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Modelling the usage of mobile banking apps from the perspective of bank customers in Jordan

By

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Dedication

This thesis is dedicated to: my beloved family

This thesis is dedicated to my beloved mother for her endless love and support. Her encouragement was my first motivation to achieve my dream. She is the one who has never left me alone and without her love and support this work would not have been completed.

To my beloved father, who is my countless source of inspiration and guidance. He believed in my ability to achieve my dream. His continued motivation supported my PhD journey.

I also dedicate this thesis to my wonderful brothers and my sister for their support and encouragement. At the end, I dedicate this work to my beloved wife and best friend for her support and inspiration.

Declaration

To certify fulfilment of candidature for the degree of PhD in Business and management

I wish to be a candidate for the PhD degree, in the present academic year. I have followed the prescribed programme for the degree and present to the University a thesis, of which I enclose copies.

I have read and complied with all the University regulations and procedures relating to this research degree.

My supervisor has seen a final draft of my thesis and is aware of its submission for examination.

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Abstract

Mobile banking, M-banking or MB is one of the latest mobile technological booms that allow people to have access to their bank accounts and perform transactions anytime and anywhere. Mobile banking allows bank customers to perform banking services via their portable devices or smart phones, such as: general inquiries, account management, payment of bills, find ATM locations, transferring money and other financial banking transactions. Therefore, such technology enhanced the customer satisfaction and banking services as well; banks have now developed from the traditional branch banking services to e-services, which gives banks' customers more flexibility and convenience to perform transactions.

Nevertheless, the adoption rate of mobile banking technology is not ideal. Despite the large amounts of effort and money being invested, the adoption of electronic banking services in Jordan is not in line with what was expected, and Jordanian banking customers are still slow to adopt these technologies. As it is in the early stages of development and implementation, mobile banking-related concerns and matters have yet to be examined empirically in the Jordanian context. In addition, there is a scarcity of literature addressing customer intention and usage of mobile banking apps by Jordanian banking customers.

The present study aims to identifying the main factors that influence the usage of mobile banking apps by Jordanians and develops a research model based on the Unified Theory of Acceptance and Use of Technology (UTAUT) able to predict and explain the usage behaviour of such technology. Furthermore, this study adds considerable contribution by developing an adapted form of the Unified Theory of Acceptance and Use of Technology (UTAUT) model. This model was able to explain people's usage frequency of mobile banking apps usage in the Jordanian context. In

addition, the current research contributes in extending the literature of UTAUT by adding and examining new factors that influence the usage of mobile banking apps in Jordan. In addition, the current study provides practical implication based on the present empirical results, which will assist both of banks and mobile banking apps developers to enhance such kind of service.

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List of Abbreviations

ANCOVA: Analysis of Covariance

ATM: Automated Teller Machine

AVE: Average Variance Extracted

C-TAM-TPB: Combined Technology Acceptance Model and Theory of Planned Behaviour

EE: Effort Expectancy

FC: Facilitating Conditions

H1: Theoretical Hypothesis Proposed

IDT: Innovation Diffusion Theory

IS: Information System

IT: Information Technology

JOD: Jordanian Dinar

MM: Motivation Model

MPCU: Model of Personal Computer Utilisation

M-money: Mobile money

M-banking: Mobile banking

PBC: Perceived Behavioural Control

PC: Personal Computer

PCA: Principal Component Analysis

PDA: Personal Digital Assistants

PE: Performance Expectancy

PR: Perceived Risk

SCT: Social Cognitive Theory

SPSS: Statistical Package for the Social Sciences

TAM: Technology Acceptance Model

TAM 2: Technology Acceptance Model 2

TAM 3: Technology Acceptance Model 3

TPB: Theory of Planned Behaviour

TRA: Theory of Reasoned Action

UB: Use Behavior

UTAUT: Unified Theory of Acceptance and Use Technology

UTAUT2: Extending the Unified Theory of Acceptance and Use of Technology

WAP: Wireless Application Protocol

Z-Value: Critical Value

α: Cronbach's Alpha

χ2: Chi-Square

Declaration

Some of the material and content contained in this thesis has been published in Journals and conferences as the following:

Journal paper:

- ✓ Al-Tarawneh, J. (2016). Factors influencing the adoption of Mobile banking services in Jordan from the perspective of customers: Overview and Pilot study. International Journal of Scientific and Research Publications (IJSRP), 6(9)

Conference Publication:

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Chapter one: Introduction

1.1 Research background

Jordan is one of the fastest growing countries in the Middle East area in the sector of telecommunications and mobile technology; there are multiple mobile network providers working within the country (Telecommunications Regulatory Commission, 2015; The Gulf Today, 2012). There are 368,938 fixed lines (telephones) with a ratio of 5 phone lines per 100 inhabitants (The world fact book, 2016). Moreover, there are 13.798 million mobile subscriptions, or 170 subscriptions per 100 inhabitants. Mobile telecommunication services have improved and increased recently and digital equipment has been developed, such as microwave radio, coaxial and fibre-optics, which are used to connect lines that help to increase the usage of mobile technologies rather than fixed line services in both urban and rural areas (The world fact book, 2016). Moreover, the publication Internet World Statistics (2016) reported that the number of internet users in Jordan rose from only 127,300 users in December 2000 to 5,700,000 users by the end of June 2016.

Mobile banking is an example of the mobile technological boom. Even though automated teller machines (ATM), telephone, and internet banking offer effective delivery channels for traditional banking products, mobile banking is likely to have significant effects on markets (Laforet et al., 2005).This technology allows people to perform bank transactions anytime and anywhere (Chin, Harris & Brookshire, 2018; Al-Alwan et al., 2017; Al-Tarawneh, 2016; Zhou, 2012). In particular, the rapid growth in the use of smartphones has increased the need for mobile banking services, and requires service providers to include this innovative service with new sets of products, services and applications (apps) designed to expand their clients' access, improve customer loyalty, enhance operational efficiency, increase market share, and provide new jobs (Riquelme & Rios, 2010).

Jordanian banks have recognised a need to enhance customer satisfaction by providing flexible services to customers whenever and wherever they want them (Rehman, 2012). To fulfil this need, banks have attempted to satisfy the requirements for flexibility of customers by the introduction and evolution of mobile banking (Safeena et al., 2011). Mobile banking attempts to solve these issues by enabling customers to be on the move and utilize their devices to perform financial activities without the previous limitations associated with traditional banking or internet banking (Anyasi & Otubu, 2009). Mobile banking allows bank customers to perform banking services via their portable devices or smartphones; examples include: general inquiries, account management, payment of bills, finding ATM locations, transferring money and other traditional banking services (Luarn & Lin, 2005).

Despite the large amounts of effort and money being invested, the adoption of electronic banking services in Jordan is not in line with what was expected and Jordanian banking customers are still slow to adopt these technologies (Alalwan et al., 2017; Al-Tarawneh, 2016). Furthermore, even though the number of mobile subscriptions has surpassed 10 million (Jordan-BuddeComm, 2017), the usage rate of mobile banking services in Jordan is still low and banking customers show little interest and motivation to adopt such technologies (Alalwan et al., 2017; Al-Tarawneh, 2016; Alalwan et al., 2016).

Because it is in the early stages of deployment and implementation, mobile banking-related issues have yet to be examined empirically in the Jordanian context (Alalwan et al., 2017; Al-Tarawneh, 2016; Khraim et al., 2011; Awwad & Ghadi, 2010). Moreover, there is a dearth of literature addressing customer intention and usage of mobile banking by Jordanian banking customers (Awwad & Ghadi, 2010; Khraim et al., 2011; Shammot & Al-Shaikh, 2008). So the present study is devoted to demonstrating the main factors that influence the usage of mobile banking apps by Jordanians and provides a research model able to predict the usage of such technology, as well as enriching the literature of empirical studies in the Jordanian context in this area of research. More details about the contextual background, mobile banking and the country profile of Jordan can be found in the following chapter.

1.2 Problem statement

As mentioned above, the large amounts of effort and money being invested have not resulted in adequate level of the adoption of electronic banking services in Jordan as it is not in line with what was expected to benefit from these technologies (Alalwan et al., 2017; Alalwan et al., 2016; Al-Rfou, 2013). The usage rate of mobile banking services in Jordan is still lower than the expected level and the banks customers show to be less involved and motivated to use this electronic banking channel (Alalwan et al., 2017).

The above-mentioned problem of low usage of mobile banking services by Jordanians may relate to the fact that successful implementation of such technologies is not a simple procedure and involves a large amount of financial and technical investment (Meuter et al., 2005). The Hashemite kingdom of Jordan is one of the fastest growing countries in the Middle East area in the sector of telecommunications and mobile technology; there are multiple mobile network providers working within the country (Telecommunications Regulatory Commission, 2015; The Gulf Today, 2012). For example, this led to a 140% increase in the rate of adoption of mobile devices and landline phone usage and their apps in 2012 (The Jordan Times, 2013).

It would therefore seem that the problem of low usage of mobile banking apps is not related to a lack of advanced technological infrastructure, but may rather be related to the ability of the Jordanian banks to attract and convince their customers to adopt these electronic banking channels. Banking reports, statistics and studies about the notable low usage level of mobile banking has begun to create serious concerns among the banks' managements regarding the feasibility of large technical and financial investments to further develop these kinds of technologies.

In brief, regarding the previously mentioned facts and statistics, the core challenge to implementing successful mobile banking apps is not only

designing and providing these advanced apps, but how to change the negative perceptions and beliefs seemingly held among customers about the usage of this technology. In addition, there is a need to explore how to encourage and educate customers towards the usage of such technology. Therefore, to reach to this level of understanding of how to attract and convince banking customers to adopt such technology, there is a need to study the main factors that influence the adoption of mobile banking in Jordan. As mentioned above, there is a lack of previous studies about this phenomenon, particularly from the perspective of customers and in turn, this creates a necessity to begin studying this problem within the context of the customers.

1.3 Research aim and objectives

In view of the background of mobile banking in Jordan, the research problem is encapsulated in the need to develop a conceptual model applicable in the customers' context, in view of the dearth of previous literature that has studied the usage of mobile banking apps in Jordan. Therefore, the overall aim of this research is twofold: to explore and analyse the factors influencing the usage of mobile banking apps in Jordan; and to develop a conceptual model to predict the adoption of mobile banking apps.

Based on the research aim, two objectives are listed below:

1- To identify the factors that influence bank customers' acceptance and usage of mobile banking apps from the perspective of customers.

2- To develop and test a conceptual model in terms of predicting the adoption of mobile banking apps in Jordan.

1.4 Research questions

The following are the research questions that attempt to address the research aim and objectives:

1- What are the situated factors which may influence the usage of mobile banking apps by Jordanians, from the perspective of bank customers?

2- What is the capability of the proposed conceptual model to predict the usage behaviour of mobile banking apps by Jordanians?

1.5 Research significance

The significance of this research is represented by its concentration on the main factors that influence the usage of mobile banking apps in Jordan. Such factors relate to psychological, social and technical fields and provide deep understanding about the adoption of mobile banking technology in Jordan. In addition, the research findings could be applied to other developing countries and particularly the Arabian countries, as these countries share with Jordan many of the same features of race, culture, religion, language, etc. Moreover, in the Jordanian context, there have been no previous studies that have focused specifically on mobile banking apps, so the current study can be considered as the initiator of this research direction to focus mainly on the usage of mobile banking apps in the Jordanian context from a customer perspective.

The current research is expected to be significant because it will provide broad theoretical integration between the mobile banking area with other closely related areas of the literature on information systems, such as self-service technology, internet/online banking, e-learning, e-healthcare systems, etc. Furthermore, the present study researches the most prevalent factors that influence the acceptance and use of electronic banking services in Jordan, such as internet banking and mobile banking. Likewise, the current study reflects its significance by providing practical implications to services providers (Jordanian banks). These implications are derived from the empirical results of the current study. Such practical implications may enable the Jordanian banks to develop a deeper understanding of the factors that affect the adoption/usage of mobile banking apps. Thus, the current research provides banking services with suggested solutions and practical recommendations to purposely apply as

a means of enabling them to enhance their services' quality and to avoid any potential non-feasible investment in developing and updating such technology.

1.6 Thesis structure

The current thesis consists of eight chapters, including the present chapter. The researcher adopted the methodology developed by Phillips and Pugh (2000). Therefore, the thesis is divided into four main categories: background theory (chapters 2 and 3); focal theory (chapter 4); data theory (chapters 5 and 6); and research contribution (chapters 7 and 8). A summary of each chapter is provided below:

Chapter 2: This chapter explains the research background, a definitions of online and mobile banking as well as providing the definitions and comparisons among the types of mobile banking and focuses on the mobile banking apps that are to be targeted in the present research. Moreover, strengths and weaknesses of each type has been illustrated, as well as justifying the selection of mobile banking apps for this research. This chapter also introduces the country of study (Jordan) through its country profile details, and presents the current level of the ICT sector in the country. Moreover, this chapter provides a brief overview about related technologies in Jordan. Furthermore, some researches' empirical results about the technology acceptance and particularly about the usage and adoption of mobile-banking services in Jordan have been shown as well.

Chapter 3: This chapter reviews the main theories and models in the field of technology acceptance. These theories has been critically reviewed and compared in light of the current research aim. Multiple constructs across these theories and models has been reviewed in purpose of developing the research's conceptual model (see Chapter 4) by extracting and capturing the main constructs that selected for this study. Furthermore, it has been rationalised the selection of the research theory which is the UTAUT. In addition, three main constructs of UTAUT (PE, EE and SI) have been selected to be added to the conceptual model as explained the following chapter. Furthermore, this chapter

mentioned some aspects related to the methodologies and research approaches that used in the previous studies in the field of technology acceptance.

Chapter 4: This chapter develops a model to predict the use of mobile banking among customers in Jordan. This model is designed to be as an adapted form of the UTAUT model (Venkatesh et al., 2003). Venkatesh's model has been considered as a foundation upon which to build a theoretical model, because it has been justified to be the most suitable of the existing models/theories within the technology acceptance field of study. During construct analyses and mapping, the following external factors were discovered: mobile performance risk, quality of apps, security risk and transactional risk. All such factors were subsequently implemented into the current research's conceptual model, alongside other UTAUT constructs such as performance expectancy, effort expectancy and social influence. It is worth mentioning that findings from the pilot study have been used to extract the aforementioned external factors. As a result, nine research hypotheses have been developed based on key causal relationships within the theoretical model.

Chapter 5: This chapter provides a comprehensive overview about the methodological context that followed during this research. Explanations and justifications have been detailed among this chapter's sections. This chapter introduces clear insights about the research paradigm and the methodology that was adopted to study the usage of mobile banking apps by Jordanian customers. An inclusive comparison has been conducted among research's epistemologies and ontologies to critically review and evaluate every aspect in purpose to justify the selection of positivism and quantitative research approaches. It has been explained clearly why such an approach is the most appropriate for the current research to develop, validate and examine the research's conceptual model. Furthermore, this chapter critically reviewed the research methods that are commonly used in the field of technology acceptance such as Survey and Interview, as well as providing rational justification behind the selection to conduct the field survey to be the current research's method.

Furthermore, the related aspects of the field survey was explained such as the research population, sampling frame, sampling technique, sample size and the research's data collection method. Therefore, the researcher rationalised the applying of non-probability sampling to access the targeted sample of mobile banking apps users in Jordan. Subsequently, the researcher provided a discussion and justification about the selection of electronic questionnaire as the most suitable and feasible research instrument to collect the data of this student self-funded study. Moreover, this chapter explains the steps of development and design of the research's instrument.

The processes of formatting, wording, organising and modifying the instrument's questions detailed in the chapter, in addition the stage of translating the questionnaire into Arabic language using the back translation techniques has been explained. Likewise, the stages of pre-testing and piloting the questionnaire have been illustrated and summarized the results of the pilot study and explained the validity and reliability of such results in purpose to modify the main survey. Finally, a brief illustration about the data analysis stage and the analysis methods has been summarised. In addition, the ethical considerations have been explained and how the researcher has treated the ethical issues such as: privacy and safety and the guarantee the anonymity of the participation in this research and protect the respondent's data securely.

Chapter 6: This chapter presents and analyses the data that were gathered by the current study's survey. Such data has been gathered with the purpose of measuring the main factors that affect the usage of mobile banking apps by Jordanian customers. This chapter started by initial procedures of data analysis such as manipulating the issues of response rate, treatment of missing data, normality and reliability. Such basic analysis was used to assess the consistency of data in addition to preparing the data for further analysis, such as factor analysis and regression.

Furthermore, a factor validity test (factor analysis) was conducted. The technique of principal components analysis was used and in turn it revealed that each of the first five dimensions, namely: Performance Expectancy, Effort

expectancy, Social Influence, Mobile performance Risk, and Mobile Application Quality, were unique factors that comprised a unity, and for all of them the factor analysis suggested that the intended concepts were measured well. On the other hand, a new factor was extracted from each of two factors (Security risk and Transactional risk), namely this factor was Technology-Related-Anxiety.

In addition, descriptive analysis revealed the main statistics about the demographic profiles of the survey's respondents as well as the rates of the usage frequencies of the users of mobile banking apps in Jordan. Moreover, this chapter provides statistical information about the main factors of the conceptual model of the current research, these kinds of statistics have been further illustrated and summarized in the tables and figures listed among the chapter. Such descriptive analysis clarifies any potential ambiguity with the purpose of conducting some examination prior the regression analysis.

The multiple linear regression analysis was employed to test the model and revealed that some factors had a significant influence upon the usage of mobile banking apps in Jordan (Performance Expectancy, App Quality, and Technology-related Anxiety and Transactional risk). However, four other factors showed an insignificant effect upon the usage of such apps (Effort Expectancy, Social Influence, Mobile Performance Risk and Security Risk). Furthermore, the moderator (screen size) of the devices was tested to establish if it had a significant moderating effect upon some main factors toward the usage, which showed that there was no noteworthy influence of such a moderator to change the perceptions of users about the usage frequency of mobile banking apps.

Chapter 7: This chapter discusses the main results that have been gathered from the survey's respondents. Such empirical results have been displayed and presented in the previous chapter in form of figures and tables. This chapter discusses the results of construct measurements, including the demographic profiles of the survey's respondents followed by illustrating the reliability analysis of the main constructs. Moreover, the factorial validity of the scales

has been discussed in depth and this chapter provides an illustration and justifications about the factor analysis results. In addition, it justifies the results of extracting a new factor, which is technology related anxiety and which has been extracted from previous two factors (security risk, transactional risk). Furthermore, there is an in-depth discussion of the research hypotheses. Therefore, the conceptual model was validated in the current study after conducting multiple linear regression. The descriptive results of both the demographic variables and the conceptual model main factors have been discussed and related to previous studies.

In conclusion, mobile banking app quality factor was the most significant factor that influences the usage of such apps, followed by performance expectancy technology, related anxiety and transactional risk. On the other hand, the factors of effort expectancy, mobile performance risk, security risk and social influence were all revealed to have no significant influence on the usage of the mobile banking apps, as the results of multiple linear regression analysis revealed. This chapter provides an integrated model to predict the usage of mobile banking apps by Jordanian customers.

Chapter8: The current chapter presents an overview, main conclusions and the contributions about the content and findings of the main chapters that covered the current thesis. Therefore, this chapter provides an overview of the previous chapters and main conclusions that accredited during the current research. Moreover, the chapter clarifies the main contributions that achieved by this research as well as categorises the contributions into theoretical contributions and practical implementations. Furthermore, the research aim, objectives and questions achieved and answered through the research conclusions and contributions.

Furthermore, this chapter spotlights the main limitations and obstacles that met the current research. Finally, the future research ideas and directions suggested by the author to add more empirical and theoretical contribution to the knowledge in the area of the adoption of the mobile banking in Jordan.

1.7 Chapter summary

This chapter provides an overview about the mobile banking and its type and uses. In addition, it presents some statistics and information about the usage of mobile banking services in Jordan. It explains the overall aim of the current research and lists the related objectives to achieve study's aim. Furthermore, the research questions are provided in this chapter in light of the overall aim of this study and to address the research objectives as well. Moreover, the research problem explained in the current chapter as well as presents the research significance. Finally, this chapter provides a summary of the thesis chapters to give a clear image about the current study.

Chapter Two: Contextual Background: Mobile banking and Jordan

2.1 Introduction

This chapter explains and defines the online and mobile banking main concepts such as mobile banking overview, definitions of mobile banking, mobile banking and internet banking, mobile banking versus mobile money and mobile payments and mobile banking types. Also provides comparisons among the types of mobile banking and focuses on the mobile banking apps that are to be targeted in the present research. Moreover, strengths and weaknesses of each type have been illustrated, as well as justifying the selection of mobile banking apps for this research. This chapter also introduces the country of study (Jordan) through its country profile details, and presents the current level of the ICT sector in the country. Moreover, this chapter provides a brief overview about related technologies in Jordan. In addition, some empirical results about the technology acceptance have been reviewed and particularly about the usage and adoption of mobile-banking services in Jordan.

2.2 Section 1: Mobile Banking Background

2.2.1 Mobile banking overview

Mobile banking services were first introduced to customers in Finland in 1992. Finnish banks enabled their customers to perform financial transactions and pay bills using their mobile phones. Since that time, mobile banking services have been structured to follow specific standards of wireless services and have created a new global trend for using banking services through mobile devices (Natarajan, Balasubramanian & Kasilingam, 2018; Barnes & Corbitt, 2003). New technological solutions have changed how customers interact with their shopping, payments and banking. For example, customers have several alternatives to pay for their purchase such as paying by traditional (contact/contactless) credit card, online payment, or mobile devices, all of which are a result of the rapid development in innovations of banking and payment methods (Capgemini, 2016).These days, smartphones are a key technological device and many activities have been developed in many countries through the use of smartphones and their apps (eMarketer, 2014).

Mobile banking (M-banking) is one of the latest mobile technological booms. While banks offer many effective channels to deliver their banking services, such as automated teller machines (ATM), tele-banking and internet banking, they are still seeking better efficiency to improve the quality of their services by allowing people to have access to their bank accounts and perform transactions anytime and anywhere (Zhou, 2012). Mobile banking, as the latest delivery channel established by banks in many countries across the world, is likely to have a significant effect on the market (Safeena et al., 2012).

Elwork and Gutkin (Natarajan, Balasubramanian & Kasilingam, 2018; 1985) found that computers have a significant impact on both societies and sciences. Despite the sophistication of computers, there are still several challenges of technology. Information solutions have emerged because of rapid global growth of the internet, and regarding the good accessibility to this technology, the lifestyle of people has been affected by internet services. The internet has been widely used and adopted in different sectors such as commerce, banking, learning, etc. For example e-commerce has come to be an accepted channel for selling and buying products and services online, and it has been expanded within different practices and procedures of business, which has resulted in the general development of technological solutions in the banking sector (Akturan & Tezcan, 2012; Zhou, Lu & Wang, 2010).

This advance in delivering services has led banks to introduce services like internet banking, which achieve the customers' demands. However, the lack of mobility in the use of internet banking became a main concern for users as they had to use only local area network (LAN) or WI-FI connections to access internet banking, in addition to which they needed to be on a personal computer (PC) such as a desktop or laptop to do their transactions. Therefore, the banks found there was still a need to enhance customer satisfaction by providing flexible services to customers whenever and wherever they wanted them (Rahmani, 2012). To fulfil this need banks attempted to satisfy the mobility requirements of customers by the introduction and evolution of mobile banking.

As mentioned previously, Anyasi and Otubu (2009) claimed that mobile banking attempted to solve these issues by enabling customers to be on the move and utilize their devices to perform the financial activities they need without the previous limits associated with traditional banking or internet banking. Mobile banking allows bank customers to perform banking services via their portable devices or smart phones, such as: general inquiries, account management, payment of bills, find ATM locations, transferring money and other traditional banking services, as shown in table 2.1 (Luarn and Lin, 2005). This enhanced customer satisfaction and banking services as well; banks have now developed from the traditional branch banking services to e-services, which give banks' customers more flexibility and convenience to perform transactions (Infosys, 2009; Rahmani, 2012). Another reason for the introduction of mobile banking services is the need of banks to reduce the operational costs of traditional banking services by depending on e-channels such as internet banking and mobile banking rather than traditional banking services, which require more staff, branches, and the costs of an ATM infrastructure (Yaqub et al., 2013).

Table 2.1: Main M-banking services

Transactional services	Non-transactional services
Bill payments	Balance enquiry
Peer-to-peer payments	Mini-bank statement
Fund transfers	PIN change
Remittance	Check book request
Shopping and donations	Due alerts for payments
Mobile balance top-up	Locate ATMs

Source: Shaikh and Karjaluoto (2015)

Therefore, it is obvious that the use of Mobile devices for performing banking transactions is useful for both customers and banks. This enhances the relationship between the banks and their customers (Laukkanen, 2007). However, despite the majority of banks around the world offering M-banking services, and despite the prevalent adoption of mobile devices, such as smartphones, the usage rate of mobile banking is still low, and this is one of the main reasons behind this research (Febraban, 2015; Akturan & Tezcan, 2012; Zhou, 2012; Zhou et al., 2010).

According to a report by Berg Insight (2010) "the worldwide number of users of mobile banking and related services is forecasted to grow from 55 million users in 2009 at a compound annual growth rate (CAGR) of 59.2 percent to reach 894 million users in 2015". Other media reports such as Juniper Research (2017) have shown that more than 1 billion people are estimated to use mobile banking universally by 2017, but that number represents only 15% of the global mobile subscriptions (International Telecommunication Union, 2011). In addition, around half of mobile subscribers remain with limited access to traditional banking services, as the next table 2.2 reveals.

Table2.2 Mobile banking users.

M-banking users		
Global population	7.100 billion	100%
Mobile phone subscription	6.835 billion	96%
M-banking accounts/users	0.590 billion	8.6%

In Jordan, the banking sector is a competitive market, and Jordanian banks focus on providing M-banking services to their customers. About 15 banks out of 26 had introduced M-banking services by the end of 2012 (Migdadi, 2012). Despite the great efforts and investments, the adoption rate of M-banking by Jordanians is still low. Statistics provided by some banks in Jordan (for example, Arab Bank and HSBC) indicates that only 1.65% of bank customers have adopted M-banking (Awwad & Ghadi, 2010). Therefore, it is important to investigate the factors that affect the adoption rate of M-banking in Jordan; otherwise any additional efforts and investments in this sector will be unsuccessful with regard to the majority of bank customers adopting this technology to use it as a channel to perform their banking transactions (Mallat et al., 2004). Analysing the factors or limitations that may slow down the adoption of M-banking could help the banks to enhance the adoption rate, which could achieve an anticipated return of their investments. M-banking in Jordan is still in the stage of deployment and implementation; therefore, there are some related issues that need to be studied empirically within the Jordanian context (Awwad & Ghadi, 2010; Khraim et al., 2011). For that reason, this study aims to investigate factors influencing the acceptance of M-banking by Jordanian customers.

2.3 Definitions of Mobile banking

The banking industry has gone through several worldwide renovations over the years and, besides the introduction of new solutions, products and services, the use of information technology in banks has changed the way a number of processes are executed. It has also provided banks, and their customers, with new solutions, such as automated teller machines (ATM), point of sale (POS) terminals and online banking, which improve customer accessibility, service delivery and banking processes (Tiwari & Buse, 2007). These cashless payment solutions benefits both of bank and its customers, who incur lower costs compared to traditional manual banking services as they became computerized, offering higher efficiency and accuracy. Bank customers have also benefitted

from the adoption of E-banking, saving more time and effort as they no longer need to be physically present in a bank queue to perform a range of banking transactions, such as cash withdrawals or bill payments (Mattila et al., 2003).

Banks' competitive plans to innovate have continued to utilize the latest technological advancements and gave a rise to the beginning of M-banking, which emerged by the end of the 1990s, when both the German Company Paybox and Deutsche Bank launched the first M-banking service. Initially, it was installed and tested mostly in European countries: Austria, Spain, Germany, Sweden, and the United Kingdom and then spread among developing countries (Shaikh & Karjaluoto, 2015).Veijalainenet al. (2006) claim the main reason behind the rapid growth of the acceptance of mobile devices is the accessibility they offer to access services and use apps whenever and wherever bank customers want, including while travelling around.

There are several terms to refer to mobile banking, including mobile banking (Liu et al., 2009), m-finance, m-payments (Donner and Tellez, 2008), branchless banking (Ivatury & Mas, 2008), or pocket banking (Amin et al., 2006). As an important element of electronic banking, m-banking is considered an alternate delivery channel of the most common transactional and non-transactional services, as mentioned before in Table 2.1. Mobile banking refers to an electronic solution provided by banks to give customers more flexibility to perform basic banking transactions through mobile devices without a need to be physically in the bank branch (Suoranta, 2003).

According to Segun (2011), mobile banking means the use of mobile devices by customers through a mobile wireless telecommunication network to access their bank accounts and perform transactions. Akpan (2009) provides another definition of mobile banking as an extra dimension of mobile commerce (M-commerce), where customers can perform banking transactions virtually through mobile devices without the barriers of time, distance, cost or effort of being in the physical branch. Laukkanen, (2007), Gu et al. (2009), provide further definitions which are very similar to those explained above.

Researchers commonly define mobile banking as an application of mobile commerce that helps customers to access their bank accounts through mobile devices to perform transactions such as checking account balances, transferring funds, or making payments, (e.g., Alafeef et al., 2012; Lee and Chung, 2009). Others define M-banking as an innovation that creates a communication channel between the customer and the bank through a portable device (Shaikh & Karjaluoto, 2015; Akturan & Tezcan, 2012; Shih et al., 2010).

2.4 Mobile banking and internet banking

Banking is one of the key sectors that invest in employing technological solutions such as internet and mobile to enhance the services they provide to their customers. Consequently, their service delivery has also been changed. The continuous development of e-banking services by using various electronic channels has created opportunities to provide new added value for customers. Numerous service innovations have been provided for customers by internet and mobile technologies, these multifarious services are becoming progressively more important for banks trying to create a competitive advantage, retain their customers, and reduce costs (Laukkanen, 2016). Internet and mobile banking services offer bank customers unlimited remote access by improving the accessibility to their account balances and perform transactions wherever and whenever the user might need it, this leads to improved customer satisfaction with their banking affairs in both internet (Jayawardhena & Foley, 2000) and mobile banking.

While these service innovations appear to be similar, and despite M-banking sharing many of the features of internet banking such as accessibility, convenience and saving time and effort, historically their adoption patterns are radically different (Laukkanen, 2016). For example, Finland, which is considered to be a leading country in the adoption of internet banking, has an 86% adoption rate of internet banking usage (Eurostat, 2014), but the usage rate of M-banking is still around 11% (TNS Gallup, 2012). Conversely, M-banking experts have predicted a higher adoption rate of the service because around 30% of the world's bank customers have an interest in adopting this service sooner

or later. This suggests that potential opportunities for significant growth still remain (see Shaikh & Karjaluoto, 2015).

Internet banking was first introduced in the United States in 1995, after which it spread to other developed countries, and lately it has grown to be global. Pew Research (2013) approximations indicate the use of internet banking has increased steadily among internet users in the last decade.

Figure 2.1 Global percentages of internet users who used online banking, 2000-2013
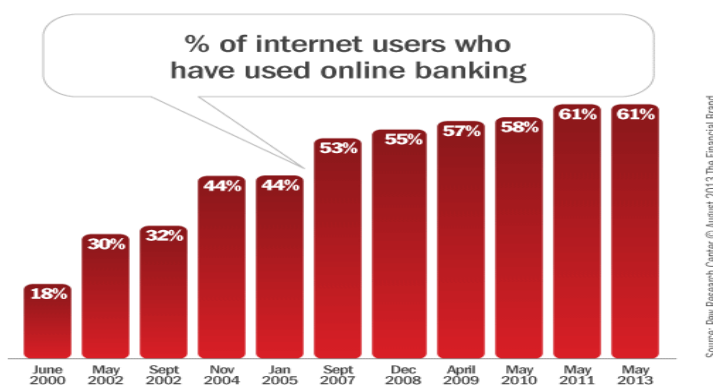
Source: Pew research centre (2013)

International Telecommunication Union (2014) estimated the total number of Internet users in the world to have increased significantly in the previous decade, which explains the increasing number of internet banking users. Previous studies, such as Littler and Melanthiou (2006), have also anticipated a progressive growth in the number of internet banking users worldwide. Although internet banking is widely used and adopted in the western world, its adoption ratio is still low indeveloping countries such as Jordan and other Arabian countries (Eid, 2011; Al-Ghaith et al. 2010).

Figure 2.2 Individuals using the internet, 2001-2014

Individuals using the Internet per 100 inhabitants, 2001-2014

Developed — 78.3
World — 40.4
Developing — 32.4

The developed/developing country classifications are based on the UN M49, see:
http://www.itu.int/en/ITU-D/Statistics/Pages/definitions/regions.aspx.html
Note: * Estimate
Source: ITU World Telecommunication /ICT Indicators database
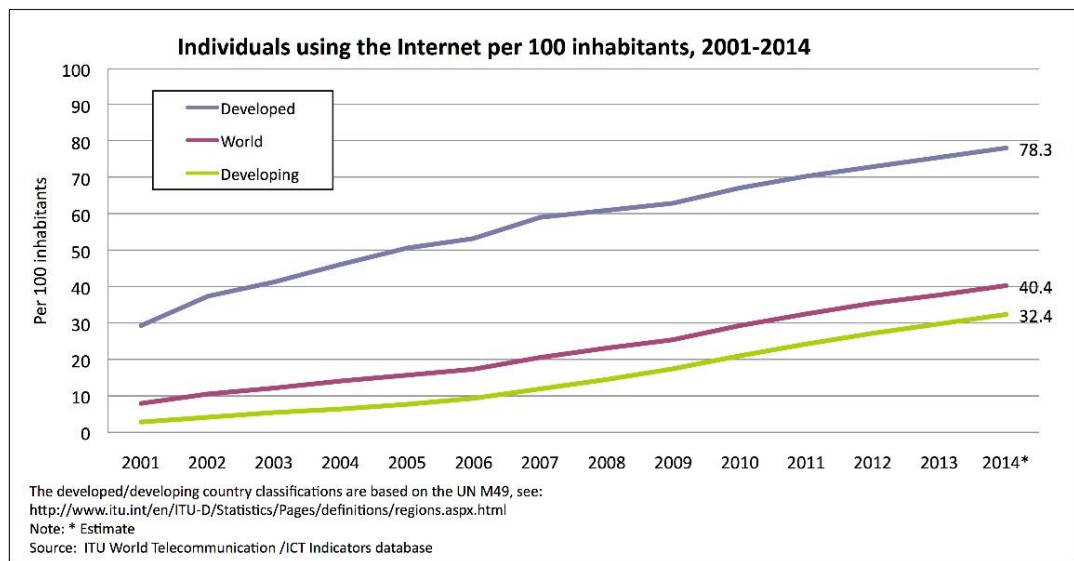
Source: International Telecommunication Union (2014)

The unprecedented changes in the world of internet banking benefit customers in terms of convenience and banks by making it more efficient for them to offer access to banking services to their customers. Many banks these days have started to take initiatives to focus more and more on customers' added value. One example of their initiatives is the execution of customer relationship management systems (CRMS) (Peppard, 2000). The adoption of such systems and electronic services is considered to be a feasible technique of communications between banking service providers and their customers (Rotchanakitumnuai & Speece, 2004).

Banks provide various types of banking services; some provide the option of going into a physical branch or using online services and information, while others offer a "virtual" branch or "Internet only" banking (Huang et al., 2010). There are different forms of online banking, such as web-based, which allow customers access to their account via the internet whenever and wherever they want to use it, whereas others provide customers with banking services through a particular server to access their accounts, which is known as extranet, a direct connection between the bank and its customer.

