811**

5.4.2 Assessing formative measurement models

Formative measurement models differ from their reflective counterparts in the steps involved in their validation. As recommended by Henseler et al. (2009), validity must be examined in the context of both the indicators and constructs through indicator weights and variance inflation factors (VIF) for the former, and discriminant validity for the latter. Satisfactory indicator validity and relevance in the construction of the formative index is reflected by formative constructs' indicator weight should present with 0.05 significance level (Urbach & Ahlemann, 2010). As for VIF, values lower than five are recommended for this measure (Diamantopoulos & Siguaw, 2006; Hair, Anderson, Babin, & Black, 2010), which reflects the degree of multicollinearity among latent variables with hypothesised effect on another distinct variable (Kock, 2011).

Behavioural intention is recognised as a formative construct in the present study. The establishment of both construct validity and reliability must precede hypothesis testing and assessment of the structural model. As shown in table 5-8, all indicators loaded far more significantly than the minimum recommended threshold, with a p-value inferior to 0.001. The indicator validity of formative constructs was detected along with the lack of critical collinearity between latent variables. More specifically, VIF values in both Lebanon and the UK did not exceed the conservative threshold of 3.2 recommended by (Diamantopoulos & Siguaw, 2006), with a maximum VIF value of 3.183 in Lebanon, and 2.099 in the UK.

Table 5-8: formative model assessment in Lebanon and the UK

	Lebanon			**UK**		
	VIF	**Indicator Weight**	***p*-value**	**VIF**	**Indicator Weight**	***p*-value**
BI1	2.671	0.377	<0.001	1.774	0.377	<0.001
BI2	3.183	0.356	<0.001	1.725	0.368	<0.001
BI3	2.902	0.360	<0.001	2.099	0.421	<0.001

The assessment of Common Method Bias (CMB) was undertaken for both study samples, with the recommendation of a maximum threshold of 50% adopted. Harman's test was conducted in SPSS, with results demonstrating the explanation of 31.029% and 38.021% of variance by behavioural intention in the UK and Lebanon, respectively. CMB was not investigated further considering the acceptable values obtained with unrotated factor analysis (lower than the maximum threshold).

5.4.3 Assessing the Structural Model

The structural model is defined as "*a set of one or more dependent relationships linking the hypothesized model's constructs; representing the interrelationships of variables between constructs*" (Hair et al., 2010). In the structural model, both direct and indirect inter-construct influences are delineated, thereby specifying the relationships existing between latent constructs in the proposed model (Byrne, 2013). The assessment of the structural model follows that of the measurement model in the satisfactory event. This step in the evaluation of PLS-SEM results is completed based on standard assessment criteria, such as the coefficient of determination (R2), the blindfolding-based cross-validated redundancy measure Q2, in addition to the statistical significance and relevance of the path coefficients (Hair et al., 2010; 2018; Byrne, 2013).

5.4.3.1 *Assessment of Collinearity*

The present study undertook the assessment of predictor constructs (e.g. EE, PE, HB, PV, HB, FC, BI) in relation with the two dependent variables of the structural model, namely behavioural intention and usage (Table 5-9, 5-10). The analysis yielded VIF values of independent variables with BI as the dependent variable ranging between 1.853 and 4.363 in the Lebanese sample, and between 1.393 and 4.134 in the British sample. As for usage as a dependent variable, VIF values ranged between 1.759 and 2.827 in Lebanon, and between 1.349 and 2.267 in the UK. The absence of collinearity issues can be interpreted seeing as VIF values were inferior to 5, and tolerance values higher than 0.2 (Hair et al., 2016).

Table 5-9: Results of Collinearity Assessment of the Structural Model for the Lebanese sample

BI as dependent Variable			**Usage as dependent Variable**		
Construct	**Tolerance**	**VIF**	**Construct**	**Tolerance**	**VIF**
EE	0.31	3.222	BI	0.389	2.827
FC	0.298	3.355	FC	0.565	1.759
HB	0.376	2.658	HB	0.416	2.505
HM	0.527	1.898			
INQ	0.333	3.000			
PE	0.285	3.508			
PP	0.54	1.853			
PS	0.531	1.882			
PV	0.436	2.295			
SE	0.367	2.722			
SI	0.495	2.02			

SYQ	3.613	4.363			
TR	2.598	1.979			

Table 5-10: Results of Collinearity Assessment of the Structural Model for the UK sample

BI as dependent Variable			**Usage as dependent Variable**		
Construct	**Tolerance**	**VIF**	**Construct**	**Tolerance**	**Usage**
EE	0.286	3.502	BI	0.498	2.267
FC	0.428	2.336	FC	0.790	1.349
HB	0.471	2.123	HB	0.592	1.86
HM	0.718	1.393			
INQ	0.27	3.71			
PE	0.394	2.536			
PP	0.415	2.412			
PS	0.463	2.16			
PV	0.598	1.673			
SE	0.356	2.808			
SI	0.652	1.535			
SRVQ	0.403	2.483			
SYQ	0.242	4.134			

5.4.3.2 *Coefficient of Determination, R2*

The examination of the R2 value of endogenous constructs succeeds in the establishment of a lack of collinearity issues (Hair et al., 2019). R2 referred to as in-sample predictive power (Rigdon, 2012), reflects a model's explanatory power through its measurement of the variance in each of the endogenous constructs (Shmueli & Koppius, 2011). R2 measures the relationship between the total variance of dependent variables, and the explained variance of latent variables (Chin, 1998). Higher R2 values are indicative of greater explanatory power, with R2 values ranging between 0 and 1 (Hair et al., 2019). According to Chin (1998), R2 values of approximately 0.670 can be considered substantial, while those around 0.333 and lower than 0.190 reflect average and weak explanatory power, respectively.

Analysis yielded R2 values of two endogenous variables, BI and USE. In Lebanon, the R2 value was 0.727 and 0.368 for BI and USAGE, respectively. On the other hand, R2 value for BI was 0.673 and 0.280 for USAGE in the UK, indicating that the model explained 72.7% and 67% of the variance in behavioural intention in Lebanon and the UK, respectively, while it accounted for 36.8% and 28% of the variation in mobile banking usage. As a result, the effects

of exogenous latent variables on endogenous latent variables can be elucidated independently of the moderators.

5.4.3.3 *Predictive Relevance Q2*

The Q2 value is a metric based on the blindfolding procedure employed to reflect a path model's predictive accuracy in PLS (Geisser, 1974; Stone, 1974). In this procedure, model parameters are estimated based on the model, in which data points are deleted and imputed with the mean (Rigdon, 2014; Sarstedt, Ringle, & Hair, 2014). In other words, Q2 indicates the predictive accuracy of a model and its parameter estimates in the reconstruction of observed values. Higher Q2 values, and by extension, higher predictive accuracy, are reflected in the event that small differences exist between the predicted and the original data values (Hair et al., 2019). Predictive relevance is assumed for each endogenous construct when Q2 values are positive (Q2>0), with small predictive relevance indicated for Q2>0, while Q2 larger than 0.25 and 0.5 reflecting medium and large predictive relevance (Hair et al., 2019). Q2 thus represents a combination of in-sample explanatory power with certain aspects of out-of-sample prediction (Shmueli, Ray, Estrada, & Chatla, 2016; Sarstedt et al., 2017).

In the present research, the predictive relevance of reflective, and not formative (Hair et al., 2014), endogenous constructs were computed using the blindfolding procedure in SmartPLS, thereby yielding the Stone-Geisser Q2 values. Blindfolding was carried out for a given omission distance D, whose values should remain between 5 and 10. Moreover, dividing the number of model estimation observations by D must not yield an integer (Hair et al., 2014; 2017).

The sample size for Lebanon and the UK are 478 and 419 respectively. Therefore, a default omission distance of 7 was chosen for both. The Q2 effect size values (shown in Table 5-11) were calculated by hand following the deletion of each exogenous construct in the structural model, for which Q2 values for BI were already computed.

The Q2 values for the assessed constructs ranged from -0.001 to 0.065, with small to no predictive relevance in the assessed relationships.

Table 5-11: predictive relevance Q2 in Lebanon and the UK

	Lebanon	**UK**
EE -> BI	-0.001	-0.002
FC -> BI	0.003	0.001
HB -> BI	0.065	0.065

HM -> BI	0	0
INQ -> BI	-0.001	0.002
PE -> BI	0.015	0.012
PP -> BI	0	0.004
PS -> BI	0.01	0.004
PV -> BI	0	0.003
SI -> BI	0	0
SRVQ -> BI	0.001	0.016
SYQ -> BI	0	0
TR -> BI	0.002	0.001

5.4.3.4 *Path Coefficients*

The magnitude and significance of path coefficients between latent variables serve for their assessment. In other words, the t and p values (significance level) of the hypothesised relationships in the model reflect significant paths in the structural model (Hair et al., 2014). Bootstrapping was used for the determination of path coefficients in this study's structural model, and 16 paths were assessed in each sample (Lebanon and the UK). The obtained path coefficients, t and p values are represented in Tables 5-12 and 5-13 and indicate the significance of 7 and 8 paths in Lebanon and the UK, respectively. The paths in H1a, H1b, H2d, H4a, H4c, H5c, H5d, H6b, H7a, H7b, H7d, H8a, H8c, H8e, H8f, H9b, H10a, H10b, H11b, H12c, H13c, H13e, H13f, H14a and H14b were thus supported.

The assessment of the main proposed hypotheses was undertaken based on path coefficients, their t value and significance, as determined in previous sections.

Table 5-12: Summary of the hypothesised results for Lebanon (Significance level p≤0.05. ** Significance level p≤0.01. *** Significance level p≤0.001*

Lebanon	**Path Coefficients**	**Standard Deviation (STDEV)**	**T Statistics (|O/STDEV|)**	**Significance Levels**	**P Values**
BI -> Usage	0.353	0.06	5.89	***	**0**
EE -> BI	0.001	0.055	0.026	Not Significant	0.98
FC -> BI	0.12	0.048	2.515	*	**0.012**
FC -> Usage	0.267	0.055	4.825	***	**0**
HB -> BI	0.421	0.042	10.121	***	**0**
HB -> Usage	0.056	0.059	0.948	Not Significant	0.344
HM -> BI	-0.076	0.047	1.617	Not Significant	0.107
HM -> PE	0.258	0.049	5.239	***	**0**
INQ -> BI	-0.012	0.044	0.274	Not Significant	0.784
INQ -> EE	0.437	0.05	8.635	***	**0**

INQ -> PE	0.248	0.064	3.897	***	**0**
PE -> BI	0.248	0.051	4.847	***	**0**
PP -> BI	0.044	0.037	1.202	Not Significant	0.23
PS -> BI	-0.15	0.033	4.547	***	**0**
PV -> BI	0.015	0.038	0.404	Not Significant	0.687
SI -> BI	0.011	0.036	0.3	Not Significant	0.764
SRVQ -> BI	0.084	0.047	1.766	Not Significant	0.078
SYQ -> BI	0.061	0.049	1.229	Not Significant	0.22
SYQ -> PE	0.123	0.059	2.051	*	**0.041**
TR -> BI	0.103	0.038	2.69	**	**0.007**
TR -> EE	0.256	0.056	4.668	***	**0**
TR -> PE	0.224	0.057	3.946	***	**0**

UK	**Path Coefficients**	**Standard Deviation (STDEV)**	**T Statistics (|O/STDEV|)**	**Significance Levels**	**P Values**
BI -> Usage	0.435	0.074	5.845	***	**0**
EE -> BI	0.015	0.064	0.24	Not Significant	0.811
FC -> BI	0.059	0.055	1.066	Not Significant	0.287
FC -> Usage	-0.001	0.062	0.01	Not Significant	0.992
HB -> BI	0.391	0.042	9.317	***	**0**
HB -> Usage	0.127	0.065	1.953	*	**0.05**
HM -> BI	0.043	0.034	1.261	Not Significant	0.208
HM -> PE	0.09	0.033	2.63	**	**0.009**
INQ -> BI	0.097	0.057	1.697	Not Significant	0.09
INQ -> EE	0.348	0.058	5.945	***	**0**
INQ -> PE	0.115	0.064	1.759	Not Significant	0.079
PE -> BI	0.22	0.07	3.161	**	**0.002**
PP -> BI	0.102	0.042	2.446	*	**0.015**
PS -> BI	-0.114	0.04	2.848	**	**0.005**
PV -> BI	0.081	0.035	2.309	*	**0.021**
SI -> BI	-0.032	0.037	0.862	Not Significant	0.389
SRVQ -> BI	0.246	0.061	4.055	***	**0**
SYQ -> BI	-0.102	0.064	1.592	Not Significant	0.112
SYQ -> PE	-0.048	0.072	0.627	Not Significant	0.531
TR -> BI	0.061	0.042	1.441	Not Significant	0.15
TR -> EE	0.36	0.055	6.609	***	**0**
TR -> PE	0.032	0.039	0.927	Not Significant	0.355

When the significance level is set at 5% (p-value ≤ 0.05), 1% (p-value ≤ 0.01) or 0.1% (p-value ≤ 0.001) statistically significant relationships can be assumed at t values equal or superior to

1.96, 2.56, or 3.26, respectively. The probability of error of path coefficients must not exceed 5%, if so, it is considered significant (Hair et al., 2014).

5.5 Moderating Factors

Group comparisons and the delineation of existing differences between study groups was undertaken through PLS-MGA in SmartPLS. PLS-MGA served as a non-parametric approach, Henseler et al. (2009) established the effect of moderators by way of PLS path analysis of individual groups and the subsequent testing of proposed hypotheses. More specifically, PLS-MGA incorporates bootstrapping results obtained in PLS-SEM in order to reflect the direction of significant influences in path coefficients between groups. The superior influence of the first or the second tested group is assumed the p-value to be inferior to 0.05, or superior to 0.95. The assumption of equal variance across groups calls for the use of a parametric test for the determination of statistical significance, while the Welch-Satterthwaite test is used in the case of unequal variances. For the control of result stability, large number of tests were employed with a bootstrap using the SmartPLS software on a large subsample of 5000 randomly ran from the original set of data.

5.5.1 Age as Moderator

The modest number of responses in some age groups prompted the division of the Age moderator into two groups, representing younger (18-25 years) and older (26+ years) users.

222 and 256 participants were included in the younger users and older users' group of the Lebanese and UK samples respectively. The R2 values for BI and USE for the younger group were 0.727 (73%) and 0.248 (25%) respectively. On the other hand, the older group had R2 values for BI and USE of 0.735 (74%) and 0.484 (49%) respectively.

The significant moderating effect of age on the relationship between habit and usage - H7c1 (p=0.999) is shown in Table 5-14, with a stronger influence of Habit evidenced among the older, and not the younger, users' group.

Table 5-13: Summary of the Moderating Effect of Age for Lebanon (O: Old, Y: Young, PCO: Path Coefficients Original, PCM: Path Coefficients Mean, PCD: Path Coefficients difference, T: T-Values, P: P-Values)

Hypothesis	PCO (O)	PCO (Y)	PCM (O)	PCM (Y)	STDEV (O)	STDEV (Y)	t (O)	t (Y)	p (O)	p (Y)	PCD (|Y- O |)	p (Y vs O)
BI -> Usage	0.279	0.43	0.278	0.426	0.088	0.084	3.159	5.088	0.001	0	0.15	0.106

EE -> BI	0.036	-0.05	0.048	-0.056	0.075	0.083	0.481	0.601	0.315	0.274	0.086	0.792
FC -> BI	0.051	0.159	0.057	0.158	0.064	0.07	0.804	2.283	0.211	0.011	0.108	0.109
FC -> Usage	0.285	0.205	0.288	0.207	0.067	0.078	4.24	2.618	0	0.005	0.08	0.778
HB -> BI	0.409	0.407	0.402	0.399	0.069	0.056	5.93	7.258	0	0	0.002	0.504
HB -> Usage	0.221	-0.127	0.222	-0.128	0.09	0.078	2.442	1.623	0.007	0.053	0.348	**0.999**
HM -> BI	-0.005	-0.073	-0.004	-0.074	0.049	0.078	0.103	0.933	0.459	0.176	0.068	0.773
INQ -> BI	-0.029	-0.039	-0.026	-0.03	0.082	0.066	0.356	0.6	0.361	0.275	0.01	0.538
PE -> BI	0.219	0.267	0.207	0.27	0.075	0.076	2.917	3.532	0.002	0	0.048	0.327
PP -> BI	0.031	-0.036	0.013	0.015	0.047	0.053	0.663	0.677	0.254	0.249	0.067	0.822
PS -> BI	-0.155	-0.097	-0.144	-0.096	0.048	0.053	3.212	1.814	0.001	0.035	0.058	0.217
PV -> BI	0.016	-0.016	0.015	-0.026	0.057	0.053	0.282	0.296	0.389	0.384	0.032	0.655
SI -> BI	0.025	0.06	0.026	0.058	0.055	0.05	0.445	1.2	0.328	0.115	0.036	0.3
SRVQ -> BI	0.157	0.013	0.169	0.017	0.088	0.06	1.792	0.215	0.037	0.415	0.144	0.921
SYQ -> BI	0.03	0.112	0.022	0.111	0.116	0.058	0.256	1.924	0.399	0.027	0.083	0.246
TR -> BI	0.047	0.171	0.04	0.18	0.054	0.064	0.86	2.689	0.195	0.004	0.125	0.062

As for the British participants, the ‘younger users’ group included 89 participants, while 330 were allocated into the ‘older users’ group.

The R2 values for BI and USE for the younger group were 0.829 (83%) and 0.113 (11%) respectively, while in the older group they took the values of 0.645 (65%) and 0.348 (35%) respectively.

Table 5-15 shows that age significantly moderated the hypothesised relationship between behavioural intention and usage - H14b1 (p value=0.978), Effort expectancy and behavioural intention - H2b1 (p value=0.999), habit and behavioural intention H7b1 (p value=0.037) and hedonic motivations and behavioural intention - H5b1 (p value= 0.041). In the latter, the effect of BI was stronger among older, as opposed to younger users, while the influence of EE and HM was stronger among younger users. That being said, HB exhibited comparable influence in both age groups.