Thulani et al. (2009) and Yibin (2003) classify internet banking into three functional levels: Information-level, Communication-level and Transaction-level.

➤ Information-level: The level of Internet banking with minimal probability of risk, which banks use to distribute their marketing information by websites viaa separate server connected to the bank's internal network.

➤ Communication/non-transactional level: Bank designed websites allow a limited interaction between the bank's systems and the customer, the website allows the customers to contact the bank to perform some routine non-transactional activities such as: personal information updates, balance inquiries, or loan applications. But it cannot be used for transactional tasks such as transferring funds, paying bills, etc.

➤ Advanced Transactional level: in this level the bank's website allows customers to perform online transactional tasks such as transferring money, paying bills and other transactional tasks.

Clearly, internet banking has developed at an incredible rate; however, there is no proof that usage leads to long-term adoption among clients. Robinson (2000) theorized that 50% of the general population who tried internet banking will in the long run not remain active users due to many barriers such as trust, security, website features, and other determinants (Boateng, Adam, Okoe & Anning-Dorson, 2016), while Safeena, Abdullah and Hema (2010) suggest that internet banking is not as satisfying as it is claimed to be. Additionally, the profound security concerns around internet banking may have contributed to the reluctance of some customers to adopt this technology. Moreover, some customers have concerns about their privacy and security while using online banking because of the possibility of a leak of users' details through web browsers (Joshi et al., 2001).

Around the world banks are increasingly aware of the potential outcomes that internet banking can bring them. For many local banks in developing countries

it could mean moving from a neighbourhood to a worldwide presence (Mavri and Ioannou, 2006). Internet banking permits customers to see their financial balances and different administrations without having the bother of sending faxes, emails, or having phone discussions, among other conventional modes of communication (Thulani et al, 2009; Dube et al., 2009) and fundamentally, the bank can give data to the customers about its services on a website page (Ibrahim et al,, 2006).

Through these services, customers can perform most of their banking transactions, such as exchanges, balance reports and regular payments, without leaving their homes and workplaces (Ndlovu & Sigola, 2013). It is a universal access that can be connected from any computer device worldwide, and an electronic solution that enables customers to perform their banking transactions without the need to visit the banks physically (Thulani et al, 2009).

However, despite the flexibility provided by internet banking, there are still some determinants of its success, one of the main challenges being how to satisfy and retain customers (Bauer et al., 2005). Banks, like other service providers, have become increasingly dependent on technological solutions to enhance their customer satisfaction, improve the quality of the delivery of their services and cut costs at the same time (Farzianpour et al., 2014; Vize et al., 2013; Beheshti et al., 2012; Gounaris et al., 2010; Ibrahim et al., 2006).

Utilizing the internet by merely focusing on cost reduction may enhance the effectiveness of the bank but the potential customer value may be neglected (Jonsson & Gunnarsson, 2005). Hua (2009) mentions also that internet banking has greatly cut costs while there is still a need to maintain or even enhance the quality of customer service. Therefore, the development of service delivery channels should be consistent with customers' behaviour and perceptions, such as their desire to visit the traditional branch less often, being more adaptive to new technologies and more demanding of better service delivery, including 24 hour accessibility (Coelho & Easingwood, 2003).

Bank customers are no longer required to be on a desktop computer to access their accounts, because mobile devices such as smart phones and tablets have ensured that banking services are always available and accessible (Malaquias & Hwang, 2016). Brown, Cajee, Davies and Stroebel (2003) claim that there are great advantages of adopting M-banking over other channels. One advantage is the accessibility, which enables the customers to check their accounts and balances, or perform transactions wherever the user might be, which enhances the customer's satisfaction in terms of controlling and managing their transactions and other financial affairs (Laukkanen & Lauronen, 2005). Another advantage that distinguishes M-banking from other banking channels is the number of mobile devices available to customers, compared with the number of desktops and other devices. M-banking has therefore become the current rising trend in banking services and is more popular than ever among bank customers.

Therefore, it can be seen that performing banking transactions with mobile devices is useful for both customers and banks. This leads to the establishment of a stronger relationship between the banks and their customers (Hanafizadeh, Behboudi, Koshksaray & Tabar, 2014; Laukkanen, 2007).

The increasing growth and diffusion of the use of mobile devices that is enabled by Wireless Application Protocol (WAP) has encouraged the banking sector to deliver their banking services through apps designed for mobile devices (Pousttchi & Schurig, 2004). Mobile banking has seen an increased and accelerated growth in the banking sector (Lin, 2011). M-banking offers a simple way to perform banking tasks through mobile devices that are connected to the bank system through WAP. Without the development of mobile devices and telecommunication networks, M-banking could not exist. The mobile device provides a means of communication to enable customers to interact with banking systems while the telecommunication network provides the channel to send and retrieve queries, information and transactions to or from the bank (Baptista & Oliveira, 2015).

In addition, regarding the increasing growth of the number of mobile devices and mobile users, it has created a new trend of using banking services through mobile devices which became a preferable and attractive option of both

customers and banks in this sector (Lee et al., 2014; Shareef et al., 2014; Lin, 2013; Koenig-Lewis et al., 2010).

2.5 Mobile money, mobile payment and mobile banking

The phrase Mobile money (M-money) is commonly used to describe any financial services that are delivered or conducted by mobile devices (ITU, 2013). Porteous (2006) and Weber and Darbellay (2010) subdivide M-money into two main categories: M-banking and mobile payment (M-payment). The World Bank Group and the International Finance Corporation (IFC), defines M-money as a channel that enables users to access and use money via a mobile phone (Jenkins, 2008).While this research is about M-banking, it is important to distinguish it from M-payment. M-payment enables mobile users to pay their bills or online shopping through a mobile devices that connected with telecommunication networks (Dahlberg, Mallat, Ondrus & Zmijewska, 2006). M-payment utilises the boom of wireless and communication technologies. It enables customers to make payment using mobile devices and via multiple channels such as SMS message, PIN number transmission, mobile WAP, and mobile apps that connected directly to credit cards system through mobile devices (Kim, Mirusmonov & Lee, 2010). Due to its convenience and usefulness over other payment solutions, M-payment has increasingly been adopted by mobile users; also the manufacturers of Smartphones such as Samsung and Apple have lately offered M-payment services for their customers and are available respectively under the name of Samsung Pay and Apple Pay, which have increased both customers' awareness and adoption of M-payment solutions. Despite the useful traits that are offered by M-payment providers, still only half of mobile users actually pay through such devices (de Kerviler, Demoulin & Zidda, 2016).

The development of M-banking started with the use of the interactive voice response (IVR) calling system, which interacts with customers through an automated system (Patel & Marwala, 2008). Later, various technological solutions emerged, especially those which depend closely on mobile devices such as: (1) browser-based or WAP-based M-banking, (2) application-based

M-banking, (3) messaging-based or SMS-banking (Pousttachi & Schurig, 2004; Kim et al., 2009; Alafeef et al., 2012).

M-banking can help bank customers to benefit from banking facilities whenever and wherever they may be (Luarn & Lin, 2005).According to Morgan Stanley research (2015), the usage rate of mobile banking worldwide has exceeded the rate of internet banking. Figure 2.3 shows that after the middle of 2014 the global trend of banking services was towards choosing mobile banking services over the same services accessible via desktops (internet banking). Compared to internet banking, M-banking is safer, cheaper, and easier to use (Lee & Chung, 2009; Laurn & Lin, 2004). Previous studies claimed that the unrestricted access regarding time and location is the key feature affecting the acceptance of mobile technologies and solutions (Carlsson, Walden & Bouwman, 2006; Jarvenpaa & Lang, 2005).

Figure 2.3 Number of global banking users (Millions)
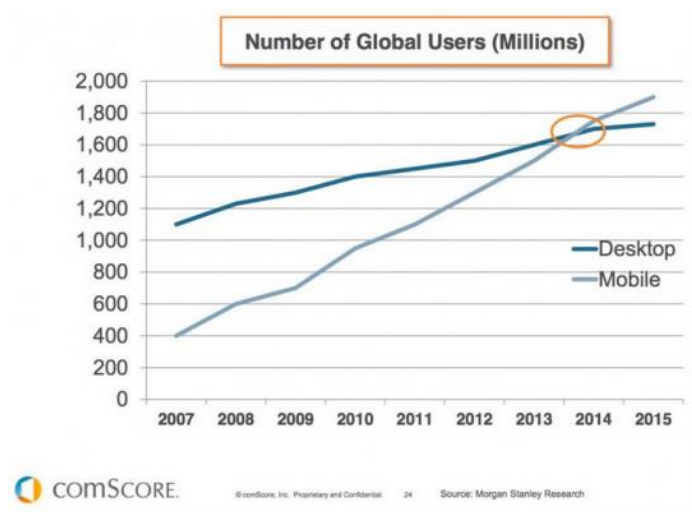
Source: Morgan Stanley research (2015)

2.6 Mobile banking types

Both virtual and electronic technologies are growing rapidly and globally, and have been applied extensively in diverse sectors such as government, business,

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education, gaming, social media and banking (Sarrab, Elbasir & Alnaeli, 2016; Zhang, Zhang, Ordóñez de Pablos & Sun, 2014). In addition to the development of communication technologies, the image of traditional usage of phones has changed. Mobile devices are developed to be smarter and their features have been improved beyond the traditional features of merely a channel of communication (Reynolds, 2008).

Above all, banking solutions that use mobile technologies have enhanced the performance of banks in general and provided their customers with a wide variety of new services by utilising mobility and wireless features. This helps create a new banking environment in which customers are able to access and manage their bank accounts on a 24/7 basis and regardless of their physical location (Hanafizadeh et al., 2014; Alzahrani, Alalwan & Sarrab, 2014; Sarrab, 2014). The use of mobile devices as a banking channel to enhance the banking services is seen as a feasible key solution to overcome some of the current challenges facing customers, bankers, and service providers all together. The utilising of mobile technologies as a banking channel is the most recent approach to serve bank customers and to expand banks services (Hanafizadeh et al., 2014).

Although smartphone apps are widespread, there are three most common mobile solutions, including the apps that are offered by banking providers:
●Short Message Service (SMS)-based services
 ●Mobile browsers (WAP-based M-banking)
●Downloadable apps
In the earlier stages of M-banking, the service was delivered to customers by enabling them to send and receive information to or from their account balances via short message services (SMS). The new era of mobile phones that are supportive and compatible with WAP and Java has created a wide variety of banking channels via the phone's micro browsers (Mallat, Rossi & Tuunainen, 2004). Figure 2.4 shows the evolution of M-banking.

Figure 2.4: Service and technology evolution of mobile banking

SERVICES

| SMS ALERTS | FUND TRANSFER AND BILL PAYMENTS | PAYMENT SERVICES | LOAN REQUEST AND OTHER REQUESTS |

EVOLUTION

| SMS TECHNOLOGY | WAP TECHNOLOGY | MOBILE BANKING WEB PAGES | MOBILE BANKING APPLICATIONS |

TECHNOLOGY
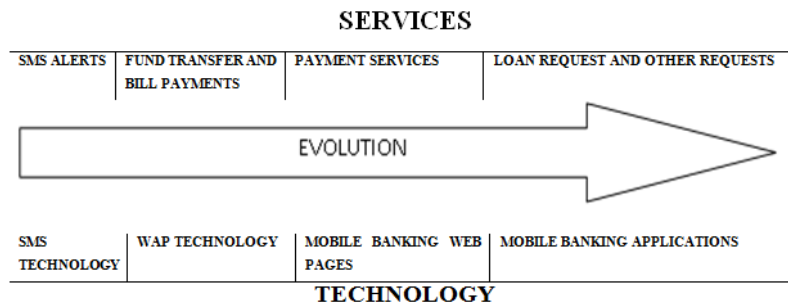
Source: Infosys, (2009)

2.6.1 SMS-based mobile banking:

Sillence and Baber (2004) claimed that text messages were the most common method used for one-to-one communication between friends, but banks realised that there were vast potential benefits in SMS for performing banking transactions, and establishing new communication channels with customers.

SMS-based M-banking solutions were offered to customers to meet the need to perform routine and simple tasks such as checking their account balances, sending enquiries and browsing their recent account activities by sending or receiving SMS messages on their mobile devices (Dube et al., 2011; Rotimi et al., 2007). This need was met through the use of SMS innovation, which enabled mobile devices to send and retrieve financial information from banking providers through a mobile network in a push and pull mode (Dube et al, 2011). The push mode enables customers to send keywords and predefined information included in SMS messages to make a request or enquiry to their financial institutions, such as account details, account balance, and other banking activities. Meanwhile, the pull mode responds to the customer's request by enabling them to receive replies as SMSs, answering their requests and enquiries to the provider of the banking services after validating their registered mobile numbers and credential details (Dube et al., 2011).

SMS banking services have been widely accepted by bank customers as they offer a convenient and effective way to provide simple banking services to

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customers and they have become pervasive as they are compatible with almost every type of mobile phone. Both customers and banks have benefited from SMS banking, which has led to increased adoption of this technology by users as they have started to use SMS banking to perform simple transactions; consequently banks have reduced their operational costs in terms of physical branches and ATMs (Rotimi et al., 2007).

However, there are some drawbacks to this technology, such as security exposure to hacking due to the lack of automatic encryption when messages are transmitted (Pousttchi & Schurig, 2004) and there is a possibility of such technology that M-banking users can become under the risk of fraud by receiving fake SMS messages (Chandran, 2014). In addition, the number of characters is limited on text messages, and they lack a particular graphical user interface to simplify complex banking services in the same way as the features that exist in WAP and USSD technologies, which have helped to overcome and improve the adoption of such technologies that deliver banking services through graphical interfaces on mobile devices (Rotimi et al., 2007).

2.6.2 Web-based mobile banking

The growing use and acceptance of smartphones is due to the distinctive features and technologies provided by these devices. Among other unique features of smartphones, they enable customers to browse web pages through a specialised mobile web browser with enhanced capabilities on their mobile device (Reynolds, 2008). As a result, bank customers nowadays are able to reach and manage their bank accounts with no need to use their desktop computers, as almost all mobile devices and tablets are presently within reach (Veríssimo, 2016). Some statistics provided by ComScore (2011) show that the time spent by mobile users who browsed their phones via mobile browsers in the US, Europe and Japan was 36.4%, 28.8% and 55.4% respectively out of the total time of mobile usage, which helped in estimating the usefulness and popularity of browsing websites through mobile browsers (Fazal-e-Amin, 2015).

Based on that it has created a new trend in both smartphone manufacturing and website development to offer smartphones with web browsers and establish websites that are compatible with mobile browsing (Fazal-e-Amin, 2015). In order to create more integrity and compatibility between WAP and web sites, the web server hosts such WAP site which is a worldwide standard for providing the content of internet-based data to wireless devices such as smartphones and PDAs to enhance the value of the customers' services using similar transmission protocol (hypertext transport protocol, known as HTTP) (Barnes & Corbitt, 2003).

Web-based M-banking allowed M-banking providers to utilise the WAP technology to enable customers to use their mobile phones to access their bank accounts through secure web pages dedicated to performing banking transactions (Mallat et al., 2004). WAP technology on mobile phones has enabled users to perform activities similar to internet banking on a computer such as viewing transactions, transferring funds and other financial transactions (Teo & Pok, 2003; Upadhyaya, 2002). Moreover, the addition of these features has further reduced operational costs as customers no longer have to visit branches and use cheques to pay their bills or manage the funds in their accounts. They can now perform all these tasks with their mobile phones. In addition to the previous benefits there is no need to purchase or download any particular apps to access the bank account (Mallat et al., 2004).

Even though the previous features and traits provided by web-based M-banking technology there are still some weaknesses of such technology, for example, from the perspective of security and privacy experts the users of web browsers still under the risk of some privacy and security issues (Garfinkel et al., 1997). For example, Joshi et al. (2001) claims that some information could be collected about the device user and about device itself such as login details and device name or number, in addition to other privacy-related issues such as cookies which is kind of data saved on the user's device in purpose of collecting some private/personal information about user and exchange it between the web browser and website. Also the web-based M-banking websites it is not easy to navigate as in SMS or App based M-banking solutions, as customers required

to perform more clicking and scrolling to complete their transactions, which resulted in discouraging the users to adopt both of this technology and its interrelated services (Infosys, 2009). As a result of these discomforts of using WAP-based M-banking, the banks and other financial institutions took into their considerations other technologies and solutions to introduce their M-banking services to their customers with more convenience and to enhance their customers satisfaction about the service. One of the alternative solutions of WAP was the M-banking apps which allow M-banking providers, marketers and advertisers to benefit from some unique functionalities that are already offered by mobile apps (Pentina et al., 2016). There is further explanation about M-banking application in the following section.

2.6.3 Application based mobile banking

Both personal computers (PCs) and mobile devices have been used alongside each other to perform or execute certain tasks or processes, but due to the increased penetration of mobile devices in various spheres of life in the past few years, and also because of the great quantum leap of the mobile device from was being only used as a tool of the voice transition and then became related to many of life activities such as social networking, multi-media exchange, business transactions and entertainment, so services providers have new demand to develop specific mobile apps software to satisfy the requirements and needs of the currents mobile users (Pentina, Zhang, Bata & Chen, 2016; TechCrunch, 2014)

Mobile apps in general are software applications designed to perform a particular process or action and tailored to be consistent with the uses and features of handheld devices, such as tablets, PDAs or smartphones.These mobile apps could be pre-installed as a part of the device operating system itself that installed by the manufacturers, or could be installed by the mobile users who need such software applications (Kim & Baek, 2018; Hayikader, AbdHadi & Ibrahim, 2016; Fenu & Pau, 2015).

In the early stage of developing mobile apps, they had been designed basically for general, routine activities such as calendar, e-mail, weather, and stock market information (Hsiao, Chang & Tang, 2016), but as a result of the development and availability of mobile technologies there is increasing public demand to establish more mobile-based functions such as social apps, games, order-tracking, location-based services and banking. The growing and widespread use of smartphones has resulted in the extensive adoption of mobile apps, and increased the number of people who are familiar with using such technology (Mohd Suki & Mohd Suki, 2017; Hsiao et al., 2016). Mobile apps are usually classified into two main categories, based on their core functions: in one category are utilitarian apps such as business scheduling, order-tracking, stock trading, translators and banking; and the other category comprises hedonic apps such as downloadable images/music apps, games, chatting apps, social media apps (Kim & Hwang, 2012).

Nowadays, many businesses among diverse industries adopt mobile apps when they provide their services because of the exclusive benefits they could gain by using these apps such as better customer service, more specific targeting of customers, and enhancing the customer relationship management (Pentina et al., 2016; IAB, 2015). These apps offer new features and information that are required by services providers, such as identifying the user's location, preferences, gender, age, and other personal data, which could be straightforwardly collected through the access that is given by the mobile user to such apps after agreeing the apps licences when they download them on their mobile devices. For example, some apps require access to some of the mobile features such as GPS, camera, storage, etc. (Pentina et al., 2016).

Banking sector like other industries is investing to enhance the mobility of their services, and the expected return of this investment resulted in various forms such as better customer loyalty, attracting new customers and retaining the current customers, which helped banks in achieving extra revenue and reducing some costs and saving cost and effort for customers as well (Fenu & Pau, 2015). Banks around the world employed the ubiquity of smartphones and tablets, to enable their customers to manage and access their bank accounts with no need

to use desktop computers as the smartphones and tablets are convenient and could allow them to manage their accounts whenever and wherever by offering many services through both of mobile and web application channels, and providing new mobile payment methods (Fenu & Pau, 2015).

The increased usage of Mobile apps has led to further research into the adoption and use of M-banking apps. Moreover, the expanding availability of smartphones and tablets has extended the need for new M-banking solutions (Veríssimo, 2016). According to a study conducted by Mapa research (2012), over than third of banks websites have mobile device detection feature that could redirect the mobile users who visited or browsed some banks' websites to an app store to download a specific M-banking app or redirecting to an M-banking specialised web pages. However, some tasks can be performed on apps using specific features that are only found on mobile devices, other tasks are only available on the desktop web, but anyway the fact is that using mobile apps is more convenient because of the ubiquity and portability of mobile devices (Fenu & Pau, 2015).

However, the utilisation of such apps to perform banking transactions by bank customers is still less than expected (Shaikh & Karjaluoto, 2015).While banks investing highly in such apps to enhance the customer value and consider the customers' satisfaction is the main target of their business strategies, this creates a need to recognise how M-banking will add value to the customers. Also there is a real need to study all the factors that enhance it from the perspectives of bank customers (Veríssimo, 2016). This research focus on the adoption of M-banking apps, whichcan be considered as an utilitarian apps from the perspective of bank customers who use such apps, because many previous studies have investigated the general context of mobile apps in both of the utilitarian and hedonic categories, as described above, others have explained the differences between these two mobile apps categories (Kim et al., 2014) or concentrated on a particular mobile app as an illustrative contextual investigation; for example, mobile games (Park et al., 2014) and mobile banking apps (Hsiao et al, 2016; Fenu et al., 2015).

As mentioned before, this research focuses on exploring the adoption of mobile banking apps from the perspective of bank customers, and this is justified by two main impulses: firstly, there is a need to distinguish mobile banking apps, which are utilitarian apps, from other, hedonic apps; secondly, there is also a need to distinguish mobile banking apps from other M-banking solutions such as SMS and web-based M-banking, as the majority of previous studies have focused on mobile banking in general, but few researchers have worked on this issue specifically (Veríssimo, 2016; Fenu et al., 2015).

2.7 Section 2: The Jordanian context: ICT and Mobile banking

2.7.1 Jordan: Country profile

Jordan, or formally The Hashemite Kingdom of Jordan (local pronunciation as Al Urdun), is situated at a strategic position in the intersection of the MENA region and near to Europe, Asia, and Africa (Facts about Jordan, 2016). The country was mandated by Britain for 25 years until it gained its independence in 1946. King Hussein ruled the country in the period between 1953-1999 which is most of the history of Jordan, then King Abdallah II (the eldest son of King Hussein) assumed the throne after his father in 1999. The constitution in Jordan is parliamentary with an inherited soverign, and the king assigns the prime minister, who assign the cabinet in consultation with king. This cabinet must have the confirmation of the parliament, elected by popular vote. The national assembly of Jordan consists of two chambers; an upper house that comprises 55 senators, and a House of Representatives that has 130 members elected by the citizens every four years (House of Representatives, 2016).

The legal system of Jordan is a mix of Ottoman Empire law, British common law, French law and Islamic law (The world fact book, 2016). Jordan is a relatively small country of a population of 9.5 million and a 0.83 population growth rate in 2016 (The world fact book, 2016), the population is distributed over an area of 89,341 km² with a density of 107 persons per km². Jordanian citizens forms the 69.4% of the total population, with non-Jordanian people forming more than 30% of the population due to the recent flow of refugees, of whom about half (1.3 Million) are Syrians who came after the Syrian war (Department of Statistics, 2016, "Facts about Jordan", 2016). The population is

realtively homogenous as the majority is Arab (98%), and there is a minority of Circassian (1%), and Armenian (1%). Islam is the official religion of the country as 92% of population are Muslim, with a 6% Christian minority and 2% others (The world fact book, 2016; Department of Statistics, 2016).

The country is considered as 'young' as the median age is 22.3 years and 91.6% of the population is under the age of 54, with 4.46% between 55-64 years and only 3.94 over 65 years old (The world fact book, 2016). The formal language is Arabic and English is the first foreign language and widely understood among inhabitants. Amman is the capital of Jordan and it is the most crowded city in the country and also the country's financial and political centre. Other main cities include Alzarqa'a, Irbid, Aqaba, and Karak (Facts about Jordan, 2016).

Jordan has limited natural resources such as water and gas, also it has no oil, and consequently, the country imports most of its consumables. Jordan's economy is built based on very limited industries and it has been affected negatively by external environment problems happened in the neighbouring area such as in Iraq, Syria and the west bank (The world fact book, 2016; Facts about Jordan, 2016). As a result of having limited natural resources, Jordan has invested in its human resources by improving its educational system and having a focus on development and training of professional jobs. Therefore the literacy ratio among the total population of Jordan for the age 15 and over is 95.4 (The world fact book, 2016).

The health care service in Jordan is one of the best in the Middle East region, with 102 governmental hospitals and 59 private hospitals in addition to 1245 primary healthcare centres. Jordan has a good reputation in surgical operations; for example, the first heart transplant in the Middle East was carried out in the Kingdom in 1987 (Oxford Business Group, 2007).

The Jordanian government has carried out a bundle of economic procedures to reform the economy, such as starting a programme of privatisation of some public organisations to create new competitive opportunities in the market. In

addition to attracting new investment and investing in infrastructure (MOP, 2004), Jordan also signed trade agreements with several international organisations and unions such as Great Arab Free Trade (GAFTA), European union (EU), and the kingdom joined the world trade organisation (WTO) in 2001 (MOITAL, 2008).

Despite the positive economic achievements in Jordan, still there are several challenges, such as the high ratio of the unemployment 13.1% in 2015 and particularly the unemployment rate among youth people of ages (15-24) which was estimated as 29.3% in 2012. There are other challenge as well, a high rate of poverty, which was estimated in 2001 at 14.2% of people are below the poverty line (The world fact book, 2016; Survey of economic and social developments, 2003).

2.8 Jordan: the ICT sector

The Hashemite kingdom of Jordan is one of the fastest growing countries in the Middle East area in the sector of telecommunications and mobile technology; there are multiple mobile network providers working within the country (Telecommunications Regulatory Commission, 2015; The Gulf Today, 2012). This has led to 140% increase in the rate of adoption of mobile devices and landline phone usage and their applications in 2012 (The Jordan Times, 2013). In addition, approximately 55% of the Jordanian population are internet subscribers (The Gulf Today, 2012; The Jordan Times, 2013).

There are 368938 fixed lines (telephones) with a ratio of 5 phone lines per 100 inhabitants, ranking 107th in the world (The world fact book, 2016). In the other hand, there are 13.798 million mobile subscriptions, or 170 subscriptions per 100 inhabitants, ranking the country 81st in the world. Mobile telecommunication services have improved and increased recently and digital equipment has been developed, such as microwave radio, coaxial and fibre-optics, which are used to connect lines that help to increase the usage of mobile technologies rather than fixed line services in both of urban and rural areas (The world fact book, 2016). Recent report revealed by International

Telecommunication Union (2015) shows the information society and the component of measuring ICT index in Jordan detailed in table 2.3 which point toward the long stride that Jordan has achieved in ICT sector during the years between 2002 and 2015.

Table 2.3: Jordan ICT statistics

Fixed telephone subscriptions per 100 inhabitants		Mobile-cellular subscriptions per 100 inhabitants		Households with a computer Percentage		Households with Internet access at home percentage		Individuals using the Internet percentage	
2002	2015	2002	2015	2002	2015	2002	2015	2002	2015
12.8	4.8	23.2	179.4	16.4	47	5.0	75.9	3.1	53.4

ITU Telecommunication/ICT Statistics (2015) ICT Statistics

In 1995, Jordan lunched a telecommunication law which opened the door for all non-fixed line services (wireless) and created competition among the working companies (mobile network providers). Currently, multiple mobile providers are working in the country. Recently the region of Middle East has witnessed a high internet penetration rate (57.4%) which is above the world average of 49.5% (The internet world statistics, 2016) as shown in Figure 2.5

Figure 2.5 internet penetrations in the Middle East, 2016
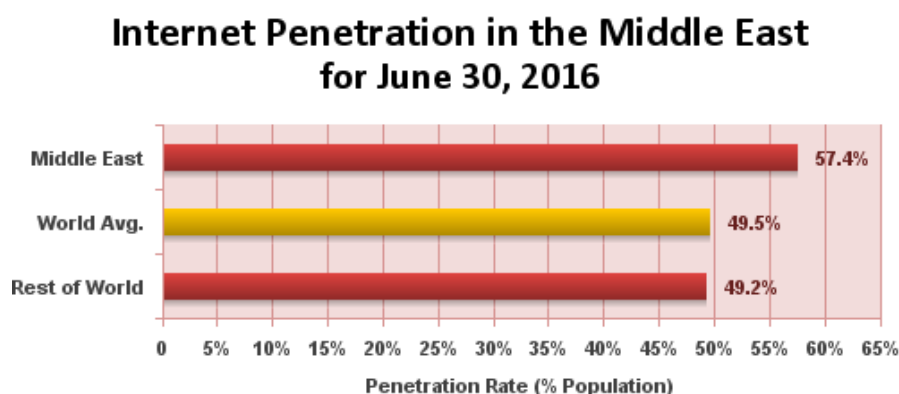
Source: Internet World Stats - www.internetworldstats.com/stats5.htm
141,489,765 Internet users in the Middle East estimated for June 2016
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In addition, approximately 4.5 million of the Jordanians (55%) of the population are internet subscribers (The world fact book, 2015; The Jordan Times, 2013). while recently, The internet world statistics (2016) reported that the number of internet users in Jordan boosted from only 127,300 users in December 2000 to 5,700,000 users by the end of June 2016.

2.9 Mobile banking in Jordan

There is a high competition within the Jordanian banking sector in attracing the customers by offering them the latest services and products. In this regard, the Jordanian banks utilise benefits new technologies such as Self-service technology channels. Almost of the Jordanian banks nowadays offer such self-serice technologies to their customers. (Alalwan et al., 2017; Al-Tarawneh, 2016; Alalwan et al., 2016; Association of Banks in Jordan, 2010; Migdadi, 2012). In addition, large investments have been employed to enhance the electronic banking services (Al-Majali, 2011; Association of Banks in Jordan, 2010; Migdadi, 2012).

Certainly, Jordanian banks invested in such electronic services to reach their customers regardless their place, to cut costs, and to enhance the service quality; which in turn, improves the customer satisfaction and loyalty (Al-Rfou, 2013; Khraim et al., 2011). Still the adoption of electronic banking solutions in Jordan

lower than expected (Alalwan et al., 2017; Alalwan et al., 2016; Al-Majali, 2011; Al-Rfou, 2013; Al-Smadi, 2012).

Along the same lines and based on a recent survey involving 40 bank staff who were specialists in the online transactions section in 16 Jordanian commercial banks, Al-Rfou (2013) has provided statistics demonstrating the lower usage rate of Internet banking in Jordan. A lack of awareness of the existence of Internet banking is reported by 61% of the employees surveyed to be the main barrier to this technology in Jordan (Al-Rfou, 2013). Al-Rfou, (2013) has illustrated that less than 19% of Jordanian banking customers applied for Internet banking services, while less than 21% of customers are actually able to use Internet banking in Jordan. Accordingly, Jordanian banks are concerned at the low adoption rate of this technology by their customers (AbuShanab et al., 2010; Al-Majali, 2011; Al-Rfou, 2013; Al Sukkar and Hasan, 2005).

As stated by Alafeef et al. (2011), 6 % of the Jordanian banking customers have truly used mobile banking services. They moreover stated that 31 % of Jordanian customers have not adequate awareness about the existence of mobile banking services. Gharaibeh et al. 2016 claimed that only 8 % of the Jordanian banking customers have used their banking transactions via mobile banking services. In addition, most banking customers believe that they can do their banking transactions without mobile banking (79%).

As it is in the early stages of deployment and implementation, Mobile banking-related issues are yet to be examined empirically in the Jordanian context (Awwad and Ghadi, 2010; Khraim et al., 2011). Nevertheless, there is a dearth of literature addressing customer intention and usage of Mobile banking by Jordanian banking customers (Awwad and Ghadi, 2010; Khraim et al., 2011; Shammot and Al-Shaikh, 2008). Further studies and research about mobile banking in Jordan is presented in chapter 3.

2.10 Chapter Summary

This chapter explains the research background, a definitions of online and mobile banking as well as providing the definitions and comparisons among the types of mobile banking and focuses on the mobile banking apps that are to be targeted in the present research. Moreover, strengths and weaknesses of each type has been illustrated, as well as justifying the selection of mobile banking apps for this research. This chapter also introduces the country of study (Jordan) through its country profile details, and presents the current level of the ICT sector in the country. Moreover, this chapter provides a brief overview about related technologies in Jordan. Furthermore, some researches' empirical results shown about the technology acceptance and particularly about the usage and adoption of mobile banking services in Jordan.

Chapter 3: Literature Review

3.1 Introduction

This chapter provides theoretical background about the adoption of mobile banking apps by Jordanian customers. In turn, this chapter aims to propose a research model that explains the usage behaviour of such technology by bank customers. Consequently, this chapter begins with section 3.2 a theoretical overview about the technology acceptance theories and models, which includes a review of previous studies related to the adoption and usage of such technology and other similar technologies. Later, on section 3.3 justifying the research theory selection and addresses the reviews and provides clear justifications that support this selection.

3.2 Overview of technology acceptance theories and models

The success of a new system or innovation depends on the extent of acceptance of such new technology among its users. Therefore, there is a need to understand the initial decision that is made by individuals to accept or reject new technologies (Venkatesh et al., 2003). This need of deep understanding about user's acceptance has led to the development of several theories and models that are used to explain and forecast the adoption of new products, systems, innovations, technologies, etc., which help to explain why individuals adopt or reject them. After reviewing the literature related to this field of study, the researcher found there are many models and theories used to examine and explain people's behaviour relating to technology adoption (Benbasat & Barki, 2007; Venkatesh et al., 2012). Moreover, there are some theories in the field of human behaviour, such as the theory of reasoned action (TRA) (Ajzen & Fishbein, 1975) and the theory of planned behaviour (TPB) (Ajzen, 1985) that, while not directly related to technology adoption, have been adapted by researchers to fit the technology adoption sphere (e.g. Shih & Fang, 2006).

Each model has developed over time and each addition is a result of each era of which they are representative. As mentioned before, the Theory of Reasoned Action (TRA)

(Ajzen & Fishbein, 1975), in which psychology was a factor, was essentially developed to predict human behaviour. It was further evolved into the Theory of Planned Behaviour (TPB), (Ajzen, 1985), and later extended to the Decomposed Theory of Planned Behaviour, (DTPB) (Taylor & Todd, 1995). Another example, this time with information systems being a contributory factor, is the Technology Acceptance Model, (TAM) (Davis, 1986), which developed from the Theory of Reasoned Action. TAM further developed into TAM2 (Venkatesh & Davis, 2000) and the Unified Theory of Acceptance and Use of Technology, (UTAUT) (Venkatesh et al., 2003). In addition to these, other combinations of theories and models include Rogers' Diffusion of Innovations, (DOI) (1983), Bandura's Social Cognitive Theory, (SCT) (1989), Deci and Ryan's Motivational Model, (MM) (1985), and Triadis's Model of PC Utilization. Therefore, models that are applied to the acceptance of technology are not necessarily concerned with technology specifically and must also be considered chronologically, as this enables the tracking of how each model evolved and how they are interconnected. The next section will explain the main theories that have been researched by this study to determine and justify the relevant factors that affect the adoption of Mobile bankingby Jordanian banks' customers.

3.2.1 Theory of Reasoned Action (TRA)

This theory was developed in the social science field of social psychology and is the earliest model used to explain technology acceptance. Fishbein and Ajzen's (1975) work focussed on the prediction behaviour undertaken in both laboratory and applied settings and their work was a result of a research programme that began in the latter years of the 1950s. Their aim was to develop a theory that could predict, explain, and influence human behaviour (Ajzen & Fishbein, 1980).

This theory since has been redeveloped and refined as well as put to the test within different disciplines and domains such as consumer behaviour, the industrial sector, education and technology adoption. TRA has been used as base-theory for many models and theories in the fields of human behaviour and technology acceptance such as TPB, TAM, and UTAUT (Davis et al., 1989; Ajzen, 1991; Venkatesh et al., 2003).

This theory focuses on behavioural intention rather than attitude and considers it as the main predictor of behaviour. An individual's behaviour is determined by behavioural intentions, according to TRA, and is the most important factor. Behaviour, and the intention to perform or act on behaviour, is a mixture of attitude towards performance of the behaviour and also subjective norms. The theory is presented as a model in Figure (3.1).

Figure 3.1: Factors determining a person's behaviour
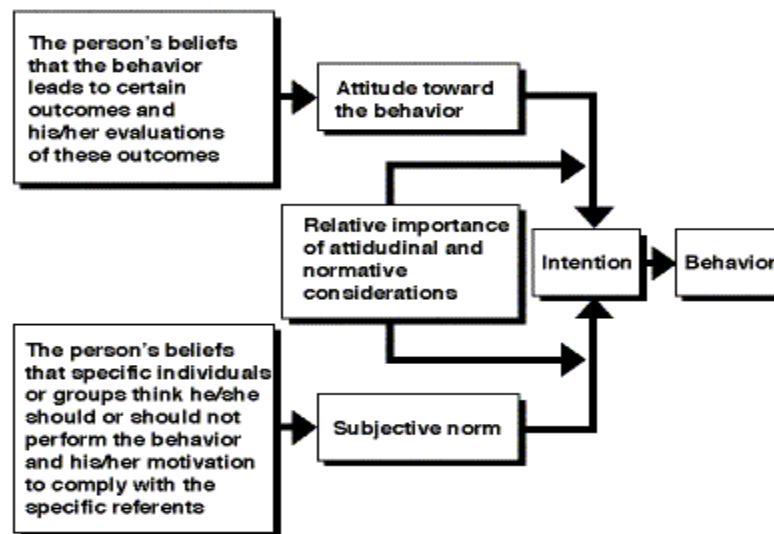
Source: Ajzen & Fishbein (1980, p.8)

If Mobile banking is employed as an example to assume that an individual believes that Mobile banking is risky and non-user-friendly, then according to Ajzen and Fishbien's (1980) model the attitude of this individual is the strength with which they hold their beliefs and that the individual uses subjective probability to determine that Mobile banking is related to the attributes of risk or the quality of being non-user-friendly. In the same way that Subjective Norms refers to the way in which the social environment influences behaviour.

Across the studies and applications of TRA within the context of electronic banking solutions, some researchers have applied TRA to predict customers' adoption of such e-solutions in the banking sector (Al-Majali, 2011; Yousafzai et al., 2010; Shih & Fang,

2006). For example, Shih and Fang' study in 2006 showed results that the TRA explained 46% variance in behavioural intention while only 20% of variance in usage behaviour. However, Wan et al. (2005) claimed that adoption of online banking solutions cannot be clearly explained by TRA. Likewise, Yousafzai et al. (2010) claimed that TRA provided less accurate predictions of users' intention and adoption of online banking comparing with TAM and TPB models; it explained only 37% of variance in intention towards adoption of Internet banking.

There are several criticisms of TRA from different perspectives. For example, Ajzen (1985) realised that TRA was restricted by correspondence, because action, target, context, timeframe and specificity must be in agreement with attitude and intention in order to predict behaviour (Sheppard et al., 1988). The assumption that behaviour is under conscious control is a limitation of the theory, therefore the theory cannot account for any behaviour that is not conscious, such as irrational decisions and habitual actions (Sheppard et al., 1988). Moreover, there are some doubts about the applicability of TRA to explain users' behaviour in the context of technology acceptance (Hale et al., 2002; Davis et al., 1989; Sheppard et al., 1988; Liska, 1984).

3.2.2 Theory of Planned Behaviour (TPB)

Ajzen (1985) put forward the Theory of Planned Behaviour due to the shortcomings of TRA. Ajzen (1985) extended TRA by adding the construct of perceived behavioural control (PBC) as a key factor affects both of behavioural intention and actual behaviour.TPB considers unconscious behaviour that is out of an individual's control and differs from TRA due to the addition of PBC. PBC accounts for behaviour where individuals have less control over their actions in certain situations and includes variables according to the situation and the actions involved (Ajzen, 1991), as shown in Figure 3.2.

TPB examines the originators of attitude, subjective norms and PBC to predict and explain behaviour. It assumes behaviour is a function of beliefs and therefore those beliefs are relevant to that behaviour and are predominant causes of a person's intentions and actions; see Figure (3.2) which depicts the TPB main constructs.

Figure 3.2: Theory of Planned Behaviour
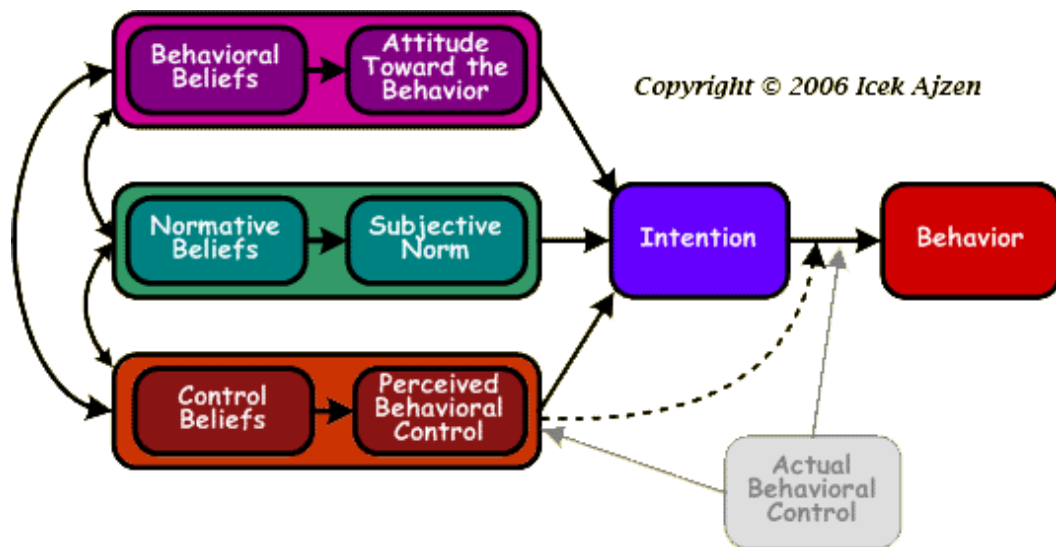
Source: Aizen (2006)

TPB has been adapted and extended by numerous studies to predict the individuals' behavioural intention and actual usage across different technological contexts including banking solutions (Al-Lozi and Papazafeiropoulou, 2012; Lee, 2009; Chen et al., 2009; Choudrie and Dwivedi, 2006). For example, Lee (2009) adapted a theory of planned behaviour to fit with a technology acceptance model (TAM) to explain the adoption of Internet banking, while Chen et al. (2009) proposed TPB alongside with the technology readiness and TAM in a unified combined model to predict the users' satisfaction and continual intention toward using self-service technology.

Yousafzai et al. (2010) compared the prediction power of TPB to TAM, which revealed that TAM was able to predict the behavioural intention by 75% of variance, while TPB explained only 39% of variance to predict the behavioural intention to use Internet banking. Likewise, Shih and Fang (2004) argued that even supposing TPB was capable to sufficiently fit the observed data, the path coefficient analyses showed that the attitude had significant impact over the behavioural intention whereas individuals' behavioural intention was not significantly related with both PBC and subjective norm.

However, TPB is criticised by Taylor and Todd (1995a). They state that both required certain behaviours to be displayed when individuals are motivated to perform them. However, this can be a problem when examining consumer adoption behaviour, in

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addition to the supposition that respondents share an identical belief structure when performing a behaviour. Armitage and Conner (2001) mentioned that despite of the advanced improvements of TPB to modify TRA by including PBC, such limitations have been raised due to the fact that the TBP excepted some important scopes such as personal, motivational and psychological scopes and related factors (Bamberg et al., 2003; Armitage & Conner, 2001; Sparks et al., 1995; and Sparks and Shepphard, 1992).

Other examples of important factors they have not been encompassed in TPB (perceived risk, performance expectancy, perceived usefulness, perceived ease of use, intrinsic motivation, technology readiness,) which, sequentially, raised some concerns about the capability of TPB to provide clear understanding regarding the individual's behavioural intention and actual behaviour toward new innovations and technologies (Chen et al., 2009; Davis et al., 1992; Liao et al., 1999; Taylor and Todd, 1995a; Yousafzai et al., 2010; Venkatesh et al., 2012).

3.2.3 Technology Acceptance Model (TAM)

Davis et al. (1989) developed the Technology Acceptance Model, which was based on the Theory of Reasoned Action. It was developed in order to discover what influences cause people to accept or reject an information technology (Figure 3.3). Davis suggests the most significant individual beliefs about using an information technology are perceived usefulness and perceived ease of use. Perceived usefulness (PU) is defined as "the degree to which a person believes that using a particular system would enhance his or her job performance" (p. 320). The definition of perceived usefulness is based on the expectancy-value model underlying the Theory of Reasoned Action. Perceived ease of use (PEOU) is defined as "the degree to which a person believes that using a particular system would be free of effort" (p. 320). Accordingly, these two behavioural beliefs lead to individual behaviour intention (BI) and actual behaviour. He found that PU was the strongest predictor of an individual's intention to use an information technology.

Figure 3.3: Technology Acceptance Model (TAM)
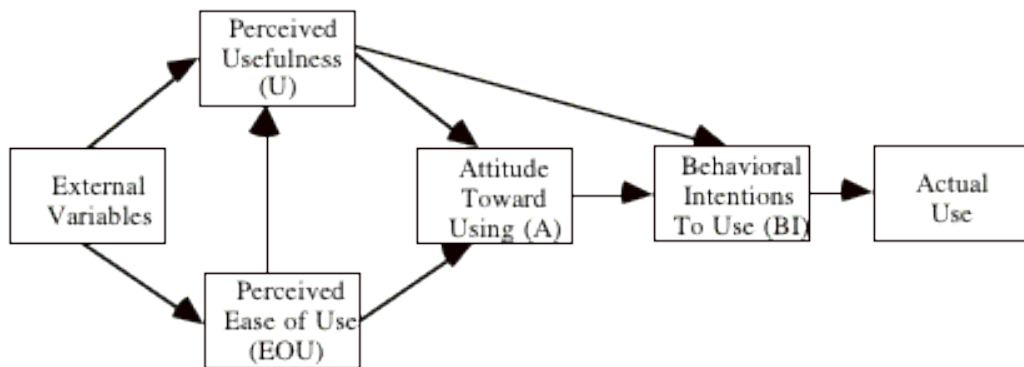
Source: Davis et al. (1989)

However, regarding to empirical evidence, the last version of TAM model exempted the attitude construct because it's weak mediating effect between PEOU and behavioural intention and the relation between PU and BI seemed more significant (Davis et al., 1989). TAM hypothesises that PU is influenced by PEOU because; the ease of the use of particular technology makes it more useful (Davis et al., 1989).

Within this model the set of variables such as design characteristics, objective system, computer self-efficacy, and user involvement in design, training, and the nature of the implementation process are all external variables (Davis, 1996). However, as TAM evolution progressed with new variables were emerged, for example: compatibility, computer anxiety, system quality, enjoyment, experience and computing support (Lee et al., 2003). These are the most referenced variables that affect PU, PEOU, BI and B.

TAM considered as one of the most used and acceptable models within the field of technology acceptance (Eriksson et al., 2005; Venkatesh et al., 2003; Davis and Venkatesh, 1996). By 2010, report published by Google scholar showed that 7,714 citations have been referred for the original TAM model (Bradley, 2012). For example, Venkatesh (2000) worked on a recommended control and adjustment based model as an extension of TAM in order to investigate the causes of PEOU in relation to a particular system. This implied that system specific PEOU are mainly individual difference variables and characteristics of situations that get stronger with understanding. Three

years later, in 2003, Venkatesh et al. developed a model that combined all eight models used to explain technology acceptance behaviour. They called the new model the Unified Theory of Acceptance and Use of Technology (UTAUT) and this is will be discussed later in this chapter.

Moreover, there are many other extensions to TAM such as the model suggested by Sun and Zhang (2006). They proposed ten moderating factors categorised into three groups. The first group was organisational factors, the second technological factors and the third individual moderators such as culture, age, experience and intellect. Their intended model included capricious factors within PU, PEOU and SN as well as the three groups of moderators to be studied within the TAM. It should be noted that TAM has been the most popular model to predict the behavioural intention and usage of customers in such context of self-service technologies (Muñoz-Leiva, Climent-Climent & Liébana-Cabanillas, 2017; Williams et al., 2014; Lin, 2010; Al-Somali et al., 2009; Berger, 2007; Weijters et al., 2007; Curran and Meuter, 2005; Eriksson et al., 2005).

However, PEOU e and PU individually does not have the ability to clearly explain the individual's intention and such actual behaviours to adopt the technology (Lee et al., 2011; Kim and Forsythe, 2009; Eriksson and Nilsson, 2007; Agrawal and Prasad, 1999; Legris et al., 2003; Lu et al., 2009; Schwarz and Chin, 2007). Hence, the TAM has been extended by adding new factors such as perceived risk (Curran and Meuter, 2005), trust (Eriksson et al., 2005) and quality of Internet connection, perceived enjoyment, privacy and security (Pikkarainen et al., 2004). Al-Somali et al. (2009) extended TAM model by including social influences, resistance to change, quality, trust, awareness, and self-efficacy.

3.2.4 Diffusion of Innovation Theory (DOI)

Diffusion of Innovation Theory (DOI) considered one of the most important theories in the field of sociology and has been used within many innovations and inventions in different disciplines to evaluate their spread among the surrounded social system (Rogers, 2003). Rogers (2003, p.11) defines diffusion as "the process by which an innovation is communicated through certain channels over a time among members of the social system." The adoption of a particular innovation is described as: "the process

through which an organisation passes from first knowledge of an innovation, to forming an attitude towards the innovation, to a decision to adopt or reject, to implementation of the new idea" (Rogers 1983, p.21).

Based on the DOI, there are five perceived attributes of an innovation hypnotized to predict the adoption of innovation, as explained in figure 3.6 (Rogers, 2003). According to Rogers these attributes have the ability to explain 49 to 87 percent of variance in predicting the rate of adoption of new innovations. The first of these attributes is relative advantage, which is the scale of perceived attributes of an innovation that displaces another. The second is compatibility, how an innovation is perceived to be well-matched with the values, experience and the needs of the prospective adopters. The third is complexity, how difficult an innovation is perceived to be to understand and use. Trial ability is the fourth perceived attribute, in other words how can an innovation be experimented with on a trial basis before entering into full adoption. Finally, observability or how visible are the results of the innovation. These five attributes are interlinked whilst being individually distinct of each other.

Figure 3.4: Diffusion of innovation theory
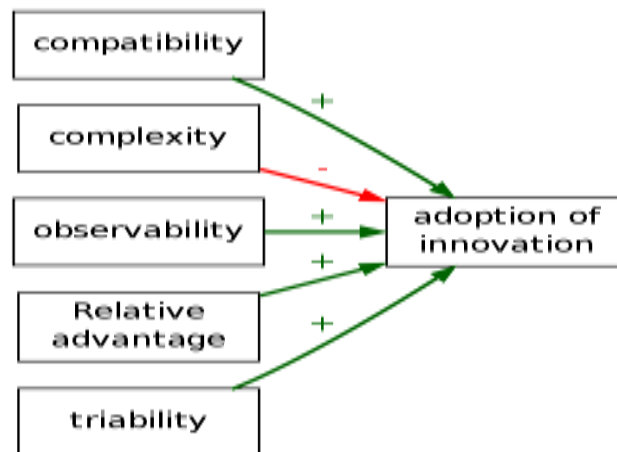
Source: (Rogers, 2003).

There are many previous studies applied or examined the DOI and its validity to predict adoption in terms of technology acceptance (Oni and Papazafeiropoulou, 2012). For example, Tornatzy and Klein (1982) conducted a meta-analysis of 75 studies; they reviewed the characteristics of innovation and theories that were able to predict the

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adoption of innovations. Furthermore, The DOI has been applied in the context of self-service technologies alongside the aforementioned theories such as TRA, TPB, DTPB and TAM or extended by adding new constructs such as social influence, accessibility, confidentiality and technology anxiety (Mallat et al., 2008; Koritos, 2008; Chen and Huang, 2006; Gounaris and Meuter et al., 2005). For example, a model has been developed in the USA based on the DOI by Gounaris and Meuter et al. (2005), they applied this modified model alongside with the characteristics of users/customers to predict their adoption of various types of self-service technologies.

Moreover, Gerrard and Cunningham (2003), which combined the risk within the DOI to predict the adoption of Internet banking services by Singaporean banks' customers. In the same context, Liao et al. (1999) mixed some extracted constructs from the DOI and TPB to examine the adoption of Internet banking services in Hong Kong.

The DOI theory assists in predicting the adoption of an innovation. It does this by attempting to rationalise the decision processes. What the theory fails on is explaining how attitudes progress to make a decision on adoption or rejection and just how innovation characteristics are embedded in the decision process (Chen et al., 2002; Karahanna et al., 1999). Rejection can occur at any stage of the process, as identified by Rogers (2003), and the psychology of the decision process occurs along the Knowledge Reinforcement path. What Rogers failed to do however was explain or examine in totality how innovation attributes influence attitudes? It must be noted at this point that what is useful to one individual or organisation may not be as useful to another, so generalisation of attitudes to innovation will be different for categories of adopters.

Despite of the adoption of applying the DOI to predict the acceptance of innovation in some literature, it also has been criticised in some quarters. For example, Wolfe (1994) claimed that DOI assumes that a single model is able to predict the adoption of diverse types of innovations among different kinds of individuals and contexts. Downs and Mohr (1976) debated that such important details as those related to the required cost and special facilities have been disregarded by the DOI. Addiotionally, Rogers (1976) criticised The DOI as disregarding social factors, such as how a social system could affect or foster the adoption of new innovations.

Despite the different disciplines that TAM and DOI came from there are similarities in the two theories, suggesting that they complement each other (Chen et al., 2002). The PU concept in TAM is considered to be the advantage attribute of an innovation. It is also considered that the complexity attribute has similarities with PEOU within TAM. Social cognitive theory (SCT) is discussed in the next section. SCT in this instance is reliant on concepts introduced by Rogers (2003) focussing on creating changes in individual behaviour.

3.2.5 The Social Cognitive Theory (SCT)

SCT assumes that the way individuals learn is influenced by their thoughts, feelings, and the environmental factors around them (Bandura et al., 1977). SCT focuses mainly on how social learning affects human behaviour and has been widely applied and examined in term of human behaviour by many studies (Bandura, 1986). Furthermore, SCT is often considered a very powerful theory of human behaviour (Beekens, 2011).

SCT has been developed based on 'reciprocal determinism', which means mutual interactions. SCT theorizes there are three main factors: environmental factors, personal factors, and behaviour, as shown in Figure 3.7 (Bandura, 1986). In SCT Bandura introduced concepts such as reciprocal determinants, self-efficacy, as well as his idea that temporal variation (time lapse) could occur between cause and effect. He noted that there was analysis of learning through one's own behaviour before Miller & Dollard's 1941 study on behaviourism, and that finding a connection through reward and punishment systems as well as stimulus and response enabled an explanation mechanism.

Figure 3.5: The social cognitive theory (SCT)
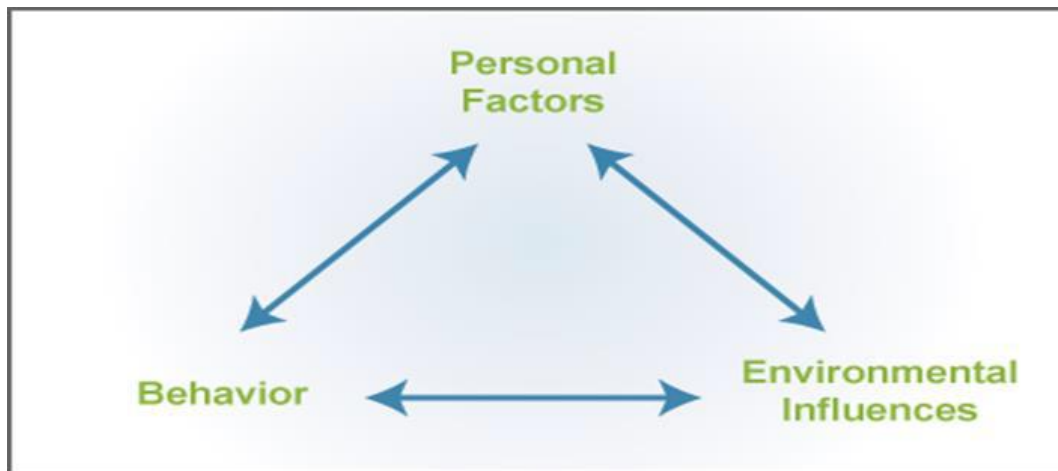
Source: (Bandura, 1986)

One of the key features of SCT is Vicarious Capacity. This involves learning through experience or studying others people's learning ideas in order to develop beliefs about behaviours without needing to display them. This has many advantages, including time management and avoiding mistakes, as experience is gained through observation; therefore, there is no need for trial and error. New patterns of behaviour, cognitive competences and rules regarding new behaviours as well as self-evaluation and standards concerning judgements are all learning models, as stated by Bandura (1989). When it comes to studying individual behaviour SCT is considered a worthy model and is also validated (Igbaria & Iivari, 1995; Compeau & Higgins, 1995a).

Self-efficacy judgement has been researched in how it encourages or dissuades particular behaviours concerning adoption of technologies, especially in the IS/IT field. Self-efficacy and its factors were added to TAM by Igbaria & Iivari (1995) as affecting computer anxiety, TAM constructs (PEOU & PU), and usage of computer technology. The results concluded with other research showed high internal consistency of PEOU & PU measures. The results also reinforced SCT perspective of computing behaviour concerning beliefs and behaviours surrounding self-efficiency and supported Bandura's (1986) conjecture of experience as the most influential determinant of self-efficacy.

TAMs concepts of PEOU and PU were investigated by Chau (2001) to see if there were an influence on behaviour intentions, self-efficacy and computer attitude. Added to the model were self-efficacy and attitude as external variables. However, the extension to TAM found no positive impact on computer attitudes with regards to PEOU and PU. A small negative effect on PU concerning computer self-efficacy was found and no impact on PEOU whatsoever.

There are some The Connexions between SCT and DOI Theory, in reference to Rogers Diffusion of Innovation Theory a chapter on the integration of social cognitive theory and social diffusion theory was written by Bandura in 2006. He states: "Social cognitive theory distinguishes among three separable components in the social diffusion of innovation. This triadic model includes the determinants and mechanisms governing the acquisition of knowledge and skills concerning the innovation; adoption of that innovation in practice; and the social networks through which innovations are promulgated and supported" (Bandura 2006, p 119). The process of social diffusion is varying because, according to Bandura, how knowledge is gained is through advances in communication technologies. Ideas, values and behaviours are now globalised and electronic media has seen observational learning increase as a key tool in innovation diffusion, especially when it was in its infant stages.

3.2.6 The Model of PC Utilization (MPCU)

Triandis (1979) developed a framework to highlight variables that trigger behaviour. He was enthused to do so as there was a lack of agreement amongst disciplines. His framework was relevant for research in all cultures as it contained variables that were general and conceptual. He said that people were influenced by behaviour that had objective consequences stating that perceived consequences were affected by reinforcement twofold. Firstly, because a behaviour has consequences, it alters the perceived probabilities of the said behaviour and secondly the value of the probabilities alters. Within the framework habit, facilitating conditions and prior experience as well as cultural variables are also determinants that have an effect on behaviour and behavioural intentions.

Behaviour has consequences, some of which are only perceived by the individual. Triandis made a distinction between perceived and actual consequences stating the perceived are predictable outcomes whilst actual consequence result after a behaviour has been actioned and can be either desirable or undesirable. Triandis claims that the behaviour-consequence reinforcement sequence is susceptible to changes in what the perceived consequences are and the value they hold, with values being interrelated with a given situation and being open to interpretation with regards to consequence. A person is more likely to connect with behaviour-consequence when consequence is unanticipated. Education, access to resources and complexity of culture are all aspects of the framework that ad the development of behaviour. Triandis (1979) stated that the determinants of behaviour are the attributes of ecology culture-society that determine the attributes of the individual and that attitudes and the values placed on behaviours change in respect of the consequences of a behaviour.

Based on Triandis' theory of human behaviour, Thompson et al. (1991) developed a model to predict the actual behaviour to use personal computers. According to Thompson et al. (1991) make up this model as seen in figure 3.8 of six constructs which are: job-fit, social factors, complexity, facilitating conditions, affect towards use, and long-term consequences. Thompson et al. (1991) theorised a direct relation between individual effect and usage of PC, he assumed that the individual's effect, feeling, or emotion has a direct impact on the usage of PC. Thompson et al. (1991) further proposed the facilitating conditions as a crucial factor to determine the actual usage, which means the required resources and facilities such as the infrastructure, technical support and training to achieve successful use of a particular system.

Figure 3.6: the model of PC Utilization MPCU
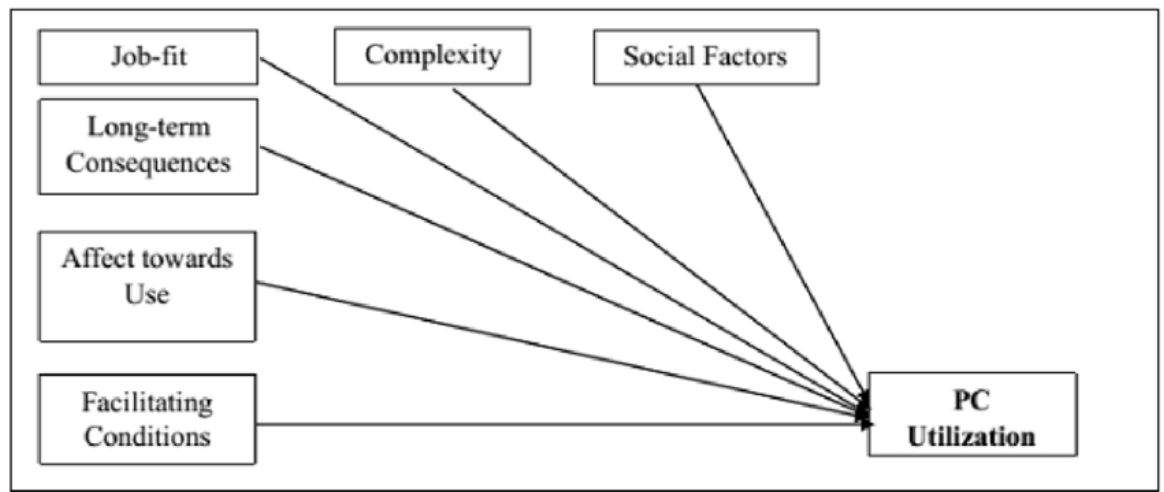
Source: Thompson et al. (1991)

Chang and Cheung (2001) proposed a model based upon Triandis' model targeting the users of internet (www). They replaced the usage with behavioural intention, as they believed that the behaviour is result of the intention.

Chang and Cheung (2001) included three perceived consequences (near-term, long-term and complexity) within Triandis' model. Additionally, they assumed there are a direct linkage between the facilitating conditions and the behavioural intention. They found that the affect toward internet construct has the most significant impact on the behavioural intention to use the Internet www. The second was the social factors followed by near-term consequences and facilitating conditions, while Complexity has a non-significant direct effect on intention; nevertheless, it has an indirect impact on the intention through both of the affect and near-term consequences constructs. These results contradicted with what already found by Cheung et al. (2000) who test the same the suggested extension of Triandis' model.

There study's results showed that totally different, as they found facilitating condition to have the most significant effect on the usage of Internet and www, afterwards social factors while Complexity has a direct negative impact on the usage, in addition to indirect impact through the construct of perceived near-term consequences. However, there are some criticisms and doubts regarding the ability of this model to predict the human behaviour towards other complicated technologies within different contexts (Venkatesh

et al., 2003). Moreover, Chang and Cheung (2001) mentioned that MPCU ignored the role of behavioural intention in spite of its vital role as a key determinant of the actual behaviour and focuses only on the actual behaviour (PC utilisation).

3.2.7 The Motivational Model (MM)

Many of studies in the field of human behaviour consider motivational factors as main determinants among different contexts of individual behaviour (Davis et al., 1992; Vallerand, 1997). There are many theories based on motivation, Deci and Ryan (1985) Self-Determination Theory (SDT) posits that experience of choice is implicated in self-determination. Deci et al. (1991) asserted that STD was able to distinguish between intentional regulation and self-determination and that this set apart SDT from other theories. Actions are controlled, they claimed, when compelled by internal or external forces, whereas motivational actions are set apart as being self-determined as the individual endorses them. This led to divide the motivational factors into two main classifications: intrinsic motivation and extrinsic motivation (Davis et al., 1992; Vallerand, 1997). Intrinsic motivation as defined by Vallerand (1997) is related to internal or intangible rewarding such as the feeling of pleasure or enjoyment, which affect the individuals' behaviour regardless of the expected outcomes of such performance.

In contrast, extrinsic motivation relates to tangential incentives or rewards that motivate the individuals to behave in order to gain prised outcomes such as time saving, and job efficiency (Davis et al., 1992). The difference between being intrinsically motivated and extrinsically motivated and the behaviours they create is that the first involves gaining satisfaction from engaging in a behaviour without any material gain, whereas extrinsically motivated behaviours are actioned as a means to an end, a necessity not through choice (Vallerand and Bissonnette, 1992). In terms of technology acceptance, Davis, Bagozzi and Warshaw (1992) tested the motivational model of technology acceptance. They found that extrinsic and intrinsic motivations were at the forefront of intentional behaviour regarding technology usage. The study was concerned with the use of computers in the workplace. In this instance, the extrinsic motivation was that if the technology was perceived as being useful then it would reap financial rewards and

the intrinsic motivation was the perceived gratification of using this technology irrespective of outcomes.

The results highlighted that perceptions in the first instance concerned job performance, whether using computers would enhance this and the second perception was the experience and the scale of enjoyment from using them. This highlighted that increasing enjoyment of using a computer system that was useful would be affective to acceptance (Davis et al., 1992). Davis et al. (1992) empirically reported that the predictive power of perceived usefulness and enjoyment to predict the behavioural intention was 62 percent and 75 percent of variance respectively. A later study compiled by Venkatsh, Speier and Moris (2002) developed an integrated model of technology acceptance through reanalysing data from the earlier research studies (Venkatesh 1999; Venkatesh and Speier, 1999). The integrated model took the fundamental ideas of technology acceptance and motivational models and examined them at length. This was done through empirically testing the new model with existing models to discover their explanatory power.

The motivational model has been applied by several studies in the context of self-service technologies, these studies discussed the impact of intrinsic and extrinsic motivations upon the behaviour or intention towards adopting some technologies or systems (Lin and Hsieh, 2011; Dabholkar and Lee et al., 2011; Pikkarainen et al., 2004). Despite the fact that both extrinsic and intrinsic motivation contributes significantly within the context of information systems, Davis et al. (1992) highly recommended that there is a need to study other important factors such as the role of adequate facilities and resources, accessibility and technology features as MM neglected the role of such important factors to predict the behavioural intention to use the technology.

3.2.8 The Unified Theory of Acceptance and Use of Technology (UTAUT)

Earlier in this chapter, there has been some brief explanation and discussion of models and theories applied in the context of acceptance of technologies and innovations to explain the main factors that affect the individual's behavioural intention and actual behaviour (Dwivedi et al., 2011; Venkatesh et al., 2003). The researchers in the field of technology acceptance are more likely to choose a favoured model or theory for study

due to the range of choices, and overlook contributions afforded from alternative models as noted by Venkatesh et al. (2003). Venkatesh and colleagues agreed that a fusion of models was required to attain a unified view of users' technology acceptance. They compared the eight principal models TRA, TPB, TAM, combined TAM - TPB, DOI, SCT, MM, and MPCU that have all be used to explain technology acceptance behaviour and as a result, five limitations of pervious comparisons of models was derived from the study.

Firstly, the technologies that had been studied were not complex in nature but were simple and individual in nature and did not include sophisticated technology. Secondly, most of the studies had been completed with students as the sole contributors. A third limitation was that in the majority of studies the time of measurement had been generalised and completed long after acceptance or rejection of a technology, and therefore reactions were outdated. Fourthly, Cross-sectional measurement was prevalent, and the fifth limitation was that it was hard to generalise results as the majority of research had been completed in voluntary circumstance of usage rather than compulsory use.

Venkatesh et al. (2003) compared the eight models empirically in longitudinal field studies within four organisations where new technologies were introduced to individuals. Three different times were used for measurement and were post training; this was measured twice after implementation at the one month and three-month point, and usage behaviour was measured over the entire six-month period of implementation. Each of the eight models were then applied to the data that had been divided by two for compulsory and voluntary conditions. Moderating variables that included experience, voluntariness, age, and gender were studied as they had been expected due to prior research to alter usage decisions. After moderators had been included predictive validity increased across six of the eight models, with the exception of MM and SCT.

Venkatesh et al. (2003) reported their statistical findings after a longitudinal empirical study, it shows that the aforementioned eight models had the prediction power as 17 percent to 53 percent of variance to predict the behavioural intention to use the new systems. They found that the predictive power of these models clod be enhanced by

including some moderating variables through these models (Venkatesh et al., 2003). At that point, UTAUT was applied and examined, and empirically shown 70 percent of variance prediction power as empirically reported by Venkatesh et al. (2003). Venkatesh et al. (2003) proposed three main constructs (performance expectancy, effort expectancy and social influences) as shown in figure 3.8 that directly determine the behavioural intention and two other constructs influence the actual behaviour (usage), which are behavioural intention and facilitating conditions. The relationships between these constructs is shown in Figure 3.8.

Figure 3.7: The Unified Theory of Acceptance and Use of Technology

Source: Venkatesh et al. (2003)

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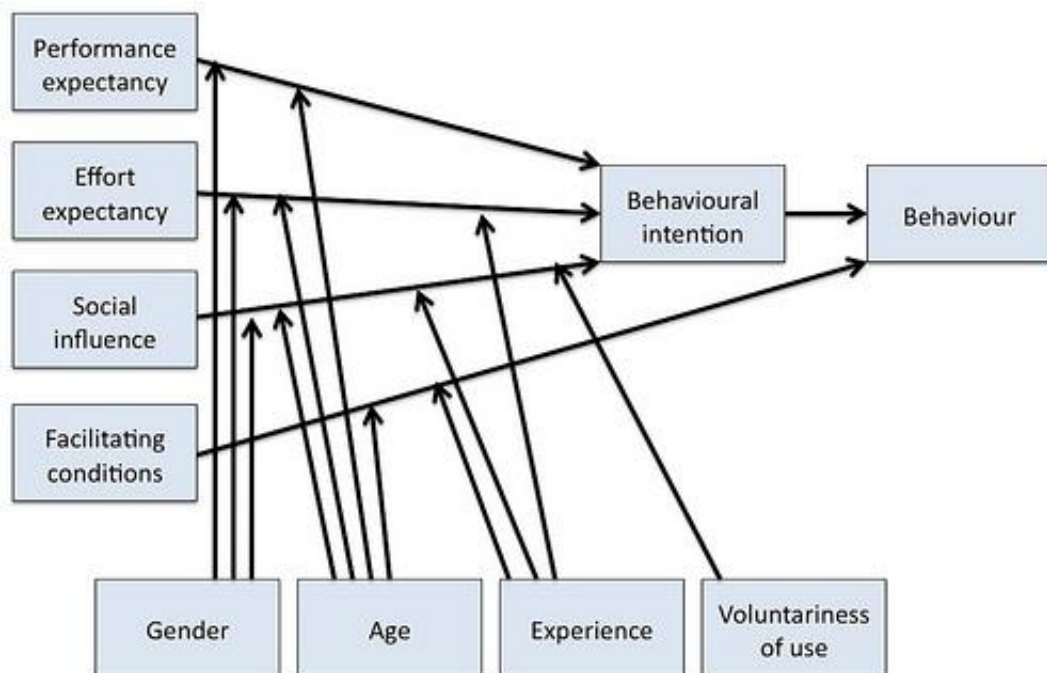
Performance expectancy (PE) is defined as "the degree to which an individual believes that applying the technology will help him or her to attain gains in job performance" (Venkatesh et al., 2003, p. 447). Venkatesh et al. (2003) identified that this construct has been derived from other factors in related theories and models which are: perceived usefulness (TAM and C-TAM-TPB), outcome expectation (SCT), relative advantage (IDT), job fit (MPCU), and extrinsic motivation (MM). Performance expectancy, was the most significant factor to affect the behavioural intention amongst any individual theory within different contexts (Venkatesh et al., 2003).