Table 5-14: Summary of the Moderating Effect of Age for the UK (O: Old, Y: Young, PCO: Path Coefficients Original, PCM: Path Coefficients Mean, PCD: Path Coefficients difference, T: T-Values, P: P-Values)

Hypothesis	**PCO (O)**	**PCO (Y)**	**PCM (O)**	**PCM (Y)**	**STDEV (O)**	**STDEV (Y)**	**T (O)**	**T (Y)**	**P (O)**	**P (Y)**	**PCD (|Y- O |)**	**P (Y vs O)**
BI -> Usage	0.504	0.105	0.508	0.095	0.079	0.183	6.368	0.575	0	0.566	0.399	**0.978**

EE -> BI	0.086	-0.28	0.084	-0.264	0.079	0.085	1.088	3.273	0.277	0.001	0.366	**0.999**
FC -> BI	0.043	0.144	0.045	0.155	0.068	0.08	0.637	1.812	0.524	0.071	0.101	0.17
HB -> BI	0.351	0.526	0.355	0.501	0.058	0.077	6.033	6.829	0	0	0.175	**0.037**
HB -> Usage	0.14	0.181	0.139	0.188	0.071	0.159	1.971	1.137	0.049	0.256	0.041	0.416
HM -> BI	0.026	0.158	0.028	0.158	0.042	0.064	0.628	2.466	0.53	0.014	0.132	**0.041**
INQ -> BI	0.107	0.048	0.109	0.013	0.066	0.124	1.622	0.389	0.106	0.698	0.059	0.655
PE -> BI	0.222	0.174	0.219	0.161	0.081	0.093	2.734	1.869	0.007	0.062	0.047	0.649
PP -> BI	0.115	0.15	0.111	0.117	0.054	0.098	2.133	1.528	0.033	0.127	0.035	0.367
PS -> BI	-0.129	-0.176	-0.128	-0.153	0.044	0.111	2.952	1.578	0.003	0.115	0.047	0.642
PV -> BI	0.075	0.101	0.078	0.111	0.042	0.058	1.799	1.743	0.073	0.082	0.025	0.356
SI -> BI	-0.02	0.083	-0.02	0.083	0.04	0.074	0.501	1.118	0.617	0.264	0.103	0.113
SRVQ -> BI	0.23	0.252	0.222	0.247	0.068	0.105	3.398	2.389	0.001	0.017	0.021	0.442
SYQ -> BI	-0.125	-0.043	-0.123	0.002	0.071	0.103	1.768	0.411	0.078	0.681	0.082	0.256
TR -> BI	0.06	0.076	0.06	0.075	0.05	0.09	1.212	0.843	0.226	0.4	0.016	0.439

5.5.2 Gender as Moderator

As expected in categorical variables such as gender, two subsamples were adopted, namely male, and female groups. In Lebanon, 246 male and 232 female participants were included in the study, with calculated R2 values for BI and USE of 0.75 (75%) and 0.406 (40%) in the male group, and 0.77 (77%) and 0.344 (35%) in the female group, respectively. The p-values reflecting group differences were obtained via MGA, which included all predictors with significant direct paths. As shown in Table 5-16, gender was a significant moderator of the relationship between EE and BI - H2a2 (p value=0.952), FC and BI - H4a2 (p value=0.044) , PS and BI - H10a2 (p value=0.017) , PE and BI - H1a2 (p value=0.027), HB and Usage - H7c2 (p value=0.978), PV and BI - H6a2 (p value=0.997), and SYQ and BI - H12a2 (p value=0.008). Remaining paths were not moderated by gender. Results indicated that the BI of females was more strongly influenced by PS, PE, FC, and SYQ than males, while the opposite was evidenced when considering the effect of EE, PV on BI and HB on usage.

Table 5-15: Summary of the Moderating Effect of Gender for Lebanon (F: Female, M: Male, PC: Path Coefficients, PCD: Path Coefficients difference)

Hypothesis	**PC (F)**	**PC (M)**	**STDEV (F)**	**STDEV (M)**	**t (F)**	**t (M)**	**p (F)**	**p (M)**	**PCD**	**p (F vs M)**
EE -> BI	-0.051	0.103	0.06	0.094	0.868	1.076	0.193	0.141	0.153	**0.952**
FC -> BI	0.204	0.031	0.065	0.079	3.112	0.356	0.001	0.361	0.175	**0.044**
HB -> BI	0.388	0.464	0.055	0.058	7.135	8.092	0	0	0.076	0.829
HB -> Usage	-0.055	0.176	0.088	0.076	0.665	2.31	0.253	0.011	0.234	**0.978**
HM -> BI	-0.108	-0.048	0.055	0.069	2.02	0.718	0.022	0.237	0.061	0.755
INQ -> BI	-0.042	0.011	0.062	0.069	0.763	0.15	0.223	0.44	0.058	0.736
PE -> BI	0.32	0.133	0.068	0.081	4.784	1.58	0	0.057	0.199	**0.027**
PP -> BI	0.023	0.07	0.041	0.05	0.475	1.625	0.317	0.052	0.062	0.829
PS -> BI	-0.085	-0.2	0.041	0.048	1.968	4.42	0.025	0.059	0.030	**0.017**
PV -> BI	-0.107	0.107	0.056	0.052	1.947	2.127	0.026	0.017	0.22	**0.997**
SI -> BI	0.01	0.016	0.055	0.054	0.264	0.33	0.396	0.371	0.003	0.519
SRVQ -> BI	0.086	0.101	0.062	0.066	1.352	1.475	0.089	0.07	0.013	0.552
SYQ -> BI	0.165	-0.072	0.067	0.071	2.488	1.017	0.007	0.155	0.238	**0.008**
TR -> BI	0.128	0.118	0.055	0.055	2.383	2.207	0.009	0.014	0.009	0.459

About UK respondents, they were divided between the male and female groups, which included 205 and 214 participants, respectively. The male group had R2 values for BI and USE of 0.67 (75%) and 0.311 (31%), while females had values of 0.702 (70%) and 0.258 (26%), respectively. All proposed hypotheses for the influence of gender were rejected in the British sample. Table 5-17 represents the lack of significant correlations between gender and all proposed relationships in the structural model, and by extension, the comparability of male and female British respondents.

Table 5-16: Summary of the Moderating Effect of Gender for the UK (F: Female, M: Male, PC: Path Coefficients, PCD: Path Coefficients difference

Hypothesis	PC (F)	PC (M)	STDEV (F)	STDEV (M)	t (F)	t (M)	p (F)	p (M)	PCD (| M - F |)	p (M vs F)
BI -> Usage	0.356	0.505	0.087	0.111	4.085	4.482	0	0	0.143	0.158
EE -> BI	0.07	-0.039	0.083	0.096	0.818	0.302	0.414	0.763	0.097	0.777
HB -> BI	0.438	0.356	0.055	0.075	7.823	4.706	0	0	0.078	0.794
HB -> Usage	0.168	0.101	0.09	0.099	1.802	1.043	0.072	0.297	0.058	0.669
HM -> BI	0.04	0.058	0.045	0.059	0.809	0.974	0.419	0.331	0.021	0.383
INQ -> BI	0.091	0.081	0.083	0.079	0.931	1.142	0.353	0.254	0.013	0.455
PE -> BI	0.148	0.27	0.089	0.095	1.712	2.812	0.088	0.005	0.115	0.187
PP -> BI	0.118	0.081	0.058	0.064	2.215	1.299	0.027	0.195	0.046	0.708
PS -> BI	-0.133	-0.082	0.058	0.054	2.38	1.616	0.018	0.107	0.051	0.261
PV -> BI	0.118	0.069	0.043	0.056	2.691	1.201	0.007	0.23	0.048	0.751
SI -> BI	-0.071	0.002	0.055	0.059	1.435	0.125	0.152	0.9	0.086	0.142
SRVQ -> BI	0.174	0.264	0.095	0.084	2.09	3.281	0.037	0.001	0.076	0.276
SYQ -> BI	-0.059	-0.101	0.097	0.092	0.711	1.23	0.478	0.219	0.045	0.629
TR -> BI	0.119	0.037	0.06	0.059	1.963	0.603	0.05	0.547	0.082	0.835

5.5.3 Experience as Moderator

Two groups were adopted in the experience variable due to the few collected responses in study groups. As a result, participants were separated into 'less experienced' and 'more experienced' groups, with less or more than 2 years of experience, respectively. In the Lebanese sample, 148 participants were allocated into the less experienced group, which had R2 values for BI and USE of 0.743 (74%) and 0.402 (40%) respectively. On the other hand, the more experienced group contained 330 participants with R2 values for BI and USE of 0.74 (74%) and 0.375 (38%).

Table 5-18 reflects experience as a significant moderator of the relationship between BI and Usage - H14a3 (p-value =0.005), FC and BI - H4a3 (p-value =0.036) , PE and BI - H1a3 (p-value =0.977), HB and Usage - H7c3 (p-value =1) as well as PV and BI - H6a3 (p-value

=0.963). FC and PV more strongly affected the BI of less experienced respondents, while the BI of experienced users were more highly influenced by PE and HB, respectively. Additionally, the less experienced moderated the effect between BI and USE.

Table 5-17: Summary of the Moderating Effect of Experience for Lebanon (L: Less experienced, E: Experienced)

Hypothesis	**PCO (L)**	**PCO (E)**	**PCM (L)**	**PCM (E)**	**STDEV (L)**	**STDEV (E)**	**t (L)**	**t (E)**	**p (L)**	**p (E)**	**PCD (| L - E|)**	**p (L vs E)**
BI -> Usage	0.55	0.232	0.55	0.228	0.107	0.071	5.121	3.29	0	0.001	0.318	**0.005**
EE -> BI	-0.046	0.001	-0.041	-0.001	0.109	0.064	0.423	0.022	0.336	0.491	0.047	0.66
FC -> BI	0.26	0.075	0.241	0.078	0.086	0.057	3.01	1.312	0.001	0.095	0.185	**0.036**
HB -> BI	0.358	0.383	0.361	0.379	0.062	0.055	5.817	6.982	0	0	0.025	0.616
HB -> Usage	-0.195	0.205	-0.193	0.208	0.088	0.071	2.219	2.892	0.013	0.002	0.4	**1**
HM -> BI	-0.099	0.013	-0.105	0.014	0.076	0.048	1.311	0.278	0.095	0.391	0.113	0.9
PE -> BI	0.088	0.305	0.079	0.307	0.093	0.064	0.943	4.776	0.173	0	0.217	**0.977**
PP -> BI	-0.011	0.045	0.043	0.034	0.099	0.04	0.115	1.127	0.454	0.13	0.056	0.689
PS -> BI	-0.077	-0.135	-0.111	-0.125	0.067	0.041	1.156	3.307	0.124	0.001	0.057	0.23
PV -> BI	-0.093	0.053	-0.09	0.049	0.068	0.046	1.373	1.145	0.085	0.126	0.146	**0.963**
SI -> BI	0.063	0.024	0.066	0.026	0.072	0.039	0.875	0.614	0.191	0.27	0.039	0.309
TR -> BI	0.165	0.091	0.168	0.092	0.092	0.043	1.791	2.11	0.037	0.018	0.073	0.229

British participants for their part were divided between 148 less experienced, and 330 users that are more experienced. The R2 values for BI and USE for the less experienced users' group were 0.679 (68%) and 0.292 (29%), and 0.694 (69%) and 0.289 (29%) for the experienced users' group, respectively. As delineated in Table 5-19, all proposed hypotheses for the influence of experience were rejected in the British sample.

Table 5-18: Summary of the Moderating Effect of Experience Gender for the UK (L: Less experienced, E: Experienced)

Hypothesis	**PCO (L)**	**PCO (E)**	**PCM (L)**	**PCM (E)**	**STDEV (L)**	**STDEV (E)**	**T (L)**	**T (E)**	**P (L)**	**P (E)**	**PCD (|L - E|)**	**P (L vs E)**
BI -> Usage	0.459	0.334	0.452	0.331	0.09	0.116	5.125	2.875	0	0.004	0.125	0.183
EE -> BI	0.054	-0.177	0.058	-0.138	0.068	0.16	0.792	1.107	0.429	0.269	0.231	0.079
FC -> BI	0.064	-0.015	0.063	-0.027	0.057	0.204	1.118	0.075	0.264	0.94	0.079	0.339
HB -> BI	0.414	0.261	0.413	0.259	0.052	0.137	7.968	1.905	0	0.057	0.153	0.124
HB-> Usage	0.074	0.295	0.081	0.3	0.08	0.115	0.925	2.57	0.355	0.011	0.221	0.947
HM -> BI	0.028	0.11	0.028	0.157	0.035	0.129	0.79	0.852	0.43	0.395	0.082	0.757
PE -> BI	0.186	0.346	0.18	0.318	0.075	0.142	2.47	2.428	0.014	0.016	0.16	0.834
PP -> BI	0.092	0.019	0.089	0.011	0.042	0.17	2.19	0.114	0.029	0.91	0.073	0.32
PS -> BI	-0.109	-0.053	-0.108	-0.034	0.04	0.137	2.707	0.388	0.007	0.698	0.056	0.668
PV -> BI	0.09	0.102	0.089	0.141	0.04	0.167	2.249	0.612	0.025	0.541	0.013	0.539
SI -> BI	-0.033	0.009	-0.036	0.03	0.038	0.182	0.877	0.052	0.381	0.959	0.043	0.591
TR -> BI	0.055	0.035	0.052	-0.023	0.046	0.203	1.198	0.172	0.232	0.864	0.02	0.467

5.5.4 Education as Moderator

The education moderator variable was represented by two groups, namely the lower education, including respondents with high school educational level and below, while the higher education group consisted of those with bachelor's degrees and above. In Lebanon, 76 and 402 participants were included in the lower education and higher education group, respectively.

The R2 values for BI and USE for the less low education users' group were 0.746 (75%) and 0.342 (34%), respectively, and 0.727(73%) and 0.37(37%) for the higher education group.

As shown in Table 5-20, all proposed hypotheses for the influence of Education were rejected in the Lebanese samples.

Table 5-19: Summary of the Moderating Effect of Education for Lebanon (H: Higher Education, L: Lower education)

Hypothesis	PCO (H)	PCO (L)	PCM (H)	PCM (L)	STDEV (H)	STDEV (L)	T (H)	T (L)	P (H)	P (L)	PCD (| L - H |)	P (L vs H)
BI -> Usage	0.316	0.432	0.311	0.423	0.07	0.115	4.511	3.77	0	0	0.115	0.191
EE -> BI	-0.044	0.028	-0.041	0.043	0.056	0.181	0.777	0.154	0.219	0.439	0.072	0.368
PE -> BI	0.262	0.303	0.261	0.316	0.059	0.175	4.484	1.738	0	0.041	0.041	0.381
PP -> BI	0.036	0.007	0.03	-0.011	0.049	0.097	0.733	0.074	0.232	0.471	0.029	0.61
PS -> BI	-0.143	-0.068	-0.14	-0.012	0.038	0.113	3.724	0.6	0	0.274	0.075	0.262
PV -> BI	0.034	0.063	0.034	0.042	0.042	0.13	0.8	0.488	0.212	0.313	0.029	0.412
TR -> BI	0.071	0.104	0.067	0.119	0.042	0.183	1.666	0.568	0.048	0.285	0.033	0.44

As for the UK, the lower education group included 155 participants, while 282 were allocated to the higher education group. The R2 values for BI and USE for the lower education users' group were 0.702 (70%) and 0.353 (35%) respectively, and 0.669 (67%) and 0.324 (32%) for the higher education group. That being said, Tables 5-20 and 5-21 show that education was not a significant moderator of proposed relationships between studies constructs in both samples.

Table 5-20: Summary of the Moderating Effect of Education for the UK (H: Higher Education, L: Lower education)

Hypothesis	PCO (H)	PCO (L)	PCM (H)	PCM (L)	STDEV (H)	STDEV (L)	T (H)	T (L)	P (H)	P (L)	PCD (| L - H |)	P (L vs H)
BI -> Usage	0.456	0.516	0.458	0.529	0.098	0.102	4.661	5.041	0	0	0.06	0.339
EE -> BI	0.078	-0.105	0.071	-0.094	0.076	0.085	1.025	1.228	0.306	0.22	0.182	0.947
PE -> BI	0.231	0.292	0.241	0.284	0.093	0.09	2.497	3.236	0.013	0.001	0.061	0.315
PP -> BI	0.078	0.083	0.073	0.13	0.05	0.101	1.571	0.819	0.117	0.413	0.005	0.458
PS -> BI	-0.09	-0.154	-0.084	-0.196	0.042	0.097	2.142	1.579	0.033	0.115	0.063	0.729

PV -> BI	0.075	0.046	0.081	0.064	0.042	0.063	1.803	0.736	0.072	0.462	0.028	0.647
TR -> BI	0.054	0.109	0.054	0.112	0.048	0.083	1.125	1.312	0.261	0.19	0.055	0.284

5.5.5 Income as Moderator

Similar to education, two groups reflected the income moderator variable due to the limited number of responses in certain study groups. The 'low income' group included participants with less than $1000 monthly income, while participants with more than $1000 monthly income were separated into the 'high income' group. In Lebanon, 286 respondents were divided into the lower income, with R2 values for BI and USE of 0.709 (71%) and 0.223 (22 %), respectively. On the other hand, the R2 values for BI and USE for the 192 participants belonging to the higher income users' group were 0.735 (74%) and 0.536 (54%) respectively.

Table 5-22 reflects the significant moderating effect of income on the relationship between HB and Usage - H7c5 (p value=1.000) as well as PV and BI - H6a5 (p value=0.974). In both instances, the influence of HB and PV on the respective studied variable was stronger among participants belonging to the higher, and not the lower, income group.

Table 5-21: Summary of the Moderating Effect of Income for Lebanon (H: Higher income, L: Low income)

Hypothesis	**PCO (H)**	**PCO (L)**	**PCM (H)**	**PCM (L)**	**STDEV (H)**	**STDEV (L)**	**T (H)**	**T (L)**	**P (H)**	**P (L)**	**PCD (| L - H |)**	**P (L vs H)**
BI -> Usage	0.272	0.359	0.267	0.359	0.078	0.083	3.49	4.327	0	0	0.086	0.221
EE -> BI	-0.072	-0.009	-0.071	-0.004	0.082	0.076	0.885	0.119	0.188	0.453	0.063	0.287
FC -> BI	0.087	0.082	0.099	0.079	0.074	0.057	1.179	1.437	0.119	0.076	0.006	0.512
HB -> BI	0.36	0.435	0.359	0.427	0.072	0.055	5.015	7.912	0	0	0.074	0.207
HB-> Usage	0.292	-0.097	0.298	-0.099	0.069	0.079	4.246	1.229	0	0.11	0.389	**1.000**
PE -> BI	0.317	0.199	0.314	0.194	0.093	0.073	3.42	2.717	0	0.003	0.118	0.838
PP -> BI	0.054	-0.005	0.056	0	0.06	0.047	0.899	0.1	0.184	0.46	0.058	0.782
PS -> BI	-0.182	-0.104	-0.174	-0.096	0.056	0.058	3.241	1.793	0.001	0.037	0.078	0.158
PV -> BI	0.102	-0.063	0.1	-0.061	0.063	0.057	1.617	1.094	0.053	0.137	0.165	**0.974**
TR -> BI	0.076	0.126	0.069	0.132	0.066	0.057	1.152	2.224	0.125	0.013	0.05	0.283

In the case of the UK sample, 100 and 319 respondents belonged to the lower and higher income group, respectively. The R2 values for BI and USE for the higher income users' group were 0.612 (61%) and 0.305 (31%), respectively. On the other hand, they took the value of 0.843 (85%) and 0.19 (19%) in the lower-income users' group.