According Venkatesh et al. (2003, p.450) *effort expectancy* (EE) is defined as the "extent of ease connected with the use of system." EE has been captured from other related factors from existing theories such as ease of use (Moore and Benbasat, 1991), perceived ease of use (Davis et al., 1989; Venkatesh and Davis, 2000) and complexity (Thompson et al., 1991). EE showed significant impact on the behavioural intention within either mandatory or voluntary contexts either at or at mandatory setting. However, Venkatesh et al. (2003) claimed that the role of this factor is limited by the time after the training-stage of the users.

Social influence defined as "the degree to which an individual perceives that others believe he or she should use the new system" (Venkatesh et al., 2003; p.451). Social influence is apprehended from subjective norm in the models of TRA, TAM2, TPB/DTPB and C-TAM-TPB, social factors in MPCU, and image in DOI. Worthwhile to mention that the social influence construct has significant impact on behavioural intention exclusively within mandatory context (Venkatesh et al., 2003).

Facilitating conditions according to UTAUT is "the degree to which an individual believes that an organizational and technical infrastructure exists to support use of the system" (Venkatesh et al., 2003, p.453). The construct of facilitating conditions referred to other different factors: compatibility in DOI, perceived behavioural control in TPB, C-TAM, and, DTPB and facilitating conditions in MPCU. All of these constructs have same influences on the behavioural intention within both of mandatory or voluntary contexts (Venkatesh et al., 2003). However, according to Venkatesh et al. (2003), the impact of facilitating conditions on the behavioural intention could be limited or

insignificant after the training stage. Moreover, Ajzen (1985) and Taylor and Todd (1995a) assumed that facilitating may have direct effect on the actual usage behaviour.

It is worth to mention that there is an extension of the UTAUT which has been extended by venkatesh et al. (2012) by adding three other constructs to the original model of UTAUT (hedonic motivation, price value and habit), this extension is called UTAUT2. Further details about the UTAUT2 later in this chapter.

3.2.8.1 Applicability of the UTAUT Model

The UTAUT model endeavoured to cope with the drawbacks of other models in technology acceptance. Some older technology acceptance models, such as TAM, did not include other important constructs because they sought simplicity during the models' development (Benbasat & Barki, 2007). The development of the UTAUT model was premised on the similarities of the constructs from several existing models, which enhanced this model's ability to explain users' behaviours. This could not have been achieved individually by any older model. This trait of Comprehensiveness has led the UTAUT model to be considered by some researchers in the field of technology acceptance as the benchmark of most predictive models (Weerakkody et al., 2013).

Knutsen (2005) used a subdivision of the UTAUT in order to assess a new mobile service performance and its related factors in order to explain the effects of such factors on customer attitudes towards new mobile services. Effort expectancy, performance expectancy and age as an antecedent to the UTAUT constructs, plus the construct of attitude, were part of the research design. Knutsen (2005) theorised that effort expectancy affected performance expectancy. Again, data was gained in different periods; the first was before the introduction of the trial version and the second after two weeks of the mobile service trial. The results substantiated the relationship that existed between effort expectancy and performance expectancy and attitude; and the relationship of only effort expectancy and performance expectancy.

Effort expectancy and performance expectancy were shown to be strong determinants of attitude displayed concerning new mobile services. Moreover, an increase in age

correlated to concerns regarding ease of use of new services. Age also affected effort expectancy in a negative capacity but it had a positive effect on attitude towards performance expectancy. This, according to Knutsen (2005), showed that older users of mobile services had higher expectations. The eight dominant models had influenced this model's structure due to the similarities they shared. Therefore, the power of UTAUT should not be underestimated simply because published studies utilising it are rare.

Wang and Yang (2005) extended the UTAUT model through the addition of the personal trait construct for research in online stock trading in the financial market. The extension experimented in two ways to identify how personal traits react in the UTAUT model to identify if they are indirect or intervening. Five factors categorised personality (extraversion, conscientiousness, agreeableness, neuroticism, and openness). The traits were said to affect intention in the first design model to adopt online stocking indirectly through UTAUT constructs and in the second model to moderate the effect of UTAUT constructs on intention to adopt online stocking. Internet experience was the only moderator used from the original UTAUT in order to simplify the study. The moderating effect had a high variance of sixty per cent; this led to the argument that personality traits do have a high influence as moderators in comparison to external variables.

The five different personality traits in the first model showed that extraversion affected intention through the four key concepts of UTAUT but that the openness trait affected intention through effort expectancy and the facilitating concept. However, in the second model there was no impact concerning intention to adopt online stocking, with the openness trait as a moderator. The social influence intention relationship was found to be moderated with the trait of agreeableness accompanied by internet experience and had a positive effect. Similarly, the trait of conscientiousness also moderated the social influence-intention relationship; however, not in a positive way. Another moderator found to facilitate the conditions-intention relationship with positive effect was neuroticism with Internet experience.

Li and Kishore (2006) studied the new measurement scale of the UTAUT in order to test for invariances. Their quest was to test whether the key constructs in the UTAUT model were invariant across different population subgroups. They chose web log system

users as their group for research and the subgroups were split according to demographics, including user's gender, user's general computing knowledge, user's specific Web log-related knowledge, user's experience with Web logs, and user's usage frequency of Web logs. They theorised that UTAUT had four main constructs that would not vary across subgroups including gender, low and high computing general knowledge users, users with or without particular Web log knowledge/ experience, and users with low and high frequency use of Web logs.

There were three stages to the data analysis. The first split the data along the lines of demographics, with two balanced groups in each of the dimensions. The second stage involved measuring equivalent-item-factor loadings or measurement of tau-equivalence. This was measured under each dimension and across the two groups. Full equivalence under each dimension was tested and recognised as the third stage of the analysis. Different experience and knowledge amongst users resulted in the same interpretation of effort and performance expectancy. Social influence was not interpreted in the same way, with users having either a high or low frequency of Web log usage. The scores of facilitating conditions with varying levels of web log experience were also not interpreted in the same fashion from the perspective of statistical significance; however, they were compared for computing and Web log knowledge. This statistical significance is not indicative of a large difference in the score of these subgroups, as the authors argued that gender specific statistics showed that they were comparable when looking at effort expectancy and facilitating conditions.

However, Li and Kishore (2006) also stated that this was not the case for performance expectancy and social influence instruments. Caution was stressed in interpreting the results as the instrument relating to the constructs of UTAUT had invariant true scores in most of the subgroups, especially in regards to the acceptance of online web log systems. In order to offer explanation on an individual and mass scale, the UTAUT was applied to advanced mobile services and device adoption. The objective of Carlsson et al. (2006) was to examine the factors affecting the use of mobile devices and services. The effects of attitude toward using mobile devices and services and the effects of anxieties on behavioural intention were examined. Performance expectancy and effort expectancy were found to have a strong effect on intention to use. It was also found that when attitude came into the equation, the effect was reduced, which was indicative that

attitude had an influence on intention to use. Intention was also positively impacted by social influences but appeared unsustainable in all the models and Carlsson et al. stated from their results that anxiety had no impact at all on intention; however, influence was mediated by performance expectancy and social influence.

The fact that attitude when accompanied by effort expectancy and performance expectancy had no impact on intention highlights the assumption made in the original model. Intention to use had a significant and positive direct influence on the actual use of the three mobile services studied. However, the direct effect of intention vanished when the other variables (EE, PE, FC, anxiety, and attitude) were included in the model. Carlsson et al. (2006) argued that results indicated that variables had a significant role in the influence of behavioural intention concerning the use of mobile services. It can now be assumed that behavioural intentions affects usage and are affected by PE, EE, SI, FC, anxiety and attitude. Similarly, there was no direct influence on the use of mobile services through facilitating conditions and no indirect effect concerning behavioural intention. Through incorporating behavioural intention into the model, the effect of variables on the use of mobile services was in fact reduced and this was shown using logistic regression models. There was an exception to this rule: ring tones were part of the study, with FC the independent variable in this study, and effects were not reduced in this case (Carlsson et al., 2006).

The authors had argued from the start that the UTAUT model needed to be either extended or modified in order to explain differences in adoption behaviour concerning mobile devices and services (Carlsson et al., 2006). The results they gained from the study did not support across the board all the cases within the original UTAUT and this is recognised by the authors. Therefore, they were justified in their initial thoughts that UTAUT was not a complete model to explain behaviours of intention and usage of mobile devices and services in a coordinated way.

As this research is about the adoption of Mobile banking apps, there is moderately a small number of related studies that have adopted and applied the UTAUT model to explain the acceptance and usage of such self-service technologies, particularly within the context of banking electronic solutions (such as Martins et al., 2014; Al-Qeisi & Abdallah, 2013; Riffai et al. 2012; Yu, 2012; AbuShanab et al., 2010). While some

studies added external constructs to the UTAUT model, such as Perceived risk, Website quality perceptions, Education level and output quality (Martins et al., 2014; Al-Qeisi & Abdallah, 2013; Wang & Shih, 2009; Riffai et al. 2012), others combined the UTAUT model with other models such as the theory of task technology fit (Zhou et al., 2010).

Alalwan et al. (2017) conducted a study based on the UTAUT2, targeting bank customers in Jordan who used Mobile banking services. After analysing the data collected from 334 distributed questionnaires, they reported that the behavioural intention construct was affected significantly and positively by performance expectancy, effort expectancy, hedonic motivation, price value, and trust. Al-Qeisi and Abdallah (2013) extended the UTAUT model by adding external constructs (Website quality perceptions, education and income). Uniquely, this study focused on the Joranian bank customers' actual usage of internet banking services rather than their behavioural intention. Another study within the Jordanian context was conducted by AbuShanab et al. (2010). They modified the UTAUT model on purpose to explain the acceptance of internet banking by Jordanian bank customers. They added some external factors (self-efficacy, technology anxiety, perceived risk, internal locus of control, trust and innovativeness). AbuShanab et al. (2010) tested the modified model, which resulted in 48% of the variance to explain the intention to use internet banking comparing to 43% of variance to predict the intention of banks customers by the original model.

In the same manner, Riffai et al. (2012) modified the UTAUT model by encompassing other external variables (website design, trust, playfulness, output quality and awareness) to explain the adoption of online banking services by Omani banks customers. Their results showed that the adoption of online banking services was significantly affected by performance expectancy and effort expectancy but the social influences construct had a non-significant effect over the customers' intention to adopt such technology. By contrast, to modifying the UTAUT model, Zhou et al. (2010) combined the UTAUT model with the theory of task technology fit (TTF). They suggested a new conceptual model that presented a mix of factors that was extracted from both models; their results indicate that the proposed model provided prediction power of 57.5% of variance to adopt Mobile banking services, compared to explanation power of 45.7% and 43.3% percent of variance to UTAUT and TTF respectively.

Yu (2012) modified the UTAUT model by adding the constructs of perceived credibility, perceived financial cost and self-efficacy, to examine Taiwanese customers' adoption of Mobile banking services. Yu's proposed model showed 60% of variance to predict the behavioural intention of customers to use mobile banking services, while 65% of the variance to predict the actual usage. By the same token, YenYuen and Yeow (2009) extended the UTAUT model by including three external constructs (self-efficacy, perceived credibility and anxiety) to explain customers' behavioural intention to use Internet banking services in Malaysia. They reported performance expectancy as the dominant factor for predicting behavioural intention.

Martins et al. (2014) formulated an extension of the UTAUT model by including the construct of perceived risk to examine Portuguese bank customer's behavioural intention and actual usage of Internet banking services. The original UTAUT model includes constructs of (performance expectancy, effort expectancy and social influence) and provided 56% of variance to predict the adoption of Portuguese customers toward Internet banking services. However, the extended model with construct of perceived risk showed 60% of variance to predict the customers' behavioural intention and 81% of variance to explain the customers' actual usage towards Internet banking services (Martins et al., 2014). Luo et al. (2010) also added the constructs of perceived risk and trust alongside with the UTAUT's constructs (performance expectancy). Their results reported that the customers' behavioural intention to use mobile banking services had been significantly and positively affected by performance expectancy. Dwivedi et al. (2011) provided another evidence to approve the UTAUT's validity. They conducted a meta-analysis of 43 previous studies that applied the UTAUT; the results show that the construct performance expectancy had the most significant effect on the behavioural intention. Additionally, Dwivedi et al. (2011) confirmed that the constructs effort expectancy, social influences and facilitating conditions were crucial factors to predict behavioural intention.

The UTAUT model covers the cognitive and social dimensions of technology acceptance among its three constructs (performance expectancy, effort expectancy and social influences), which means it is considered one of the most comprehensive models

to predict technology acceptance (Bagozzi, 2007). Moreover, Venkatesh et al. (2003) considered the role of environment and external factors by including the construct of facilitating conditions. Notably, comparing UTAUT to other, older models, it was the first one to reach the highest percentage of variance in explaining behavioural intention (70%), while the older models achieved less variance regarding behavioural intention in technology acceptance (Venkatesh et al., 2003).

As mentioned before, due to the inclusiveness of the UTAUT model and its high prediction power, it has been applied and adopted by many researchers in the field of technology acceptance (Slade et al., 2014; Alryalat et al., 2012; AbuShanab et al., 2010). This wide utilisation of UTAUT among different kinds of innovations, users, countries and cultures support its validity, applicability and generalisability (Alalwan et al., 2017; Slade et al., 2014; Rana et al., 2013; Al-Qeisi and Abdallah, 2013; Alryalat et al., 2012; Venkatesh et al., 2012; Zhou et al., 2010).

Despite these unique traits and the inclusiveness of the UTAUT model, there are some criticisms of some of its aspects. Primarily, the UTAUT model is applied to explain the adoption of technology from the perspective of employees, so there is some concerns about its applicability within other contexts, such as customers or students (Venkatesh et al., 2012). Additionally, even though the UTAUT authors reviewed the most common constructs from the eight dominant models in technology acceptance, they only selected the four most significant constructs (PE, EE, SI and FC) among 49 constructs that affect both behavioural intention and actual usage; therefore, they neglected the other factors (Venkatesh et al., 2012; AbuShanab et al. 2010). In addition, some studies have contradicted the claim for a high prediction power of the UTAUT model, as their results found this model to have poor prediction power (e.g. Chiu et al., 2010).

3.2.8.2 The Extended Unified Theory of Acceptance and Use of Technology (UTAUT2)

The original UTAUT has been extended by adding three external constructs (Hedonic motivation, Habit and Price value) which creates new updated version of UTAUT names as UTAUT2. Venkatesh et al. (2012) modified the UTAUT model with the purpose of validating this model from the perspective of customers. They assumed that

individual differences (age, gender and experience) would have moderating effects over the relations between the constructs and both behavioural intention and the actual usage of the mobile internet, as depicted below in figure 3.10 (Venkatesh et al., 2012).

Price value means "consumer's cognitive trade-off between the perceived benefits of the application and the monetary cost for using it" (Venkatesh et al., 2012, p. 161). Hedonic motivation is defined as the enjoyment or joy that is caused by using a particular technology (Venkatesh et al., 2012). This construct is captured from different factors such as enjoyment, playfulness, and joy, which are significant factors to determine the users' adoption of technology (Brown and Venkatesh, 2005; Van der Heijden 2004). According to Venkatesh et al. (2012, p.161) habit means "the extent to which people tend to perform behaviour automatically because of learning."

Figure 3.8: The extended Unified Theory of Acceptance and Use of Technology (UTAUT2)
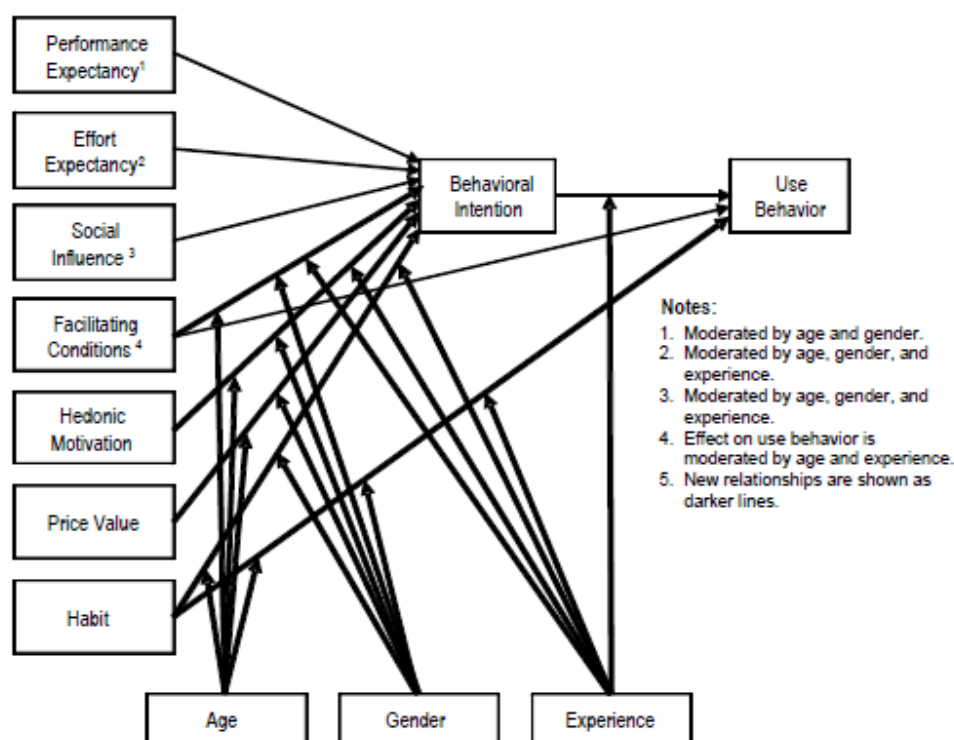
Source: Venkatesh et al. (2012)

Venkatesh et al. (2012) reported their findings after two stages of online survey of 1,512 mobile internet users. The results supported strongly the predictive power of UTAUT2, which revealed 74% and 52% of variance in behavioural intention and actual usage

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respectively, while the UTAUT provided 56% in behavioural intention and 40 % in the actual usage of mobile internet (Venkatesh et al., 2012).

Morosan and DeFranco (2016) revisited the UTAUT2 model to establish a comprehensive model to explain the acceptance of near field communication (NFC) mobile payments. Based on 794 respondents comprising American hotel customers, they reported that performance expectancy was the strongest construct to predict behavioural intention; while other factors (habit, hedonic motivation, and social influence) had lower effects. In the same manner, Alalwan et al. (2017) agreed with Morosan and DeFranco (2016). They applied UTAUT2 targeting Jordanian bank customers who used mobile banking services. After analysing the data collected from 334 distributed questionnaires, they reported that the behavioural intention construct was affected significantly and positively by performance expectancy, effort expectancy, hedonic motivation, price value and trust.

Compared to previous technology acceptance models, Venkatesh et al. (2012) considered UTAUT2 as the most powerful model to explain behavioural intention. Empirically, it scored the highest variance rate in behavioural intention (74%), which has never been accomplished by other models. On the other hand, there are some concerns about the generalisability of UTAUT2, as their study was conducted in Hong Kong, which has a high rate of mobile penetration and usage. It is therefore not comparable with this study as it is conducting in Jordan, which has a lower rate of mobile usage and penetration. Moreover, UTAUT2's sample was skewed, which is another concern about its generalisability, as the mean age of their study sample was 31; maybe it is inapplicable to older ages (Venkatesh et al., 2012).

UTAUT2 targeted mobile internet uses in general; they focused on both utilitarian (e.g. Business uses) and hedonic (e.g. mobile games apps) mobile uses. Nevertheless, this study focuses only and mainly on the utilitarian use of the mobile, in terms of performing banking services. Despite the high results of UTAUT2 regarding its ability to predict users' behavioural intention and actual behaviour to adopt technology, it does not match the objectives of this study, as the added three factors (habit, hedonic motivation and price value) are not within the scope of this study. Furthermore, the habit construct will

not be useful to consider in this study. Jordan is a developing country, therefore mobile banking service can be considered to be in their early stages, and the adoption of such technology is still low (Al-Rfou, 2013). Therefore, Jordanian bank customers do not have a habitual usage of mobile banking technology.

Regarding the hedonic motivation construct, as mentioned before this study focuses mainly on mobile banking apps, which are clear example of the utilitarian use of the mobile device and therefore apart from the hedonic context. The construct of Price value is not considered in this study as the mobile banking apps are free to download from banks' website or mobile stores, and the use of such apps does not require any prepaid subscription with the banking services suppliers. However, UTAUT2 is an extension of UTAUT, and it is a good example of how UTAUT could be applied within customers' context (Venkatesh et al., 2012), which coincides with the main aim of this study to target Jordanian bank customers.

Finally, this section has provided an overview of the most common technology acceptance models and their common constructs, as summarized below in table 3.1. Moreover, this section has explained the development and evolution of every model, noted some models' extensions and modifications, and reported some empirical results from previous studies that applied and adopted such models.

Table 3.1: The common constructs among technology acceptance models

Technology acceptance model	Common constructs affecting behaviour (Intention and actual behaviour)
TRA	Attitude / subjective norms / perceptions
TPB	Attitude / subjective norms / perceived behavioural control
DTPB	Relative advantage / complexity / compatibility / normative influence / efficacy / facilitating conditions / Attitude / subjective norms / perceived behavioural control
TAM	Perceived usefulness / perceived ease of use / attitude
DOI	Innovation features / innovators characteristics
SCT	Personal factors / environmental influences
MPCU	Affect / individual beliefs / social factors / habit / facilitating conditions / complexity / long-term consequences
MM	Intrinsic motivation / perceived benefits / external pressure
UTAUT	Performance expectancy / effort expectancy / social influence / facilitating conditions
UTAUT2	Performance expectancy / effort expectancy / social influence / facilitating conditions / habit / hedonic motivation / price value

3.3 Justifying the Research Theory Selection

In order to achieve the research aim and objectives, there was a need to select the suitable model that can explain and cover the main factors in this study and predict the customers'

actual behaviour. After reviewing the related literature, it is obvious that some of UTAUT's constructs such as performance expectancy, effort expectancy, social influence and facilitating conditions (Venkatesh et al., 2012; Zhou et al., 2010; AbuShanab et al., 2010; Venkatesh et al., 2003) have a key role in identifying the customers' intention and actual behaviour towards such technology. Therefore, the proposed research model of this study is essentially adapted form of the UTAUT model.

Despite the application of technology acceptance models such as TAM, TPB, TRA, DOI and other models in many studies in the literature, there are criticisms over the low prediction power for behavioural intention and actual behaviour (Usage). For example, while TAM as one of the most widely used models to explain the acceptance of technology, it focuses on technology acceptance rather than actual usage (Van Dijk et al., 2008). Other limitations and drawbacks of each model have been mentioned previously in section (3.2). From reviewing the literature of technology acceptance, many studies have tried to explain the adoption of technology by integrating salient factors from different models to enhance their results in term of prediction power. This means there was a need to combine some models or constructs to enhance the prediction power of such models.

The UTAUT model attempted to formulate a comprehensive model; it encompasses eight models of psychology, sociology and technology acceptance fields of study (Venkatesh et al., 2003). This combination of the most common models in technology acceptance has been proven by many studies in terms of validity and reliability within different contexts (Al Awadhi & Morris, 2008). In addition, it has high prediction power, accounting for 70% of variance to explain technology acceptance and 50% of the variance of actual usage of the technology (Venkatesh et al., 2003, 2012). Moreover, the UTAUT model is considered as the most predictive and comprehensive model among the information technology acceptance models because of its validity and reliability (Bagozzi, 2007).

 The wide utilisation of UTAUT among different kinds of innovations, users, countries and cultures, supports its validity, applicability and generalisability (Alalwan et al., 2017; Slade et al., 2014; Rana et al., 2013; Al-Qeisi and Abdallah, 2013; Alryalat et al., 2012;

Venkatesh et al., 2012; Zhou et al., 2010). Another reason to adapt the research model from the UTAUT within this research is the existence of the facilitating conditions factor, which has not been acknowledged in other theories such as TAM and DOI. Facilitating conditions factor indicates that organizational and technical infrastructure exists to support use of the system (Venkatesh et al., 2003), which has been represented in this research by the factor of mobile banking application quality, which has been considered another piece of evidence for the suitability of UTAUT model to this research.

Furthermore, as the main aim of this study is to provide more understanding of the adoption (usage) of mobile banking from the perspective of Jordanian banks customers, the researcher found that agreed with the extended version of the UTAUT model in 2012 (UTAUT2), which also focused on the technology acceptance from the customers' perspectives rather than from the perspectives of organizations. In conclusion, attributable to the aforementioned reasons and justifications; the UTAUT model employed to this research in an attempt to enhance the understanding of the adoption of mobile banking in Jordan from the perspectives of banks' customers by developing and testing an adapted form of the UTAUT model in terms of prediction.

However, by an in-depth review and analysis of the literature of the electronic banking solutions such as mobile banking and internet banking, it has been observed that other salient factors have been excluded from the UTAUT model. Venkatesh et al. (2012) mentioned there is an ongoing need to update the UTAUT model by including and testing other related factor to broaden the applicability of the model across different contexts. Therefore, this research proceeded to further survey and assessments of other factors to capture the appropriate constructs that will be added to the extension of the UTAUT model. The following sections (3.4) and (3.5) illustrate the constructs originating, direction and selection.

3.4 chapter Summary

This chapter reviews the main theories and models in the field of technology acceptance. These theories have been critically reviewed and compared in light of the current research aim. Multiple constructs across these theories and models have been reviewed with a view to developing the research's conceptual

model (see Chapter 4) by extracting and capturing the main constructs that selected to this study. Furthermore, it has been rationalised the selection of the research theory which is the UTAUT. In addition, three main constructs of UTAUT (PE, EE and SI) have been selected to be added to the conceptual model as explained the following chapter.

Furthermore, this chapter mentioned some aspects related to the methodologies and research approaches that used in the previous studies in the field of technology acceptance.

Chapter 4: Conceptual Model

4.1 Introduction

This chapter introduces the conceptual model, which predicts the usage of mobile banking apps by Jordanian customers. Therefore, the chapter was initially developed based on the previous chapter, the literature review. The conceptual model's constructs are distilled and captured from reviews and discussions of the principal theories and exemplars in the area of technology acceptance. This chapter then proposes and justifies the conceptual model and hypotheses development. Section 4.2 provides an overview of the best known constructs in electronic banking literature, while section 4.3 provides justification about the constructs' selection and mapping. The development of the hypotheses is explained and the proposed research model is depicted in section 4.4. Finally, section 4.5 summarises the chapter's content and provides the summary table of the main hypotheses and relates them to their respective constructs.

4.2 Overview of the best known constructs in electronic banking literature

This section provides insights onto the most well-known constructs in the field of electronic banking solutions. By reviewing the associated literature that addresses the customer interaction with such electronic banking solutions, it has been found that many factors have been investigated and employed to predict and understand the customers' usage of such technologies. This section summarizes the most cited constructs among different contexts and explains how the factors are related to each other, as shown below in table 3.2.

Two of the most common and valuable references of factors to be taken into account, in this regard, are 'perceived ease of use' and 'perceived usefulness'; both are recognised as affecting behavioural intention and adoption, as noted in the works of Eriksson and Nilsson (2007) and Lin (2011). By the same token this is approved by other studies (Kallweit et al. 2014; Hanafizadeh et al., 2014; Zhou, 2012; Kesharwani & Bisht 2012; Zhou, 2011; Lin, 2010). Furthermore, much emphasis has been directed towards attitudes, notably from a number of different scholars and researchers in the SST domain (Berger, 2009; Shih & Fang, 2004). Another instance of the most cited constructs in this stream is perceived risk (Martins et al., 2014; Purwanegara et al., 2014; Yuan et al., 2014; Akhlaq & Ahmad, 2013; Jeong & Yoon, 2013; Akturan & Tezcan, 2012; Laukkanen & Cruz, 2009).

A number of different works have considered the importance of various factors centred on assurances, competence, confidentiality, credibility, privacy and security, reliability, and trust (Curran & Meuter, 2005; Flavián et al., 2006; Gelderman et al., 2011; Kim et al., 2009; Laukkanen & Cruz, 2009; Lin, 2011). It is noteworthy that all of these individual constructs have been emphasised and assigned much value as fundamental elements of SST adoption, particularly in the banking arena (Flavián et al., 2006). Importantly, the most critical of obstacles seen to underpin customers' intentions and ultimate use of SST have been considered in the works of Laukkanen et al. (2008) and Laukkanen and Cruz (2009), with attention directed towards usage and tradition barriers.

Basically, the key objective at the heart of social factors, namely image, reference groups, social influence and subjective norms, for instance, have been recognized and discussed by a number of academics in the field, including Jaruwachirathanakul and Fink (2005)

and Laukkanen and Cruz (2009). Moreover, other efforts in the self-service technology research arena have been centred on the effect of self-efficacy and technology anxiety (AbuShanab et al., 2010; Zhao et al., 2008). Further explanation about other constructs and the relations among those constructs is summarized below, see table 4.1.

Table 4.1: A literature survey of constructs

Constructs		Research-Contexts	Relationships significances in literature	
Independent	Dependent		Significant	Insignificant
Perceived usefulness	Usage, behavioural intention, attitude	Online banking, mobile banking, ATM	Hanafizadeh et al. (2014); Kallweit et al. (2014); Zhou (2012); Kesharwani and Bisht (2012); Zhou (2011); Lee et al. (2011); Koenig-Lewis et al. (2010); Lin (2010); Wessels and Drennan (2010); Riquelme and Rios (2010); Gu et al. (2009); Al-Somali et al. (2009); Marler et al. (2009); Berger (2009); Lee (2009); Kim and Forsythe (2009); Jahangir and Begum (2008); Mallat et al. (2008); Celik (2008); Eriksson et al. (2007); Lin et al. (2007); Berger (2007); Eriksson and Nilsson (2007); Cheng et al. (2006); Curran and Meuter (2005); Eriksson et al. (2005); Jaruwachirathanakul and Fink (2005); Luarn and Lin (2005)	Chiou and Shen (2012); El-Kasheir et al. (2009)
Relative advantage	Adoption, usage, intention, attitudes	Online banking, mobile banking, ATM	Kapoor et al. (2014); Khraim et al. (2011); Lin (2011); Püschel et al. (2010); Kim et al. (2009); Meuter et al. (2005); Kolodinsky et al. (2004); Shih and Fang (2004); Brown et al. (2003); Fitzgerald and Kiel (2001); Lee et al. (2003);	Walker and Johnson (2006)
Convenience	Adoption, usage, intention, quality	Online banking, mobile banking, self-service technology	Demirci Orel and Kara (2014); Ding et al. (2011); Lin and Hsieh (2011); Pujari (2004); Gerrard and Cunningham (2003); Dabholkar et al. (2003); Meuter et al. (2003); Yen and Gwinner (2003)	
Perceived ease of use	Adoption, usage, intention	Online banking, mobile banking, ATM, telebanking, self-service technology, online shopping, kiosks	Kallweit et al. (2014); Hanafizadeh et al. (2014); Akturan and Tezcan (2012); Lin (2011); Lee et al. (2011); Lin (2010); Kim and Forsythe (2009); Al-Somali et al. (2009); Lu et al. (2009); Berger (2009); Gu et al. (2009); Cheng Amin et al. (2008); Zhao et al. (2008); Berger (2007); Lin et al. (2007); et al. (2006); Curran and Meuter (2005); Meuter et al. (2003); Dabholkar et al. (2003); Dabholkar and Bagozzi (2002)	Kesharwani and Bisht (2012); Püschel et al. (2010); Yoon Koenig-Lewis et al. (2010); Yoon (2010); Marler et al. (2009); Celik (2008)
Complexity	Adoption, usage,	Online banking, phone banking	Kapoor et al. (2014); Al-Jabri and Sohail (2012); Yoon (2010); Kim and Forsythe (2010); Meuter et al. (2005); Jaruwachirathanakul and Fink (2005); Shih and Fang	Simon and Usunier (2007)

	intention, attitude		(2004); Gerrard and Cunningham (2003); Lee et al. (2003)	
Subjective norms	Acceptance, satisfaction	Online banking, mobile banking, ATM,	Al-Majali (2011); Riquelme and Rios (2010); Lee (2009); Marler et al. (2009); Jaruwachirathanakul and Fink (2005); Shih and Fang (2004)	Püschel et al. (2010); El-Kasheir et al. (2009).
Image	Adoption	Online banking, mobile banking	Laukkanen and Cruz (2009),	Gounaris and Koritos (2008)
Usage barriers	Adoption	Online banking, mobile banking,	Laukkanen and Cruz (2009); Laukkanen et al. (2008)	
Performance	Adoption	Online banking	Kolodinsky et al. (2004); Polatoglu and Ekin (2001); Gan et al. (2006)	
Waiting Time	Adoption, satisfaction	Adoption, self-service technology	Kokkinoua and Cranage (2013); Chang and Yang, (2008); Ding et al. (2007); Simon and Usunier (2007); Pujari (2004);	Dabholkar et al. (2003)
Perceived speed	Adoption	Internet banking, self-service technology	Shamdasani et al. (2008)	Dabholkar et al. (2003)
Technology readiness	Adoption	Online banking, self-service technology	Gelderman et al. (2011); Lee et al. (2010); Ho and Ko (2008); Berger (2007); Lin and Hsieh (2007); Meuter et al. (2005)	AbuShanab et al. (2010)
Service quality	Usage	Online banking	Gan et al. (2006); Floh and Treiblmaier (2006)	
Website quality	Usage, trust, online banking loyalty, satisfaction	Online banking, E-government	Qutaishatal (2012); Shareef et al., (2011); Connolly and Bannister (2007); Lin (2007); Gan et al. (2006); Floh and Treiblmaier (2006); Bauer et al. (2005); Kim et al. (2005)	
Perceived risk	Adoption, intention	Online banking, mobile banking	Alalwan et al. (2016); Purwanegara et al. (2014); Farzianpour et al. (2014); Martins et al. (2014); Jeong and Yoon (2013); Akhlaq and Ahmad (2013); Jeong et al. (2013); Chiou and Shen (2012); Kesharwani and Bisht (2012); Akturan and Tezcan (2012); Akhlaq and Shah (2011); Al-Majali (2011); Taylor and Strutton, (2010); Cruz et al. (2010); Koenig-Lewis et al. (2010); Riquelme and Rios (2010); Laukkanen and Cruz (2009); Ruiz-Mafe et al. (2009); Mallat et al. (2008); Curran and Meuter (2007);	Abu-Shanab et al. (2010); Lu et al. (2009)
Security and privacy			Al-Tarawneh et al. (2017); Li (2012); Demirdogen et al. (2010); Gelderman et al. (2011); Masocha et al. (2011); Lin and Hsieh (2011); Chen et al. (2008); Jaruwachirathanakul and Fink (2005)	Kolodinsky et al. (2004); Pikkarainen et al. (2004)
Credibility	Adoption, intention	Online banking, mobile banking	Hanafizadeh et al. (2014); Yu (2012); Koenig-Lewis et al. (2010); Grabner-Kraeuter and Faullant (2008); Reichheld and Schefter (2000);	
Reliability	Usage, intention	Online banking, E-scanning	Sayar and Wolfe (2007); Casalo et al. (2007); Lichtenstein and Williamson (2006); Chang and Yang (2008); Gan et al. (2006)	

Attitude	Usage, intention	Online banking, mobile banking, ATM	Hanafizadeh et al. (2014); Lin (2011); Koenig-Lewis et al. (2010); Püschel et al. (2010); Laukkanen and Cruz (2009); Mallat et al. (2008); Chen and Huang (2006); Meuter et al. (2005); Kolodinsky et al. (2004)	Jayawardhena et al. (2007)
Trust	Usage, intention, attitude	Online banking, mobile banking, ATM	Akhlaq and Ahmed (2013); Riffai et al. (2012); Foon and Fah (2011); Al-Majali (2011); AbuShanab et al. (2010); Yousafzai et al. (2009); Johnson et al. (2008); Casaló et al. (2007); Al-Sukkar and Hasan (2005); Eriksson et al. (2005)	Lin (2011)
Perceived behavioural control	Usage, intention, quality	Online banking, mobile banking, ATM	Chen and Li (2010); Chen et al. (2009); Lee (2009); Chang and Yang (2008); Ho and Ko (2008); Ding et al. (2007); Gan et al. (2006); Jaruwachirathanakul and Fink (2005); Shih and Fang (2004); Dabholkar (1996)	Kesharwani and Bisht (2012); Püschel et al. (2010); Yoon (2010); Koenig-Lewis et al. (2010); Marler et al. (2009)
Technology anxiety	Usage, intention, attitude	Online banking, online shopping	Lee et al. (2010); Forsythe (2009); Chen et al. (2008); Hwang and Kim (2007); Kim and Meuter et al. (2005); Meuter et al. (2003)	Lee and Yang (2013)

4.3 Constructs selection and mapping

As mentioned before, this study identifies the factors that influence bank customers' usage of mobile banking apps, from the perspective of the customers themselves. This identification of the most important constructs leads to the development of an adapted form of the UTAUT model in terms of predicting the usage of mobile banking in Jordan. Therefore, an analysis has been conducted to identify the main constructs and their relations among different contexts, as abovementioned in table 3.2. It is obvious the constructs of the UTAUT model such as performance expectancy, effort expectancy, social influence and facilitating conditions, have a key role in identifying the customers' actual behaviour towards technology usage; besides they captured several of the previous constructs in this field of study (Venkatesh et al., 2012; Zhou et al., 2010; AbuShanab et al., 2010; Venkatesh et al., 2003).

Therefore, the UTAUT's constructs (performance expectancy, effort expectancy, social influence) have been selected as main constructs in the proposed research model. Despite the importance of facilitating conditions and behavioural intention, both constructs were

excluded. Facilitating conditions were defined and explained previously in subsection 3.2.9 as "the degree to which an individual believes that an organizational and technical infrastructure exists to support use of the system" (Venkatesh et al., 2003, p. 453): it is clear that this construct reflects the concept of system infrastructure. Thus, the construct has been broken into two similar concepts in the context of mobile banking services (App quality and Mobile performance), which represent the infrastructure of mobile banking from the perspectives of both software and hardware, further details about both constructs will be provided later in this chapter.

Regarding the construct of behavioural intention, it has been excluded due to the practical nature of this research. While this research targets "actual users" of mobile banking apps in Jordan, there is no necessity to study their behavioural intention because the actual behaviour (usage) already has been happening, which mitigates and may conceal totally the effect of intention. This agrees with the practical research objectives of developing an adapted form of UTAUT to understand the behaviour of mobile banking users. Another reason is that, from reviewing the literature on technology acceptance, it is obvious that most researchers reported their prediction power is disproportionately based on users' behavioural intention, while there is a huge gap between intention and actual behaviour.

The model of PC Utilisation (MPCU) by Thompson et al. (1991) is considered an example or evidence of excluding behavioural intention. Thompson et al. (1991) theorised a direct relation between individual effect and actual behaviour (usage) of PC, he presumed that the individual's effect, feeling, or emotion has a direct effect on the usage of the PC without the mediating role of behavioural intention, thus it has been excluded from the model. Moreover, Chang and Cheung (2001) mentioned that in spite of the critical role of behavioural intention as a key determinant to predict actual behaviour, MPCU only considers the actual behaviour while ignoring behavioural intention.

The above-mentioned perspective, stated by Thompson et al. (1991), agrees with this research's objectives. Behavioural intentions to use such technology is only important in the early stages of system implementation. In contrast, in the evaluation and validation stages of such technology, the actual behaviour (usage) provides robust insights for the

service provider by revealing information about the systems' strengths and weaknesses. This kind of information is useful to analyse the current usage rate of mobile banking apps and therefore assists in planning future strategies. To sum up, first this study is targeting actual users of mobile banking apps, second the mobile banking services in Jordan have already been implemented and are in the stage of evaluation, which justifies the focus on actual behaviour (usage) rather than behavioural intention, with the purpose of presenting the current users' perceptions and usage decisions about mobile banking apps.

As claimed by Venkatesh et al. (2012), UTAUT needs an ongoing update by including and testing other related factors to broaden the applicability of the model across different contexts. Therefore, this research proceeded to further survey and analysis of other factors, as seen in table 3.2, to capture the appropriate constructs that will be added to UTAUT's selected constructs. In addition to conducting construct/relation analysis, this study utilised exploratory interviews with online banking experts to provide more explanation about other factors. Furthermore, the data that has been gathered from the pilot-study have been used in the same manner. Consequently, there are four constructs have been selected/extracted from the literature (app quality, mobile performance risk, app security risk, app transactional risk). These constructs were captured mainly from both perceived risk and system quality constructs, which in turn, are found frequently cited as important factors to affect both behavioural intention and actual usage.

It was stated by the participants of pilot study, that they had serious concerns about the use of mobile banking apps due to the financial nature and the sensitivity of its data. This contributed to further study of the perception of potential hazards that may face mobile banking users. The concept of perceived risk encompasses numerous kinds of risk, which depend on the nature of the process or technology. Perceived risk influences the users' actual behaviour to use or not use an online service. This perception could change from client to customer (Hong & Yi, 2012). Perceived risk, as mentioned before, is one of the most important factors to influence the usage of new technology. It is worthwhile to mention that perceived risk can be observed in several areas, such as security, financial, transactional, social, privacy, psychological, and performance risks (Yoon & Occeña, 2014; Benjamin & Samson, 2011; Aransiola & Asindemade, 2011; Masocha et al., 2010).

For example, Charfeddine (2012) recommended considering some risk factors such as system reliability, system security and system responsiveness, to reduce the customers' perceived risk that negatively affects the use of e-banking services. Because there are several dimensions of perceived risk, this study focuses mainly on three dimensions (mobile performance risk, app security risk, app transactional risk), which are linked to the nature of mobile banking apps. Also these kinds of risk were mentioned by both of mobile banking customers and experts during the pilot study and exploratory interview respectively.

Regarding to the quality construct in the context of electronic banking services, there were found to be several dimensions of quality in this stream, such as portal, product and service quality. \in this context, Treiblmaier (2006) measured the quality of a website by testing the dimensions of design, content and structure; in addition, he measured the effect of the website's quality upon satisfaction and trust in the online context. He affirmed that satisfaction and trust was determined by website quality. This study focuses on mobile banking app quality, in terms of structure, design and content; this construct, in addition to the previous constructs, have been matched with the related constructs derived from the literature review. This construct mapping is summarised below in table 4.2

Table 4.2 Construct mapping

Research selected constructs	Literature related constructs	References
Performance expectancy	**Perceived usefulness**	Hanafizadeh et al. (2014); Kallweit et al. (2014); Zhou (2012); Kesharwani and Bisht (2012); Zhou (2011); Lee et al. (2011); Koenig-Lewis et al. (2010); Lin (2010); Wessels and Drennan (2010); Riquelme and Rios (2010); Gu et al. (2009); Al-Somali et al. (2009); Marler et al. (2009); Berger (2009); Lee (2009); Kim and Forsythe (2009); Jahangir and Begum (2008); Mallat et al. (2008); Celik (2008); Eriksson et al. (2007); Lin et al. (2007); Berger (2007); Eriksson and Nilsson (2007); Cheng et al. (2006);

		Curran and Meuter (2005); Eriksson et al. (2005); Jaruwachirathanakul and Fink (2005); Luarn and Lin (2005)
	Relative advantage	Kapoor et al. (2014); Khraim et al. (2011); Lin (2011); Püschel et al. (2010); Kim et al. (2009); Meuter et al. (2005); Kolodinsky et al. (2004); Shih and Fang (2004) Brown et al. (2003); Fitzgerald and Kiel (2001) Lee et al. (2003);
	Convenience	Demirci Orel and Kara (2014); Ding et al. (2011); Lin and Hsieh (2011); Pujari (2004); Gerrard and Cunningham (2003); Dabholkar et al. (2003); Meuter et al. (2003); Yen and Gwinner (2003)
Effort expectancy	**Perceived ease of use**	Kallweit et al. (2014); Hanafizadeh et al. (2014); Akturan and Tezcan (2012); Lin (2011); Lee et al. (2011); Lin (2010); Kim and Forsythe (2009); Al-Somali et al. (2009); Lu et al. (2009); Berger (2009); Gu et al. (2009); Cheng Amin et al. (2008); Zhao et al. (2008); Berger (2007); Lin et al. (2007); et al. (2006); Curran and Meuter (2005); Meuter et al. (2003); Dabholkar et al. (2003); Dabholkar and Bagozzi (2002)
	Complexity	Kapoor et al. (2014); Al-Jabri and Sohail (2012); Yoon (2010); Kim and Forsythe (2010); Meuter et al. (2005); Jaruwachirathanakul and Fink (2005); Shih and Fang (2004); Gerrard and Cunningham (2003); Lee et al. (2003)
Social influence	**Subjective norms**	Al-Majali (2011); Riquelme and Rios (2010); Lee (2009); Marler et al. (2009); Jaruwachirathanakul and Fink (2005); Shih and Fang (2004)
	Image	Laukkanen and Cruz (2009),
Apps quality	**Technology readiness**	Gelderman et al. (2011); Lee et al. (2010); Ho and Ko (2008); Berger (2007); Lin and Hsieh (2007); Meuter et al. (2005)
	Service quality	Gan et al. (2006); Floh and Treiblmaier (2006)
	Website quality	Qutaishatal (2012); Shareef et al., (2011); Connolly and Bannister (2007); Lin (2007); Gan et al. (2006); Floh and Treiblmaier (2006); Bauer et al. (2005); Kim et al. (2005)
	Perceived speed	Shamdasani et al. (2008); Dabholkar et al. (2003)
Mobile performance risk	**Usage barriers**	Laukkanen and Cruz (2009); Laukkanen et al. (2008)
	Performance	Kolodinsky et al. (2004); Polatoglu and Ekin (2001); Gan et al. (2006)

App security risk	Security and privacy	Al-Tarawneh et al. (2017); Li (2012); Demirdogen et al. (2010); Gelderman et al. (2011); Masocha et al. (2011); Lin and Hsieh (2011); Chen et al. (2008); Jaruwachirathanakul and Fink (2005)
App transactional risk	Credibility	Hanafizadeh et al. (2014); Yu (2012); Koenig-Lewis et al. (2010); Grabner-Kraeuter and Faullant (2008); Reichheld and Schefter (2000);
	Reliability	Sayar and Wolfe (2007); Casalo et al. (2007); Lichtenstein and Williamson (2006); Chang and Yang (2008); Gan et al. (2006)
Performance risk Security risk Transactional risk	Perceived risk	Alalwan et al. (2016); Purwanegara et al. (2014); Farzianpour et al. (2014); Martins et al. (2014); Jeong and Yoon (2013); Akhlaq and Ahmad (2013); Jeong et al. (2013); Chiou and Shen (2012); Kesharwani and Bisht (2012); Akturan and Tezcan (2012); Akhlaq and Shah (2011); Al-Majali (2011); Taylor and Strutton, (2010); Cruz et al. (2010); Koenig-Lewis et al. (2010); Riquelme and Rios (2010); Laukkanen and Cruz (2009); Ruiz-Mafe et al. (2009); Mallat et al. (2008); Curran and Meuter (2007)

4.4 Overview of Proposed Research Model

After justifying the research-based theory in the preceeding section, this section is dedicated to analysing and justifying the proposed research model. As previously mentioned, this research aims to develop and test an adapted form of the UTAUT model in terms of predicting the adoption of mobile banking in Jordan. Therefore the key constructs in the UTAUT model (performance expectancy, effort expectancy, social influence, and usage behaviour) were selected as a main factors in the proposed research model.

4.4.1 Research Hypothesis Development

This section provides scientific justifications and arguments about the main factors in the conceptual model. In addition, further explanations are provided about the relations among the constructs with the purpose of developing a conceptual model of the use of mobile banking apps in Jordan by considering the effects of the selected factors on usage. Such factors have been hypothesised based on models and theories from the literature of the technology acceptance field of study.

4.4.1.1 Performance Expectancy

Performance expectancy is defined as "the degree to which consumers expect that using a particular technology will benefit their performance of certain tasks" (Venkatesh et al., 2003). Performance expectancy (PE) is a factor that significantly affects the user's intention to accept the use of mobile banking apps (Grant & Edgar, 2012). PE implies that the user comprehends the benefits of using Mobile banking. This construct is acknowledged as similar to the perceived usefulness (PU) construct from TAM as mentioned in the previous section, see table 3.3 (Kim et al., 2009; Martins, Oliveira & Popoviˇc, 2014; Miltgen, Popoviˇc & Oliveira, 2013; Venkatesh et al., 2003).

TAM research indicates that PU has been found to have a significant positive relation to usage intention. For instance, the adoption of mobile internet and Mobile-services were affected positively by PU (Chiu et al., 2005). A study by Venkatesh and Davis (2000) found that the PU had both a direct and indirect effect on behavioural intention (BI). Performance expectancy has been acknowledged as one of the most influential drivers of behavioural intention to use electronic banking services, such as online and mobile banking (AbuShanab et al., 2010; Chiu et al., 2010; Riffai et al., 2012; Wang & Shih, 2009; YenYuen & Yeow, 2009; Yeow et al., 2008; Yu 2012, Zhou et al., 2010).

For instance, performance expectancy has been proven to be a strong factor determining behavioural intention to use self-service kiosks at a governmental sector (Wang & Shih, 2009) and retail industry (Chiu et al., 2010). It has crossed over to the banking industry as well (Zhou et al., 2010). YenYuen and Yeow (2009) and Yeow et al. (2008) confirmed that performance expectancy

is the most considerable determinant of customer intention to adopt online banking in Malaysia and Australia.

In Oman, Riffai et al. (2012) empirically supported the role of performance expectancy in contributing the customers' willingness to use internet banking. More recently, performance expectancy has been found to be a crucial factor predicting the customers' intention to use internet banking in Portugal (Martins et al., 2014). In their study to investigate the acceptance of Mobile banking, Zhou et al. (2010) and Yu (2012) concluded that clients' intention to use Mobile banking is significantly predicted by performance expectancy. Performance expectancy has also been empirically examined and confirmed as a crucial factor determining the Jordanian customers' intention and usage of internet banking, as reported by both AbuShanab et al. (2010) and Al-Qeisi and Abdallah (2013).

Additionally, there are factors related to performance expectancy, such as the perceived usefulness (e.g. Al-Somali et al., 2009; Amin, 2007; Black et al., 2002; Celik, 2008; Chen et al., 2009; Curran & Meuter, 2005; Eriksson et al., 2005; Foon & Fah, 2011; Kesharwani & Bisht, 2012; Nor et al., 2008; Shareef et al., 2012; Wang et al., 2003) and relative advantage (e.g. Brown et al., 2003; Kapoor et al., 2014; Kolodinsky et al., 2004; Lee, 2009; Lee et al., 2003; Liao et al., 1999; Lin, 2011; Püschel et al., 2010; Shih & Fang, 2004), they have been found as salient antecedents of behavioral intention and the usage of electronic banking solutions.

Also important, Venkatesh et al. (2012) and Dodds et al. (1991) argued that customers are usually involved in a rational comparison process between the extent of benefits and utilities obtained by using technology in relation to the monetary cost paid to use technology from another point of view. This leads to the following hypothesis:

H1: The usage of M-banking apps by Jordanians will be positively affected by performance expectancy.

4.4.1.2 Effort Expectancy

Based on other dominant models, Venkatesh et al. (2003) define effort expectancy (EE) as "the degree to which a person believes that using a certain technology or innovation would be effort free", a definition captured from perceived ease of use (PEOU) in TAM and TAM2 models, complexity in MPCU model, and ease of use in IDT theory. Previous studies of M-banking acceptance (Amin et al., 2008; Puschel et al., 2010; Sripalawat et al., 2011) supported PEOU as a factor affecting the user's intention to accept M-banking. Based on UTAUT model, Lu et al. (2009) utilized the following constructs of this model: performance expectancy, effort expectancy, and social influence to search what factors affect an individual's intention to accept mobile technology. Lu's study determined that the intention to accept mobile technology was significantly influenced by effort expectancy.

Several authors across the electronic banking services context have recognised that an individual's intention to use SST is significantly predicted by effort expectancy (AbuShanab et al., 2010; Chiu et al., 2010; Wang & Shih, 2009). Both Wang and Shih (2009) and Chiu et al. (2010) confirmed the significant effect of effort expectancy on the behavioural intention to accept self-service kiosks. Similar conclusions have been reached by YenYuen and Yeow (2009) and Yeow et al. (2008), who empirically supported the considerable influence of effort expectancy on clients' intention to use online banking. Likewise, effort expectancy was found to be a key factor in driving Omani customers' intention to use internet banking, as concluded by Riffai et al., (2012). Similar findings have been newly reached by Martins et al. (2014), who approved a significant association between effort expectancy and Portuguese customers' willingness to use internet banking.

In the Jordanian banking context, statistical findings from AbuShanab et al. (2010) also reported that effort expectancy is a salient predictor of customers' intention to use Internet banking. Furthermore, the factors that capture effort expectancy, such as perceived ease of use, ease of use, and complexity have been recognised as crucial determinants of the individuals' intention to use an electronic banking solution (e.g. Akturan &Tezcan, 2012; Al-Somali et al.,

2009; Berger, 2009; Cheng et al., 2006; Curran & Meuter, 2005; Gerrard & Cunningham, 2003; Gu et al., 2009; Hanafizadeh et al., 2014; Howcroft et al., 2002; Jaruwachirathanakul & Fink, 2005; Kallweit et al., 2014; Kolodinsky et al., 2004; Lee et al., 2003; Liao et al., 1999; Lin, 2011; Lu et al., 2009; Mallat et al., 2008; Meuter et al., 2005; Shih & Fang, 2004; Wang et al., 2003; Yoon, 2010; Zhao et al., 2008).

This leads to the following hypothesis:

H2: The usage of M-banking apps by Jordanians will be positively affected by effort expectancy.

A large part of the literature in both the psychology and communication fields has systematically found that increasing screen size positively impacts the cognitive domain of user perceptions in areas such as: User satisfaction, and acceptance of new technology (Detenber & Reeves, 1996; Maniar, Bennett, Hand & Allan, 2008). Large screen size is thought to affect the perceptual process by providing users more obvious reality than a smaller screen (Nabi & Oliver, 2009, pp. 545-560), leading to the following sub-hypothesis:

H2a: Mobile screen size moderates the effect of effort expectancy upon the usage of M-banking apps

4.4.1.3 Social Influence

Social influence is the extent of the perception of a person that other people believe that he/she should use new technology (Venkatesh et al., 2003). The authors of UTAUT captured social influence from subjective norms in TRA, TAM2, TPB/DTPB, social factors in MPCU, and image in IDT. In a survey of 158 customers of leading Malaysian banks, Amin et al. (2008) empirically found that individuals who intend to use M-banking were affected significantly by people around them. Other evidence from Puschel et al. (2010), and Sripalawat et al. (2011) indicates that subjective norms have a significant influence on behavioural intention, while Dasgupta et al. (2011) indicated that

perceived image is a significant factor in people's willingness to accept M-banking.

The selection of social influences as a key determinant of the behavioural intention is built on prior literature which supports the impacting role of social influences on customers' propensity to use such electronic services (Chiu et al., 2010; Martins et al., 2014; Wang & Shih, 2009; YenYuen & Yeow, 2009; Yu, 2012; Zhou et al., 2010). For instance, Yu (2012) emphasised that social influences were found to be the most predictive factor determining customers' intention to use mobile banking in Taiwan. In line with these findings, Zhou et al. (2010) empirically proved the significant effect of social influences on clients' intention to use mobile banking in China. Other empirical findings from Wang and Shih (2009) and Chiu et al. (2010) demonstrated that behavioural intention to accept kiosk technology is statistically affected by the role of social influences. Previous researches related to internet banking, such as YenYuen and Yeow (2009), Cheng et al. (2008) and Yeow et al. (2008), have noted that social influences are key drivers of customers' predisposition to utilise internet banking.

It is worth mentioning that social influences have been extensively addressed over the self-service banking by using similar concepts such as subjective norms (Jaruwachirathanakul & Fink, 2005; Lee, 2009; Marler et al., 2009; Riquelme & Rios, 2010; Shih & Fang,2004); family recommendations (Al-Majali, 2011; Howcroft et al., 2002); word of mouth (Lin & Hsieh, 2007; Meuter et al., 2003; Mols, 1998); reference groups (Mallat et al., 2008); social desirability (Gerrard & Cunningham, 2003); personal contact with employee (Gelderman et al., 2011; Howcroft et al., 2002; Meuter et al., 2005; Simon & Usunier, 2007; Walker & Johnson, 2006); and image (Fitzgerald & Kiel, 2001; Globerson & Maggard, 1991; Laukkanen & Cruz, 2009).
This leads to the following hypothesis:

H3: The usage of M-banking apps by Jordanians will be positively affected by social influence.

4.4.1.4 Mobile Performance Risk (MPR)

Nowadays, M-banking is presented as a new channel. The revolution in telecommunications has led to the use of mobile devices to access banking services (Suoranta & Mattila, 2004). It is important to understand users' perceptions of the characteristics of mobile innovation, which have an important influence on acceptance behavior (Agarwal & Prasad, 1997; Van Slyke et al., 2002; Moore & Benbasat, 1991). The characteristics of the mobile device affect the likelihood and speed of its diffusion (Holak & Lehmann, 1990). In a survey of 1434 participants of users of M-banking apps in India, Lalit Mohan et al. (2014) found that the better adoption was led by the usability and in turn, better revenues for the banks.

When customers engage in e-banking activity they have certain functional expectations with the system. The risks that these functional expectations may not be met are known as performance risks. Performance risk refers to consumers' concerns about the product or service level of performance in relation to expectations (Nicolaou et al., 2013). Laroche, Bergeron and Yang (2004) defined performance risk as the possibility of a defect or failure as a result of purchasing a product. In the context of e-banking, performance risk can arise in several situations, such as transactions taking longer than anticipated, customers facing problems in accessing services, or customers not being capable of completing the transaction request due to connectivity issues, etc. (Littler & Melanthiou, 2006).

For customers to face performance risk, they must have some background knowledge about the system in order to develop some expectations. Nonetheless, e-banking is characterised by asymmetric information as well as lack of personal interaction, which makes it difficult to correct errors. These factors reduce trust in the performance of e-banking, leading to performance risk (Littler & Melanthiou, 2006). A few banks have tried using dummy websites or applications to allow users to practice using the website before the actual use of an electronic banking website (Cunningham et al., 2005). However, the impact of these was quite limited as there is significant difference in perception when it comes to using a dummy website and a real one, even if they seem the same. This is because in the dummy website the customer is not concerned and can

make decisions without worrying about the consequences. Also his/her steps are reversible. This is not true in real websites, where a step taken may be the final step.

According to Polatoglu and Ekin (2001), a product is considered effective if it can do what it was supposed to do. When individuals buy products or services, the worth of these products is measured after the objectives have been achieved. Objectives therefore might relate to the cost of doing so, the time, the amount of work that can be done with the product, etc. Online banking depends on an elaborate infrastructure (Featherman et al., 2003) and the performance of the infrastructure depends on its quality (Kolodinsky et al., 2004). It is therefore vital to examine performance from the perspective of tools that have been provided. Kolodinsky et al. (2004) examined the challenges to online banking by assessing the problem of performance of the equipment that is meant to do the task.

On the other hand, Suganthi, Balachandher and Balachandran, (2001) examined the products that the company has in place and determined that such products, if they fail to do what the client needs, might be termed low in performance. According to Rotchanakitumnuai and Speece, (2003), an individual is able to view a product as effective depending on their personal circumstances and hence performance of the infrastructure might also hinge on the ability of individuals to interact with the same, and therefore affects the level of usage of the system. This leads to the following hypothesis:

H4: The usage of M-banking apps by Jordanians will be negatively affected by mobile performance risk.

4.4.1.5 Application Quality (AQ)

M-banking apps or software quality is defined as the extent to which desirable features of the application are incorporated into an M-banking system to enhance its performance and satisfy the user's requirements and specifications (Fitzpatrick, 1996). App quality reflects the performance and implementation of the system, and continuation of service (Bouazzouni, Conchon & Peyrard, 2018; Shareef et al., 2007). System quality identifies the quality of the information system itself (Chen, 2010). Dabholkar (1996) found that speed, ease of use, reliability, control and enjoyment were all major factors that affect

perceptions of system quality. However, Lin (2007) claims that system quality can be measured by interface design and interactivity. Information Systems literature reports that there is a direct effect of system quality upon usage (Delon & Mclean, 2003).

Interactivity is another aspect of technical quality and refers to the interaction between the electronic solution channel, such as a website, and the user of that site and goes to the core of the computer–mediated communication environment (Dennis et al., 2004). Interactivity is looked upon as a two way communication: from the viewer to the firm and vice versa. Some authors even emphasize the ability of the individual to control the communication and learn from this feature of the interactive process (Merrilees, 2002). Merrilees & Fry (2003) found a relation between interactivity on the site and e-trust. The result showed that interactivity is a powerful influence on e-trust; the higher the users rating of interactivity on the site, the greater their perception of e-trust on the site and in turn, the greater usage rate.

Availability of a website or application is another dimension of its quality, which means the availability of online service round the clock (convenience), accessibility, and the wide range of financial facilities on the Iiternet banking was found, among other attributes, to be the most important quality attributes in the perceived usefulness of electronic banking services among users (Liao & Cheung, 2002).

The quality of an application or website of electronic banking services reflects the general content quality, a dimension of website quality, refers to the features of the overall content of the website with respect to: usefulness, completeness, clearness, currency, conciseness, and accuracy (Aladwani, 2006). Information quality on the website refers to the degree to which information produced by the website is accurate, relevant, complete, and in a format desired by the user. Schaupp et al. (2006) found that the quality of information provided on a website plays a vital role in satisfying end users. Liao & Cheung (2002) argue that individuals would be especially concerned about precision in the sense of expected accuracy in money transfer and accounts involved in the e-banking context. They found accuracy to be the most important factor affecting consumer willingness to use e-banking. This debate leads to the following hypothesis:

H5: The usage of M-banking app is positively influenced by the application quality

A large part of literature in both psychology and communication fields has systematically found that an increase in screen size positively impacts the cognitive domain of user perceptions such as: user satisfaction, and acceptance of such technology (Detenber & Reeves, 1996; Maniar, Bennett, Hand & Allan, 2008). Large screen size is supposed to affect the perceptual process by providing users more obvious reality rather than a small screen (Nabi & Oliver, 2009, pp. 545-560).

H5a: The influence of the quality of an application on the usage of M-banking apps in Jordan will be moderated by the size of mobile screen.

4.4.1.6 Apps Security Risk (ASR)

Security risk represents the worries and concerns of customers that their personal or financial information could be seen by others without their permission (Ndloovu and Sigola, 2013). Security risks occur when customers are worried that others can see their personal financial information without their consent and this concern creates a perception of security risk (Littler & Melanthiou, 2006; Agboola & Salawu, 2008; Dube, Chitura & Runyowa, 2009; Masocha et al. 2011; Ndlovu & Sigola, 2013; Usman & Shah, 2013; Gerrard et al. 2006). In internet banking, perceptions of security risk pose the biggest obstacle (Masocha et al. 2011). Furthermore, improving security can increase the preference for internet banking (Angelakopoulos & Mihiotis, 2011; Demirdogen et al., 2010).

Security on the internet is the most important of customer perceptions, which, in turn, influences the customers' purchasing behaviour. As discovered by Angelakopoulos and Mihiotis (2011), the main reason for customers being deterred from using internet banking is mistrust in these services. Another study, which involved university employees, determined that if customers feel that their confidentiality with the internet banking is not safe, they do not use it (Gülmez & Kitapçı, 2006 as cited in Demirdogen

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et al., 2010; Agboola & Salawu, 2008). Auta (2010) and Li (2012) emphasize the importance of privacy and confidentiality in the adoption of online banking.

It has become a real challenge for banks to provide information security (Li, 2012; Farzianpour et al., 2011b; Gerrard et al., 2006) because users like to control all aspects of gathering information while using online services (Farzianpour et al., 2011a). This issue has gained the attention of many researchers who have studied the behaviour of governments in this context. Wu et al. (2011) researched the similarities in online privacy regulations in the USA and China. They found that the American legislative initiatives are more integrated and comprehensive when compared to the Chinese. Until recently, there was no specific right of privacy specified in dedicated legislation in China. These disparities create potential risks for customers in some countries.

According to consumers, security risk is often associated with the possibility of losing money. Surveys show that the adoption of online banking services is greatly influenced by security risk. The gap between the actual and perceived security of a technology is what affects the behaviour of people (Huang et al., 2011; Demirdogen et al. 2010). It is the lack of awareness and incorrect knowledge about money security that threatens the success of online banking (Huang et al., 2010; Gerrard et al., 2006). This leads to the following hypothesis:

H6: The usage of M-banking apps by Jordanians will be negatively affected by security risk.

4.4.1.7 Apps Transactional Risk (ATR)

Transactional risk is the risk that a transaction executed by the bank customer does not take place as expected by the customer (Ruiz-Mafe et al., 2009). In any online service the online environment acts as an interface between the user and the provider and there is no direct interaction between the two. There thus exists a spatial distance between the provider and the user and this means that the user is not able to view physical cues which will help him judge creditworthiness and build trust (Reichheld and Schefter, 2000). Furthermore, the transaction may not take place spontaneously, leading to a greater degree of uncertainty (Grabner-Kraeuter & Faullant, 2008). The delay in transaction

combined with the uncertainty that the transaction will take place as expected leads to a higher perception of risk (Li, 2013). The trust that the transaction will take place as instructed is critical for the adoption of e-banking (Casalo et al., 2007; Hernandez & Mazzon, 2007; Lichtenstein & Williamson, 2006; Sayar & Wolfe, 2007).

Another concern that customers may have regarding a transaction is that customers may be worried that the transaction will not take place at all (Vatanasombut et al., 2008; Gerrard et al., 2006) and this could have serious implications for customers. For example, a business customer may lose a contract or his reputation as a result of unexpected delays or cancellation of transactions. Thus, eliminating any perceptual gaps in expected and actual service delivered is essential for banks to improve the adoption of e-banking (e.g. Vatanasombut et al., 2008; Liu & Wu, 2007; Casalo et al., 2007; Lichtenstein & Williamson, 2006). The researcher has thus concluded that transactional risks can significantly increase an individual's perception of risk and therefore negatively affects usage rate. This leads to the following hypothesis:

H7: The usage of M-banking apps by Jordanians will be negatively affected by transactional risk.

At the end of this subsection, below is figure 3.11, which depicts the proposed research model. The main constructs of the UTAUT model (performance expectancy, effort expectancy, social influence), in addition to the quality and perceived risk factors (app quality, mobile performance risk, app security risk, app transactional risk), are proposed to have direct impact on the usage of mobile banking apps by Jordanian customers.

Figure 4.1: The proposed research model
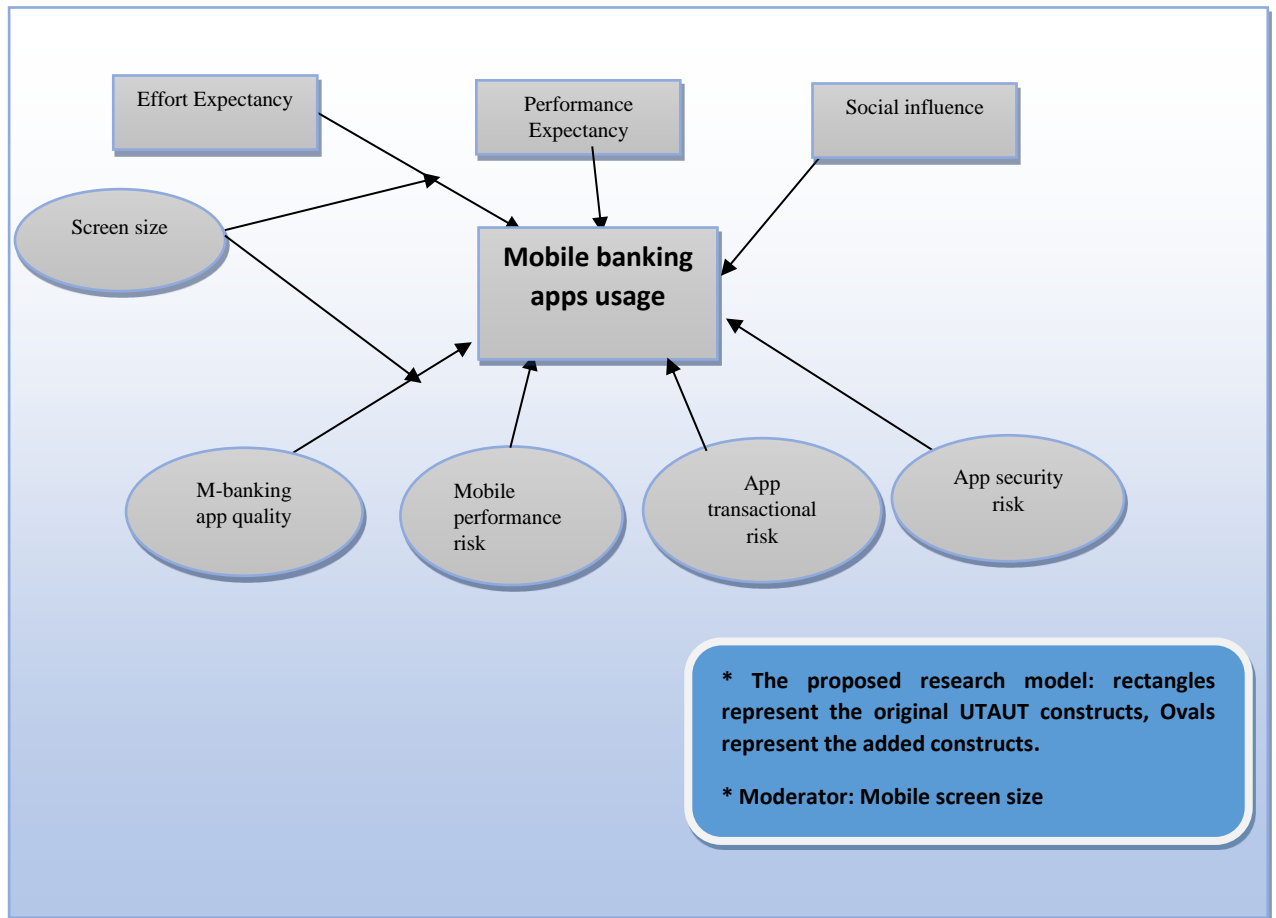
4.5 Chapter Summary:

As previously stated, the objective of this research is to develop a model to predict the use of mobile banking among customers in Jordan. This model is designed to be as an adapted form of the UTAUT model (Venkatesh et al., 2003). Venkatesh's model has been considered as a foundation upon which to build a theoretical model, because it has been justified to be the most suitable of the existing models/theories within the technology acceptance field of study. During construct analyses and mapping, the following external factors were discovered: mobile performance risk, quality of apps, security risk and transactional risk. All such factors were subsequently implemented into

the current research's conceptual model, alongside other UTAUT constructs such as performance expectancy, effort expectancy and social influence. It is worth mentioning that findings from the pilot study have been used to extract the aforementioned external factors. As a result, nine research hypotheses have been developed based on key causal relationships within the theoretical model. These hypotheses can be seen in table 4.4.