Table 5-23 shows that income moderated the relationship between HB and BI - H7b5 (P value=0.004) PE and BI - H1b5 (P value=0.964) as well as PV->BI - H6b5 (P value=0.019). While HB had comparable influence in both groups, FC and PV more strongly affected users in the lower-income group, as opposed to PE, which had a higher effect on the behavioural intention of higher, and not lower, income participants.

Table 5-22: Summary of the Moderating Effect of Income for the UK (H: Higher income, L: Low income)

Hypothesis	**PCO (H)**	**PCO (L)**	**PCM (H)**	**PCM (L)**	**STDEV (H)**	**STDEV (L)**	**T (H)**	**T (L)**	**P (H)**	**P (L)**	**PCD (| L - H |)**	**P (L vs H)**
BI -> Usage	0.461	0.244	0.464	0.238	0.08	0.176	5.777	1.388	0	0.166	0.218	0.872
EE -> BI	0.045	-0.092	0.04	-0.055	0.073	0.13	0.623	0.711	0.534	0.477	0.138	0.817
FC -> BI	0.051	0.136	0.057	0.097	0.064	0.102	0.795	1.326	0.427	0.185	0.085	0.234
HB -> BI	0.337	0.567	0.344	0.57	0.057	0.063	5.859	9.069	0	0	0.23	**0.004**
HB-> Usage	0.163	0.09	0.17	0.101	0.076	0.137	2.138	0.658	0.033	0.511	0.073	0.674
PE -> BI	0.268	0.019	0.267	0.001	0.088	0.114	3.056	0.166	0.002	0.868	0.249	**0.964**
PP -> BI	0.137	0.007	0.134	0.061	0.055	0.082	2.476	0.086	0.014	0.932	0.13	0.903
PS -> BI	-0.121	-0.025	-0.116	-0.105	0.043	0.086	2.798	0.291	0.005	0.771	0.096	0.16
PV -> BI	0.056	0.219	0.058	0.239	0.045	0.066	1.25	3.328	0.212	0.001	0.163	**0.019**
TR -> BI	0.099	-0.022	0.105	-0.014	0.052	0.064	1.899	0.343	0.058	0.732	0.121	0.93

5.6 Conclusion

In this chapter, the results of the preliminary screening of survey data was presented. Questionnaires with more than 3% missing data were eliminated and detected outliers were expected and retained. Normal distribution of both the UK and Lebanese samples was observed. Demographic information was presented in both contexts and the data analysis process was expounded. Reflective measurement models were assessed leading to the deletion of items with unsatisfactory loadings. Composite reliability and convergent validity were then demonstrated in Lebanon and the UK. As for formative measurement models, the validity and lack of critical collinearity could be detected. The structural model was assessed through VIF, followed by an examination of the coefficient of determination, the effect size and the predictive relevance of model constructs. Finally, the significance of path coefficients and moderating variables was explored, and significant correlations were indicated, as shown in table 5.24 and Figure, which represents a summary of the findings reported in this chapter.

Table 5-23:Summary of findings of the extended UTAUT2 model and moderating variables in the Lebanese and UK sample.

	Constructs	**Lebanon**	**United Kingdom**
		Sign Levels	***Sign Levels***
Behavioural Intention	Effort Expectancy	N/S	N/S

	Performance Expectancy	***	**
	Facilitating Conditions	*	N/S
	Habit	***	***
	Hedonic Motivations	N/S	N/S
	Social Influence	N/S	N/S
	Price Value	N/S	*
	Perceived Privacy	N/S	*
	Perceived Security	***	**
	Trust	***	N/S
	Information Quality	N/S	N/S
	System Quality	N/S	N/S
	Service Quality	N/S	***
Usage	Behavioural Intentions	***	***
	Habit	N/S	*
	Facilitating Conditions	***	N/S
		Number of moderated relationships	Number of moderated relationships
Moderators	Age	1	4
	Gender	7	N/S
	Education	N/S	N/S
	Experience	5	N/S
	Income	2	3

N/S = Not Significant, * Significance level $p \leq 0.05$. ** Significance level $p \leq 0.01$. *** Significance level $p \leq 0.001$

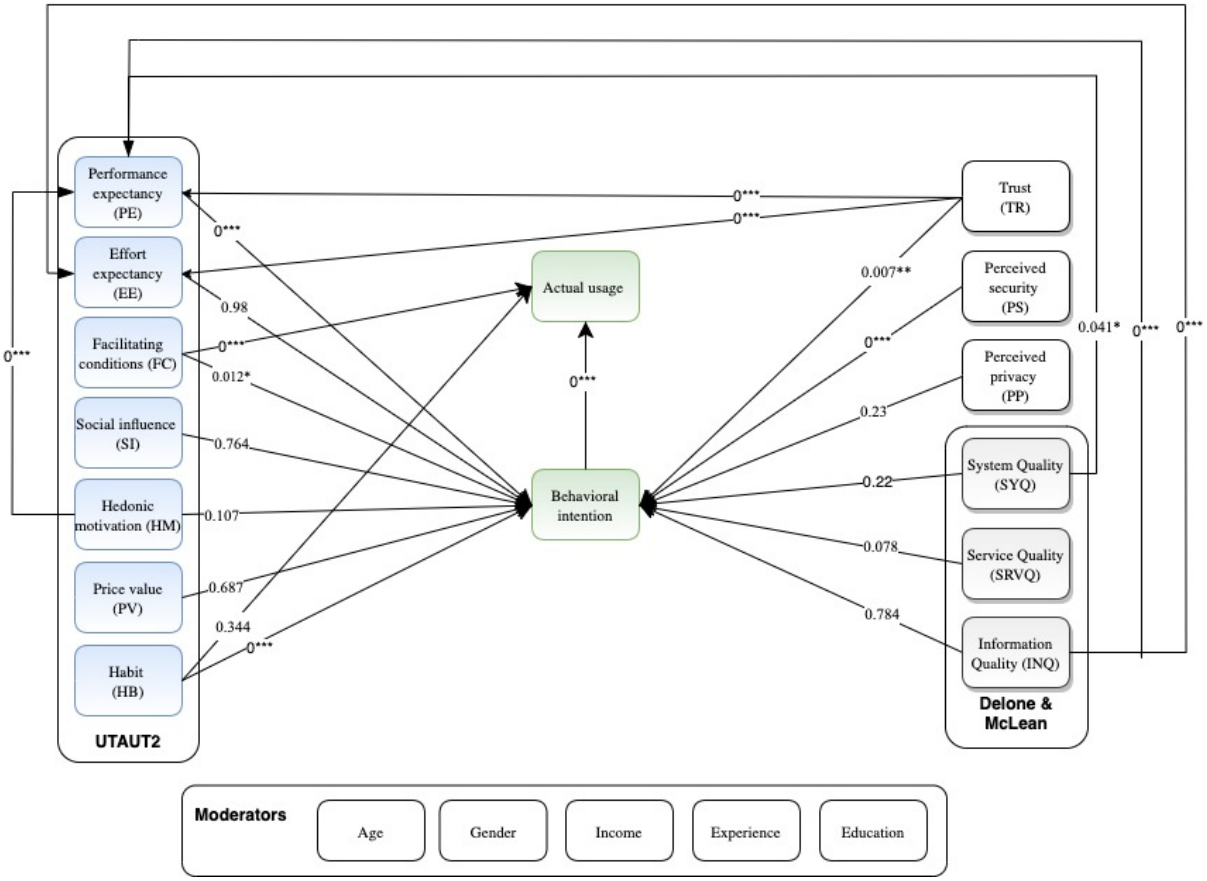

Figure 5-3: Overview of path coefficients in Lebanon

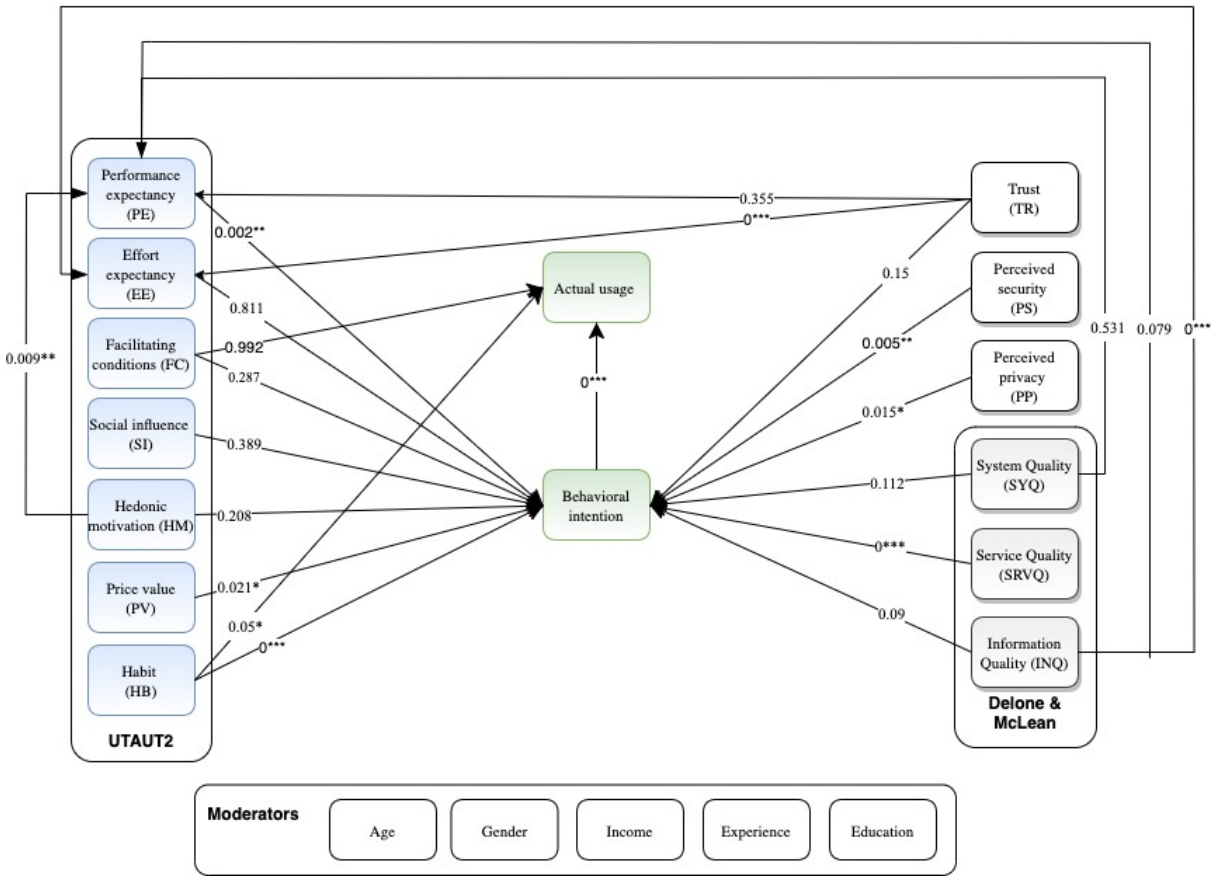

Figure 5-4: Overview of path coefficients in the UK

Chapter 6 - **Discussion**

6.1 Introduction

Results generated following data analysis in each studied sample is discussed throughout this chapter. As such, the observed factor effects and relationships in the proposed model will be explored and justified in Section 6.2. This will be followed by a discussion and rationalisation of moderator effects in each country (Section 6.3). Finally, the conclusion of the proposed research objectives in Chapter 1 will be discussed in Section 6.4. It is important to note that the author has previously published portions of the present discussion.

6.2 Research Hypotheses Testing

6.2.1 Habit (HB)

Among the various factors affecting technology usage, habit frequently exerts the highest influence (Venkatesh et al., 2012; Lewis, Fretwell, Ryan, & Parham, 2013; Wang et al., 2016; Yen & Wu 2016; Arenas-Gaitán et al., 2015). Both Lebanese and British respondents' behavioural intention to use mobile banking services was most significantly affected by habit (H7a, H7b; Table 5-12; 5-13). These findings are consistent with those of El-Masri and Tarhini (2017), which validated the prevailing effect of HB among Qatari e-learning users.

As such, continued use of ISs seems to be directly and substantially dependent upon the cause of habitual behaviour among users. Policymakers are thus suggested to promote mobile banking services usage through the implementation of habit-forming features and extending available offerings.

In fact, the improvement of available offerings is expected to encourage increased mobile banking usage, which in turn would contribute towards habit building. Similarly, frequent push notifications and reminders of available features in mobile banking applications, such as the ability to remotely check monthly statements, transfer funds and pay bills, would promote habitual mobile banking usage.

The importance of integrating habit-oriented considerations while formulating strategies for the improvement of mobile banking usage further emerges considering the direct influence of HB on actual use, independently of behavioural intention (Limayem et al., 2007). This indicates

the ability of habit-based behaviour to prompt actual technology usage irrespective of the behavioural intention to do so.

6.2.2 Perceived security (PS)

Both Lebanese and UK respondents considered the security of mobile banking when formulating their intentions towards it, as evidenced by the highly significant correlation between PS and behavioural intention to adopt this channel (H10a, H10b; Table 5-12; 5-13). The manipulation of sensitive financial transactions and private information is the cornerstone of mobile banking, which inevitably paints this technology as a high-risk application. Theoretically, security concerns were prevalent in multiple studies reporting PS as a significant predictor of behavioural intentions (Patel & Patel, 2018; Shah, Peikari, & Yasin, 2014), further emphasising the role of this construct in the modulation of customer adoption intentions.

The implementation of additional security measures is therefore recommended as a means to promote perceptions of mobile banking safety, which should be considered superior to that of internet banking. Providing banking services through applications, as opposed to browsers as in the case of internet banking, ensures direct safe access to accounts and financial transactions independently of third-party applications/channels. On a technical level, banking providers could integrate measures such as multi-factor authentication and the right level of encryption to ensure the legitimacy of all financial transactions conducted using mobile banking. This could be implemented in addition to the inclusion of antivirus software as a mandatory prerequisite for the use of mobile banking. Protection strategies could be further developed to include swift and effective measures in the event of suspected or reported unauthorised access to customer accounts. Additionally, the successful implementation of ISO or PCI-compliant mobile banking applications could be challenged internally by means of penetration tests or ethical hacking in order to reveal the potential vulnerabilities of offered channels and address them accordingly.

From a customer standpoint, clear communication and education campaigns are suggested in order to moderate unavoidable customer security concerns. The risks implicated in the use of mobile banking should thus be clearly presented, along with recommendations for the mitigation and prevention of these risks. Moreover, customer education should focus on mitigating customer fears by guaranteeing compensation in case of mobile banking fraud, in addition to the establishment of security measures to be called upon by both the service provider (banks) and the user (mobile banking customers), in the event of complications. To

that end, constant monitoring of banking activities could be undertaken in order to detect deviations from normal behaviour, such as unusual large or international transfers, and log-ins from different locations. Moreover, banks could supplement sensitive transactions with multiple security layers, which include passwords and personal validation by the customer through bank representatives.

6.2.3 Trust (TR)

In conjunction with the security concerns expressed by respondents in both Lebanon and the UK, TR emerged as a significant associate of behavioural intention to use mobile banking, albeit solely among Lebanese respondents (H8a; Table 5-12; 5-13). Previous studies corroborate the influence of TR in shaping consumer behavioural intentions to adopt a technology (Tarhini, Alalwan, Al-Qirim, & Algharabat, 2018; Yadav, 2016; Alalwan et al., 2015; Malaquias et al., 2016), further emphasising the importance of mobile banking security and reliability. As was anticipated, customer perceptions of mobile banking and actual usage of this channel are intimately related to the level of trust exhibited towards this technology. This holds particularly true in light of the sensitivity and riskiness of transactions handled in the confines of mobile banking (Malaquias & Hwang, 2016; Sun, Sun, Liu, & Gui, 2017). The interaction between TR and mobile banking customer intentions was actually demonstrated in the current study as well as that of (Hanafizadeh et al., 2014; Malaquias et al., 2016). Moreover, trust in mobile banking services seems to increase perceptions of their usefulness and ease of use significantly, and consequently, the intention to use them. This was observed in the current study, where the indirect influence of TR on adoption intentions through performance and effort expectancy could be discerned in the developed and developing contexts of the UK and Lebanon alike (H8c, H8d, H8f; Table 5-12; 5-13).

The significance of TR in the Lebanese, and not the UK, study samples could be explained by the inherent trust in mobile banking applications among the latter. The availability of a safety net to protect customers from all instances of fraud is clearly communicated by banks providing mobile banking services in the UK. One such example includes the below statement from the British Barclays' bank, *"When you use our Online Banking Online Banking password* and the Barclays app, you're automatically protected by our Online and Mobile Banking Guarantee. This means that, if a fraudster takes any money from your account, we'll reverse the transactions so it's like it never happened. This includes paying money back into your*

account, refunding any charges and interest you've paid, and paying any interest you've missed out on." (Online and Mobile Banking Guarantee | Barclays, 2020).

Providing unconditional protection seems to promote customer trust in mobile banking, thereby disregarding the command of this factor over the technology's adoption. This was reflected in our findings, which indicated the need for the establishment of an implicit deep-rooted trust among Lebanese customers in banks and their provided services. Improvement in mobile banking adoption could, therefore, be expected in conjunction with the implementation of trust-promoting policies in Lebanese banks, especially considering the volatility of the Lebanese financial and economic framework.

Advancing the guarantee of full compensation in the event of any loss encountered during mobile banking usage is recommended to promote mobile banking adoption. Banks could actively promote the availability of such safety nets to potential and actual mobile banking users, in addition to information about implemented security measures. Enhancing customer trust would further allow banks to improve mobile banking adoption by taking advantage of its contingent influences, which could be achieved by ensuring timely customer awareness of available security procedures as well as improved or added mobile banking features.

6.2.4 Performance expectancy (PE)

The efficacy, usefulness and productiveness conferred by mobile banking services have been generally reported to fuel their acceptance and adoption. This was evident in our study and various others (Venkatesh et al., 2003; Venkatesh and Zhang, 2010; Maruping, Bala, Venkatesh, & Brow, 2017; Raza et al., 2017) through the significant effect of PE on mobile banking usage across different respondent populations. Both PE and its related factors, such as perceived usefulness and relative advantage, have been described as critical antecedents of mobile banking usage intention. The influence of PE on behavioural intention was actually confirmed using multiple technology adoption theories, of which UTAUT and UTAUT2 were notable examples (Foon & Fah, 2011; Luo et al., 2010; Martins et al., 2014; Riffai et al., 2012; Yu, 2012). Moreover, customer behavioural intention to use mobile banking remains impressionable by performance-related factors when examined in the scope of TAM and IDT. Perceived usefulness, as proposed in the former, was actually demonstrated as a significant contributor to mobile banking customers' behavioural intention (Baabdullah et al., 2019; Farah et al., 2018; Priya et al., 2018; Thaker et al., 2019) and many others.

Consistently, our results showed that Lebanese and British user perceptions of mobile banking usefulness increased the likelihood of the technology's adoption through their influence on behavioural intention (H1a, H1b; Table 5-12; 5-13). This is in line with mobile banking's integration of innovation and user-friendliness in order to provide traditional banking services in a time-efficient and easily accessible manner (Munoz-Leiva, Climent-Climent, & Liébana-Cabanillas, 2017; Noh & Lee, 2016). Moreover, mobile banking allows customers to complete routine banking transactions at their convenience (Olannye, Dedekuma, & Ndugbe, 2017), thereby promoting the intention to adopt this technology. Possible strategies to increase mobile banking adoption would reside in the promotion and development of this service's features and consequently, the emphasis of its time-effectiveness and functionality to potential and current users.

6.2.5 Perceived privacy (PP)

The use of technology handling sensitive and private data such as those handled by mobile banking naturally raises privacy concerns among its potential and actual users. The latter are generally wary of possible data and privacy breaches when formulating their intentions to use technologies (Lowry, Cao, & Everard, 2011; Thaker et al., 2019; Alalwan, et al., 2018; Hassan & Wood, 2020). Instances of message spamming and disclosure of personal information by service providers have been reported and remain prevalent privacy concerns among users. Privacy risks thus modify the adoption intention of mobile banking both directly (Lowry et al., 2011), and indirectly through their negative effect on attitude (Arif, Afshan, & Sharif, 2016; Zhang, Lu, & Kizildag, 2018). The relationship between PP and behavioural intentions was reflected in our study, albeit solely among British respondents (H9b; Table 5-12; 5-13). Privacy concerns were also shown to play a role in shaping customer satisfaction, as well as the perceived ease of use and perceived usefulness of mobile banking (Albashrawi & Motiwalla, 2017).

It is thus important that banks implement rigorous security measures for the protection of personal data and secure financial transactions handled by their channels. By stating their commitment to securing customer privacy, banks could circumvent potential concerns among actual and prospective mobile banking users (Tseng, Han, Su, & Fan, 2017). Legal measures were actually advanced in the UK in May 2018 by means of the general data protection regulation (GDPR) for the tight regulation of consumer privacy in conjunction with services provided by website and service providers. As a result, newly implemented regulations and

security measures were clearly delineated to customers, which most likely increase the awareness and importance of PP in the UK, and by extension, study respondents.

On the other hand, the insignificance of privacy concerns in Lebanon (H9a) could be attributed to the relative novelty of mobile banking and other technologies handling financial transactions (e.g. online shopping, e-commerce) in this setting. As such, data breaches, account hacking and private data mishandling remain highly infrequent, which circumvents the existence and role of privacy concerns when establishing adoption intentions among mobile banking customers. Alternatively, the perceived usefulness of mobile banking could induce Lebanese customers to overlook their privacy concerns. Studies have previously described the privacy paradox phenomenon, in which perceived risk exhibits no influence on the adoption or use of mobile technology, despite rampant security concerns among users Pentina, Zhang, Bata & Chen (2016). Security concerns thus fail to induce risk-avoiding behaviour in users of technologies strongly associated with benefits (Hampshire, 2017; Lim, Kim, Hur, & Park, 2019) or providing personalised services (Albashrawi & Motiwalla, 2017; 2019). Regardless, national and bank-specific privacy regulations should be implemented in Lebanon in order to promote the favourable establishment of mobile banking services among its citizens.

6.2.6 Facilitating conditions (FC)

As for FC, its significant correlation with the adoption of mobile banking was noted among Lebanese (H4a), but not British (H4b), responders in the present research (Table 5-12; 5-13). Previous studies have demonstrated the influence of infrastructure availability in the support and promotion of technology usage, including mobile banking (Venkatesh et al., 2012; Baabdullah et al., 2019; Gharaibeh & Arshad, 2018; Ashraf, 2019). In fact, amenities such as smartphone ownership, and internet or mobile data access determine the accessibility and applicability of financial services through mobile banking, and by extension, usage behaviour.

Theoretically, FC emerge as a significant predictor of both behavioural intention (Afshan & Sharif, 2016; Hew, Lee, Ooi, & Wei, 2015) as well as technology adoption (Yu, 2012; Oliveira, Faria, Thomas, & Popovic, 2014) and actual usage behaviour (Martins et al., 2014; Yu, 2012). In Pakistan, behavioural intention to adopt mobile banking exhibited FC as its sole direct significant antecedent, which further suggests the importance of technological and organisational infrastructure in the development of usage intention (Afshan and Sharif, 2016).

In a similar vein, Lebanese respondents showed particular susceptibility to the influence of FC when considering the use of mobile banking (H4c; Table 5-12; 5-13). Ensuring access to the

resources, facilities, and skills necessary for the smooth and easy utilisation of mobile banking in Lebanon is therefore suggested to promote adoption intention. Strategies could target the reduction of the cost, time and effort required for mobile banking usage through the integration of these services into channels and platforms with which customers exhibit a high familiarity (Simintiras, Yeniaras, Oney, & Bahia, 2014).

On the other hand, FC failed to predict both the behavioural intention (H4b) and actual usage (H4d) of mobile banking in the British population. Similarly, insignificant relationships were previously reported in both mobile and internet banking literature (Martins et al., 2014; Owusu Kwateng et al., 2019; Farah et al., 2018) with notable country-specific connotations. In countries where FC remain severely lacking (e.g. African countries) technical support is not expected or anticipated, which limits the influence of this construct on the intention to use a technology (Baptista and Oliveira, 2015). Alternatively, the role of facilities, infrastructures and support as predictors of user intentions could become insignificant in voluntary contexts (Chong, 2013; Venkatesh et al., 2003), as well as countries that have progressed beyond the novelty of mobile banking, such as the UK.

6.2.7 Price value (PV)

Empirical evidence demonstrates the significant role of PV in shaping behavioural intentions to adopt a technology (Venkatesh et al., 2012). Financial concerns are particularly prevalent in the consumer context, as opposed to the organisational context, in which cost is translated in time and effort (Venkatesh et al., 2012). In the former, the cost of using a particular technology falls on the consumer, thus modulating adoption intentions in conjunction with the perceived benefit of this service.

A technology offering greater utility and performance relative to its associated cost would thus show higher perceived price value, which by extension would promote adoption intentions. This relationship was observed among British respondents in our study (H6b), but not their Lebanese counterparts (H6a) (Table 5-12; 5-13). Previous studies support PV as a significant predictor of behavioural intention to adopt a technology (Venkatesh et al., 2012; Oliveira et al., 2014; Maillet et al., 2015). The inconsequential influence of PV in Lebanon could be explained by the perceived lack of expenses incurred by mobile banking usage. In fact, the cost of mobile banking prerequisites such as data charges and smartphone ownership could be practically negligible or widely available among Lebanese consumers. This could also account for the

modest role of PV in the UK (H6b), where only a slightly significant relationship could be established with behavioural intention.

Regardless, reducing expenses is widely accepted as a notable consideration affecting consumer adoption and satisfaction with a particular technology (Navimipour & Soltani, 2016). The cost-effectiveness of mobile banking in terms of time, effort and adjunct expenses savings are recognised relative to traditional banking (Lwin et al., 2019; Tam & Oliveira, 2017). This further supports the positive influence of PV on mobile banking adoption, especially among respondents of moderate to low income where financial expenses are impactful (Al-Debei et al., 2013; Brown & Venkatesh, 2005; Baabdullah et al., 2019; Owusu Kwateng et al., 2019; Alalwan, et al., 2018).

Banks could thus promote mobile banking adoption by establishing and advancing the cost-effectiveness and utility of this mobile service among prospective and actual users. Eliminating the cost of mobile banking usage through the provision of necessary facilities and services at a reduced or no charge could further increase adoption intentions by means of enhanced PV (Venkatesh et al., 2012; Alalwan et al., 2017). Alternatively, completing financial transactions through mobile banking could be promoted by offering rewards upon the usage of the platform. This approach was adopted by certain British banks, in which additional discounts and financial rewards are available to customers choosing to receive their salary or purchase items and services with their mobile banking application. Such strategies are expected to positively influence consumer perceptions of mobile banking, thereby modulating the technology's adoption among users (Farah et al., 2018).

6.2.8 Social influence (SI)

SI presents an irregular association with behavioural intention in IS literature. Various studies, including those employing a UTAUT-based conceptual model, actually support the significant effect of SI on technology adoption intention (Martins et al., 2014; Ingham et al., 2015; Pascual-Miguel, Agudo-Peregrina, & Chaparro-Peláez, 2015). The context-dependent role of social influences was recognised by researchers to vary according to study setting, country development level, nature of technology, as well as individual factors (Chipeva, Cruz-Jesus, Oliveira, & Irani, 2018; Meier, 2019). Social influences could thus fulfil a positive, negative, or insignificant role in shaping adaptive intent of innovations depending on the interaction between the social system and the technology itself (Burton-Jones & Hubona, 2006).

It was expected that social factors would greatly influence the perceptions and opinions of the present study's respondents, and by extension, their adoption of mobile banking. However, the relationship between SI and the BI was not supported in this study in both the Lebanese and the UK samples (H3a, H3b). While surprising among the Lebanese collectivist society, further investigation reveals that extant literature also could not establish the effect of SI in the context of technology adoption. Both Davis et al. (1989) and Mathieson (1991) reported the insignificance of SI on behavioural intention, with recent IS acceptance studies supporting their findings (Oliveira, Thomas, Baptista, & Campos, 2016; Ameen, 2017; Singh & Matsui, 2018).

While negligible in the context of BI, SI exhibited a significant effect on perceived ease of use (Thompson, Compeau, & Higgins, 2006) as well as technology acceptance (Iqbal and Qureshi, 2012). Technology adoption behaviour thus seems to be generally independent of SI s, irrespective of the studied technology or the country. In fact, the adoption intention of online shopping, telebanking and mobile banking customers was not significantly predicted by SI, an observation that was evident in both developed and developing countries (Escobar-Rodriguez & Carvajal-Trujillo, 2014; Alalwan et al., 2016; 2017).

Significant negative interactions were previously noted between subjective norms and customer attitudes, with an increase in one attenuating the other's effect on behavioural intentions (Titah & Barki, 2009). Empirical evidence actually advances the notion of the ability of conceptual model factors, such as PE and technology anxiety, to obscure the role of SI on behavioural intention (Carlsson et al., 2006). This veiling effect could account for the insignificance of SI in the present study, in which PE and habit were potent drivers of behavioural intention to adopt mobile banking in both samples.

Alternatively, the role of SI s could be rendered ineffective in the context of mobile banking, which is essentially an individual, personal and sensitive technology (Alalwan, et al., 2018; Baabdulah el al., 2019). As such, mobile banking adoption intentions could be impervious or even averted by high social applications and the implication of the social system (Davis et al., 1989; Karjaluoto et al., 2002). Mobile banking perception, and by extension, its adoption, was actually suggested to be negatively influenced in light of extensive social interactions between customers and employees (Karjaluoto et al., 2002). Moreover, promotional campaigns and interpersonal communication regarding mobile banking remains limited, which in turn could restrict the influence of social networks on perceptions of and the intention to use mobile banking (Chitungo & Munongo, 2013; Dineshwar & Steven, 2013).

In keeping with the personal nature of mobile banking, the inception of adoption intentions remains somewhat unaffected by the existing social system. In fact, the immaturity of mobile banking implementation and awareness in developing countries such as Lebanon limits the influence of the social system (Al-Rfou, 2013, Ashraf, 2019). The positive role of social systems is further restricted by increasing customer experience, familiarity and knowledge of a particular technology. This promotes self-evaluated, perceptions of innovations based on actual experience as opposed to the influence of the social system to which individuals belong (Venkatesh & Morris, 2000; Venkatesh et al., 2003; Matsuo, Minami, & Matsuyama, 2018). This is particularly evident among young educated respondents included in our study that are recognised to be least susceptible to the direction of social influences due to their adequate experience and computer/mobile literacy (Venkatesh et al., 2003).

6.2.9 Hedonic motivations (HM)

HM were not a direct antecedent adoption intention among British and Lebanese respondents alike (H5a, H5b; Table 5-12; 5-13). Our findings contradicted advanced hypotheses as well as the majority of technology adoption studies (Venkatesh et al., 2012; Baptista & Oliveira, 2015; Sharif & Raza, 2017). The relationship between behavioural intentions and HM was also reported in the context of mobile banking and other non-traditional banking channels, particularly in developing countries (Farah et al., 2018; Alalwan et al., 2017).

While unusual, previous studies have similarly reported the insignificance of HM in mobile banking adoption and other financial channels (Koenig-Lewis et al., 2015; Oliveira et al., 2016). In France, perceived enjoyment failed to directly predict mobile banking usage intention but indirectly influenced it through perceived usefulness (Koenig-Lewis et al., 2015). This was reflected in our study, where customer perceptions of the enjoyment and fun of mobile banking were solidly reflected in those of its usefulness, and by extension, the adoption to use this technology. Enjoyable technologies are thus not only more likely to be used but are perceived to be more useful and safer, as demonstrated among e-banking users (Salimon, Yusoff, & Mokhtar, 2017).

The perceived novelty and modernism of these technologies could account for the importance of intrinsic motivations in shaping the intention to use them (Alalwan et al., 2015; 2017). When perceived in a technology, novelty contributes to the retention of user interest through the implication of intrinsic hedonic motivation and pleasure (Arenas-Gaitán et al., 2015; Malaquias & Hwang, 2016; Farah et al., 2018). It thus stands to reason that adoption intentions are

positively modulated by innovativeness, both directly and indirectly through effort expectancy (Oliveira et al., 2016). Mobile banking applications have been shown to induce feelings of fun and playfulness among consumers (Baabdullah et al., 2019; Farah et al., 2018). Combined with the perception of mobile device enjoyability (Malaquias & Hwang, 2017; Farah et al., 2018), HM could attenuate the perceived difficulty and usefulness (effort and performance expectancy) of mobile banking usage among potential users (Matsuo, Minami, & Matsuyama, 2018; Farah et al., 2018).

While traditionally disregarded when considering the determinants of mobile banking adoption, the frequency of consumer-smartphone interactions emphasises the need to integrate novelty and gratification into mobile financial channels, which generally offer low monetary value. Providing an agreeable fun mobile banking experience could increase the adoption of this technology, which could be simply perceived as no more than a convenient service or an established habitual tool by Lebanese and British respondents in our study, respectively. The integration of visually pleasing interfaces and playful elements into mobile banking apps could thus further influence adoption intentions by augmenting and complementing the role of PE and HB.

6.2.10 Effort expectancy (EE)

Previous studies have established a positive influence between user intentions to adopt a technology with perceptions of its ease of use (Bhatiasevi, 2016; Venkatesh et al., 2003; Venkatesh & Zhang, 2010; Maruping et al., 2017; Raza et al., 2017). In addition to its modulation of mobile banking adoption intention, performance expectancy was significantly associated to actual technology usage and performance expectancy (Baptista & Oliveira, 2016). In other words, users who perceived mobile banking as a straightforward, undemanding channel were more likely to perceive it to be useful and intend to use it.

As observed in our study, EE could not always be established as a significant predictor of behavioural intentions (H2a, H2b; Table 5-12; 5-13). In fact, mobile banking adoption intentions and usage were previously reported to be independent of the direct influence of EE (Al Mashagba & Nassar, 2012; Baabdullah et al., 2019). This was demonstrated both in technologically advanced countries with considerable mobile banking adoption (e.g. Portugal) (Oliveira et al., 2014) as well as in lower resource contexts such as Jordan (Al Mashagba & Nassar, 2012). The increasing familiarity in the use of the internet and mobile phones in all populations could account for the insignificance of EE shown in our study (Venkatesh et al.,

2003; Venkatesh & Zhang, 2010). It is possible that the majority of mobile banking users draw on their previous mobile technology and electronic banking experience in order to comfortably and impulsively use this channel. This eliminates the role of EE on adoption intentions, while occasionally conserving an indirect influence through performance expectancy (Zhou et al., 2010).

As such, it is important for banks and policymakers to provide easy to use mobile banking applications by simplifying its user interface, input and responsiveness. Moreover, the accessibility of mobile banking to less technologically proficient users should be targeted by the formulation of training material and the design of an adaptive application supporting different sized and branded mobile devices.

6.2.11 System quality (SYQ)

When considering information system success, SYQ was demonstrated as a significant predictor of the adoption of technology adoption (Dwivedi, Kapoor, Williams, & Williams, 2013; Kurt, 2019; Floropoulos, Spathis, Halvatzis, & Tsipouridou, 2010), such as online shopping (Gao et al., 2015). Extant evidence supports the role of SYQ as a direct influencer of user satisfaction as well as actual technology usage (Petter & McLean, 2009; Dwivedi et al., 2013). The effect of service quality on mobile banking adoption behaviour could be mediated by initial user trust (Sarkar, Chauhan, & Khare, 2020; Alalwan et al., 2017). In fact, the perceived quality of a system is suggested to reflect the ability and integrity of service providers, and by extension, user attitude towards the technology. As such, integrating visually appealing yet functional user interfaces and navigational ease across all mobile operating systems would greatly enhance customers' experience and encourage adoption intentions by promoting trust in the mobile banking system.