Table 4.4 Summary of the Research Hypotheses

	Hypothesis	variables
H1	*The usage of mobile banking apps by Jordanians will be positively affected by performance expectancy.*	PE, Usage
H2	*The usage of M-banking apps by Jordanians will be positively affected by effort expectancy.*	EE, Usage
H2A	*Mobile screen size moderates the effect of effort expectancy upon the usage of mobile banking apps*	EE, Screen size, Usage
H3	*The usage of M-banking apps by Jordanians will be positively affected by social influence.*	SCI, Usage
H4	*The usage of M-banking apps by Jordanians will be negatively affected by their mobile performance risk.*	MPR, Usage
H5	*The usage of M-banking app is positively influenced by the application's quality.*	AQ, Screen size, Usage
H5A	*The influence of the quality of an application on the usage of M-banking apps in Jordan will be moderated by the size of mobile screen.*	AQ, Usage
H6	*The usage of M-banking apps by Jordanians will be negatively affected by security risk.*	SR, Usage
H7	*The usage of M-banking apps by Jordanians will be negatively affected by transactional risk.*	ATR, Usage

CHAPTER 5: Methodology

5.1 Introduction

The previous chapter explained the conceptual model, which is proposed and designed for the purpose of testing Jordanian customers' usage of mobile banking apps. This chapter illustrates the research paradigm and approach by critically reviewing the related literature across the technology acceptance and information systems disciplines. The most commonly adopted research paradigms and methodologies have been reviewed to illustrate how the researcher selected the appropriate research paradigm, approach, philosophy, methodology and method, and in turn to justify the selection of a positivist paradigm for the current study and explain the adopting of a quantitative approach as an appropriate research approach for testing and validating the research hypotheses and constructs of the proposed research model. In addition, this chapter justifies the selection of the field survey to be conducted as a research method for the current study.

In addition, this chapter details the related aspects of the research survey, such as the data collection method and sampling process. For example, justifying the selection of an online questionnaire as the most suitable method for gathering the targeted data. Likewise, this chapter reveals the selection of convenience sampling as an appropriate technique that suite the current research sample in terms of accessing the customers of Jordanian banks. Moreover, the design and development of the research instrument is detailed within this chapter by illustrating the measurement items, questions content, pilot study, and translation process. The final survey process is explained in this chapter, in addition to which the data analysis process is discussed and summarised in section 5.10. Furthermore, the procedure of the pilot study is explained together with its validity and reliability, as well as the design of the questionnaire. Finally, ethical considerations and issues underpinning the research stages are also discussed.

5.2 Research Purpose

There are three common purposes for studies: exploratory, descriptive and explanatory (Sekaran & Bougie, 2010). Exploratory study is used for enhancing the researcher's understanding about the research problem, and sets the research

question in light of a specific understanding to the evaluation of phenomenon, by reviewing the literature, conducting exploratory interviews to get clearer understanding of the nature of the problem (Saunders et al., 2009). A descriptive study attempts to ascertain the characteristics of the variables related to the research problem (Sekaran & Bougie, 2010). A descriptive study would not be suitable for this research since there is no need to build a profile for the phenomenon. Also, the characteristics of the variables do not need more description as they are already well established in the literature. In an explanatory study, the emphasis is on constructing relationships among variables, and explaining these relationships in order to study a situation, or a problem.

In this research, the purpose of study is explanatory (hypotheses testing); the latter intends to identify the relationship between actual behaviours (usage), in the light of UTAUT theory. Also there are exploratory purposes in some parts of this research; particularly in exploring the main factors that affect the usage of mobile banking apps. As Robson (2002) highlights, the purpose of the research may vary over time, hence there is more than one purpose for this research. Saunders et al., (2009) support the possibility that there may exist more than one purpose.

5.3 Research Paradigm and Philosophy

A paradigm may be described as a number of different postulations made to give an overall philosophical or conceptual framework to facilitate a global view; in other words, facilitating an organised approach to examining the surrounding environment (Suppe, 1977) as well as the phenomenon under study. In consideration to this definition, a paradigm is described by Taylor, Kermode & Roberts (2007, p. 5) "as being a wide-ranging perspective of something", with a further definition provided by Weaver and Olson (2006), who state that a paradigm may be viewed as encompassing various beliefs, patterns and practices, all of which go some way to controlling and normalising inquiry within a specific discipline, notably through the presence of frames, lenses and processes, and facilitating investigation.

Essentially, a research paradigm seeks to examine two different aspects, namely what reality can be viewed as and how reality can be understood (Collis & Hussey, 2009). In this sense, reality may be seen to refer to the phenomenon under examination in a study. The choice of the research approach, strategy and methods to be used in seeking to develop insight into reality is dependent on the view of reality, as adopted by the researcher; in other words, whether or not it actually exists.

5.3.1 Epistemology

In essence, when considering epistemology, it may be seen to consider the way in which researchers strive to both gather and organise knowledge, or otherwise develop insight into a specific phenomenon or event through in-depth examination and analysis (Bhattacherjee, 2012; Bryman & Bell, 2007; Sekaran, 2003). When considering the information system field, there are three different philosophical approaches available, namely critical, interpretive and positivist, all of which have been established as guiding approaches in the completion of a study (Straub et al., 2005; Orlikowski & Baroudi, 1991). The researcher should be well informed to create an awareness of which type of data needs to be gathered, how it can be collected, and how analysis should be carried out (Bhattacherjee, 2012; Straub et al., 2005). This can fundamentally be achieved by providing the researcher of deep understanding of each of these individual approaches and their assumptions, concepts and rules; without this, a researcher may be unable to establish the most appropriate approach to facilitate an in-depth analysis of the event under examination (Bhattacherjee, 2012).

5.3.1.1 Positivist Philosophy:

The positivist approach is considered to be the most widely used and therefore most popular philosophical approach implemented by researchers in the information system area, when contrasted with those who choose to implement an interpretive approach, with much fewer researchers using a critical approach in the same field (Mingers, 2003; Orlikowski & Baroudi, 1991). Essentially, a number of critical elements have been identified by Orlikowski and Baroudi

(1991) as a standard list for any study within the positivist paradigm scope; these include: devised propositions, hypotheses-testing, quantified measurement of variables, and establishing generalizable inferences from the study sample to the overall population under analysis in relation to a specific phenomenon.

In the view of a number of scholars, for example, Orlikowski and Baroudi (1991) and Bhattacherjee (2012) the positivist approach appears to be more appropriate and well aligned in those study cases that aim to complete theory-testing and research hypotheses-testing in an effort to improve the overall prognostic insight into the occurrences under examination. Moreover, it is noted that a greater extent of objectivity in methods is required by positivist researchers when completing such works, irrespective of the phenomenon under analysis, i.e. whether it is social or natural (Bhattacherjee, 2012; Easterby-Smith et al., 2002; Orlikowski & Baroudi, 1991). In light of this, it is highlighted that a positivist researcher should not attempt to influence, nor should be influenced by, the study subject; rather, researchers are required to ensure their own beliefs and thoughts are not injected into the work when investigating and analysing the phenomenon at hand (Bhattacherjee, 2012). Similarly, when conducting a positivist approach, the researcher's epistemological perspective depends on the assumption that objective observation and measurement can be used when examining social phenomenon, notably through the use of quantitative and statistical data (Myers, 1997).

In positivist works, it is common for variables to be grouped into two different categories, namely independent and dependent variables; the latter provide inference as to the research hypotheses through providing an explanation of the causal link between such variables so as to ascertain a very specific degree of anticipation in regards the phenomena being analysed (Cassell & Symon, 1994; Straub et al., 2005). When considering the study from a statistical perspective, Straub et al. (2005) make the statement that, in a positivist paradigm (notably when implementing a quantitative approach), the key assumption to be made is the need to disprove the null-hypothesis (H0) against the theoretical hypothesis (H1), with the latter needing to be verified; otherwise stated, the disproving of

H0 would automatically result in the validation of H1, which makes the assumption that any degree of difference between the independent variable values will highlight a notable variation in the dependent variable's value; this would then provide support for the theoretical hypothesis suggested in relation to such variables (Straub et al., 2005).

Works of a quantitative positivist nature generally have a more deductive nature owing to the fact that these works are initiated through the suggestion of a conceptual model alongside its corresponding hypotheses, in line with any existing, valuable theoretical foundations, followed by the gathering and examination of empirical data through the adoption of quantitative approaches (see Bhattacherjee, 2012; Bryman & Bell, 2007; Myers, 1997; Walsham, 1993). When applied in a positivist work, such quantitative methods can include a field survey and a laboratory experiment (Bhattacherjee, 2012). It is important to emphasise that the widespread use of quantitative data in positivist works does not necessarily suggest that qualitative data is not seen to offer value to positivist studies and therefore should not be used; rather, the opposite may be true (Bhattacherjee, 2012).

5.3.1.2 Interpretive Philosophy:

In an effort to outweigh and ultimately re-balance the drawbacks associated with the positivist approach, the interpretivist approach is recognised as being centred on the assumption that reality is not exterior and objective, as highlighted by Easterby-Smith et al. (2002), but rather is afforded meaning by people and therefore is considered socially constructed (p. 29). In the view of Kaplan and Maxwell (1994), one of the most critical distinctions recognised between interpretive and positivist methods is that the main focus of the interpretive approach is directed towards the intricacy of how people make sense of things when there is the occurrence of a specific situation. In this instance, the interpretive paradigm relates to establishing what meaning an individual had in mind with the aim of understanding the phenomena under analysis (Orlikowski & Baroudi, 1991). As such, interpretive works commonly encompass the need to gather qualitative data through the examination of a small sample (Myers, 1997; Straub et al., 2005).

Overall, the interpretive approach does not seek to examine external elements or present theories when developing insight into social phenomena; rather, it aims at acknowledging and accordingly highlighting the causes underpinning the difference between people's behaviours, beliefs and experiences in the specific place the event unfolds (Hussey & Hussey, 1997). In this regard, those investigators implementing an interpretive approach need to ensure engagement and involvement within the phenomenon under examination; through so doing, the researcher needs to ensure their thoughts and attitudes are not isolated from the phenomenon under examination (Guba, 1990). As such, interpretive works have been recognised as having a degree of subjectivity in their approach to identifying and drawing conclusions on social behaviours (Bryman, 2001; Guba, 1990; Hussey & Hussey, 1997). When considering the information system field in particular, the point has been made by Walsham (1993, 1995) that, through the adoption of an interpretive method, researchers aim to gather complete insight into the information system context, in addition to how the given context is affected by and affects mechanism systems.

In the view of Bhattacherjee (2012) and Hussey and Hussey (1997), there is a clear distinction to be made when considering the interpretive and positivist approaches, which also may be established in line with the study design, mechanisms and tools implemented and used in the gathering and examination of data. Although field surveys and laboratory experiments are recognised as the most widely implemented approaches in positivist works (Bhattacherjee, 2012; Orlikowski & Baroudi, 1991), action research, case study and ethnography are seen to be the most widely recognised approaches implemented in interpretive works (Bhattacherjee, 2012; Hussey & Hussey, 1997). Moreover, whilst the positivist method is viewed as being more deductive and quantitative, the interpretive approach, on the other hand, is more inductive and qualitative (Bhattacherjee, 2012; Easterby-Smith et al., 2002). Stated otherwise, in research cases that seek to build theory, interpretive approaches are utilised, beginning with the collection of data from the chosen population, before seeking to build theory (Bhattacherjee, 2012; Myers, 1997).

A further contrast with the positivist approach is that it is common for the interpretive approach to utilise qualitative data that is commonly gathered from a relatively small number of subjects (Bhattacherjee, 2012; Easterby-Smith et al., 2002; Hussey & Hussey, 1997). Accordingly, in the case of interpretative works, relative to positivist works, generalisability is seen to be low (Collis & Hussey, 2003; Easterby-Smith et al., 2002; Hair et al., 2003; Orlikowski & Baroudi, 1991; Remenyi et al., 1998; Saunders et al., 2003).

5.4   Rationalising Positivism Selection

In line with the present work's aim, which focuses on analysing and gathering insight into the key aspects affecting the use of mobile banking apps amongst Jordanian customers, the philosophy considered to be most appropriate for use in this study is that of the positivist approach (Bhattacherjee, 2012; Orlikowski & Baroudi, 1991). A number of justifications underpinning this selection are given below:

- Technology acceptance and information systems present a mature, well-developed subject arena, offering a number of different models and theories that have received much attention and validation; therefore, they can be applied in an effort to provide explanation as to individual behaviour towards technology (Orlikowski & Baroudi, 1991; Venkatesh et al., 2003). Otherwise stated, the presence of strong, theoretical foundations, such as in the cases of TAM, TPB, TRA and UTAUT, facilitate the researcher in choosing the most appropriate factors, whether independent or dependent, that could be used to predict the actions, behaviours and intentions of people towards the use of new systems (Venkatesh et al., 2003; Orlikowski & Baroudi, 1991). In consideration to the present work, as has been discussed in the third chapter, the conceptual model and its corresponding research hypotheses have been devised in line with the UTAUT theory, as well as other elements derived from literature in the field of technology acceptance.

- In this study, emphasis is placed on the completion of an objective test for the key aspects affecting customer use in mobile banking apps, which is seen to be

more likely to be achieved through the application of the positivist approach as this commonly encompasses a greater degree of objectivity, not only in methods but also in researchers (Bhattacherjee, 2012; Bryman & Bell, 2007; Easterby-Smith et al., 2002; Orlikowski & Baroudi, 1991). In this work, the key factors inherent in the suggested model have been chosen in relation to logical and theoretical justification, aside from the beliefs and opinions of the researcher. Secondly, the present work applies an online survey-questionnaire; this facilitated the subjects in answering questions away from the researcher, meaning there is a greater degree of objectivity in the data, without any bias from the researcher's own beliefs (Bhattacherjee, 2012; Sekaran, 2003).

- In analysing the study hypotheses and accordingly validating the suggested model in the present work, an empirical study was deemed necessary. The purpose of the study was centred on achieving a greater degree of reliability and generalisability in the results. Accordingly, there was a need to secure accurate and sufficient quantitative data from a large number of Jordanian banking clients, and to further employ sophisticated statistical analyses, such as regression analysis. As such, a greater degree of applicability and feasibility were seen to be more likely in the instance that positivist approaches, such as field surveys, were applied; this would facilitate the gathering of the necessary data through the use of more convenient tools, such as online questionnaires (Bhattacherjee, 2012; Collis & Hussey, 2003; Easterby-Smith et al., 2002; Remenyi et al., 1998).

- In consideration to the criteria implemented by Orlikowski and Baroudi (1991) in the classification of positivist researchers, the present work needs to be detailed in terms of the positivist paradigm scope. This is owing to the present study's process nature, which appears to be more deductive and positivist owing to the fact it seeks to test theory as opposed to building theory. In an effort to test the research hypotheses and accordingly validate the conceptual model, both independent and dependent variables underwent quantitative measurement. The results yielded from the sample are more likely to be generalisable to the population of Jordanian banking customers as a whole (Orlikowski & Baroudi, 1991).

5.5   Research Approach

The choice of which research method is to be adopted is a critical element in the research process. This decision is followed by the choice of a plan and corresponding procedures in the completion of the study and in providing answers to the research questions. Importantly, when considering the different approaches, methodologies and research design, a number of different terms are used by researchers, with an association between the different research approaches and the various philosophies and methodologies. Notably, there are a number of different paradigms that have emphasised research approaches applied in the study of information systems and social science, namely quantitative versus qualitative, exploratory versus confirmatory, and inductive versus deductive, which will be given further consideration in this section (Fitzgerald & Howcroft, 1998).

5.5.1 Quantitative versus Qualitative

A number of other outcomes may be seen when categorising studies between interpretive and positivist through the categorisation of research approaches into either qualitative or quantitative (Bhattacherjee, 2012; Straub et al., 2005). As depicted in figure 5.1, a qualitative approach is more focused on the interpretive; a quantitative approach, on the other hand, directs more attention towards a positivist perspective (Bhattacherjee, 2012; Saunders et al., 2009). Amongst the key differences identifiable between the two approaches are the way in which the methods may be applied in an effort to gather and examine the necessary data, and the degree to which quantifiable and numerical data can be used to describe the problems inherent in the study (Bryman & Bell, 2007).

Figure 5.1: Research approaches and Epistemology
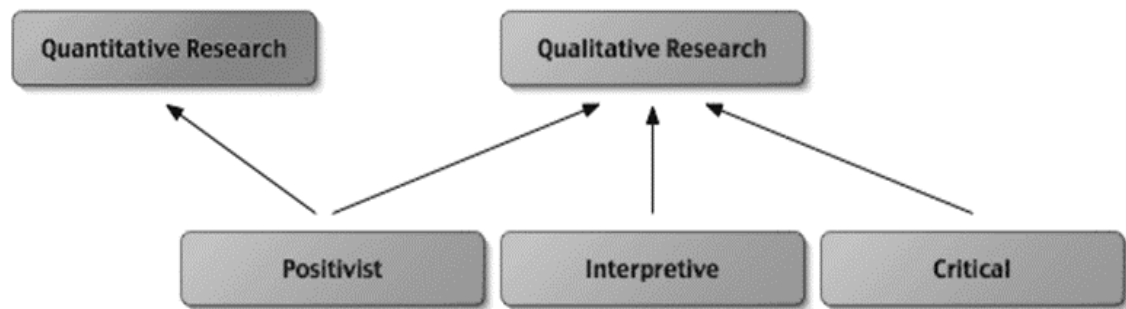
(Source: Straub et al., 2005)

In consideration to qualitative works, a more detailed examination of the phenomenon under investigation is necessary if the words and their purport are to be well understood in line with their natural environment (Bryman & Bell, 2007; Myers, 1997). Otherwise stated, when adopting a qualitative approach, key emphasis is centred on the phenomenon's comprehension and meaning, rather than merely predicting and explaining it (Bhattacherjee, 2012; Denzin & Lincoln, 1998; Myers, 1997). Accordingly, it is common for qualitative studies to warrant the researcher to be one aspect of the creation of meaning around the phenomenon under analysis. Furthermore, through the very nature of a qualitative research, the researcher is required to demonstrate a greater degree of analytical mentality and creativity, in addition to a more detailed experience of the context in which the data is to be gathered (Bhattacherjee, 2012). Owing to the fact its nature is both interpretative and inductive, qualitative works are commonly carried out with the overriding purpose of establishing theories that correspond with the researcher's own understanding (Collis & Hussey, 2003).

Examples of interpretative approaches include action research, case studies and ethnography, which commonly secure the necessary data through the application of specific tools, such as documentation and interviews (Bhattacherjee, 2012; Saunders et al., 2003). It is important to acknowledge that it is common for informal language to be used in the case of qualitative works (Collis & Hussey, 2003; Creswell, 2003), whereas quantitative approaches are

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recognised as 'organised methods for combining deductive logic with precise empirical observations of individual behaviour in order to discover and confirm a set of probabilistic causal laws that can be used to predict general patterns of human activity' (Neuman, 1997, p. 63).

More generally, in the completion of quantitative works, the data gathered are commonly of a numerical and statistical nature; therefore, more formal language tends to be used in such research (Bhattacherjee, 2012; Collis & Hussey, 2003; Creswell, 2003; Guba & Lincoln, 1988; Saunders et al., 2003). In quantitative works, there also is a need to complete an empirical examination of social phenomenon through the adoption of particular statistical approaches in the analysis of the data commonly obtained through the implementation of specific tools and methods, such as self-administered questionnaires (Collis & Hussey, 2003). As summarized in table 5.1, it is stated that the quantitative approach directs more emphasis to the positivist view; moreover, quantitative works tend to be more deductive through investigating, analysing and validating the causal links between variables in line with the formal propositions so as to estimate and accordingly describe the phenomenon under examination (Orlikowski & Baroudi, 1991).

Moreover, quantitative works tend to seek out generalisability in their findings; this warrants a significant degree of numerical data needing to be obtained from a sizeable sample (Collis & Hussey, 2003; Orlikowski & Baroudi, 1991). As has been pointed out in the works completed by Bhattacherjee (2012), Myers (1997) and Straub et al. (2005), amongst others, laboratory experiments, more formal approaches (such as econometrics), field surveys and numerical methods (such as mathematical modelling) are considered to be amongst the most commonly utilised quantitative positivist methods with the proficiency to gather quantitative data.

Table 5.1 Differences between Quantitative and Qualitative research approaches

	Quantitative	Qualitative
Principal orientation to the role of the theory to research	Deductive Testing of theory	Inductive Generation of theory
Epistemological Assumptions	Positivism	Interprevitisim
Ontological Assumptions	Objectivism	Constructionism

Source: Bryman (2006)

When considering that the decision has been made to adopt a positivist paradigm for the present work, a quantitative approach has been implemented in order to achieve the aims and objectives of the present study. Essentially, in order to obtain the present work's data, a field survey study was carried out through the use of a self-administered questionnaire. In addition to the theoretical constructs underpinning the conceptual model, there is the characterisation of various aspects through the use of values and levels, these are: behavioural intention, effort expectancy, facilitating conditions, hedonic motivation, performance expectancy, price value, perceived risk, social influences, and use behaviour (Myers, 1997; Straub et al., 2005). Accordingly, in the present work, the data obtained is more quantitative than qualitative.

5.5.2 Induction versus Deduction

When implementing a methodological approach, consideration needs to be directed to whether exploration will be of something new, i.e. inductive, or whether there will be the application of existing knowledge in a new context, i.e. deductive. The former is focused on gathering insight into the various perspectives of a social problem (Yin, 2009). Essentially, a theory/framework is what should be produced from an inductive study (Saunders et al., 2011), with the researcher examining patterns in the empirical reality, which create general inferences and, based on such inferences, facilitate the conceptualisation of a theory/framework. Owing to the fact that such inferences

are made within a particular context, the theory/framework may not be generalizable but may be contextual.

On the other hand, however, other researchers might make the decision to utilise data that has a diverse nature, so as to facilitate generalisation (Collis & Hussey, 2009). Importantly, inductive research is focused on shifting from particular observations to more wide-ranging theories and generalisations. In contrast, deductive studies direct a more restricted view, focusing on specifics (Saunders et al., 2011). In this regard, one of the most apparent differences between deductive and inductive research, as emphasised in the work of Creswell (2009), is the use of existing theory and literature. As noted by Creswell (2009), the deductive approach is focused on theory-testing, meaning that literature is considered in mind of establishing interrelationships and questions to be posed prior to the collection of data. As further advocated by Creswell (2003), this research can be categorised as deductive. In the present work, there was the formulation of a conceptual framework in line with the UTAUT theory, as discussed in the literature. Subsequently, the framework underwent testing in the context of the banking sector in Jordan.

5.5.3 Exploratory versus Confirmatory

The majority of social science research can be seen to fall between the confirmatory and exploratory approaches (Gerring, 2001). Whilst the former, confirmatory studies, tend to be implemented when researchers have the goal of testing pre-specified relationships, with the aim of further validating them, exploratory studies, in contrast, tend to be adopted when researchers are concerned with defining potential relationships in their most general forms, and accordingly facilitating a number of different approaches to predict resulting relationships (Saunders et al., 2009). Otherwise stated, when conducting an exploratory work, researchers are not seeking to validate relationships that are outlined before analysis, but instead seek to enable the method and data to define the relationships between the variables of the models, and the nature of such (Hair et al., 2006).

When applying the exploratory strategy, it is common for researchers to be open in regard to conceptualisation, investigation and theorisation so as to ensure sensitivity to the evidence under examination. The process, in essence, is centred on discovery; the focus is on improving the alignment between evidence and theory (Gerring, 2001). Moreover, exploratory research may be considered through the lens of being inductive in nature, with various benefits offered, including flexibility when it comes to generating hypotheses, rather than requiring more than data to provide support (Meyers et al., 2005). Notably, however, the process of exploratory research causes problems in terms of over-fitting results, which goes hand-in-hand with bias. In contrast, however, confirmatory studies tend to rely on the deductive approach and statistical inferences, as recognised by Meyers et al. (2005), with hypotheses first outlined and then tested with a view to providing answers to specific questions.

This goes some way to rationalising why, overall, there is a preference towards the confirmatory approach when completing analyses (Gerring, 2001). Although the present work has adopted a quantitative and deductive approach, alongside hypotheses-testing, the research also utilises an explanatory approach owing to the fact its aim is to establish the link between the main factors that influence the utilisation of mobile banking apps and actual usage, in consideration to the UTAUT.

Notwithstanding this, however, the study also allows manoeuvre in terms of the exploratory inductive process, which is initiated with empirical evidence of the particular phenomena before proceeding on to a level of abstraction, theorisation, generalisation and the confirmatory deductive process in the testing of theories' hypotheses (Rocco et al., 2003). Accordingly, in various aspects of this study, there are exploratory purposes; this is most clearly seen when investigating the key factors influencing the use of mobile banking apps. As has been validated in the work of Robson (2002), the purpose of the research might change with time, meaning that more than one approach could be implemented. This is a view that has been further corroborated in the writings of Saunders et al. (2009), who suggest that it is feasible to complete a work with more than one purpose.

5.6 Research Data and Methods

A data collection method is seen to be the methodological instrument applied by a research in the gathering and analysing of data. There is a need for researchers to direct attention to their epistemological, methodological and ontological position whilst also considering their selection of methodical tool (Saunders et al., 2011). In this way, researchers may need to make use of both primary and secondary data when answering their research questions. More specifically, it is common for researchers to use both through the review of past literature, in order to gather more in-depth insight into the phenomenon under examination, whilst also deriving new and fresh data (Malhotra & Birks, 2006).

In such a way, the present work makes use of both types of data: the primary data comprising data gathered by the researcher in specific consideration to the present work. When gathering primary data, researchers might choose to use one or more of the primary data collection methods to gather it. The most widely used instruments include focus groups, interviews, observations and questionnaire surveys (Saunders et al., 2011). In regard to secondary data, this may be any data that has been gathered in the past, which can be used by researchers to further their own research purposes. Secondary data is inexpensive to gather and convenient to use, but ultimately has been gathered in mind of another purpose and so might not be as accurate or up-to-date as primary data (Yin, 2009). The following section considers the primary and secondary data in greater depth.

5.6.1 Primary and Secondary Data

Primary data may be recognised as that which is collected by the researcher, first hand, with the aim of satisfying the research purpose. Such data will be high-quality in relation to the study objectives and research context owing to the fact it has been gathered with the intention of satisfying the aims of the research. Both quantitative and qualitative approaches may be used. In the view of Fisher (2007, p. 153), there are two types of discoverers, namely explorers and surveyors. Importantly, the former explores with the aim of trying to gather

greater insight into the unknown, (they do not know what is unknown, and so need to ensure they remain open). Such explorers are similar to qualitative researchers. In contrast, however, surveyors focus on what they know.

They utilise structures in an effort to survey what they need to establish. Surveys were well-informed in terms of their aims, and accordingly plan to seek out what is needed. Furthermore, surveyors measure various things; they create maps and accordingly present their results through statistics in the form of tables (Fisher, 2007). Surveyors can be said to be comparable to quantitative researchers. In the present work, the researcher adopts the roles of both surveyor and explorer, notably in the quantitative and qualitative aspects, respectively. Secondary data, in contrast, is data which has been presented in the past and which has not been gathered with a specific intention for the research purpose.

In this vein, a definition is provided by Sekaran (2003, p. 63) as to the meaning of secondary data: 'Secondary data can be extracted from various sources, including books and periodicals, government publications and information sources, the media, census, stock market reports, and mechanised and electronic information of all kinds such as the bar code, scanner data, and the Internet.' Moreover, Saunders et al. (2009) considers secondary data as being categorised into two different types, namely documentary data, which encompasses written data, such as that included in books, journals, newspapers and reports, and non-written data, such as that available via CD-ROMs, tapes and television programmes.

In much the same way as other works carried out before it, this study uses secondary data through the review of past published articles and research. Moreover, existing literature on topics of relevance, such as those focused on mobile banking, technology acceptance and self-service banking technology, have undergone review with the aim of establishing understanding in the field. This study has also completed a literature review focused on mobile banking in the Jordanian context. Nonetheless, owing to the lack of research in the context under examination, research carried out in other countries has also been reviewed and considered. The secondary data gathered is sourced from

organisations with a good reputation; this is viewed as being valuable as the data is then considered reliable.

The data presents an unobtrusive and valuable source of data for all works (Saunders et al., 2011). Websites of major banks in Jordan, Internet World Stats, the ITU and World Bank were accessed with the aim of gathering insight into secondary data in relation to the overall adoption of mobile banking and the patterns of such. Alternatively, the primary data could be gathered through the completion of interviews, observations and questionnaires (Hair et al., 2003). Such approaches may be implemented in the case of both qualitative and quantitative works (Silverman, 2001). The following section discusses in greater depth the most common research methods when aiming to gather primary data, as well as their advantages and disadvantages.

5.6.2 Research Methods

In the view of various scholars, such as Bhattacherjee (2012) and Remenyi et al. (1998), there are various different types of study method, which the researcher can review and examine in order to establish the most appropriate one for completing their empirical works. Good examples of such research methods include action research, case studies, ethnography, field experiments, field surveys, focus groups and laboratory experiments (Bhattacherjee, 2012; Orlikowski & Baroudi, 1991; Sekaran, 2003; Zikmund, 2003). Nonetheless, as has been supported in the work of Orlikowski & Baroudi (1991), amongst the most common research methods to be utilised in the field of information system are case studies, field surveys and laboratory experiments.

It is essential that all research methods be chosen with consideration to the study nature and aim: as an example, a focus group is considered most suitable when carrying out exploratory studies; a field survey, on the other hand, is recognised as most suitable when completing explanatory studies or cause-effect works (Bhattacherjee, 2012). Nonetheless, when selecting the most suitable method, a number of different considerations need to be made, including the goals of the research, the study's adopted philosophical approach, and limitations,

whether in terms of costs, resources or time (Bhattacherjee, 2012; Remenyi et al., 1998; Saunders et al., 2003; Sekaran, 2003; Zikmund, 2003). In line with what is stated by Bhattacherjee (2012), there are three procedures warranting consideration in any work prior to completing an empirical study, all of which have been summarised by Bhattacherjee (2012), as highlighted below:

- ✓ In what ways will the data be gathered?
- ✓ What techniques and sample size are deemed necessary?
- ✓ What elements need to be considered when gathering data and developing the instrument(s)?

Based on the above-mentioned facts about the most common methods that applied in the field of information systems, also based on the fact that this research is an explanatory study and applies cause-effect relations within the proposed research model, this study recognises the field survey as the most suitable research method to develop the research instrument (E-questionnaire) and then collects the date form the targeted sample.

5.6.2.1 Field Survey:

When a field survey is carried out without the administration or manipulation of causal variables, it may be described as a non-experimental approach that seeks to analyse the causal relationships between independent and dependent variables through the application of a statistical method (Bhattacherjee, 2012; Saunders et al., 2003). In more general terms, through the adoption of a well-structured questionnaire or, in other instances, interviews—a survey research may be able to gather the necessary data from a sample of subjects through systematic means, gathering insight into their actions, attitudes, behaviours, beliefs, opinions and profiles (Bhattacherjee, 2012; Dwivedi et al., 2006; Remenyi et al., 1998; Saunders et al., 2003).

There are two different types of field survey, which can be grouped in regard to their time horizon, namely: longitudinal field surveys, and cross-sectional field surveys (Bhattacherjee, 2012; Saunders et al., 2012; Yin, 2009). In the case of the former, independent variables are measured, followed by the

measurement of their dependent variables at another time; in regards the latter, the same questionnaire analyses both types of variable at the same time (Bhattacherjee, 2012). In line with the tool applied in order to gather the necessary data, survey studies may be grouped into two different types, namely questionnaire survey and interview survey (Bhattacherjee, 2012). It is common for the data gathered through the use of questionnaires to be provided by subjects, who take on the individual responsibility of completing the questionnaire and accordingly detail their answers in line with the format provided (Bhattacherjee, 2012; Yin, 2009).

In regards the data gathered through interviews, it is the interviewer's responsibility to interact with the subjects, whether face-to-face or through other means, with the interviewer also needing to document the answers and data gathered. It is important to recognise that both types of survey method, whether interviews or questionnaires, are able to satisfy different study aims and purposes; they can investigate, explain and describe various phenomena under examination (Yin, 2009). It is evident that the survey approach is able to facilitate direct access to various information, such as the attitudes, beliefs and emotions held by the sample subjects, in addition to facilitating the gathering of large volumes of data in relation to all aspects (Bhattacherjee, 2012; Zikmund, 2003).

Furthermore, such an approach is a more cost-efficient approach, positioning researchers in such a way that gaining access to a large number of respondents across a wide geographic area within a short period of time is possible, which is not always the case when compared with experimental methods and case studies (Saunders et al., 2003; Sekaran, 2003; Zikmund, 2003). This provides a further justification behind why such data and findings gathered from the completion of survey studies can be better generalised (Bhattacherjee, 2012; Creswell, 2003; Hair et al., 1995). Moreover, the survey is considered to be more acceptable when data is gathered from a larger sample, predominantly owing to the fact that such an approach benefits from a significant degree of spatial and temporal appropriateness, in addition to being a more suitable and comfortable way of providing the necessary data whilst gaining insight into the

views and perceptions of the respondents (Bhattacherjee, 2012; Saunders et al., 2003).

Nonetheless, much like other techniques, the survey approach has faced criticism for various reasons, including that it is considered to be more susceptible to being affected by bias (Bhattacherjee, 2012). Bias is seen to be a pivotal concern when aiming to increase the internal validity of the method. However, the internal validity of the survey approach may also be threatened by other considerations, including the problem of inference associated with the causal link between variables (Bhattacherjee, 2012). Importantly, this research has been completed with the objective to test and accordingly provide an explanation for the use of mobile banking apps amongst banking customers in Jordan. Owing to this purpose, it was considered necessary that a wealth of accurate data be gathered from a large sample of banking customers from Jordan (Bhattacherjee, 2012). It is recognised that the use of such a study tool would require a large number of resources, including financial, time and human, in completing the research (Bhattacherjee, 2012). Notably, in the case of self-funded student research, as in this instance, such resources are markedly limited.

It is essential that the method chosen for the work is seen to be most appropriate in the completion of an empirical study; however, such a decision is affected by the units of analyses under examination. This is owing to the different elements associated with the applicability and feasibility of such approaches, as opposed to the nature of the units of analysis (i.e. citizens, customers and organisations) (Bhattacherjee, 2012 Saunders et al., 2012; Yin, 2009). Furthermore, there has been much recognition the arena of information systems or that of the electronic banking field benefit most keenly from field surveys, with this method commonly implemented when seeking to gather insight into the behaviour of people towards new systems (Dwivedi & Irani, 2009; Dwivedi et al., 2006; Orlikowski & Baroudi, 1991; Williams et al., 2009).