While SYQ failed to predict mobile banking adoption intention in both UK and Lebanon (H12a, H12b; Table 5-12; 5-13), the significant but indirect influence of SYQ on behavioural intentions was actually evident in our study through performance expectancy (H12c, H12d). This supports the role of well-designed high-quality systems in the modulation of adaptive intent through the enhancement of mobile banking appeal and the inherent efficacy and usefulness of offered services. Mobile banking services are well established, particularly in higher-resource settings such as UK. By extension, these platforms successfully present SYQ attributes essential for their adoption, such as accessibility, ease of use, speed and navigation.

As such, it is recommended that banks provide customers with a satisfying, smooth and uncomplicated mobile banking experience in order to harness the role of service quality.

6.2.12 Service quality (SRVQ)

SRVQ was introduced along with information quality and SYQ in an attempt to reflect information system success (DeLone and McLean, 2003). While necessary for the accommodation of the modern service provider function of information systems, SRVQ fails to reach the relevance of information and SYQ when reflecting the success of a single system, as opposed to that of the IS department (DeLone & McLean, 2003; Dwivedi et al., 2013). This could account for the absence of a significant relationship between SRVQ and behavioural intention, which was previously reported in IS literature (Lwoga, 2014; Yakubu & Dasuki, 2018; Dwivedi et al., 2013) and was reflected among Lebanese (H11a), but not British (H11b), respondents in our study (Table 5-12; 5-13).

Conversely, evidence also supports the role of SRVQ in the modulation of technology adoption behaviour (Li, Dong, & Chen, 2012). In fact, the continued use of mobile banking was reportedly dependent on SRVQ and customer satisfaction, which could be intimately related (Ravindran, 2016). This could account for the variability observed in our study between the two countries, where distinct differences exist in the level of mobile banking integration and use. SRVQ would, therefore, exhibit a considerable influence on user attitude and intentions in the UK, where customers have high expectations of the well-established and routinely used mobile banking services. On the other hand, Lebanese respondents have yet to formulate exacting expectations of mobile banking applications, which remain relatively new.

6.2.13 Information quality (INQ)

IS literature provides empirical evidence of the significant role of INQ in the determination of both technology usage and user satisfaction (Petter et al., 2008; Petter & McLean, 2009; Dwivedi et al., 2013). Providing customers with accurate and reliable information in a timely manner thus emerges as an important consideration, especially when considering the sensitive nature of financial transactions. Information accuracy is a critical predictor of effective mobile banking usage, which rendered INQ the strongest predictor of this channel's adoption at the interaction stage at which queries, and requests are advanced (Shareef, Baabdullah, Dutta, Kumar, & Dwivedi, 2018).

It is thus important that mobile banking applications provide customers with a personalised experience through the recommendation or suggestion of information and services (e.g. nearest

ATM or bank branches) based on user preferences, location and transaction history. Through this, banks could positively influence customer trust to promote mobile banking adoption among users (Sarkar et al., 2020).

Consistently, while INQ was insignificant in explaining mobile banking adoption intention among British and Lebanese respondents alike (H13a, H13b), this construct exhibited an indirect effect through performance expectancy (H13c, H13d) and EE (H13e, H13f) (Table 5-12; 5-13). In other words, users are more likely to perceive mobile banking applications as useful, productive and accessible, and by extension, have positive intentions towards adopting it should the platform provides high-quality, reliable information.

6.2.14 Behavioural Intention (BI)

When attempting to characterise individual behaviour in its different forms, extensive empirical studies endorse behavioural intention's pivotal role (Ajzen, 1991). Similar evidence was advanced by means of various technology acceptance models, such as TAM, UTAUT and UTAUT2, thereby establishing behavioural intention as a fundamental predictor of actual usage behaviour (Davis et al., 1989; Venkatesh et al., 2003; Venkatesh et al., 2012). This relationship was demonstrated in different contexts such as self-service kiosk (Wang & Shih, 2009), internet banking (Martins et al., 2014), and mobile banking (Sharma, 2019; Chiu, Bool, & Chiu, 2017; Priya et al., 2018). Consistently, our findings empirically supported behavioural intention as an antecedent of actual mobile banking usage in the developed and developing context of UK (H14b) and Lebanon (H14a), respectively. Behavioural intention thus seems to be a critical construct when attempting to elucidate mobile banking use, especially considering that users who exhibit mobile banking continuance intention are more likely to test new mobile banking features (Makanyeza, 2017).

6.3 Moderators

6.3.1 Age

The moderating influence of age in Lebanon was restricted to the relationship between habit and usage (H7c1), having failed to play a significant role in other relationships. Mobile banking use was more strongly predicted by habit among older Lebanese respondents when compared to their younger counterparts. This is consistent with Venkatesh et al. (2012)'s study, which hypothesised the moderating influence of age, in addition to previous reports supporting age-dependent variations in information processing and learning or adoption habits. Automatic

information processing and habit-based learning predominantly govern individual behaviour among older people (Hasher & Zacks, 1979; Verplanken, 2006; Wood & Rünger, 2016). As such, banks should integrate habit-forming or habit-modifying measures in order to enhance the adoption intentions of potential Lebanese mobile banking users belonging to older age groups.

While not statistically significant, the influence of various constructs, such as BI on Usage (H14a1), PE on BI (H1a1), TR on BI (H8a1), FC on BI (H4a1), SYQ on BI (H12a1) was notably higher among younger users, while the other relationships showed stronger associations among older users.

However, the moderating role of age remains fluctuant, particularly in mobile banking where it was previously reported to be insignificant when examining mobile banking use (Malaquias & Hwang, 2019). This could be explained by the nature of the study's population, which was mainly formed of younger respondents in the Lebanese context.

As for the UK, the majority of examined relationships were significantly moderated by age. Similar findings were reported in a developing context, where age was the strongest predictor of mobile banking adoption (Sharma et al., 2017). The adoption intentions of younger mobile banking users was more strongly predicted by EE (H2b1) and HM (H4b1) but were comparable to those of older users when examining habit (H7b1). Conversely, the influence of adoption intentions on mobile banking usage was significantly stronger among older British participants (H14b1).

In the case of EE and HM, our findings support the hypotheses advanced in our research model and are consistent with the work of Venkatesh et al. (2012). Ease of use thus becomes a prevalent concern and a natural expectation among technologically knowledgeable users, such as younger people. Mobile banking application user-friendliness, productivity and performance thus emerge as critical considerations, especially among the youth of a developed country. The latter could be further targeted through the implementation of enjoyable and fun elements (e.g. gamification elements and rewarding advertisement) in mobile banking applications. This would promote positive attitudes towards mobile banking services among younger individuals, whose adoption intentions seem to be intimately related to the enjoyment to be derived from a particular technology (Kamel & Farid, 2007; Venkatesh et al., 2012).

As for habit, its influence on BI was age-dependent yet comparable between younger and older consumers. As such, habit-promoting strategies remain a valid approach for the guarantee of

customer retention and the promotion of mobile banking adoption. Taking advantage of the habit-forming ability to affect beliefs (Venkatesh et al., 2012) is thus suggested as a means to further improve adoptive intent by means of loyalty programs and other reward-based strategies.

6.3.2 Gender

Gender was supported in our study as a significant moderator of the effect of various constructs on behavioural intention, as well as that of HB on usage (H7c2). It was actually evident that PE (H1a2), FC (H4a2), PS (H10a2), SYQ (H12a2) and TR (H8a2) had a higher influence among female Lebanese respondents than males, while the opposite was found in the relationship between Habit and usage, in addition to EE (H2a2) and PV (H6a2) and BI.

IS literature has explored the moderating role of gender in technology adoption and reported variable findings in the context of performance expectancy. Consistently with our study, females were shown to be more concerned about performance expectancy, or a technology's usefulness, when formulating intentions to adopt it when compared to males (Gefen & Straub, 1997). Based on this evidence, it seems that the attitude and perception of technology, such as mobile banking, is more dependent on the functionality and benefits this platform offers among females than males. However, the opposite correlation was also demonstrated in the original UTAUT model, where the effect of PE on adoptive intent was a significant and powerful predictor of male respondents' intentions (Venkatesh et al., 2003).

Conversely, our results reflected a stronger influence of EE on male behavioural intentions to adopt mobile banking (H2a2). The orientation of gender's moderating role in the context of Lebanon when considering EE is consistent with previously published studies. Moreover, the prominent concern for a technology's ease of use among Lebanese men and not women falls in line with the latter's lesser technology experience in the Arab world (GSMA, 2018). Developing countries such as Lebanon thus stand to benefit from the organisation of training and technical support programs in order to bridge the noticeable gender gap in their societies and by extension, promote mobile banking adoption in their female ranks.

Similarly, the social structure of Arab countries could predict the more prevalent concern or price among male Lebanese respondents, when compared to females (H6a2). The financial dependence of women on their male partners and family members remains a frequent occurrence in Arab culture, where men are portrayed as the sole financial providers of any household (Kirdar, 2010). As such, it is sensible that male respondents are particularly

concerned about the cost-effectiveness of mobile banking when examining the possibility of using it. Banks should, therefore, target male customers by emphasising the value of mobile banking in comparison with its cost, which is often negligible considering the fact that these services are offered free of charge.

Concerns of mobile banking facilitating conditions (H4a2) and security (H10a2) were more prevalent among female respondents in our study when compared to their male counterparts. While our findings are consistent with those of Venkatesh et al. (2012) in that women are more concerned about facilitating conditions than men, Yu (2012) demonstrated the opposite holds true, with male adoptive intent showing a higher dependency on the presence of adequate infrastructure for the use of technology. As for PS, both our study and that of Musa, Khan, and AlShare (2015) showed high concerns for mobile banking and mobile payment security among Arab female respondents. This could be attributed to the higher levels of computer anxiety among women as compared to men, which could be reflected on the level of mobile technologies the likes of mobile banking (He & Freeman, 2019). Mobile banking promotional campaigns should, therefore, emphasise the security and reliability of this channel in order to appease Lebanese females and enhance adoption intentions.

Gender additionally significantly moderated the relationship between SYQ and BI (H12a2) in such a way that Lebanese women were more concerned than men about mobile banking systems' quality.

On the other hand, gender did not moderate any of the proposed model relationships in the UK. While in direct contrast to our findings in Lebanon, the established gender equality and the consequent abolishment of gender roles in British society could explain the insignificant influence of gender in the UK. In fact, the gender gap is but a remnant of the past, with women integrated with almost all societal and professional functions. As such, gender differences have become negligible in different contexts including that of ICTs (Venkatesh et al., 2003: Pan & Jordan-Marsh, 2010), where gender failed to significantly moderate technology usage despite accounting for prior experience and knowledge (Al-Qeisi, 2009; Venkatesh et al., 2003). When examining internet banking adoption, evidence from the UK reports equal technology usage among female and male users (Ilett, 2005), which further supports the waning role of gender in modern societies as shown in our study (in the British sample), as well as those conducted in the context of a developing country (Foon & Fah, 2011; Agudo-Peregrina, Hernández-García, & Pascual-Miguel, 2014).

6.3.3 Experience

In Lebanon, our findings revealed that experience was a significant moderator of a number of proposed model relationships, including that of HB (H7a3) and BI (H14a3) on usage. The moderating influence of experience was also evident on the effect level of PV (H6a3), PE (H1a3) and FC (H4a3) on BI to adopt mobile banking, whose effect on usage was similarly experience-dependent. Less experienced users were more concerned about available facilitating conditions and the cost-benefit ratio of mobile banking when formulating their intentions to adopt or actually use mobile banking. As suggested by Mathieson (1991), Venkatesh et al. (2003) and Venkatesh et al. (2012), the accumulation of familiarity and experience with a certain technology serves to mitigate the technical difficulties of mobile banking. As such, the need for an existing supportive framework to facilitate or even allow effective mobile banking use fades as experienced users' technical competency becomes sufficient to manipulate the platform in a satisfactory and advantageous manner.

In a similar vein, the role of performance expectancy remains variable and was previously shown to be both negligible Venkatesh et al. (2003) and significant in the moderation of users' behavioural intentions (Taylor & Todd, 1995a). However, contrary to our findings, Taylor and Todd (1995a) reported that less experienced users showed greater susceptibility to a technology's perceived usefulness when compared to more experienced users. Conversely, our findings revealed the superior effect of performance expectancy on the adoption intentions of experienced users, which could be attributed to their practical and personal knowledge of the benefits and usefulness of mobile banking. The opposite reasoning holds true when considering price value, in that less experienced users would be more likely to shape their adoptive intent based on the technology's cost rather than its potential practical benefits, to which they remain insufficiently exposed.

As for the British sample, experience failed to show a significant moderating influence on all proposed model relationships. That being said, mobile banking usage tended to depend more strongly on habit among less experienced users (H7b3), while other constructs had a stronger albeit statistically insignificant influence among experienced British mobile banking users. Extant evidence reports the significant influence of experience on technology adoption, as examined by the lens of different adoption models (e.g., Taylor and Todd, 1995c; Wu and Wang, 2005; Park et al., 2009; Venkatesh et al., 2003, Venkatesh et al., 2012). These studies contradict our findings, which fall in line with those of previous researchers indicating

comparable technology usage among experienced and inexperienced users Ameen (2017). In fact, descriptive statistics revealed slight differences in the average usage of mobile banking between experienced and less experienced users. This difference was in favour of the latter, whose higher mobile phone or mobile banking usage frequency could compensate for their limited mobile banking literacy. The absence of significant differences between the two groups in terms of experience could, therefore, be implied, thereby abolishing the role of experience as a moderator of adoption and usage intentions.

6.3.4 Education

Education had no significant moderating role in any of the relationships proposed in our model (H1a4, H14a4, H1b4, H14b4). This held true in both the Lebanese and British context and was consistent with previous reports of the inconsequential influence of educational level (Wang et al., 2016; Chawla & Joshi, 2018; Talafha & Abu-Shanab, 2015). Considering the pervasiveness of technology in the modern world, services such as mobile banking have become accessible to individuals regardless of educational attainment. This could account for the irrelevance of education in the formulation of adoption intent of users, particularly in the case of mundane and relatively traditional financial services such as those offered by mobile banking applications.

Previous research has supported the role of education in the formulation of adoptive intent towards technologies, including internet and telebanking (Abu-Shanab, 2011; Sim et al., 2011). Evidence also seems to suggest that highly educated individuals are better equipped for the faster and less challenging adoption of technology, particularly mobile banking services when compared to those with lesser education (Koksal, 2016). Higher educational attainment may actually enable users to better process information and exhibit higher computer or mobile competency (Nasri, 2011). In addition to its influence on individuals' self-efficacy, education affects the perceived usefulness and trust of internet banking (Abu-Shanab, 2011), which carries significant implications in the similar context of mobile banking.

6.3.5 Income

In Lebanon, the moderating role of income was irregular, reaching statistical significance only in the relationship between PV (H6a5) and BI, as well as HB and usage (H7c5). In both, the influence of PV and HB on their respective variable was higher among participants with higher income. Previous studies reported stronger effect of price value on the intentions of lower-income users (Alwahaishi & Snášel, 2013; Ameen, 2017), which was contrary to our results.

While seemingly counter-intuitive, the income-related moderation of price value's effect in the Lebanese sample could be explained by the higher frequency of mobile banking usage in higher-income groups. The higher financial capacity of the latter allows them to conduct more transactions, which translates into continual monitoring of accounts, expenditures, savings and transactions through mobile banking.

In regard to the UK, income was supported as a moderating variable for more relationships. Empirical evidence reflects the significance of income's moderating effect on mobile banking adoptive intent and usage (Alalwan et al., 2015). In our study, lower-income British users were more concerned about price value (H6b5) and facilitating conditions (H4b5) when formulating their intentions to use mobile banking when compared to those with higher income. The latter would face little to no financial challenges in terms of acquiring facilities and resources required for mobile banking use, such as internet packages and smartphones (Kolodinsky, Hogarth, & Hilgert, 2004).

Consistently with previous studies, the relationship between PE and BI (H1b5) was significantly and positively moderated by income (Suoranta, 2003; Porter & Donthu, 2006). In the context of mobile banking, user attitude towards the technology significantly varied under the effect of perceived efficiency in an income-dependent manner. This was reflected in our findings, where users in the higher income group were more concerned about the benefit and performance of mobile banking when considering its adoption. The fast-paced, busy lifestyle predominantly led by high-income users most likely enhances the usefulness of mobile banking, which becomes an efficient alternative to physical branch visits to complete various needed transactions.

6.4 Summary

This chapter provided an extensive discussion of the study findings following the testing of the model's proposed hypotheses. The theoretical significance of our findings was explored in relation to the existing empirical perception and understanding of the theories underpinning our research model. As such, a verification and examination of proposed model relationships and constructs was undertaken in relation to the unified theory of acceptance and use of technology model (UTAUT2), the DeLone-McLean IS success model as well as privacy, security and trust. The comparability of our findings to extant IS literature was then surveyed

in order to rationalise the obtained results and elucidate their implications on mobile banking adoption in the Lebanese and UK context.

Chapter 7 - **Conclusion**

In its seventh chapter, the thesis is concluded with an overview of the research included therein. The delineation of notable contributions to theory is outlined in Section 7.2.1, while contributions to methodology and practice are discussed in Sections 7.2.2 and 7.2.3. The limitations of the study are presented in Section 7.3, followed by a discussion of future research directions.

7.1 Research Overview

Chapter 1 - Introduction:

Chapter 1 briefly touched upon the general state and the advantages of mobile banking in modern financial sectors. The choice of a cross-national approach could be justified by delineating the current characteristics of the Lebanese information technology sector while considering the demonstrated role of cultural variables in technology adoption behaviour. It is then argued that the recommended extension of the UTAUT2 in culturally and technologically distinct settings could be achieved within the scope of the present study. While Lebanon and the UK present with contrasting cultural dimensions, mobile banking adoption in both countries remains impeded by security, privacy and quality concerns. The present study thus aimed to contribute to extant technology adoption literature by undertaking the first attempt to validate an extended UTAUT2 model with trust, privacy and security constructs while integrating the DeLone and McLean model of IS success and moderating factors in an Arab country. A positivist quantitative survey-based approach was adopted and served to explain the adoption behaviour of mobile banking services and its variations among Lebanese and British respondents. Through this, the present study aimed to provide valuable methodological, practical and theoretical insights into cross-national mobile banking adoption.

Chapter 2 - Literature Review:

Chapter 2 provided an overview of the implication of financial innovations, namely internet and mobile banking, as drivers of the overhaul of the traditional banking system. The evolution of the latter was briefly examined and the role of innovation in the financial sector was explored. This was followed by a discussion of the services offered through both internet and mobile banking, as well as the advantages they carry in respect to all involved parties (i.e. banks, institutions, customers). Despite the notable penetration of both digital banking platforms, internet and mobile banking are faced with various impediments, of which security

and privacy concerns remain predominant. Empirical insights into the drivers and barriers to both internet and mobile banking adoption and acceptance were presented, followed by an overview of the chosen countries of Lebanon and the UK. In this regard, the cultural and technological characteristics of each country were explored, in addition to an examination of their respective banking sectors with an emphasis on its digital aspect. The penetration and state of mobile banking was emphasised in both Lebanon and the UK, in addition to the presentation of the determinants of its adoption as reflected by available market and empirical studies.

Chapter 2 then continues with a brief evaluation of available technology acceptance models and behavioural theories. To that end, the constructs and theoretical underpinning of each model were presented and their applicability to the study context was assessed. The choice of the UTAUT2 as the theoretical framework of this research was justified, while recognising the limitations of this model. Finally, the chapter concludes by presenting the DeLone-McLean IS success model, which was also adopted in this research.

Chapter 3 - Theoretical Framework:

Chapter 3 was formulated in order to provide empirical support for the hypothesised interplay between behavioural intentions and usage towards mobile banking and constructs from the UTAUT2, the IS success model constructs as well as trust, perceived privacy and perceived security. The advanced hypotheses reflected the causal relationships existing not only between constructs and behavioural intention, but also between the constructs themselves in certain cases. The chapter undertook the theoretical and empirical validation of each of the proposed hypotheses. The latter suggested the significant influence of PE, EE, SI, HM, PV, TR, PP, PS, SRVQ, SYQ and INQ on BI to adopt mobile banking in both Lebanon and the UK. Moreover, the role of HM and SYQ in determining PE, HB on Usage, as well as TR and INQ on both PE and EE was demonstrated. Finally, an overview of the theoretical underpinning of hypothesised moderating influences of age, gender, education, experience and income was presented within the framework and the context of this research.

Chapter 4 - Methodology:

Chapter 4 undertook the evaluation and discussion of prevalent research paradigms, namely positivism, post-positivism interpretivism and critical theory. The selection of the positivist paradigm as the appropriate research assumption for the present study was then justified. This was followed by the recognition of the importance of adequate research design and the

delineation of its constituents. The research process, from the identification of research setting and data collection and analysis methods, is thus elucidated, and the data collection approach is further detailed. Extensive evidence justifying the suitability of surveys or self-administered questionnaires for this study was provided, followed by the presentation of the sampling process. The population of the present study was then defined and detailed and the choice of convenience sampling as well as sample size was discussed. The instrument development, design, and pre-testing process was then illustrated with an emphasis on questionnaire wording and instrument validity in the context of the present study. The process by which instrument reliability and suitability were determined and the conducted pilot study was briefly summarised. This was followed by the justification of employing a PLS-SEM for model validation and hypotheses testing. Finally, the ethical considerations critical to any type of research are outlined and discussed in the context of the present study.

Chapter 5 - Analysis:

In this chapter, the results of the preliminary screening of survey data was presented. Questionnaires with more than 3% missing data were eliminated. The occurrence of outliers was detected in the case of educational attainment and income. However, these outliers were expected and were therefore retained. Normal distributions of both the UK and Lebanese samples were observed, as reflected by skewness and kurtosis values. Demographic information was presented in both contexts and reflected the differences in age, gender, education, income, mobile phone usage, and mobile banking use and experience. The data analysis process was overviewed, first by assessing the reflective measurement models leading to the deletion of items with unsatisfactory loadings first. Item reliability, convergent validity and discriminant validity of model constructs were evident in both contexts, furthermore the validity and lack of critical collinearity could be detected in formative models. The structural model was assessed by the examination of the coefficient of determination, the effect size, and the predictive relevance of model constructs.

Chapter 6 - Discussions:

Chapter 6 discussed the present study's demonstrated relationships within the context of mobile banking intentions in Lebanon and the UK. Empirical studies were employed in order to derive the theoretical significance of research findings. The theoretical concepts and theories underpinning the proposed research model and its inherent relationships could thus be elucidated. Through this, the validity and applicability of our findings was rationalised within

the scope of the unified theory of acceptance and use of technology model (UTAUT2), the DeLone-McLean IS success model as well as privacy, security and trust. The results from this study were then compared to extant IS literature and their implications were derived in terms of the determinants of mobile banking adoption in both studied contexts.

7.2 Research Contributions

In this section, the theoretical, methodological and practical implications of the present research are discussed. In this study, an extension of the UTAUT2 model with trust, perceived privacy and perceived security was undertaken in addition to the integration of the DeLone-McLean model of IS success. Through the proposed model, the antecedents of mobile banking adoption in Lebanon and the UK were examined. The present study contributed to the theoretical foundation of the UTAUT2 model while reflecting potential cultural differences in adoption intentions in Lebanon and the UK through its proposed conceptual framework. This was achieved through the empirical validation of the proposed model in these contexts, which also allowed the investigation of the moderating influences of demographic variables on behavioural intentions. Based on our findings, recommendations to enhance mobile banking acceptance, adoption and usage in both countries are advanced.

7.2.1 Theoretical Contributions

By developing and validating a conceptual framework extending the UTAUT2 with trust, security and privacy constructs while integrating the constructs of the DeLone-McLean model of IS success, the present research fulfils objective 1 by contributing to the theoretical advancement of technology adoption models. Our findings provide valuable insights for the improvement and enrichment of future attempts in the context of technology acceptance research by reflecting the applicability of the extended UTAUT2 model in cross-natural and cross-cultural settings. Through this study, the factors affecting the adoption of mobile banking in a developed (Lebanon) and developing (UK) country were examined. This was undertaken in conjunction with the investigation of the moderating role of gender, age, education, experience and income on model relationships. The contributions of this research are as follows:

Firstly, as foreseen in objective 2, this research demonstrated the validity and fitness of the integration of DeLone-McLean model of IS success constructs into a UTAUT2 model extended with three constructs, namely trust, perceived security and perceived privacy. This constitutes

a noteworthy contribution to the theoretical foundation of the UTAUT2 model, as it is the first attempt to extend the UTAUT2 with these constructs. More importantly, the present study demonstrated the validity and applicability of the proposed conceptual model in a new context, with satisfactory explanatory power.

Secondly, this research provides critical insights in a mobile banking setting where data sensitivity issues are prevalent and demonstrate the hypothesised role of included factors. Both Lebanon and the UK exhibited a predilection of mobile banking adoption behaviour towards perceived security. Privacy concerns were significant in the context of the UK only, while adoption intentions in Lebanon greatly depended on trust. In regard to the DeLone-McLean IS success model, the importance of system quality attributes was examined in relation to empirical evidence available in the literature, thus validating the role of service quality in developed countries such as the UK. Through the elucidation of the comparability and differences of these two countries, the present study fulfils objective 4.

Thirdly, the need for further research elucidating the moderating role of various demographic variables was recognised in UTAUT literature (Williams et al., 2015). Moderating variables remain a critical consideration when examining adoption behaviour that was often neglected in previous studies applying the UTAUT model. The present study bridges this gap according to objective 5 by examining the moderating influence of age, gender, education, experience and income on the behavioural intentions of Lebanese and UK respondents. This empirical demonstration of the moderating role of demographic variables and its variation across different cultural contexts would contribute to the eventual formulation of an in-depth understanding of consumer adoption behaviour and actual technology usage. By extricating variation patterns in the influence of variables, cross-nationally significant factors such as age and income can be distinguished from country-exclusive (e.g. gender and experience in Lebanon) and insignificant (e.g. education) factors. The delineation of the moderating role of demographic variables and its variation on user intentions thus serves to enhance the UTAUT2 model's explanatory power in a mobile banking setting by accounting for user-dependent variables, as suggested by Venkatesh et al. (2012). Furthermore, the observed divergence in moderating variable's influence provides valuable insights into the applicability of UTAUT2 in different settings. Demographic variables should thus be included in future models in order to better understand consumer behaviour and the driving factors behind their significance. This is further validated by the evident differences between study populations irrespective of the impact of demographic variables' moderation of model relationships.

Fourthly, the present study also demonstrates the applicability of an extended UTAUT2 model in a cross-national setting. This was validated in the context of Lebanon and the UK, which represent developing and developed countries, respectively. Cross-cultural studies have been generally exclusive of Arab countries, with few studies exploring the validity of the UTAUT2 model within the Arab region (Ameen & Willis, 2015). Comparative cross-cultural studies including an Arab country in relation to Western or other non-Arab countries were similarly limited, with few researchers venturing in this direction (e.g., Ameen & Willis, 2015; Al-Qeisi Dennis, & Abbad, 2015). In this regard, this study provides an important avenue for the understanding of mobile banking adoption antecedents through the comparison of the culturally dissimilar Lebanese and UK settings (objective 4). Moreover, this research was among the rare studies of the determinants of mobile banking adoption in Lebanon and the only attempt to include Lebanon in a cross-national examination of the applicability of an extended UTAUT2 model in this context.

Finally, this study contributes to existing literature through the development and validation of a context-specific survey instrument, as set out in objective 3. This venture is critical for the advancement of valid new measures modifying existing items to ensure their applicability in contexts similar to or different from the ones they were initially conceived for (Straub, Boudreau, & Gefen, 2004). As previously mentioned, this research extended the UTAUT2 with perceived privacy, perceived security and trust along with the integration of IS success factors. As such, our findings validate the proposed instrument and its integrated items in the context of mobile banking.

7.2.2 Methodological Contributions

Among the methodological contributions of this study is its empirical demonstration of the validity and reliability of predictors in a culturally dissimilar setting than that in which they were originally designed. While the UK falls in line with the North American and European context to which the included predictors are indigenous, our findings reflect their applicability as well as that of their respective scales in the context of a developing country, namely Lebanon. That being said, predictors were adapted to the study setting through the deletion of certain indicators from the conceptual model. This was necessary in order to ensure reliability, in addition to convergent and discriminant validity of measurement items. Regardless of the modification of original constructs, this study provides a valuable contribution to the extant

literature by the determination of the robustness and applicability of these predictors in a cross-cultural setting such as that of Lebanon and the UK.

The present research is among the few employing PLS-SEM for the examination of a conceptual model in a cross-cultural context, particularly that of an Arab country such as Lebanon. PLS-SEM was used in this research to study the complex proposed model in a two-step approach consisting of measurement model and structural model. As such, this research provides a reliable description and guidelines for the application of PLS-SEM in the relatively understudied context of cross-cultural investigations of mobile banking adoption intentions including an Arab country, and to the best of researcher's knowledge, no other study has been conducted using PLS-SEM in a cross-cultural context including Lebanon, thus fulfilling objective 6, hence it was considered a contribution to the literature with a successful employement for the proposed model. Moreover, the choice of PLS-SEM allowed the consistent analysis and comparison of the proposed conceptual framework in accordance with that of Venkatesh et al. (2012).

Another noteworthy contribution to the methodology consists of the employment of Multi-group analysis (MGA) technique for the evaluation of moderating variables within the framework of a complex model including formative constructs (objective 7). This constitutes one of the infrequent applications of this technique in the context of technology adoption studies. The present research, therefore, provides valuable insights into the methodological soundness of MGA for the determination of moderating influences and group differences, particularly in Lebanon where such studies are scarce. This was achieved using a hierarchical multiple regression model consistent with the approach of Cohen, Cohen, West and Aiken (1983) and Pedhazur (1982).

7.2.3 Implications to Practice

The current findings carry a number of practical and managerial implications, which could guide bank managers, mobile banking app providers, decision-makers and mobile banking application developers in their efforts to improve mobile banking adoption (objective 8). Rethinking the design, implementation, delivery and management of mobile banking applications is an important consideration that would supplement overall bank strategies in potentiating cross-product sales, service adoption and customer retention (Figure 7-1). Our study undertook the empirical examination of prevailing factors predicting the intentions of Lebanese and British individuals towards mobile banking. As such, the findings and inferences

are drawn from our research with a degree of applicability in similar contexts to those studied herein, namely that of developing and developed countries.

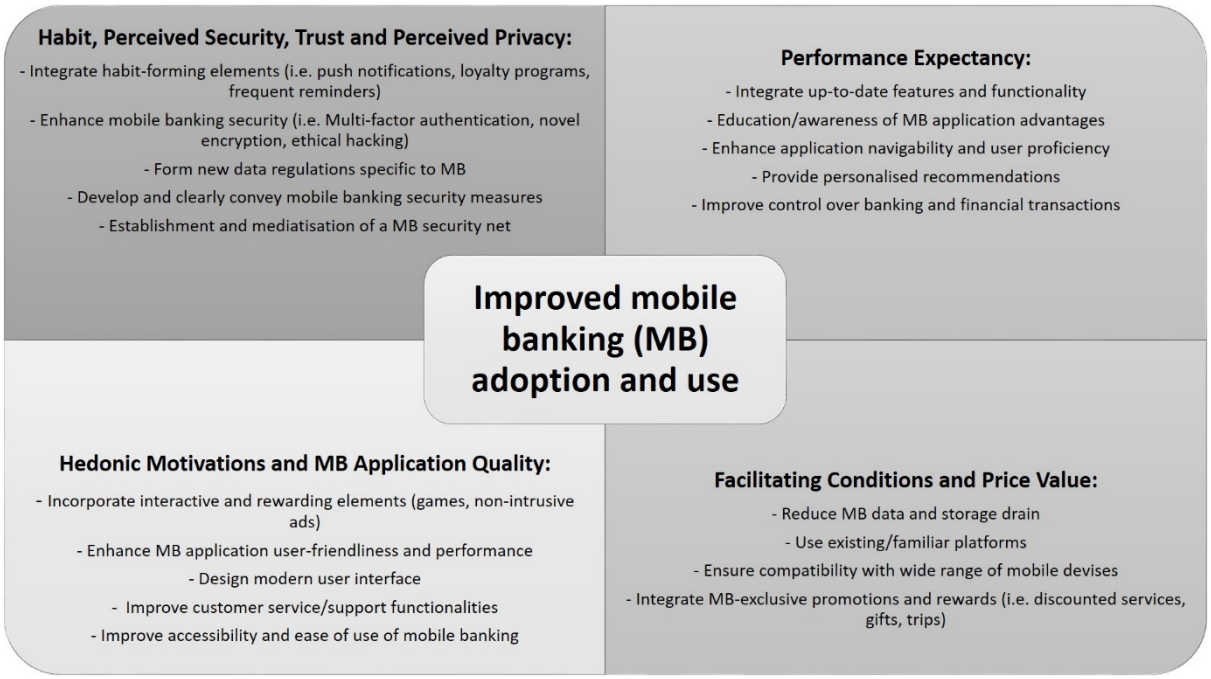

Figure 7-1:Synthesis of implications of the present study to practice

Habit was a strong cross-national predictor of behavioural intention to use mobile banking. Mobile banking application designers should take the significant influence of habit in stride by incorporating it into the features and services offered through the platform. Integrating habit-forming elements, such as push notifications, loyalty programs and frequent reminders could serve to improve mobile banking usage. Such features would prompt users to take advantage of mobile banking services, such as fund transfers, bill payment and account management, by increasing customer awareness of their availability. Designing habit-oriented mobile banking applications should thus be prioritised in order to directly influence usage behaviour without the need to influence behavioural intentions towards the platform. This is most applicable in specific demographic groups, particularly among older Lebanese customers.

In respect to mobile banking security, implementing measures to enhance and integrate this functionality seems to be critical for the promotion of positive user intentions towards the technology, particularly among female Lebanese customers. This would serve to circumvent the risk of hacking and financial security threats that remain rampant in the modern digitised world. Addressing mobile banking security should be undertaken on a technical level while not neglecting the managerial and human aspect of promoting perceived security. The latter

includes the clear conveyance of existing mobile banking security measures, as well as the development and dissemination of interactive, relevant educational or instructional material that would guide customers in the event of a security breach. Regular updates of security updates and potential issues (i.e. bugs, contingency plans and security accreditation) could be provided to mobile banking users through their mobile application. The latter should also include a clear, accessible statement of mobile banking usage risks and the possible measures to prevent or alleviate security issues. Mobile banking credibility can be further supplemented through the display and improvement of the application's positive ratings on reliable platforms such as Apple Store and Google Play. Bank managers can further comfort actual and potential mobile banking customers through the establishment of a security net to be deployed in the event of breaches, as well as the clear statement of the eventuality of reparations to any damages and loss incurred through mobile banking use.

From a technical standpoint, implementing familiar security measures could prove useful in promoting positive user attitudes and intentions towards mobile banking. While novel security measures are critical, it is important to preserve the simplicity and convenience of customers' mobile banking experience. Multi-factor authentication is a possible measure that could be integrated in order to provide multiple layers of protection at the login stage of mobile banking application use. Multi-factor authentication increasingly challenges intruders as the number of factors put in place increases. This ensures a lower risk of application breach, which would then significantly reduce the likelihood of unauthorised data access and manipulation. Multi-factor authentication provides an additional layer of security to traditional two-factor authentication. By combining the use of passwords or pins with unusual hard-to-access factors such as an owned item or biometric data (e.g. fingerprint, voice), multi-factor authentication prevents forced system access by complicating the identification of all factors required for login. Another possibility is the implementation of novel encryption methods and scripts in order to secure data transfer between the mobile banking application and respective target channels. This would further serve to enhance the compliance of mobile banking applications to high-security standards and by extension, promote its perceived security. The practice of white or ethical hacking could also be employed in order to identify the potential issues and vulnerabilities of mobile banking applications. Such ventures would be initiated by the service provider and would provide application designers with valuable insights for the reinforcement of existing security measures.

In addition to the communication of mobile banking security reassurances, banks should formulate a comprehensive safety net guaranteeing the compensation of customer assets in the event of security breaches. This is practised by British banks, in which protection strategies are clearly stated and implemented in the case of loss due to fraudulent activity. This could account for the insignificance of trust among British respondents as a predictor of intentions towards mobile banking. Lebanese bank managers could, therefore, draw upon their British counterpart's successes and implement similar security nets to protect the interests of Lebanese customers. Such strategies would serve to enhance customer trust in mobile banking applications and their providers, and by extension, enhance the adoption of this seemingly risky platform in the financially volatile Lebanese environment. Clear communication and educational campaigns are needed to supplement the adoption of safety nets in order to promote awareness of their availability.