Selecting the most suitable approach also rests on the extent to which the researcher can influence the setting in question. In specific regards the banking

field in Jordan, being involved in such a context is not practical for the researcher; subsequently, this resulted in the need to consider a survey method, which is viewed as being more practical and therefore appropriate when compared with other techniques (e.g., action research and observation research), which commonly warrant that researchers be actively involved in the setting under examination (Bhattacherjee, 2012 Saunders et al., 2012). When selecting the most appropriate research method, there is a need to consider the type of models and theories undertaken in testing the study problem; in other words, theory-building versus theory-testing (Bhattacherjee, 2012).

In relation to the present work, as detailed in the fourth chapter, the research hypotheses and conceptual framework suggested in this model were centred on a strong, present, theoretical underpinning; subsequently, this necessitated the need to gather a sufficient volume of accurate quantitative data, in addition to the application of a sophisticated statistical analysis approach focused on achieving the validation of the conceptual model whilst also analysing any underpinning hypotheses (Bhattacherjee, 2012 Saunders et al., 2012; Yin, 2009). Although there are a number of quantitative positivist methods that may be deemed suitable in the need to gather quantitative data (e.g., experimental studies, field survey and observations), nonetheless, there is the widespread view that surveys are most appropriate when seeking to achieve conceptual model validation and research hypotheses verification, specifically in the field of social science research, where the units of analyses are individuals; in this case, banking customers (Bhattacherjee, 2012; Straub et al., 2005).

When taking into account the aforementioned reasons and, in consideration to the present work's nature, which is a quantitative positivist study, as highlighted in earlier sections, the decision was made that a field survey would be not only the most appropriate and suitable approach to accessing a large sample and accurate data within a reasonable time, but also presents a cost-effective means of so doing (Bhattacherjee, 2012 Saunders et al., 2012; Yin, 2009). The following section provides a more in-depth discussion as to the various elements inherent in the survey approach.

5.7   Research Sample

Sampling may be described as an approach focused on choosing a group of individuals who represent an entire population. Nonetheless, the sampling method chosen will be affected by cost restrictions, research objectives, sample size and time available (Sekaran, 2003). In the view of Bhattacherjee (2012, p. 65), sampling may be explained as follows: 'statistical process of selecting a subset (called a 'sample') of a population of interest for the purposes of making observations and statistical inferences about that population.' In the case of such a systematic process, one of the key assumptions is that the units of analysis, whether customers, students or organisations, for example, should be seen to represent the larger population from which the sample is chosen (Gay & Airasian, 2000).

In the specific context of social science, there is the widespread view that the analysis of an entire populations tends to appear less applicable and unworkable, and therefore warrants a larger number of resources, whether in terms of cost, human resources or time (Bhattacherjee, 2012; Gay & Airasian, 2000). Accordingly, sampling has been the focus of many claims that it is a more practical and appropriate option in the completion of social science works, particularly when the population under examination is large (Bhattacherjee, 2012; Gay & Airasian, 2000; Zikmund, 2003). The following subsection provides a more in-depth explanation as to the process of frame, population and technique sampling.

5.7.1 Research Population

A research population is defined as a group that includes all individuals, items or any other type of unit of analysis, such as customers, organisations, students or users, for example, where all units comprise specific features in which the researcher has an interest (Sekaran, 2003). In consideration to the present work and its aims, which places emphasis on the analysis of those factors affecting the use of mobile banking apps amongst customers in Jordan, each Jordanian banking customer is viewed as being a potential candidate for the study's

population, and therefore can be targeted as a potential respondent to the research survey.

Despite the fact that a controlled environment may be measured through observation and monitoring could improve the overall generalisability achieved by the findings, due to limited resources, what would be required in order to facilitate this approach is not available, predominantly owing to the fact that the study is a self-funded and a student work. Moreover, the banking customer population is large and known to be scattered across a large geographic area. This poses other issues in terms of the entire population, especially when reflecting on the limitations in terms of human, cost and time resources. Owing to these reasons, an appropriate sample size, type and frame that represents the population as a whole was considered most appropriate in gathering the necessary data, as opposed to attempting to approach the population as a whole.

5.7.2 Shaping the Sampling Frame

A sampling frame may be described as part of a whole population to which the researcher is able to gain access and derive data; (Saunders et al., 2012; Yin, 2009) it is essential that the sampling frame represent the population as a whole so as to ensure the researcher is able to generalise the findings from the sample to the population as a whole (Bhattacherjee, 2012). Essentially, this work has targeted the users of mobile banking apps, who otherwise may be described as actual users who have chosen to use mobile apps and therefore are open to innovative banking services.

The subjects were asked to take part in an online questionnaire, notably on a voluntary basis. The sampling method implemented was unrestricted to ensure the aggregation of heterogeneous subjects. A covering letter was included in the questionnaire to explain the purpose behind the questionnaire and study. In addition to inviting people to participate via email, links to the online questionnaire were also posted on social networks.

5.7.3 Selection of Sampling Technique

Sampling techniques may be broken down into two different types: primarily, probability sampling, also referred to as random sampling, implies the potential for any individual to be chosen from the population, with the subjects chosen randomly through a probability sample; secondarily, non-probability sampling, otherwise referred to as convenience sampling, differs to the first type through facilitating the research by intentionally choosing the sample population (Bryman, 2008). There is a pressing need for the research sampling technique to be actively chosen, with such a decision needing to consider the final sample that is to be chosen from the sampling frame (Bhattacherjee, 2012).

Each of the sampling techniques available will be considered below, alongside justification for the approach chosen in the present work. In probability samples, it is common for there to be the use of cluster sampling, simple random sampling, stratified sampling and systematic sampling, as noted by other scholars (Bhattacherjee, 2012; Bryman, 2008). In an effort to ensure the equal size of the sample included in the work, simple random sampling may be used; however, when the population is sub-divided into various homogenous groups that are drawn into the sample from each group, there is the use of stratified sampling. Cluster sampling is used in the instance that various clusters of individual units needing to be grouped.

Importantly, stratified and cluster sampling differ in that only selected clusters are surveyed randomly with cluster sampling; however, with stratified sampling, there is a random survey of each strata. Through ensuring the avoidance of a table of random numbers, units are chosen both randomly and directly from the sample through the use of systematic sampling. Despite the fact that probability sampling provides a number of different benefits, including the lack of sampling bias and the ability to draw inferences, a higher degree of generalisability is achieved (Bryman, 2008).

The present work aimed at achieving a large sample with differing characteristics in terms of age, education, gender, and internet experience. As such, the application of an approach was recognised as problematic in the

present work. Essentially, various requirements that need to be satisfied in order to ensure success in the adoption of this technique were not feasible in the sampling frame of the work: as an example, a detailed and up-to-date list of Jordanian banking customers was not available. As such, it was not possible for the researcher to establish a non-zero and accurate probability for all Jordanian banking customers to be a part of the final sample. Accordingly, this represented one of the main limitations facing the use of probability sampling in the present work (Castillo, 2009; Dwivedi et al., 2006).

Moreover, considering the widespread population and its large size, accessing targeted samples through probability sampling appeared to be far more impractical and problematic than other methods (Bhattacherjee, 2012; Castillo, 2009). In addition, in consideration to security and privacy factors, any information relating to customers' contacts and addresses could not be provided by the banks in questions; subsequently, this caused further issues in relation to the adoption of probability sampling (Castillo, 2009; Dwivedi et al., 2006). Considering the aforementioned factors, probability sampling was held to be less applicable and not as well-suited when choosing samples from the Jordanian banking customer population.

Directing attention to non-probability sampling, it is common for convenience, quota and snowball sampling to be used (Bhattacherjee, 2012; Bryman, 2008). Sample accessibility, alongside the researcher's own judgement, forms the basis of convenience sampling, with researchers choosing to implement such a sampling method commonly deriving their sample from the part of the targeted population that is considered more convenient, easier to access, and within reach (Bhattacherjee, 2012; Champion, 2002). When seeking to establish various groups or different categories with relative proportion to the participants, it is commonplace for quota sampling to be used, which may be compared to the stratified sampling approach, involving the researcher adopting both methods; therefore, the population could be fragmented into what are considered to be mutually exclusive subgroups (Bhattacherjee, 2012).

On the other hand, when original subjects share the survey with other potential participants, this may be described as snowball sampling. This approach, in some instances, may be the only approach available and considered practical by some of the population; nonetheless, the results gathered through the application of such a technique may not be so well generalised (Bhattacherjee, 2012; Bryman, 2004). Despite the fact there are various restrictions and drawbacks in generalising to the population, in addition to the ability to make inferences, non-probability sampling does offer various benefits, including that it is inexpensive, targeted, time- and cost-efficient (Bryman, 2008).

In consideration to the lack of an up-to-date and detailed list of Jordanian banking customers, as mentioned earlier, in combination with the fact that such banks are unable to share the contact details of their customers owing to privacy and security considerations, it was decided that the most appropriate sampling technique to be applied in this research would be non-probability (Castillo, 2009; Dillon et al., 1994). A further justification for this approach is that the population of banking customers in Jordan is widespread and large, meaning convenience sampling would be more cost-effective and practical in this case (Castillo, 2009; Dillon et al., 1994; Wilson, 2006).

It has been noted by Cooper (2000) that, when considering non-probability methods for online surveys, there are various techniques. First and foremost, harvested e-mail lists may be of use; these are defined as 'sets of e-mail addresses collected from postings on the web and from individuals who are (wittingly or unwittingly) solicited for their e-mail addresses' Fricker (2006). When making use of such a type of survey, researchers purchase unsolicited e-mail lists; this is considered to be more a commercial approach as opposed to a professional one, and could even be said to go against ethical and professional standards. Moreover, for consideration is entertainment polls survey, which seeks to gather insight into general issues lacking restrictions for any sample frame; in this vein, entertainment polls surveys are recognised as unscientific.

A third option is unrestricted self-selected surveys, which do not encompass any restrictions, thereby allowing any internet user to complete the survey

through its widespread availability on social media, in emails, and on various advertising mediums and websites. This survey type does, however, have limitations in the sense that it lacks a sample frame. Nonetheless, a number of well-regarded scientific establishments support this type of survey as a valuable and legitimate approach (Couper, 2000). Above all, this study has applied non-probability as its sampling technique, with unrestricted self-selected survey technique. Owing to the fact that this particular method has sought to encompass a wide-ranging geographical area and survey a large population in mind of gathering data from a diverse population with varying characteristics, such as in terms of age, education level and gender, for example, this method was believed to be most suitable.

Owing to the fact that various discussion forums and social groups were used to publicise the research and invite participants to join, this approach was viewed as most suitable. In an effort to encourage participation, the survey was detailed in various social media groups related to different parts of Jordan. When considering sample size, the literature suggests the need to have at least 384 respondents (Comrey & Lee, 1992; Tabachnick & Fidell, 2001). Owing to such findings, the researcher made the decision to target at least 384 individuals.

5.7.4 Sample Size

When making a decision as to the sample size of a questionnaire survey, there is a need for the researcher to direct attention to two different elements, namely the population size and the margin of error. In this regard, margin of error has been described by Fisher (2007, p. 189) as 'the measure of uncertainty of how much should be taken as a sample to be considered as the representative of the whole population'. In this vein, the table below provides guidance as to the number of questionnaires needing to be completed in direct relation to the population size and margin of error.

Table 5.2: Margin of error

	Margin of error			
Population	5%	3%	2%	1%
50	44	48	49	50
100	79	91	96	99
150	108	132	141	148
200	132	168	185	196
250	151	203	226	244
300	168	234	267	291
400	196	291	343	384
500	217	340	414	475
750	254	440	571	696
1,000	278	516	706	906
2,000	322	696	1,091	1,655
5,000	357	879	1,622	3,288
10,000	370	964	1,936	4,899
100,000	383	1,056	2,345	8,762
1,000,000	384	1,066	2,395	9,513
10,000,000	384	1,067	2,400	9,595

Source: Saunders et al. (2002, p. 156 as quoted in Fisher, 2007, p. 190)

Essentially, selecting the most appropriate sample size not only assists in achieving a greater degree of results generalisability from the sample to the targeted population, but further facilitates the researcher in completing a thorough and well-considered statistical analysis; subsequently, this helps to achieve greater validity and reliability in the results (Hair et al., 2006; Luck & Rubin, 1987; Malhotra & Birks, 2003). Nonetheless, when it comes to establishing what is viewed as an optimal sample size, thus far, there is a lack of consensus (Muthén et al., 2002). This is owing to the fact that there are a number of different elements needing to be taken into account in this regard, including the suggested complexity of the conceptual model, the target population's overall accessibility, the degree to which the variables are normally distributed, and the effect of some variables on others (Kline, 2005; Muthén et al., 2002; Tabachnick & Fidell, 2007).

Kline (2005) recommended that in case of applying complex model with many interrelated relations, the sample size should not be less than 200 responses. However, Hair et al. (1998) stated that the sample size should be between 200

and 400 responses in order to be accurate and suitable. Hair et al. (2006) and Carmines and McIver (1981) mentioned that there are particular fit indices, such as chi square, that are more sensitive to a larger sample size, and they could indicate a poor fit model via using a larger sample size higher than 400. Regarding Saunders et al. (2002, cited in Fisher 2007, p. 190) the sample of a population of more than a million people should be at least 384 based on 5% margin of error, as seen in table 5.1.

On the other hand, other literature suggests that the sample size should not be less than 300, while 500 is considered to be very good and 1000 would be excellent (Tabachnick & Fidell, 2001; Comrey & Lee, 1992). This study targeted the Jordanian bank account holders who are using the mobile banking apps. According to internetworldstats.com (2015) the total number of Internet users in Jordan is 5,700,000 and 26% of Adult Jordanian have banks accounts (Petra.gov.jo, 2015), so the expected number of the research population is about 1,482,000. The sample required, according to the sample calculator available online and according to sample size table in research methods books and articles, is 384 people (see Krejcie & Morgan, 1970; Saunders et al., 2009). Accordingly, the researcher targeted a range of 384 to 500 participants for this research and based on the aforementioned discussion, the size of the sample that has been actually gathered in the current research is 416.

5.8   Data Collection Method

The instruments chosen for data collection will be influenced by the data characteristics, the research objectives, and the research problem. In this study, the focus is directed towards the obstacles underpinning the low use of mobile banking services, whilst the aim of the research is focused on establishing which factors affect such usage through analysing cause and effect relationships, as influenced through statistical data. The online questionnaire has been designed with a view to assessing the attitudes, behaviours and beliefs of the respects in regards a particular phenomenon; this is positioned as the study's research strategy (Malhotra, 1999).

5.8.1 Questionnaire Survey

Questionnaire surveys are recognised as being one of the most widely used and appropriate data collection tools when seeking to gather data through survey studies (Saunders et al., 2012; Yin, 2009; Dwivedi et al., 2006; Sekaran, 2003; Zikmund, 2003). In the view of Bhattacherjee (2012, p. 74), questionnaire surveys are 'a research instrument consisting of a set of questions (items) intended to capture responses from respondents in a standardized manner'. In this regard, Hair et al. (2003) further state that questionnaires may be defined as a data collection tool facilitating respondents to read questions and provide answers away from researcher influence and interference.

The questions posed through such a method may be structured, unstructured or a combination. When questions are structured, the respondents will be asked to choose from pre-defined responses; in the case of unstructured questions, the respondents are able to use their own language and may write as much or as little as they choose, expanding as they see fit (Bhattacherjee, 2012). A questionnaire's success, in the sense of the tool being able to gather effective data, ultimately rests on various factors, including the method and language used. Essentially, the questionnaire needs to be designed in a well-mannered way, should be readable and easy to understand in consideration to the perspectives of the respondents (Bhattacherjee, 2012).

In line with how the questionnaire is delivered to the subjects, it is stated that there are three different types of questionnaire survey, namely self-administered, group-administered and online survey (Bhattacherjee, 2012). Self-administered are the most commonly used in the collection of the necessary data over the customer context (Zikmund, 2003). In this case, the questionnaire is distributed across a large number of people, with the questionnaires completed and then sent back to the researcher (Bhattacherjee, 2012). Notably, the respondents are able to give their answers away from any researcher involvement (Hair et al., 2003). However, the respondent's own inclination to complete the questionnaire can affect the response rate, meaning a lower response rate is common in the case of self-administered questionnaires.

This may be seen coupled with the fact that such questionnaires can take up too much of the respondent's time (Bhattacherjee, 2012). In group-administered questionnaires, a sample of respondents is invited by the researcher to meet at a common place, where all individuals are then asked to read and complete the questionnaire (Saunders et al., 2012; Yin, 2009). Such an approach to the questionnaire could be considered to be more suitable, from the researcher's perspective, owing to the fact it can provide a good response rate, whilst also allowing the respondents the chance to clarify any misunderstandings they may have (Bhattacherjee, 2012). Nonetheless, this format might not be suitable if the population is large and dispersed across a large geographic region. Moreover, there are obstacles to be seen in locating a suitable time and place that are convenient to all.

Through making the questionnaire available online, more recently, researchers have been well positioned to develop an electronic questionnaire. Such a questionnaire can then be distributed across large respondent groups with the use of email or other electronic means of communication, such as through social networks, for example (Bhattacherjee, 2012; Saunders et al., 2012; Yin, 2009). There are several alternatives to distribute the online questionnaire such as sending an electronic format of the survey by email and the respondent can download the file then fill and send their answers back by email to the researcher. Another form of sending the online survey could be distributed through specialised survey website to design the questionnaire and provide a hyper-link that could be accessible by the respondents and their answers would be immediately stored on the database of this website survey (Saunders et al., 2012; Yin, 2009).

Online or website survey provides more flexibility to conduct the survey by enabling the researcher to edit/adjust any required changes in the questionnaire content/design. Also, it simplifies the data collection process by enabling the respondents to answer the online questionnaire by few clicks and store their answers immediately on the database of the survey website. In addition, this method enables the researcher to conduct the survey with less cost comparing

to other manual/traditional methods (Saunders et al., 2012; Yin, 2009). Conversely, there are some critics over the online survey such as it has more sample bias because it targets the people who have adequate technological infrastructure such as computers, emails, networks, internet and other amenities to facilitate the use of online survey.

Likewise, there is sample bias in this method because the majority of the respondents are more likely to be from the younger generation who are familiar and prefer using such electronic/online method which in turn would create bias over the age of the respondents among the targeted sample (Yin, 2009). After reviewing the most common data collection methods, online survey was selected as the most appropriate method to collect the required data in this research. This electronic research instrument targeted a wide range of respondents groups across different abroad geographical areas among Jordan (Bryman, 2008; Couper, 2000). There are other reasons and advantages behind the selection of online questionnaire as the data collection method for this study such as its cost-effective method to conduct as this study is self-funded student research (Bryman, 2008).

In addition, Bryman (2008) mentioned other advantages of using such data collection method which found to be useful to this research such as the saving time, unrestricted access, attractive layout, respondents privacy, flexible, and immediate response. Furthermore, because of the nature of the research area of this study, the internet access assumed for the research population who already have such access to use mobile banking services. Specifically, the researcher used Bristol Online Survey (BOS). This software offers the aforementioned traits of the online questionnaire, also it provides the feature of exporting the collected data as an Excel or SPSS file which simplifies the data entry and analysis (Bryman, 2008). Another feature of online surveys is providing links (Preece et al, 2002). BOS provides the Uniform Resource Locator (URL) link of the online questionnaire survey, which is posted online on social media such as (Facebook, Twitter, and WhatsApp).

5.9 Instrument (Questionnaire) design and validation

Questionnaire design and development requires a number of steps before launching the main survey, as mentioned by Churchill and Iacobucci (2004), who suggested a questionnaire development process as seen in figure 5.2. This process consists of sequence of steps such as validation of measurement scale and content, sequence of questions, wording of questions, as well as the physical design of the questionnaire interface.

Figure 5.2: Questionnaire development process

Step 1:	Specify what information will be sought
Step 2:	Determine the types of questionnaire and methods for administration
Step 3:	Content of individual items
Step 4:	Determine form of response
Step 5:	Determine wording of each question
Step 6:	Determine sequence of questions
Step 7:	Determine layout and physical characteristics of the questionnaire
Step 8:	Re-examine steps 1-7 and revision, if necessary
Step 9:	Pretest questionnaire

Source: Churchill and Iacobucci (2004)

5.9.1 Constructs' Measurement

As mentioned above, this questionnaire was sent to Jordanian bank account holders who used mobile banking apps. This survey questionnaire was designed

to identify the main constructs that impact bank customers' actual behaviour when using mobile banking apps. Bryman (2008) recommended the adoption of questions from previous literature, therefore 52 questions (scale items) were used from the previous literature of information system and e-business to measure both of dependent and independent variables that existed in the research conceptual model. Those questions are reliable and validated by the previous studies. In addition, to ensure deeper understanding of the questionnaire questions by the respondents, multi-scale items were used to measure every construct in this study. Items were included for all constructs in the conceptual model (dependent and independent) and their references presented in table 5.3.

Noteworthy, there is a difference between the term variable and the term construct with regard to measurement. Ghauri et al. (2004) and Sekaran (2003) explained that when the construct is linked to actual measure, it converts into a variable and become measurable by observing or recording the behavioural dimensions of that construct. This study includes items from different instruments that already measured the constructs in the proposed conceptual model. For example, the measurement items of the constructs that were adapted from the UTAUT, which are performance expectancy, effort expectancy and social influences, were adapted mainly from studies by Venkatesh et al. (2003) and Venkatesh et al. (2012), while other measurement items were adapted from several resources from the previous literature among technology acceptance, internet banking, online banking, e-business and mobile banking studies as detailed in table 5.3.

Table 5.3: Survey constructs and items.

Factor/construct	Questions	Reference
Performance expectancy(PE)	1-I think using M-banking app saves me time.	Venkatesh et al. (2012)
	2- I think M-banking app is useful.	Venkatesh et al. (2003)
	3-M-banking app enables me to easily obtain the information I need.	Tashmia et al (2011)
	4- M-banking app enhances the way I conduct my financial transactions.	
	5- I will improve monitoring of my savings using M-banking app.	
	6- M- banking app enables me to easily obtain any information I need about my bank account.	
EffortExpectancy (EE)	1- I think learning to use M-banking app is easy.	Venkatesh et al. (2012)
	2-I think interaction with M-banking app does not require a lot of mental effort.	Venkatesh et al. (2003)
	3-I find M-banking app easy to use.	Tashmia et al. (2011)
	4-I think it is easy for me to be skilled person at using M-banking apps.	
Social influence (SI)	1- People who have influence on my behaviour think that I should use the M-banking app.	Venkatesh et al. (2012)
	2- I would use M-banking app if people who are important to me already used it.	Venkatesh et al. (2003)
	3- My friends and family value the use of M-banking app.	
	4- I find using of M-banking app fashionable.	
	5- I think the use of M-banking apps gives me distinct status.	

Mobile performance risk (MPR)	1- A disruption of the usage of the mobile data probably happens at any time.	Pousttchi and Schurig (2004)
	2- The use of mobile data packets is costly.	
	3- The mobiles' battery life is too short.	
	4- The mobile storage capacity is small.	
	5- The mobile device may contain private and personal data.	Researcher
	6- The mobile device maybe exposure to lose or theft.	
M-banking app quality (AQ)	1- I find the process of completion of the task on M-banking app needs a few clicks (screen touches).	Lin et al. (2011) Davis et al. (1989) Aladwani and Palvia's (2002)
	2- The app of M-banking suffers from unexpected shutdown problems.	
	3- I think the availability of the access to M-banking app is 24/7.	
	4- M-banking app looks simple to navigate.	
	5-M-banking app loads quickly.	
	6- The content of the M-banking app is useful.	
	7- The content of the M-banking app is clear.	
	8- M-banking app updates regularly.	
	9- The M-banking app looks attractive.	
	10- The M-banking app looks organized.	
	11- The M-banking app adapts automatically with the screen size of the mobile.	
	12- The M-banking app uses suitable colours.	
	13- On the M-banking app, I can find guidelines about customer policies such as privacy and disputes.	

M-banking app_ security risk (ASR)	1- I think that M-banking app has sufficient security features.	Tashmia et al (2011)
	2- I would not feel secure by passing my sensitive information via the app of M-banking.	Suh And Han (2003)
	3- I believe my bank information is well secured by the provider of M-banking apps.	
	4- I think M-banking provider checks all Communications between the app and me for protection from hacking or eavesdropping.	
	5- Only authorized users are able to access to secret information on M-banking app.	
	6- M-banking app ascertains the identity of user every single login.	
	7- The reports and news about M-banking fraud worry me about the security of M-banking.	
M-banking app_ transactional risk (ATR)	1- I am unsure that transactions on mobile banking banking app will take place as I expect.	Ruiz-Mafe et al. (2009)
	2- I fear that apps of M-banking technology are not reliable.	Suh & Ingoo Han (2003)
	3- I am worried the M-banking app cannot verify the actual completion of the transaction.	
	4- I find it risky to do large amount of money transactions on M-banking apps.	
	5- I prefer to use M-banking app only for non-transactional tasks (ie. Only for viewing balance, transactions, etc.)	
	6- I think M-banking app will not deny the transaction that occurred by me.	
	7- Internet providers usually make sure that transactional information is protected from accidentally changed or lost.	
	8- M-banking app requires one-time-passcode (OTP) to perform every transaction.	
M-banking usage	1- Have you used M-banking app before.	Researcher Venkatesh et al. (2012)

5.9.1 Questionnaire Development and Design

As depicted in figure 5.2, Churchill and Iacobucci (2004) suggest the questionnaire development process, which includes questionnaire design and development, requires a number of steps before launching the main survey. This process consists of sequence of steps such as validation of measurement scale and content, sequence of questions, wording of questions, as well as the physical design of the questionnaire interface.

As previously mentioned, electronic questionnaire/online survey was selected as a data collection method in the current research to gather data from the banking customers in Jordan about their perception of the factors related to their use of mobile banking apps. Items that measure the constructs that adapted from UTAUT (performance expectancy, effort expectancy and social influences), which were originally proposed by Venkatesh et al. (2003, 2012), were selected to this survey. The use of questions from previous studies has been emphasized by Bryman (2008), because such questions have already been validated and tested. Moreover, the above-mentioned items have been widely used and validated by previous studies in technology acceptance field of study such as (see, for example, Martins et al., 2014; Al-Qeisi and Abdallah, 2013; Riffai et al., 2012; AbuShanab et al., 2010; Zhou et al., 2010). Other measurement items were adapted from several resources from the previous literature among technology acceptance, internet banking, online banking, e-business and mobile banking studies as detailed in table 5.3.

The electronic questionnaire of the current study consisted of three parts to provide a well-structured design to simplify the way of answering the questions by the respondents, in addition to categorise the questions in purpose of facilitating the mission of the researcher during the following stages of the research such as data entry and analysis (Bhattacherjee, 2012). In order to provide more simplicity in organising, managing and coding the questionnaire, it was necessary to utilise a clear scale that facilitated the stage of collecting the required data, such as a Likert-scale, to save the time and effort of both the respondent and the researcher (Hair et al., 2006; Churchill, 1995). The Likert-scale was developed by Likert (1932), who built up the rules of measuring the

respondents' attitudes by requesting them to respond to a series of questions about a particular issue, in pattern that shows the extent of their agreement/ disagreement with such issue. In turn, this would reveal the affective and cognitive element of the individuals' attitudes.

This research used five points Liker-scale (starting from strongly disagree to strongly agree) because of its simplicity and to save the respondents and researcher's time and effort (Hair et al., 2006; Bowling, 1997; Churchill, 1995). Furthermore, Likert-scale has been widely utilised in information technology literature such as (Venkatesh et al., 2012, 2003; Laukkanen et al., 2008; Curran and Meuter, 2005; Davis et al., 1989). The first part of the questionnaire consists of closed multiple choice question to gather demographic information about mobile banking customers in Jordan, such as age, gender, marital status, education level and occupation.

The second part of the questionnaire consists of close-ended questions about the dependent variable, which is the actual usage of mobile banking apps, as explained by the proposed conceptual model in chapter 4. This section includes some questions about the device that used to access the mobile banking services such as the type of the device (smartphone or tablet) and the screen size of the device. In addition, this section includes some 5 points Likert-scale questions to ask about the frequency of the usage of mobile banking apps by the customers. The third and last part of the questionnaire relates to the scale items that are devoted to measure the seven independent variables (PE, EE, SI, MPR, AQ, ASR and ATR), which are the main factors that affect the usage of mobile banking apps in Jordan.

During the designing and wording the questionnaire's questions, the researcher considered following some general guidelines to formulate and prepare a survey questions. Bryman (2008) recommended that the questions should be clearly written with no ambiguity, also to ensure as possible the questions to be brief and not too broad-spectrum. In addition, the researcher should avoid redundant and repeated questions, also to avoid the professional and technical questions (Bhattacherjee, 2012; Bryman, 2008). Furthermore, the researcher

placed emphasis on the sequence and classification of the questions, the wording and content of the questions as well as the language that has been used (Bhattacherjee, 2012).

There is a necessity to ensure the design and layout of questionnaire should be attractive and the questions are listed in vertically format (Bryman, 2008). The design of the layout of the questionnaire has been taken in the account by the researcher, as this feature provided by the website/ software that used for this survey BOS https://www.onlinesurveys.ac.uk, which is an online survey tool designed for academic research, education and public-sector organisations. In addition, this questionnaire was valid and accessible via different internet browsers, such as Google Chrome and Internet Explorer. Also, this survey was valid in different operating systems and platforms from either desktop or mobile devices. Furthermore, the responses were automatically transferred to the database once the respondent finished the survey. BOS enabled the researcher to export the collected data as SPSS format which saved the time and effort of data entry into the SPSS in purpose of preparation for analysis. Such features usually required in such website/ software of online surveys (Andrews et al., 2003).

Finally, a covering statement has been added to provide the participants with information about the nature of the research and the expected time to complete the questionnaire. In addition, the respondents were informed they could contact the researcher if they had any concerns or inquiries related to the questions or the procedures of the questionnaire. Furthermore, participation in this survey was entirely anonymous and voluntary and no personal information was required and privacy is completely protected.

5.9.2 Questionnaire Translation

The questionnaire has been translating into the Arabic language, which is the native language of Jordanian banking customers who are targeted sample of this research. Therefore, the back translation method used for this purpose (Brislin, 1976). Back translation method is widely used in international research

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(Mallinckrodt and Wang, 2004; Brislin, 1976). Even though that back translation method is the most common and efficient method of translation, there are some drawback and criticism over this method such as the expanding of the meaning of the whole statement, rather than a brief and literal translation (Douglas and Craig, 2007).

Briefly, the procedure of the translation of the present survey into Arabic language was directed in two stages as highly recommended by Brislin (1976). Firstly, the questionnaire completely translated into Arabic language by the researcher, then it has been reviewed by two licenced translators in Jordan. Secondly, the comments from both translators has been combined into one Arabic version and it has been reviewed by two Arabic language professors in Mu'tah University in Jordan. Finally, the comments from both professors have been integrated into latest version of the survey which tested and piloted later as the following subsection explains. It is worth mentioning that this method of translation has been adopted by various studies in the field of technology acceptance and especially in the electronic banking services such as (Hanafizadeh et al., 2014; AbuShanab et al., 2010).

5.9.3 Pilot Study

Conducting a pilot study by the researchers before the final survey is usually recommended in purpose to avoid any potential errors that may influence the participation in the survey (Saunders et al., 2012). There are multiple common errors that could be detected during the pilot study related to the length of questions, wrong instructions, incorrect wording or spelling mistakes (Saunders et al., 2007; Andrews et al., 2003; Gill & Johnson, 2002). Piloting the questionnaire before launching the main survey assurances a satisfactory of validity and reliability in the instrument's items that are selected to measure the aforementioned constructs (Bhattacherjee, 2012; Sekaran, 2003). Furthermore, Dillman (2000) recommends there is a need to review the questionnaire before piloting.

Consequently, the process of piloting the survey of current study was started by reviewing and discussing the questionnaire with well-informed colleagues of PhD students and graduates in the University of Gloucestershire. This followed by reviewing the updated version of the questionnaire by three professors in Business and Management school in the University of Gloucestershire, the UK to ensure the questions was appropriately formatted, relevant, and complete. In addition, four specialists in online banking and mobile banking services in Jordanian banks (Arab Bank, Housing Bank for Trade & Finance, Bank of Jordan, and Jordan Commercial Bank) requested to review the questionnaire.

At the end of reviewing process, the researcher considered carefully the recommendations of the reviewers. Accordingly some modifications were conducted based on the feedback and useful comments of the aforesaid reviewers. Furthermore, the participants also requested to add their comments and notes on free space that included at the end of the questionnaire to give them the opportunity to express their impressions about their usage of mobile banking apps in Jordan as well as their comments and concerns during the completion of the survey (Yin, 2009).

The questionnaire was posted (Piloted) online and a URL linking to it was posted on e-mail and some social media (Facebook, Twitter, and WhatsApp). A snowballing technique was applied, as participants were requested to forwarding a link to the piloted survey to friends and colleagues who they thought may be interested. BOS survey tool was used to collect the data, which protected the anonymity of the participants.

The Pilot study received 57 respondents after 1 month of distributing the questionnaire's link; those respondents were similar sample to the intended sample of the final survey, as the questionnaire filtered the participants, who had to be mobile banking apps users. The participants' noted that the language of the questionnaire was clear and the questions length was appropriate and did not take more than the anticipated time in the covering statement of the questionnaire.

Some respondents reported there was some repeated questions which had the same meaning; other respondents suggested there were some factors affecting there adoption of mobile banking apps such as the screen size of the mobile device and the type of the device. The researcher considered the participants' notes and feedback and some modification and insertion were conducted on the main questionnaire based on the pilot study to provide adequate level of internal validity. Moreover, the reliability of the instrument's items was examined using Cronbach's alpha test carried out using SPSS IBM Program, version 24.

As seen in table 5.4, the results show that all of Cronbach's alpha results exceeded the value 0.70 of all constructs, which is adequate level of reliability as recommended by Nunnally (1978), who considers this value to be the threshold level to approve the measurement reliability and internal consistency. Afterwards addressing the main steps and procedures of translation, validity, reliability and internal consistency of the questionnaire, the main survey launched, data was collected on subjects using an online BOS survey tool.

Out of 500 surveys emailed and sent over the social media networks (Facebook, Twitter, WhatsApp) to various banks customers, only 416 were completed and returned. The data was then imported into the commercially available SPSS IBM Program, version 24 to prepare for analysis stage.

Table 5.4: The internal consistency and reliability testing of the questionnaire. N=57.

Constructs	Cronbach's alpha (α) (> 0.70)
Performance Expectancy (PE)	0.93
Effort Expectancy (EE)	0.89
Social influence (SI)	0.84
Mobile performance Risk (MUP)	0.86
Mobile banking app quality (AQ)	0.92
Mobile banking app Security (ASR)	0.86
Mobile banking app Transactional risk (ATR)	0.88

5.10 Data Analysis

Quantitative data analysis conducted in this research as explained earlier in this chapter. The data obtained from the questionnaire was analyzed using a statistical package SPSS IBM Program, version 24 to describe the sample in terms of its demographic characteristics, mobile banking apps use patterns and factors affecting the usage of such technology. Descriptive statistics were presented to understand the overall structure of the data before proceeding to any form of inferential statistical analysis. Means, medians, standard deviations, variances, and frequencies were considered in presenting the descriptive statistics of the data. The researcher ensured to conduct the appropriate statistical tests (e.g., Cronbach's Alpha, Exploratory factor analysis) to examine the reliability and validity of the research main constructs. In addition, correlations and multivariate regression analysis were also conducted to examine the proposed hypotheses of this research.