Similarly, to the latest regulations that were established to control and protect personal information, the new Payment Services Directive 2 (PSD2) was recently released in the EU as a control measure for the different types of electronic payment. While data and payment regulations exist, it remains critical to form new regulations that are more specific to mobile banking. Having such a regulation in the EU and more specifically in the UK should provide a clear framework for current and new development. Furthermore, introducing such regulations, which are currently limited in Lebanon, should give current mobile banking providers structured regulations to follow and implement. Additionally, this should potentiate consumer confidence in the mobile banking app when they perceived its adherence to tested and mature regulations rather than being solely driven by bank policies.

Considering the significance of performance expectancy in Lebanon and the UK, mobile banking applications should exhibit a high degree of usability and usefulness in order to satisfy customer expectations. Application designers should consider this by integrating new features and functionality, which make use of up-to-date technologies. Through this, mobile banking transactions would be facilitated and enhanced while circumventing the need for supportive factors and services. Performance expectancy was a notable concern among older British customers. British banks should thus emphasise the advantages of mobile banking applications when looking to implement this technology among its older customers, while Lebanese banks would benefit from promoting the ease of use of mobile banking among male customers. This could be achieved through educational and awareness campaigns or readily available

instructions designed to convey the mobile banking's convenient features and enhance the navigability of the application and the proficiency of its potential users.

Furthermore, the mobile banking application should be able to provide personalised recommendations for the different financial products it offers. Examples include providing an overview or suggestions regarding the different types of insurance available through the application, as well as personalised loan offerings with discounted interest rates.

Consumers should also be able to access analytical reports of their spending through mobile banking applications. Such reports will allow customers a greater degree of control on their spending in addition to the ability to manage their spending according to different categories. This could be achieved by pushing notifications when spending nears a predefined limit, which would not only facilitate bank account management and spending, but would also carry implications in the management of customers' overall financial budgets.

Service providers should also integrate the influence of intrinsic motivations in the otherwise utilitarian mobile banking framework in order to induce positive user adoption intentions. This could be achieved by the supplementation of existing mobile banking application interfaces with interactive and rewarding elements that would enhance user experience and improve mobile banking use. Boosting the enjoyability of mobile banking through gamification elements and non-intrusive advertisements would particularly improve the intentions of younger British users towards the application.

Mobile banking application design should comply with modern user interface design in order to promote perceptions of usability and innovation. This would complement the benefits of mobile banking, which should be clearly communicated to customers through awareness campaigns delineating the functionalities and features through which this application draws its advantages, such as time-effectiveness and convenience. British banks are particularly suggested to provide easy to use mobile banking applications in order to cater to younger users' expectations. Young customers present with higher computer and technological literacy than older individuals, and as such have higher anticipations of application user-friendliness, productivity and performance.

The use of mobile banking requires the availability of robust resources, facilities and skills, which are often lacking or subpar in developing countries such as Lebanon. This could account for the significant impact of facilitating conditions among Lebanese respondents and suggests the need for an improved support structure to facilitate mobile banking use in this country.

Bank managers should thus aim to alleviate the hindrances facing mobile banking application usage through cost-reduction strategies. Possibilities include the use of existing widely adopted platforms and channels (iOS & Android) for the delivery of mobile banking services, which would limit the effort and skills required for the effective use of the technology. Moreover, mobile banking application designers should take into consideration the potentially limited resources of customers and reduce the data and storage drain following system usage. This could be achieved by designing a light small-sized application relying on cached content whenever possible to provide mobile banking services. Moreover, compatibility between the provided mobile banking application and a wide variety of mobile devices should be ensured in addition to low bandwidth consumption. Through such strategies, banks can target less experienced and female users in Lebanon and enhance their perceptions of mobile banking's benefits, and thereby improve their intentions towards adopting it.

Other recommendations relevant to the British context include the formulation of mobile banking-exclusive promotions and rewards, which would boost the price value of these applications. This would positively influence mobile banking use by allowing customers to access discounted services and products or win valuable gifts or trips. Younger users face many financial challenges, which accounts for their higher consideration of price value when formulating their intentions to adopt mobile banking. In order to address that, British banks could integrate reward programs, which confer mobile banking with a profitable connotation in addition to the implementation of the budget and cost-saving features. Such strategies could supplement efforts to improve the accessibility of mobile banking services to lower-income users in the UK, where price value concerns are prevalent.

Finally, enhancing customer service would positively reflect on mobile banking experience and enhance service quality. To this end, application developers could implement functionalities to reduce waiting times and facilitate access to mobile banking services through the automatic authentication of customers requesting support through the mobile banking channels.

7.3 Limitations

The present research provided valuable insights in its extension of the UTAUT2 and the cross-cultural validation of the proposed model, albeit with notable limitations.

Firstly, the use of convenience sampling as a data collection method limits the generalisability of our findings to the general population. The cross-sectional quantitative approach adopted in our research allowed the collection of data at a single time point through surveys and questionnaires in Lebanon and the UK. While the quantitative approach was strongly supported in the literature, it does not provide a comprehensive understanding of the research phenomena. Future research unrestricted by time and resource limitations should consider employing combined quantitative and qualitative methodologies, integrating interviews and longitudinal studies for example, in order to more faithfully reflect the interplay between culture and technology.

Another important limitation resides in the study's sample size, despite its adherence to PLS-SEM analysis requirements and previous IS literature. While similar size between both countries, the sample size does not reflect actual population differences between Lebanon and the UK. However, it is essential to note that this measure was necessary in order to prevent issues in multigroup analysis tests as well as any potential bias in terms of relationship significance in each of the studied contexts. Regardless, the generalisability of the present findings remains significantly restricted, with larger sample sizes needed to reflect population and culture-specific variations in mobile banking adoption behaviour. Increasing the sample size would confer study results with a higher degree of robustness and increased statistical power. Moreover, preventing inadequate sample sizes by targeting users of all age groups is an important consideration. This would yield a more inclusive sample, which was not satisfactorily achieved in this study, as evidenced by the need to merge different age group samples to maintain statistical relevance (e.g. respondents over the age of 56).

While adopting a cross-cultural approach, this study did not account for cultural factors and their variations between Lebanon and the UK. Future studies should integrate Hofstede's cultural dimensions into their conceptual frameworks in order to provide culturally relevant insights into mobile banking customers' adoption behaviour. Moreover, future research should take into account differences in external factors relevant to the studied context, such as national mobile phone usage and mobile banking maturity. Despite their importance, our study did not address these potentially confounding external variables.

In view of its cross-sectional approach, the current study carries a notable limitation in terms of causality inference. The adopted conceptual model extends on the theoretical concepts of the UTAUT2, which is in turn based on several behavioural cognition theories (e.g. TRA,

TAM). As such, studies should take into account the time-dependent variation in technology acceptance and behaviour (e.g., Venkatesh & Davis, 2000; Hoque & Sorwar, 2017). Our study examined the effect of model predictors over a single point in time as its cross-sectional design permits. However, this limits the potential of the model to reflect time-mediated relationships between different constructs and mobile banking intentions and use. As such, future studies should undertake the examination of the phenomena in question at multiple time points in order to account for behavioural changes in response to increased user experience and technology literacy (He & Freeman, 2019).

The present research also neglected to account for indirect mediating influences between its model's key predictors. Significant factors such as PE, EE and TR could play a role in the modulation of other constructs' influence on behavioural intentions. EE is one such example, with our findings revealing its insignificance in the context of behavioural intentions, but not in that of certain model predictors. Such indirect correlations should be explored in future studies in order to provide a more comprehensive understanding of mobile banking acceptance antecedents.

In a similar vein, the moderating influences of chosen demographic variables were examined individually, without considering the possible multiple-way interaction between moderators. Social psychology literature reveals the interplay between moderating factors often considered in IS studies, with notable associations between gender and each of experience, age and voluntariness (e.g., Venkatesh et al., 2003).

Research also confirms the confounding influence of income, occupation and education when examining the role of age (Deursen, Dijk, & Peter, 2015; Elias, Smith, & Barney, 2012). In fact, older age categories often exhibit elevated distributions of individuals with higher income, educational attainment and career advancement, which emphasises the need to account for this confounding reciprocity.

7.4 Future Research

Our findings and the limitations of our study provide valuable insights and directions for future studies. The latter could adopt a mixed-methods approach in order to contribute to a more comprehensive understanding of the present research's findings. The supplementation of our quantitative approach with a qualitative analysis would help further explain model relationships, particularly those which had proved insignificant. In a similar vein, longitudinal

studies can be carried out in order to reflect the variations and stability of model constructs' influence on behavioural intentions to adopt mobile banking over time, which could not be achieved within the framework of our cross-sectional study. Moreover, future studies could validate the proposed model in a larger population, be it in Lebanon or the UK.

The present study undertook the examination of mobile banking adoption behaviour in a cross-cultural context via an extended UTAUT2 model. Our findings can illuminate future efforts in this setting and indicate the importance of extending collected consumer data to include the city of residence of respondents. While not considered in this study, this would allow researchers to gain a richer perspective of mobile banking adoption variations between demographic areas, where ICT infrastructure and technological pervasiveness could be limited. Cultural beliefs influence customer intentions to various extents in different populations and different geographical areas. Validating the proposed model in different cultural settings would thus advance both the general and context-specific understanding of mobile banking adoption antecedents. Multi-cultural studies would prove valuable for the comparison of adoption behaviours across countries and mono-cultural approaches would further validate our model in countries other than Lebanon or the UK.

In regard to the constructs included in this research, future studies could look into the possible mediating influences of key determinants on other factors affecting behavioural intentions towards mobile banking. This includes trust, security, PE, EE, as well as demographic moderators such as gender and income. Moreover, researchers should attempt to rationalise the insignificant role of social influences observed in our study and that through an investigation of its underlying mechanisms, namely identification, internalisation, and compliance. This would provide a deeper understanding of the exact mechanism implicated in significant social influences reflected in an individual (Al-Qeisi & Al-Abdallah, 2013; Davis et al., 1989; Venkatesh et al., 2003). Mobile banking is a technology with an inherent individualistic and personal aspect that could have important implications on the role of social influences (Davis et al., 1989; Yang, Lu, Gupta, Cao, & Zhang, 2012). The effect of the latter on behavioural intentions could also be modulated by country- or population-specific cultural values (e.g. collectivism, individualism, power distance) (Baptista & Oliveira, 2015), which further emphasises the need to account for social influences' determinants and potential confounding variables in future studies. Such considerations could also serve to explain the insignificance of other constructs previously established in IS literature, such as effort expectations, HM, INQ and SYQ.

Additionally, future studies should validate or extend the UTAUT2 model in different consumer contexts, be it developed or developing countries in order to bridge the gap between organisational and individual UTAUT2 applications. This could be undertaken in a mobile banking setting, or that of other online or mobile technologies such as e-banking, mobile payments or mobile shopping. Researchers could further narrow down the study scope by examining the proposed model in specific controlled user subsets. This would allow the determination of the model's limitations and exceptional findings in terms of adoption behaviour.

Finally, future studies could examine the outcomes of mobile banking in addition to the antecedents of its acceptance and actual use. To that end, researchers could measure customer satisfaction and consider word of mouth and customer loyalty in regard to mobile banking usage.

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Appendix A: Ethical Approval

Applicant: Mr Mohamad Merhi

Project Title: Mobile Banking Questionnaire

Reference: 6603-LR-Jun/2017- 7432-1

Dear Mr Mohamad Merhi

The Research Ethics Committee has considered the above application recently submitted by you.

The Chair, acting under delegated authority has agreed that there is no objection on ethical grounds to the proposed study. Approval is given on the understanding that the conditions of approval set out below are followed:

- The agreed protocol must be followed. Any changes to the protocol will require prior approval from the Committee by way of an application for an amendment.
- **Conditional Approval is awarded on the understanding that the research to be conducted will be an online survey and that no interviews will be taking place.**

Please note that:

- Research Participant Information Sheets and (where relevant) flyers, posters, and consent forms should include a clear statement that research ethics approval has been obtained from the relevant Research Ethics Committee.
- The Research Participant Information Sheets should include a clear statement that queries should be directed, in the first instance, to the Supervisor (where relevant), or the researcher. Complaints, on the other hand, should be directed, in the first instance, to the Chair of the relevant Research Ethics Committee.
- Approval to proceed with the study is granted subject to receipt by the Committee of satisfactory responses to any conditions that may appear above, in addition to any subsequent changes to the protocol.
- The Research Ethics Committee reserves the right to sample and review documentation, including raw data, relevant to the study.
- You may not undertake any research activity if you are not a registered student of Brunel University or if you cease to become registered, including abeyance or temporary withdrawal. As a deregistered student you would not be insured to undertake research activity. Research activity includes the recruitment of participants, undertaking consent procedures and collection of data. Breach of this requirement constitutes research misconduct and is a disciplinary offence.

Professor Hua Zhao

Chair

College of Engineering, Design and Physical Sciences Research Ethics Committee
Brunel University London

Appendix B: Cover Letter

Dear Participant,

My name is Mohamad Merhi, a PhD student at Brunel University West London. I am conducting research under the title: Factors affecting the adoption of mobile banking in Lebanon and the UK: A Structural Equation Modelling Approach.

The aim of the research is to understand the factors that impact the adoption of mobile banking in both Lebanon and the UK and based on the findings recommendations on the factors across both countries will be proposed.

The survey should only take 10-15 minutes. There no known risks linked to this survey. All the responses will be kept confidential and will be anonymous so please do not write any personal information on the questionnaire. Final findings based on analysed data will be shared not individual response.

Participation in this survey is strictly voluntary and you may refuse to participate at any time. If you choose to participate, please answer the questions freely.

If you have any concerns, complaints or require further information on myself, the study or the ethical elements of this project please contact siscm.srec@brunel.ac.uk or Professor H Zhao (Chair of Departmental Ethics Committee)

Appendix C: Survey Questionnaire

English Version

The aim of this study is to investigate the main factors that enable or hinder the adoption of mobile banking.

Please tick the box that most applies to yourself

Gender	[ ] Male [ ] Female
Age	[ ] 18 - 25 Years [ ] 26 - 35 Years [ ] 36 - 45 Years [ ] 46 - 55 Years [ ] 56 Years and above
How long you have been doing transactions with your bank?	[ ] up to 1 year [ ] 1 to 2 years [ ] More than 2 Year
How do you rate your mobile experience	[ ] Experienced [ ] Intermediate [ ] Beginner
What is your highest educational qualification?	[ ] Secondary [ ] High School [ ] Bachelor's degree [ ] Master's degree [ ] PhD [ ] Others

What is your occupation sector?	[ ] Student (College/University) [ ] Executive/Managerial [ ] Professional [ ] Academic/Teacher [ ] Computer Technical/Engineering [ ] Service/Customer Support [ ] Clerical/Administrative [ ] Sales/Marketing [ ] Homemaker [ ] Self-employed/Own Company [ ] Unemployed, looking for work [ ] Retired [ ] Other
What is the range of your monthly income?	[ ] Less than £500 [ ] Between £501 to £1,000 [ ] Between £1,001 to £2,000 [ ] Between £2,001 to £3,000 [ ] Between £3,001 to £4,000 [ ] £4,000 and above
How often do you use mobile banking	[ ] Daily [ ] Once a week [ ] Once a month [ ] Many times a month [ ] Never

What do you use mobile banking for?	[ ] Check account balance [ ] Make Payment [ ] Fund Transfer [ ] Others

Please rate the extent to which you agree with each of the following statements below.

1= Strongly Disagree 2= Disagree 3= Disagree somewhat
4= Undecided 5= Agree somewhat 6= Agree 7= Strongly Agree

Question	**1**	**2**	**3**	**4**	**5**	**6**	**7**
I find mobile banking useful in my daily life							
I am able to manage my banking tasks more effectively using Mobile banking							
I am able to save considerable time and effort using Mobile banking							
Overall, I find Internet banking very useful							
I find mobile banking easy to use							
My interaction with mobile banking website is clear and understandable.							
Using mobile banking services is relatively easy							
It is easy for me to become skilful at using mobile banking website.							
People who are important to me think that I should use mobile banking services							
People who influence my behaviour think I should use mobile banking services							
People whose opinions that I value prefer that I use mobile banking services.							
Media is full of reports, articles and news suggesting using mobile banking services is a good idea							
I have the resources necessary to use mobile banking services							
I have the knowledge necessary to use mobile banking services							
Mobile banking website is compatible with other technologies I use							
I can get help from others when I have difficulties using mobile banking services							

There are no compatibility problems with the mobile banking services I use							
Using mobile banking services is fun							
Using mobile banking services is enjoyable							
Using mobile banking services is entertaining							
Using mobile banking is safe and secured							
I am not concerned about misuse of my personal information while using mobile banking.							
I believe that mobile banking site will not share my information to third part without permission							
The mobile banking site keeps customer's best interest in mind							
The mobile banking site is trustworthy							
At the current price, mobile Internet provides a good value							
Mobile Internet is a good value for the money							
Question	**1**	**2**	**3**	**4**	**5**	**6**	**7**
Mobile Banking is reasonably priced							
The use of mobile banking has become a habit for me							
I am addicted to using mobile banking							
I must use mobile banking							
Using mobile banking has become natural to me							
I intend to continue using mobile banking in the future							
I will always try to use mobile banking in my daily life							
I plan to continue to use mobile banking frequently							
The mobile banking services are error free							
The mobile banking site is managed well and up to date							
The mobile banking site is supported by prompt 24/7 customer service							
Overall, the mobile banking site satisfies my expectations							
The mobile banking website has all the functions and capabilities I expect it to have							

I am satisfied with how quickly the mobile banking website loads pages and images							
The user interface of mobile banking website measures up to global standard							
Overall, I am satisfied with mobile banking websites							
Mobile banking website provides information that is relevant to my needs							
Mobile banking website provides me with organized content and information							
Mobile banking website provides up to date content and information							
Mobile banking website provides required content and information							
Providing personal privacy information over mobile banking may not be safe							
I am afraid of the misuse of personal information when using mobile banking							
I am afraid that someone could access my account when using mobile banking							
I am worried that if my phone was lost or stolen someone could access my mobile banking							
Security concerns prevents me from using mobile banking							
I don’t believe that mobile banking has enough security layers							
I am worried about transferring money through mobile banking in case someone hacks my account							
My bank provides me the facility of choosing a strong password							

Arabic Version

إن هدف هذه الدراسة إيجاد العوامل الأساسية التي يمكن أن تمكن او تعرقل فكرة تطبيق الخدمات المصرفية عبر الهاتف -- الرجاء اختيارالاجابة المناسبة.

اختيار الجنس	[ ] ذكر [ ] أنثى
العمر	26 – 35 [ ] 18- 25 [ ] 46 – 55 [ ] 36 – 45 [ ] عاما وما فوق 56 [ ]
مدة استخدام الهاتف المحمول والانترنت	[ ] سنة تقريبا [ ] من سنة الى سنتين [ ] أكثر من سنتين
كيف تصنف خبرتك في استخدام الهاتف المحمول	[ ] متخصص [ ] متوسط مبتدئ [ ]
ما هي مهنتك	تلميذ (معهد/ جامعة) [ ] مدير [ ] مختص [ ] مدرس أكاديمي [ ] تقني كمبيوتر/ مهندس كمبيوتر [ ] خدمة دعم العملاء [ ] إداري [ ] تسويق المبيعات [ ] ربة منزل [ ] عاطل عن العمل/ أبحث عن عمل [ ] متقاعد [ ] أخرى [ ]
دخلك الشهري	$500 أقل من [ ] $1000بين 501$ و [ ] $2000 بين 1001$ و [ ] $3000بين 2001$ و [ ] $4000 بين 3001$ و [ ] وأكثر $4000 [ ]

استخدام الخدمات المصرفية عبر الهاتف	يوميا [ ] مرة في الاسبوع [ ] مرة في الشهر [ ] عدة مرة في الشهر [ ] أبدا [ ]
سبب استخدام الخدمات المصرفية عبر الهاتف	التحقق من رصيد الحساب [ ] سداد الدفعات المستحقة [ ] تحويل الأموال [ ] أخرى [ ]

ضع علامة "x" بجانب الاجابة

1= أرفض بشدة 2= أرفض 3 = أرفض نوعا ما

4= لست متأكدا 5= أوافق نوعا ما 6= أوافق 7= أوافق بشدة

	1	2	3	4	5	6	7
أجد أن تأدية الخدمات المصرفية عبر الهاتف أمر مفيد في الحياة اليومية							
صرت قادرا على إدارة مهامي المصرفية بشكل فعال أكثر عبر تفعيل الخدمات المصرفية عبر الهاتف							
أصبح بإمكاني توفير الوقت والجهد من خلال تفعيل الخدمات المصرفية عبر الهاتف							
أجد أن تفعيل الخدمات المصرفية عبر الهاتف مفيد بشكل عام							
أجد أن تأدية الخدمات المصرفية عبر الهاتف أمر سهل							
تفاعلي مع مواقع الخدمات المصرفية عبر الهاتف واضح ومفهوم							
تأدية الخدمات المصرفية عبر الهاتف سهل نسبيا							
أصبح إتقان تأدية الخدمات المصرفية أسهل عبر الهاتف							
يعتقد الأشخاص المهمين بالنسبة لي أنه علي تأدية الخدمات المصرفية عبر الهاتف							
يعتقد الأشخاص الذين يؤثرون في سلوكي أنه علي تأدية الخدمات المصرفية عبر الهاتف							
يعتقد الأشخاص الذين يهمني رأيهم أنه علي تأدية الخدمات المصرفية عبر الهاتف							

كل التقارير والمقالات والأخبار في وسائل الإعلام تشجع على تأدية الخدمات المصرفية عبر الهاتف							
لدي المصادر اللازمة لتأدية الخدمات المصرفية عبر الهاتف							
لدي المعرفة اللازمة لتأدية الخدمات المصرفية عبر الهاتف							
مواقع الخدمات المصرفية عبر الهاتف تتوافق مع وسائل تكنولوجيا أخرى أستخدمها							
يمكنني الاستعانة بالآخرين عند مواجهة مصاعب في تأدية الخدمات المصرفية عبر الهاتف							
لا أواجه أية عراقيل عند تأدية الخدمات المصرفية عبر الهاتف							
تأدية الخدمات المصرفية عبر الهاتف أمر مسل							
هناك متعة في تأدية الخدمات المصرفية عبر الهاتف							
استخدام تقنية الخدمات المصرفية عبر الهاتف محمي وآمن							
لا أخشى فقدان معلوماتي الشخصية عند تأدية الخدمات المصرفية عبر الهاتف محمي وآمن							
لا أخشى تصدير موقع الخدمات المصرفية عبر الهاتف لمعلوماتي الشخصية الى طرف ثالث دون موافقتي							
يأخذ موقع تقنية الخدمات المصرفية عبر الهاتف مصالح المستخدمين بعين الاعتبار							
موقع الخدمات المصرفية عبر الهاتف جدير بالثقة							
	1	2	3	4	5	6	7
قيمة الخدمات المصرفية عبر الهاتف جيدة بالنسبة للاسعار الحالية							

قيمة الخدمات المصرفية عبر الهاتف عالية							
تكاليف الخدمات المصرفية عبر الهاتف معتدلة							
لا أحتاج الى مساعدة الاخرين عند تأدية الخدمات المصرفية عبر الهاتف							
لدي الوقت الكافي للاستفادة من الخدمات المصرفية عبر الهاتف							
لدي المعلومات والمهارات الكافية المتعلقة بالخدمات المصرفية عبر الهاتف							
يمكنني تأدية مهامي المصرفية عبر الهاتف بنفسي الى حد ما							
اصبح استخدام الخدمات المصرفية عبر الهاتف عادة لدي							
لقد أدمنت استخدام الخدمات المصرفية عبر الهاتف							
يجب ان استخدم الانترنت عبر الهاتف المحمول							
يجب ان استخدم الخدمات المصرفية عبر الهاتف							
أنوي الاستمرار في استخدام الخدمات المصرفية عبر الهاتف							
سوف استخدم الخدمات المصرفية عبر الهاتف دائما خلال حياتي اليومية							
أخطط للاستفادة من الخدمات المصرفية عبر الهاتف في كثير من الأحيان							
الخدمات المصرفية عبر الهاتف خالية من الشوائب							
تتم إدارة موقع الخدمات المصرفية بشكل جيد، وفيه دائما أجدد التحديثات							
موقع الخدمات المصرفية عبر الهاتف مدعوم بخدمة العملاء الفورية							
بشكل عام، يرضي موقع الخدمات المصرفية عبر الهاتف توقعاتي							
لدى موقع الخدمات المصرفية عبر الهاتف كل الخدمات والقدرات التي اتوقعها							

أنا راض عن سرعة تحميل الصفحات الالكترونية والصور في الموقع							
واجهة الوصل بين المستخدم والموقع تراعي المعايير العالمية							
انا راض عن مواقع الخدمات المصرفية عبر الهاتف بشكل عام							
يتضمن الموقع المعلومات اللازمة لاحتياجاتي							
يزودني الموقع بمضمون ومعلومات منظمة							
يوفر الموقع المضمون والمعلومات الضرورية							
تدوين المعلومات الخاصة والشخصية عند تأدية الخدمات المصرفية عبر الهاتف قد لا يكون آمنا							
أخشى الاستخدام الخاطئ لمعلوماتي الشخصية عند تأدية الخدمات المصرفية عبر الهاتف							
أخشى أن يتمكن طرف آخر من الولوج الى حسابي عند تأدية الخدمات المصرفية عبر الهاتف							
أخشى أن يتمكن طرف آخر من الولوج الى حسابي في حال سرقة هاتفي أو فقدانه							
لا أستخدم الخدمات المصرفية عبر الهاتف لمخاوف أمنية							
لا أعتقد بأن موقع الخدمات المصرفية عبر الهاتف لديه إجراءات أمنية كافية							
أخشى نقل الأموال عبر الخدمات المصرفية عبر الهاتف في حال تمت قرصنة حسابي							
يوفر لي البنك سهولة انتقاء كلمة سر قوية							

Appendix E: Measurement Items

Measurement Items

Item (by variable)		source
Performance Expectancy (PE)		
PE1	I find mobile banking useful in my daily life	Venkatesh et al. (2003, 2012)
PE2	I am able to manage my banking tasks more effectively using Mobile banking	Venkatesh et al. (2003, 2012)
PE3	I am able to save considerable time and effort using Mobile banking	Venkatesh et al. (2003, 2012)
PE4	Overall, I find Internet banking very useful	Venkatesh et al. (2003, 2012)
Effort Expectancy (EE)		
EE1	I find mobile banking easy to use.	Venkatesh et al. (2003, 2012)
EE2	My interaction with mobile banking website is clear and understandable.	Venkatesh et al. (2003, 2012)
EE3	Using mobile banking services is relatively easy	Venkatesh et al. (2003, 2012)
EE4	It is easy for me to become skilful at using mobile banking website.	Venkatesh et al. (2003, 2012)
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 behaviour think I should use mobile banking services.	Venkatesh et al. (2012)
SI3	People whose opinion is valuable to me prefer that I use mobile banking services.	Venkatesh et al. (2012)
SI4	Media is full of reports, articles and news suggesting using mobile banking services is a good idea	Venkatesh et al. (2012)
Facilitating Conditions (FC)		
FC1	I have the resources necessary to use mobile banking services	Venkatesh et al. (2003, 2012)
FC2	I have the knowledge necessary to use mobile banking services	Venkatesh et al. (2003, 2012))
FC3	Mobile banking website is compatible with other technologies I use	Venkatesh et al. (2003, 2012)
FC4	I can get help from others when I have difficulties using mobile banking services	Venkatesh et al. (2003, 2012)
FC5	There are no compatibility problems related to the mobile banking services I use	Venkatesh et al. (2003, 2012)
Hedonic Motivation (HM)		
HM1	Using mobile banking services is fun	Venkatesh et al. (2012)
HM2	Using mobile banking services is enjoyable.	Venkatesh et al. (2012)
HM3	Using mobile banking services is entertaining.	Venkatesh et al. (2012)
Price Value (PV)		

PV1	At the current price, mobile banking provides a good value	(Venkatesh et al., 2012) Alalwan et al (2016)
PV2	Mobile banking is a good value for the money	(Venkatesh et al., 2012) Alalwan et al (2016)
PV3	Mobile banking is reasonably priced	(Venkatesh et al., 2012) Alalwan et al (2016)
Habit (HB)		
HB1	The use of mobile banking has become a habit for me	Venkatesh et al. (2012)
HB2	I am addicted to using mobile banking	Venkatesh et al. (2012)
HB3	I must use mobile banking	Venkatesh et al. (2012)
HB4	Using mobile banking has become natural to me	Venkatesh et al. (2012)
Behavioural Intention (BI)		
BI1	I intend to continue using mobile banking in the future	Venkatesh et al. (2003, 2012)
BI2	I will always try to use mobile banking in my daily life	Venkatesh et al. (2003, 2012)
BI3	I plan to continue to use mobile banking frequently	Venkatesh et al. (2003, 2012)
Service quality (SRVQ)		
SRVQ1	The mobile banking services are error free	DeLone and McLean (2004); Sohail and Shaikh (2008);
SRVQ2	The mobile banking site is managed well and up to date	DeLone and McLean (2004); Sohail and Shaikh (2008);
SRVQ3	The mobile banking site is supported by prompt 24/7 customer service	DeLone and McLean (2004); Sohail and Shaikh (2008);
SRVQ4	Overall, the mobile banking site satisfies my expectations	DeLone and McLean (2004); Sohail and Shaikh (2008);
System Quality (SYQ)		
SYQ1	The mobile banking website has all the functions and capabilities I expect it to have	DeLone and McLean (2004); Sohail and Shaikh (2008);
SYQ2	I am satisfied with how quickly the mobile banking website loads pages and images	DeLone and McLean (2004); Sohail and Shaikh (2008);
SYQ3	The user interface of mobile banking website measures up to global standard	DeLone and McLean (2004); Sohail and Shaikh (2008);
SYQ4	Overall, I am satisfied with mobile banking websites	DeLone and McLean (2004); Sohail and Shaikh (2008);
Information Quality (INQ)		
INQ1	Mobile banking website provides information that is relevant to my needs	DeLone and McLean (2004); Sohail and Shaikh (2008);
INQ2	Mobile banking website provides me with organized content and information	DeLone and McLean (2004); Sohail and Shaikh (2008);
INQ3	Mobile banking website provides up to date content and information	DeLone and McLean (2004); Sohail and Shaikh (2008);

INQ4	Mobile banking website provides required content and information	DeLone and McLean (2004); Sohail and Shaikh (2008);
Trust (TR)		
TR1	Using mobile banking is safe and secured	Sharma et al. (2016);
TR2	I am not concerned about misuse of my personal information while using mobile banking.	Sharma et al. (2016);
TR3	I believe that mobile banking site will not share my information to third party without permission	Sharma et al. (2016);
TR4	The mobile banking site keeps customer's best interests in mind	Sharma et al. (2016);
TR5	The mobile banking site is trustworthy	Sharma et al. (2016);
Perceived Privacy (PP)		
PP1	Providing personal privacy information over mobile banking may not be safe	Yu (2012); Daniel and Jonathan (2013)
PP2	I am afraid of the misuse of personal information when using mobile banking	Yu (2012); Daniel and Jonathan (2013)
PP3	I am afraid that someone could access my account when using mobile banking	Yu (2012); Daniel and Jonathan (2013)
PP4	I am worried that if my phone was lost or stolen someone could access my mobile banking	Yu (2012); Daniel and Jonathan (2013)
Perceived Security (PS)		
PS1	Security concerns prevents me from using mobile banking	Yu (2012); Daniel and Jonathan (2013)
PS2	I don't believe that mobile banking has enough security layers	Yu (2012); Daniel and Jonathan (2013)
PS3	I am worried about transferring money through mobile banking in case someone hacks my account	Yu (2012); Daniel and Jonathan (2013)
PS4	My bank provides me the facility of choosing a strong password	Yu (2012); Daniel and Jonathan (2013)

Appendix F: Hypothesis Results

Path	Hypothesis	Supported/rejected
PE->BI	H1a	Supported
	H1b	Supported
EE->BI	H2a	Rejected
	H2b	Rejected
SI->BI	H3a	Rejected
	H3b	Rejected
FC->BI	H4a	Supported
	H4b	Rejected
FC->USE	H4c	Supported
	H4d	Rejected
HM->BI	H5a	Rejected
	H5b	Rejected
HM->PE	H5c	Supported
	H5d	Supported
PV->BI	H6a	Rejected
	H6b	Supported
HB->BI	H7a	Supported
	H7b	Supported
HB->USE	H7c	Rejected
	H7d	Supported
TR->BI	H8a	Supported
	H8b	Rejected
TR->PE	H8c	Supported
	H8d	Rejected
TR->EE	H8e	Supported
	H8f	Supported
PP->BI	H9a	Rejected
	H9b	Supported

PS->BI	H10a	Supported
	H10b	Supported
SRVQ->BI	H11a	Rejected
	H11b	Supported
SYQ->BI	H12a	Rejected
	H12b	Rejected
SYQ->PE	H12c	Supported
	H12d	Rejected
INQ->BI	H13a	Rejected
	H13b	Rejected
INQ->PE	H13c	Supported
	H13d	Rejected
INQ->EE	H13e	Supported
	H13f	Supported
BI->USE	H14a	Supported
	H14b	Rejected

Age Moderates	Path	Hypothesis	
	PE->BI	H1a1	
		H1b1	
	EE->BI	H2a1	
		H2b1	Younger
	SI->BI	H3a1	
		H3b1	
	FC->BI	H4a1	
		H4b1	
	HM->BI	H5a1	
		H5b1	Younger
	PV->BI	H6a1	
		H6b1	
	HB->BI	H7a1	
		H7b1	Older
	HB->USE	H7c1	Older
		H7d1	
	TR->BI	H8a1	
		H8b1	
	PP->BI	H9a1	
		H9b1	
	PS->BI	H10a1	
		H10b1	
	SRVQ->BI	H11a1	
		H11b1	
	SYQ->BI	H12a1	
		H12b1	
	INQ->BI	H13a1	
		H13b1	
	BI->USE	H14a1	
		H14b1	Older

Gender Moderates			
	PE->BI	H1a2	Female
		H1b2	
	EE->BI	H2a2	Male
		H2b2	
	SI->BI	H3a2	
		H3b2	
	FC->BI	H4a2	Female
		H4b2	
	HM->BI	H5a2	
		H5b2	
	PV->BI	H6a2	Male
		H6b2	
	HB->BI	H7a2	
		H7b2	
	HB->USE	H7c2	Male
		H7d2	
	TR->BI	H8a2	
		H8b2	
	PP->BI	H9a2	
		H9b2	
	PS->BI	H10a2	Female
		H10b2	
	SRVQ->BI	H11a2	
		H11b2	
	SYQ->BI	H12a2	Female
		H12b2	
	INQ->BI	H13a2	
		H13b2	
	BI->USE	H14a2	
		H14b2	

Experience Moderates			
	PE->BI	H1a3	Experienced
		H1b3	
	EE->BI	H2a3	
		H2b3	
	SI->BI	H3a3	
		H3b3	
	FC->BI	H4a3	Less Experienced
		H4b3	
	HM->BI	H5a3	
		H5b3	
	PV->BI	H6a3	Less Experienced
		H6b	
	HB->BI	H7a3	
		H7b3	
	HB->USE	H7c3	Experienced
		H7d3	
	TR->BI	H8a3	
		H8b3	
	PP->BI	H9a3	
		H9b3	
	PS->BI	H10a3	
		H10b3	
	BI->USE	H14a3	Less Experienced
		H14b3	
Education Moderates			
	PE->BI	H1a4	
		H1b4	
	EE->BI	H2a4	
		H2b4	
	PV->BI	H6a4	

		H6b4	
	TR->BI	H8a4	
		H8b4	
	PP->BI	H9a4	
		H9b4	
	PS->BI	H10a4	
		H10b4	
	BI->USE	H14a4	
		H14b4	
Income Moderates			
	PE->BI	H1a5	
		H1b5	Higher Income
	EE->BI	H2a5	
		H2b5	
	FC->BI	H4a5	
		H4b5	
	PV->BI	H6a5	Higher Income
		H6b5	Lower Income
	HB->BI	H7a5	
		H7b5	Equal
	HB->USE	H7c5	Higher Income
		H7d5	
	TR->BI	H8a5	
		H8b5	
	PP->BI	H9a5	
		H9b5	
	PS->BI	H10a5	
		H10b5	
	BI->USE	H14a5	
		H14b5	