Initially the data was analyzed for missing value using the missing value analysis suite, and the missing value analysis revealed that there were approximately 30 records with incomplete responses on more than 50% of the

survey variables and another 15 records were also missing responses on more than 30% of the survey questions, such questions are not suitable for imputing with missing value imputation methods due to their incompleteness on vital variables that comprise the hypotheses of the study. These 45 records were eliminated from the data and the remaining 416 records were found to have missing individual responses on some variables (at random) when analyzed again for missing data patterns.

This is consistent with Churchill (1995) who applied a rule of thumb which states that, the missing data is seen to be at an adequate and satisfactory fraction if the missing responses for every construct item are less than 5%. These missing values were imputed with the overall median of similar variable groups, e.g. the missing values for males were replaced with missing values on certain variables with the overall mean of males similar with other characteristics like education, job and age as highly recommended by Hair et al. (2006).

In addition, the Levenes test of equality of variance was used to assess the homogeneity of variance assumptions for the metric variables across various levels of other categorical variables when needed. The Spearman's rho test of correlation was used to assess the association between the metric variables of the study due to the ordinal nature of these variables, specifically the frequency of mobile application usage, which was measured using an increasing ordinal response scale between 1-5, with 1 denoting less frequently and 5 denoting very frequently. At the beginning of the stage of data analysis it was important to conduct such preliminary data analysis procedures, in addition to the processes of data editing, data screening, outliers and normality to ensure that the collected data has the adequate level to meet the conditions of further multivariate analyses (Tabachnick and Fidell, 2001).

The chi squared test of independence was used to assess the association between categorical and binary variables. Moreover, the Principal Components Analysis with the Cronbach's alpha test were used to assess the factorial validity and the reliability of the Likert-like response scales. Multiple

regression analysis was used to assess the individual and combined effects of the measured mobile banking apps perceptions on people's frequency of mobile banking apps usage. A series of t-tests and chi-squared tests were used to assess the levels of screen size and mobile device types for statistically significant differences on certain key respondent demographic, mobile device preferences, and the other mobile usage perceptions. This helped to understand these moderators better before the sequential multivariate linear regression was used to assess the moderation effects of mobile screen size between the mobile banking application and the usage of mobile application, this has been mentioned earlier in chapter 4 (namely hypotheses 2a and 5a). More details about the data analysis and results are explained in the following chapter.

5.11 Ethical Considerations

Ethical considerations have been considered in this research as one of the essential issues. The researcher has taken into account the need to protect the participants' rights from any problems and consequences as an outcome of the research. Issues of privacy, safety, anonymity, compulsion, formal consent, confidentiality and data protection of the participants were a high priority for the researcher in every stage in the current research. This study has followed the University of Gloucestershire's Research Ethics: A Handbook of Principles and Procedures, alongside the required documents that were submitted for approval.

Furthermore, the respondents to the questionnaire were treated in way which consistent with meeting all of MRS ethical standards. This includes permission to participate, the right to withdraw, and informed consent, with adherence to the data protection act 1998, and with the right to anonymity and confidentiality. All records were held securely before and after the completion of the study and has been ensured that such data will be used only for academic purposes and only the researcher has access to these data records.

5.12 Chapter Summary

This chapter provides a comprehensive overview about the methodological context that followed during this research. An explanations and justifications

have been details among this chapter's sections. This chapter introduces clear insights about the research paradigm and the methodology that adopted to study the usage of mobile banking apps by Jordanian customers. An inclusive comparison have been conducted among research's epistemologies and ontologies to critically review and evaluate every aspect in purpose to justify the selection of positivism and quantitative research approaches. It has been explained clearly why such an approach is the most appropriate for the current research to develop, validate and examine the research's conceptual model. Furthermore, this chapter critically reviewed the research methods that commonly used in the field of technology acceptance such as Survey and Interview, as well as providing rational justification behind the selection to conduct the field survey to be the current research's method.

Furthermore, the related aspects of the field survey was explained such as the research population, sampling frame, sampling technique, sample size and the research's data collection method. Therefore, the researcher rationalised the applying of non-probability sampling to access the targeted sample of mobile banking apps users in Jordan. Subsequently, the researcher provided a discussion and justification about the selection of electronic questionnaire as the most suitable and feasible research instrument to collect the data of this student self-funded study. Moreover, this chapter explains the steps of development and design of the research's instrument.

The processes of formatting, wording, organising and modifying the instrument's questions detailed in the chapter, in addition the stage of translation the questionnaire into Arabic language using the back translation techniques has been explained. Likewise, the stages of pre-testing and piloting the questionnaire have been illustrated and summarized the results of the pilot study and explained the validity and reliability of such results in purpose to modify the main survey. Finally, a brief illustration about the data analysis stage and the analysis methods has been summarised. In addition, the ethical considerations have been explained and how the researcher treated the ethical issues such as privacy and safety and guarantee the anonymity of the participation in this research and protect the respondent's data securely.

Chapter 6: Data Analysis

6.1 Introduction

This chapter presents the data that was gathered by the research's survey questionnaire as well as the statistical analysis that was used to analyze such data. In addition to presenting the data, this chapter validates and tests the research conceptual model by statistically testing the research's hypotheses, which hypothesized the influence of the model's factors on the usage of mobile banking apps within the context of Jordanian banks.

6.2 Data cleaning, response rate and missing data

Out of 570 surveys shared to various banks' customers, only 460 were completed and returned. The data was then imported into the commercially available IBM SPSS program, version 24. Initially the data was analyzed for missing value using the missing value analysis suite, which revealed that there were approximately 30 records with incomplete responses on more than 50% of the survey variables and another 15 records were also missing responses on more than 30% of the survey questions, rendering them not suitable for imputing based on missing value imputation methods, due to their incompleteness on vital variables that comprise the hypotheses of the study (Sekaran, 2000).

These 45 records were eliminated from the data and the remaining 416 records were found to have missing individual responses on some variables (at random) when analyzed again for missing data patterns. These missing values were imputed with the overall median of similar variable groups, e.g. the missing values for males were replaced with missing values on certain variables with the overall mean of males with similar other characteristics like education, occupation and age. These imputed variables had missing subject responses with equal to or less than 4 % per variable that had missing values, specifically those within the Likert response scale. This ratio is acceptable according to some scholars (see, for example, Churchill, 1995).

Two subjects had missing age, they were replaced with the average age for respondents of the same genders. The overall response rate was estimated to be around 73% (416 respondents out of 570 shared surveys). The data was further cleaned and coded as a part of data analysis and with the purpose of confirming the data was adequately completed and consistent (Tabachnick and Fidell, 2007). Likewise, the overall means and standard deviations were computed for the metric continuous scores, and the frequency and percentages were used to describe the categorical variables. Everything considered, all the variables included met the assumptions of multivariate linear regression and the findings for these assumptions within each test are detailed and reported in the following sections.

Bivariate and multivariate outliers and leveraging points were assessed using scatterplots and the values for the bi/multivariate outliers were predefined as those cases with studentized residuals >3.1 and those with Mahalnobi's distances exceeding the critical ratios relevant to the number of predictors included before the analysis was started, respectively. Very few cases were identified as multivariate outliers with little influence on the model estimates. Only one case was identified and excluded, which was an extreme bivariate outlier.

6.3 Normality

Normality is defined as the "shape of the data distribution or an individual metric variable and its correspondence to the normal distribution, which is the benchmark for statistical methods" (Hair et al., 2006, p. 79). The Kolmogorov-Smirnov test (Lilliefors test) of normality beside the P-P plots and histograms see the appendix (B.1) were used to assess the main themes of the study for normality. In addition, the Levene's test of equality of variance was used to assess the homogeneity of variance assumptions for the metric variables across various levels of other categorical variables when needed.

The majority of the independent metric variables were either normally distributed or approximated normality, as displayed in the histograms, P-P plots

and the results from the Lilliefors test of normality the appendix (B.1). Nonetheless, Hair et al. (2014) indicate that normality of the independent variables is not necessary when testing them as independent predictors within the contexts of multivariate linear regression, as the multivariate normal regression is expressed in terms of normality, linearity and equal variance of error distribution in regression contexts (i.e. the linearity assumption is presumed between the coefficients and the dependent variable and not between the individual predictor variables and the outcome variable) (Hair et al., 2014) .

This simplifies to the fact that any predictor variable, either categorical, ordinal or metric predictors, can be included as independent variables or as co-variates in multiple regression, regardless of their distribution. For example, it is not uncommon to find the gender and education of people are sometimes not normally distributed, but they are still used as predictors. The same principle applies to the perceptions of Tabachnick and Fidell (2013) and Hair et al. (2014) and nothing in the evidence suggests that independent variables must be normally distributed. Moreover, no evidence suggests that these predictors ought to be transformed before being tested in multiple linear regression to make them normally distributed. Nevertheless, these assumptions are the foundation to regression analysis, as grounded on the works of Sir Francis Galton (1822-1911).

6.4 Reliability test

Reliability, according to Field (2009, p11) refers to "whether an instrument can be interpreted constantly across different situations." Correspondingly, Bhattacherjee (2012, p. 56) defined the reliability as "the degree to which the measure of a construct is consistent or dependable." Data of this research was tested for reliability using Cronbach's alpha test of internal consistency; this test was suggested by Cronbach (1951). The reliability test results are displayed in table 6.1 below. In summary, the 49-item questionnaire had an overall Cronbach's alpha of = 0.97, denoting that people answered these questions consistently, and that the questionnaire in general was able to measure these

concepts equally for most people in the questionnaire: a Cronbach's alpha value of 0.7 and above is desirable, as suggested by Hair et al. (1995). However, each sub-concept's internal consistency was analyzed separately, as shown in table 6.1. The performance expectancy (PE) questionnaire was measured with six items, and it had an overall Cronbach's alpha value of =0.93, denoting that the six items measured people's responses on performance expectancy reliably.

Likewise, the effort expectancy (EE) questionnaire comprised four items whose Cronbach's alpha was 0.86, denoting that these indicators were internally consistent and measured the concepts reliably. In the same manner, social influence comprised five indicators, and its measure of internal consistency was 0.86, denoting it was reliably read and understood by people. Also, the six-item mobile performance risk MPR concept was also internally consistent, with a Cronbach's alpha of 0.86. The mobile banking apps quality (AQ), however, was measured using a 13-item long questionnaire; as such, its test of internal consistency also suggested that it was reliable, with a Cronbach's alpha of 0.92.

In addition, the remaining three sub-concepts: mobile banking apps security risk (ASR); mobile banking app transactional risk (ATR); and the technology related anxiety (ANX) were also internally consistent when tested separately, with their overall Cronbach's alpha tests suggesting they were all reliable too, (Cronbach's alpha of 0.86, 0.85, and 0.87, respectively).

Table 6.1: The internal consistency and reliability. N=416.

Constructs	Cronbach's alpha (α) (> 0.70)
Performance Expectancy (PE)	0.93
Effort Expectancy (EE)	0.86
Social Influence (SI)	0.86
Mobile Performance Risk (MPR)	0.86
Mobile Banking App Quality (AQ)	0.92
Technology Related Anxiety (ANX)	0.87
Mobile Banking App Security (ASR)	0.86
Mobile banking App Transactional Risk (ATR)	0.85

6.5 Factorial validity analysis

Even though the acceptable data reliability results, there is a need to test the constructs validity. Usually low validity is shown when the research does not measure what has been intended to be measured, so it may impact the accuracy of the research findings which in turn become valueless (Bryman, 2008). According to Bryman (2008), there are two ways to assess validity, which are content validity and construct validity. The content validity of this research was assessed during the final stage of instrument design by means of previous studies, pre-tests and pilot study as explained in section 5.9 in the previous chapter. Construct validity is defined as "one of a number of subtypes of validity that focuses on the extent to which a given test/instrumentation is an effective measure of a theoretical construct" (Straub et al., 2004, p. 68). Consequently, there is a need to test the validity of the model's constructs.

The main aim of this study is to develop a model that is capable to provide a valid logical predictions of mobile banking apps usage based on theoretical evidence and causal relationships among the aforementioned factors. Therefore, the factor analysis and correlation matrix tests have been conducted in this research, which are a common technique that widely used to test the construct validity (Hair et al., 2006). Factor analysis technique used in the present research to split numerous Likert-scale items related to both constructs (security risk and transactional risk) which in turn revealed new factor named as (technology-related-anxiety) as will explain well ahead in this section.

The Principal Components Analysis (PCA) applied as a factor analysis tool, were used to assess the factorial validity of the questionnaires used, especially because these questionnaires were tailored and adapted from various validated questionnaires from background research and evidence, and it was presumed these 49-items would theoretically comprise seven latent factors (dimensions). These dimensions were expected to measure respondents' beliefs, thoughts and their effects upon the use of mobile banking apps, namely they were: performance expectancy, effort expectancy, social influence, mobile performance risk, app quality, app security risk, and app transactional risk.

As such, the items that measure each latent factor (individual component) were admitted to the PCA suite in SPSS, specifying the correlation matrix between these items as a unit-of-analysis and requesting the initial extracted variance, the scree plot, the factor loadings, the pattern and the structure matrices for each latent factor separately (Chen & Xiao, 2012). The analysis revealed that all of the first five factors represented a unique single dimension, as was evident from their initial solution, scree plots and the total explained variances, signaling that each of them made a unity of one factor. Explained in simple words, these concepts reliably measured the intended concepts and were able to "catch" it accurately, and that their overall mean, which can be computed by obtaining the overall mean of the indicators comprising each of them separately, would characterize them well in the further analysis to be conducted later, such as regression tests.

Factor analysis was conducted in this research as abovementioned, considering its capability to observe underlying patterns, identify correlated items, categorize a group of constructs, as well as produce new factors for further analysis (DeCoster, 1998). As a result, analyzing the last two dimensions separately (Apps security risk, and Apps transactional risk) lead to various non-simple, meaningful and interpretable structures, which were analyzed by combining them all together in one analysis (DeCoster, 1998) (i.e., adding their items in one analysis assuming they all tapped one main concept). The resulting solution, as seen in table 6.2, was adequate, with a KMO=0.902. Bartlett's test of sphericity produced the result that $X^2(105) = 3116.9$, $p<0.001$, denoting the sample adequacy for using the principal components matrix and that the correlation matrix between these indicators was an identity matrix. As such, the principal components analysis was deemed acceptable, but the factor solution was rotated using the Promax rotation method, to allow the correlation of these concepts to be measured, because they were in reality correlated.

Table 6.2: Sampling adequacy for PCA

K-M-O	**0.90.2**
Bartlett's test.	X^2(105) =3116, p<0.001.
Determinant	>0.0001

The factor solution yielded three latent components, rather than two, as shown in the rotated factors analysis pattern matrix (Table 6.3) and the accompanying Cassilith Scree plot-1 as shown in (figure 6.1) denoting that these 15 indicators/items comprised three distinct latent factors rather than two distinct factors, and that these three factors in total accounted for 63.4% of the variations in the mobile banking apps responses to the 15 items analyzed. However, the first factor explained the first 44.2% of the variations in people's responses, and the second factor successively explained 11.8% of the variations in people's response, while the last (i.e. the third factor) explained 7.4% of the variations; adding these explained variances up results in the total explained variance of 63.4%.

Figure 6.1: Scree plot of PCA analysis (security risk and transactional risk)

Scree Plot
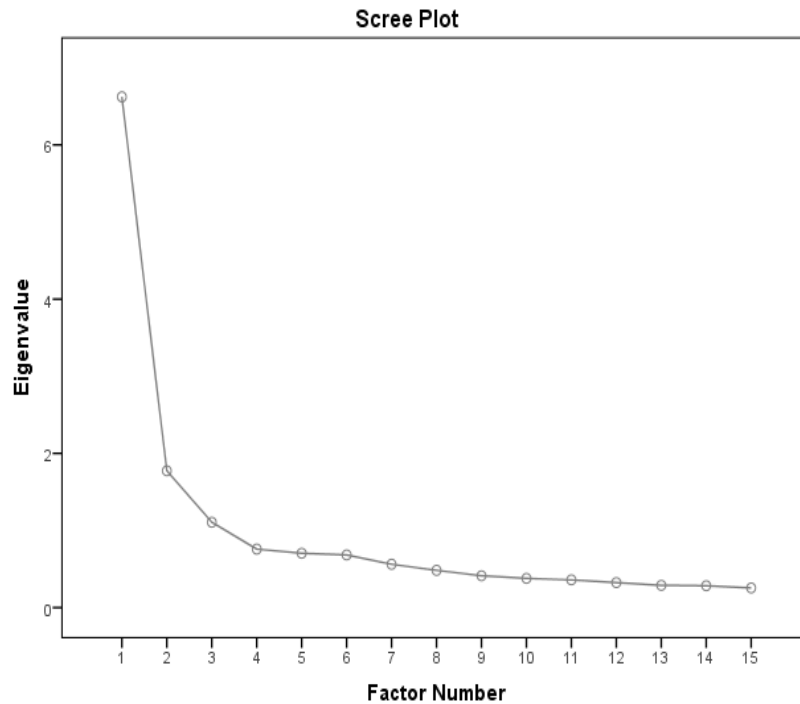
It was decided to switch the extraction method then to the Maximum Likelihood to help refine the solution based on the shared unique variance between these 15 survey items, rather than total variances, and the resulting factor solution was also simple, interpretable and meaningful when interpreted, as can be seen in table 6.3. The total explained variance, as shown in Table 6.5, was less this time, being = 54.4% of the variations in people's responses. It was therefore clear that items that measured users' worry and anxiety from the potential problems associated with technology that might arise from using mobile banking apps were arranged under one latent factor, which is factor-1, with items loading (correlating) with this factor denoting their overall association with this dimension.

Table 6.3: Rotated Factors Pattern Matrix

	Components/ factors		
	Anxiety	Security Risk	Transactional Risk
I fear that apps of Mobile banking technology are not reliable.	.855		
I am worried the Mobile banking app cannot verify the actual completion of the transaction.	.800		
I am unsure that transactions on Mobile banking app will take place as I expect.	.753		
I would not feel secure by passing my sensitive information via the app of M-banking.	.635		
The reports and news about Mobile banking fraud worry me about the security of M-banking.	.552		
I prefer to use Mobile banking app only for non-transactional tasks (i.e. only for viewing balance, transactions, etc.)	.488		.341
I find it risky to do large amount of money transactions on Mobile banking app.	.479		
Only authorized users are able to access to secret information on Mobile banking app.		.833	
I think Mobile banking provider checks all Communications between the app and me for protection from hacking or eavesdropping.		.738	
Mobile banking app ascertains the identity of user every single login.		.703	
I believe my bank information is well secured by the provider of Mobile banking app.		.659	
I think that Mobile banking app has sufficient security features.		.649	
I think Mobile banking app will not deny the transaction that occurred by me.			.786
Mobile banking app requires one-time-passcode (OTP) to perform every transaction.			.661
Internet providers usually make sure that transactional information is protected from accidental change or loss.			.645
Extraction Method: Maximum Likelihood. Rotation Method: Promax with Kaiser Normalization.			
Rotation converged in 6 iterations.			

Those items that measured the respondents' belief in security risk of the mobile banking apps also coalesced significantly (i.e. correlated) with factor-2, and the last three items that tapped the respondents' perceptions of Transactional risk also loaded (i.e., correlated) well to factor 3. Next, these latent factors were renamed as (Factor-1=Technology Related Anxiety, factor-2= Security risk, and factor-3= Transactional Risk), as shown in the rotated factor analysis pattern matrix in table 6.3 above.

Moreover, when the correlations between these newly generated concepts were analyzed, as can also be seen in the inter-factor correlation matrix table (6.4) below, greater technology-related-anxiety was significantly associated with greater perceptions of security risk issues that might come up while using such apps, r= 0.55, p<0.01.

Table 6.4: Factor Correlation Matrix

Factor	anxiety	Security
Security	.547	
Transaction Risk	.563	.642
Extraction Method: Maximum Likelihood. Rotation Method: Promax with Kaiser Normalization.		

Also, increased perceptions of transactional risk were significantly associated with increased technology associated anxiety, r=0.56, p<0.001, but also increased perceptions of transactional risk was also significantly associated with increased perceptions of security issues that accompany the use of mobile banking apps in general, r=0.64, p<0.01.

Table 6.5: Total variance explained by the three factors

Factor	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total
1	6.623	44.155	44.155	6.169	41.127	41.127	4.912
2	1.774	11.828	55.983	1.333	8.888	50.016	4.912
3	1.107	7.382	63.365	.660	4.401	54.416	4.310
4	.758	5.056	68.421				
5	.705	4.700	73.121				
6	.683	4.551	77.672				
7	.562	3.747	81.419				
8	.483	3.221	84.640				
9	.413	2.756	87.396				
10	.379	2.527	89.923				
11	.359	2.395	92.318				
12	.325	2.164	94.482				
13	.289	1.924	96.406				
14	.284	1.892	98.299				
15	.255	1.701	100.000				
Extraction Method: Maximum Likelihood.							
a. When factors are correlated, sums of squared loadings cannot be added to obtain a total variance.							

To go over the main points, the principal components analysis revealed that each of the first five dimensions, namely: performance expectancy, effort expectancy, social influence, mobile performance risk, and mobile application quality, were unique factors that comprised a unity, and for all of them the factor analysis suggested that the intended concepts were measured well. However, the factor analysis also showed that the last 15 indicators which measured the constructs (security risk and transactional risk), diverged to three meaningful solutions, resulting in an extraction of new concept, which is designated as Technology-Related-Anxiety, besides the original concepts (security and transactional risks). It was intended to group the items that comprised each of these latent factors and distinctively characterize their overall mean in the analysis. As such, separate composite scores for each of these newly identified factors were computed and used in further analysis, such as the regression analysis that will be presented later in this chapter.

6.6 Descriptive analysis

Descriptive statistics is necessary to describe the research sample by variable or combination of multiple variables and these kinds of statistics might be represented by charts, tables, or other diagrams (Tabachnick & Fidell, 2007). In this chapter, the descriptive statistics presented and analyzed in three parts (demographics, Usage, main concepts) as illustrated in the following three subsections. Such descriptive analysis clarifies any potential ambiguity in purpose to conduct some examination prior the regression analysis will be conducted (Lovie, 1986).

6.6.1 Respondents demographic characteristics:

Out of the 416 Jordanian e-Bank application users, a small majority (51.2%) were male users, and the rest (48.8%) were female. The respondents were all adults and their age ranged between 18 and 64 years or older, but of them (17.8%) were aged between (18-24 years), another (36.1%) were aged between (25-34 Years), also another (28.8%) of them were aged between (35-44 Years), also a few of them (13.7%) were aged between (45-54 Years) and even fewer (3.6%) were aged between (55-66 or more Years). Moreover, most them (52.6%) were married, and the rest were never married/ single (47.4%).

Their educational background ranged between 'no schooling' to doctorate level, but in detail their levels of education were as follows: (3.4%) with no previous completed schooling, next was those with primary school level (1.9%), then those who had completed their secondary education (6.7%) and those who were undergraduates, comprised the majority (52.4%). This was followed by those who had their Postgraduate education completed (26%) and the remainder responded they had been educated to a doctorate level (9.6%).

Also, their employment was assessed, with unemployed people comprised only (7.9%), and the majority were employed (56%) within either public or private sectors. The rest were either self-employed (12%), retired (2.9%) or students (21.2%). A majority of the sample was employed, and the majority had their background education of postgraduate degree, besides the majority were also

married and males comprised more than half of them. Notably, few of them had no education and very few of them were aged above 54 years (see table 6.6).

Table 6.6: Respondents characteristics. N= 416.

	Frequency	Percentage
Gender		
Female	203	48.8
Male	213	51.2
Age		
18-24 Years	74	17.8
25-34 Years	150	36.1
35-44 Years	120	28.8
45-54 Years	57	13.7
55-64 Years	15	3.6
Marital Status		
Never Married	197	47.4
Ever Married	219	52.6
Educational Status		
No schooling completed	14	3.4
Primary school	8	1.9
Secondary school	28	6.7
Undergraduate	218	52.4
Postgraduate	108	26
Doctorate	40	9.6
Occupation		
A student	88	21.2
Unemployed	33	7.9
Self-employed	50	12
Employed	233	56
Retired	12	2.9

6.6.2 Characteristics of mobile banking usage

As can be seen in table 6.7, most of the respondents (92.1%) used their mobile phones to access the mobile banking apps, and interestingly a few of them (7.9%) responded that they used their tablets. A Majority also responded that their devices had large screens (79.3%) and the rest (20.7%) used devices with small screens. Chiefly, when the respondents were asked how frequent do they use such apps to access their banks accounts for performing transactions or viewing purposes, a few (12%) answered they have never used it, another proportion (16.1%) responded they have not used them frequently, but a considerable proportion of them (41.8%) said they used these apps slightly frequently, and the remainder responded they have used them either frequently (43.7%) or very frequently (16.3%). Also, their habitual access to these apps on a monthly basis was assessed, and 9.6% responded they have never used it. About a quarter of them (25.2%) responded they had rarely accessed their mobile banking apps last month, but also others (21.4%) responded they used their mobile banking apps daily. Other (17.3%) answered they have used these apps on a weekly basis, but also the remainder of them (26.4%) answered they have used their mobile banking apps only once monthly.

Table 6.7: Respondents usage characteristics. N= 416.

	Frequency	Percentage
Type of device used		
Smartphone	383	92.1
Tablet	33	7.9
Device Screen Size.		
Large	330	79.3
Small	86	20.7
Mobile banking app use frequency		
Never	50	12
Not very frequent	67	16.1
Slightly frequent	174	41.8
Frequent	57	13.7
Very frequent	68	16.3
Rate of using Mobile Banking App		
Never	40	9.6
Rarely	105	25.2
Daily	89	21.4
Weekly	72	17.3
Monthly	110	26.4

6.6.3 Main concept descriptive analysis results:

The users' responses to the seven concepts that comprised the 49-item long questionnaire are displayed in tables in the following subsections, which show the descriptive statistics and the frequencies and the percentages of respondents' agreement levels to each of these indicators.

6.6.3.1 Performance Expectancy (PE)

 As shown in table 6.8, the respondents agreed to a level of mobile performance expectancy of 3.8 out of a maximum 5 points, denoting their collective agreement was between neutral to agreeing, but mostly closer to agreeing that the mobile banking apps can be helpful, and allowed them to cut time, allowing easy access to information, enhancing the way of access, and allowing surveillance to their bank accounts.

However, the respondents' overall mean agreement level to whether mobile banking apps can save time ("*I think using Mobile banking apps saves me time*") was equal to 3.8 out of a maximum 5 points, denoting they generally agreed that these apps could enhance time-cutting; however, a few of them (9.9%) disagreed strongly, another (8.7%) disagreed, with another (8.7%) responding they were uncertain /could not tell, but the rest either agreed (29.8%), or strongly agreed (40.9%). It is clear that the majority of respondents were either agreeing or strongly agreeing that such apps can cut time needed to access and use their bank accounts.

Moreover, the respondents' overall mean agreement level to whether mobile banking apps was generally useful ("*I think Mobile banking app is useful*") was rated with a mean of 3.9 out of a maximum 5 points, denoting they generally also agreed that these apps could be useful to their users; however, a very few of them (3.6 %) disagreed strongly on whether these apps were useful, another (13%) also disagreed, however (10.6%) of them responded they were uncertain /could not tell, but the rest either agreed (37.3%), or strongly agreed (35.6%). It is evident also that the majority of respondents either agreed or strongly agreed that such apps could be as useful to access their bank accounts.

Above and beyond, the overall agreement, according to the respondents, to whether (*"Mobile banking apps enables me to easily obtain the information I need"*), i.e. these apps allowed swift access to information, was equivalent to 3.8 out of a maximum 5 points, denoting their collective agreement level was between undecided to agreeing in general, but very few also (4.1%) reported they disagreed strongly, another (9.6%) of them disagreed, and a higher proportion (18.5%) was undecided, but the rest either agreed (37.%), or strongly agreed (30.8%). It is notable that the majority of the Jordanian bank customers either agreed or strongly agreed that these apps were able to ease access to their banking information.

 Notwithstanding, the respondents rated their agreement to whether these apps enhanced their ways of doing transactions ("*mobile banking app enhances the way I conduct my financial transactions*") with an overall mean of 3.7 out of 5,

denoting their collective opinion was between undecided to agreeing. (4.6%) of them were in strong disagreement with the usefulness of such apps to their transactions. Other (9.1%) respondents disagreed, and the remainder were either undecided (18.8%), in agreement (37.3%) or in strong agreement (30.3%). Notably, the majority either agreed or strongly agreed on the usefulness of these apps to enhancing transaction methods.

In addition, the Jordanian mobile banking users rated their agreement to whether these apps helped improving the monitoring of their savings ("*I will improve monitoring of my savings using Mobile banking app.*"), with an overall mean of 3.8 out of 5, but also a few of them were in total disagreement with this fact (3.6%), and another proportion disagreed also (7.7%). The rest reported they were generally undecided (19.5%), or were in agreement (40.9%) or total agreement (28.4%). Notably, the majority agreed or strongly agreed on the usefulness of these apps to the monitoring of their bank savings.

Finally, those Jordanian users of mobile banking apps collectively rated their agreement to whether such apps make it easier to access to their bank accounts ("*Mobile banking app enables me to easily obtain any information I need about my bank account*") with an overall mean of 3.7 points out of a maximum 5 points. This result denotes their collective opinion was also between undecided to agreeing. However, only (3.6%) of them disagreed strongly, and a few more (10.6%) disagreed, and another (21.2%) were undecided/could not tell, but the remainder (a majority) either agreed (40.1%) or were in strong agreement (24.5%) that these apps helped facilitate their access to their banks account's information, note table 6.8.

Table 6.8: Users' Responses to Performance Expectancy. N= 416.

Item#		Mean(SD)	S. Disagree	Disagree	Neutral	Agree	S.Agree
	Performance Expectancy (PE)	**3.81 (0.97)**					
1	I think using Mobile banking app saves me time.	3.8 (1.3)	41 (9.9%)	36 (8.7%)	45 (10.8%)	124 (29.8%)	170 (40.9%)
2	I think Mobile banking app is useful.	3.9 (1.1)	15 (3.6%)	54 (13%)	44 (10.6%)	155(37.3%)	148 (35.6%)
3	Mobile banking app enables me to easily obtain the information I need.	3.8 (1.1)	17 (4.1%)	40 (9.6%)	77 (18.5%)	154 (37%)	128(30.8%)
4	Mobile banking app enhances the way I conduct my financial transactions.	3.7 (1)	19 (4.6%)	38 (9.1%)	78 (18.8%)	155 (37.3%)	126 (30.3%)
5	I will improve monitoring of my savings using Mobile banking app.	3.8 (1)	15 (3.6%)	32 (7.7%)	81 (19.5%)	170 (40.9%)	118 (28.4%)
6	M- Banking app enables me to easily obtain any information I need about my bank account.	3.7 (1.1)	15 (3.6%)	44(10.6%)	88 (21.2%)	167 (40.1%)	102 (24.5%)

6.6.3.2 Effort Expectancy (EE):

As shown in table 6.9, the Jordanian users rated their Effort Expectancy (EE) with an overall mean of 3.71 out of a maximum 5 points, which, put simply shows that they generally were between undecided to agreeing on the ease, effortlessness, familiarity, and speed of becoming acquainted with these apps while using them via their electronic devices. In detail, the Jordanian mobile banking users rated their agreement of their experience to learn using such apps was easy and straightforward (*"1 I think learning to use Mobile banking app is easy"*) with a mean of 3.8 out of 5, denoting their agreement that the ease of these apps was approximately between undecidedness and agreeing, but much closer to agreeing. However, a few of them (4.1%) strongly disagreed, and another (8.2%) disagreed, and an additional (20.7%) were undecided, but the remainder, who comprised the majority, either agreed (42.8%) or strongly agreed (24.3%) on the ease of learning such apps. Please note the results in table 6.9.

Furthermore, the respondents rated their agreement to whether using such apps was an effort-free mental task (*"I think interaction with Mobile banking app*

does not require a lot of mental effort") with an overall mean of 3.7 out of 5, denoting they collectively were in agreement with the effortlessness of using these mobile banking apps. Similarly, a few of them strongly disagreed (2.9%), also some disagreed (12.7%) and the rest were either undecided (20.7%), or agreed (41.3%), and some also strongly agreed (22.4%). Notably, the majority of these Jordanian mobile banking users agreed or strongly agreed that using such apps did not require much mental effort.

Likewise, the overall agreement to whether ("*I find Mobile banking app is easy to use*") was close agreement in general, with an overall mean of 3.8 out of maximum 5 points, denoting the collective opinion of Jordanian mobile banking apps users was between uncertain to agreeing but much closer to being in agreement on whether it was easy to use such apps. Also, more than a quarter of them were in strong agreement (26.7%) on the ease of using such apps, another (40.9%) agreed, and the remainder's opinion was either undecided (18.3%), disagreed (10.3%) or strongly disagreed that (3.8%) ease of using mobile banking apps was a simple task to do.

However, the Jordanian mobile banking users generally agreed, with a mean of 3.7 out of 5, that it was easy to become skillful on these apps ("*I think it is easy for me to be skilled person at using Mobile banking app*"). However, a few of them noted they disagreed strongly (4.8%), or disagreed (12.5%), but also another (19%) of them were unsure, and the remainder, who comprised the majority, either agreed (40.1%) or strongly agreed (23.6%). Notably the majority found it easy to familiarize themselves with the use of such apps.

Table 6.9: Users Responses to Effort Expectancy

		Mean(SD)	S. Disagree	Disagree	Neutral	Agree	S.Agree
	Effort Expectancy(EE)	**3.71 (0.89)**					
1	I think learning to use Mobile banking app is easy.	3.8 (1)	17 (4.1%)	34 (8.2%)	86 (20.7%)	178 (42.8%)	101 (24.3%)
2	I think interaction with Mobile banking app does not require a lot of mental effort.	3.7 (1)	12 (2.9%)	53 (12.7%)	86 (20.7%)	172 (41.3%)	93 (22.4%)
3	I find Mobile banking app easy to use.	3.8 (1.1)	16 (3.8%)	43 (10.3%)	76 (18.3%)	170 (40.9%)	111 (26.7%)
4	I think it is easy for me to be skilled person at using Mobile banking app.	3.65 (1.1)	20 (4.8%)	52 (12.5%)	79 (19%)	167(40.1%)	98 (23.6%)

6.6.3.3 Social Influence:

The mobile banking users in Jordan responded to a social influence scale which measured their opinion on whether people had influence on their choice to mobile banking apps, determining its importance, whether friends and family valued the use of mobile banking apps, and whether the respondents thought that using these apps was fashionable, or whether it gave them a distinctive appearance. The means and standard deviation of the main concept of social influence and its items are shown in table 6.10 below, along with the frequencies and percentages of the agreement of the sample to the social influence items.

Table 6.10: Mobile banking Apps Users Responses to Social Influence Perceptions. N= 416.

Item#		Mean(SD)	S.Disagree	Disagree	Neutral	Agree	S.Agree
	Social Influence	**3.47 (0.9)**					
1	People who have influence on my behaviour think that I should use the Mobile banking app.	3.6 (1.1)	22 (5.3%)	46 (11.1%)	111 (26.7%)	151 (36.6%)	86 (20.7%)
2	I use Mobile banking app because people who are important to me already used it.	3.4 (1.1)	22 (5.3%)	71 (17.1%)	103 (24.8%)	149 (35.8%)	71 (17.1%)
3	My friends and family value the use of Mobile banking app.	3.4 (1.1)	29 (7%)	58 (13.9%)	111 (34.6%)	144 (34.6%)	74 (17.8%)
4	I find using of Mobile banking app fashionable.	3.4 (1.1)	24(5.8%)	66 (15.9%)	99 (23.6%)	156 (37.5%)	71 (17.1%)
5	I think the use of Mobile banking app gives me distinct status.	3.5 (1.1)	16 (3.8%)	58 (13.9%)	114 (27.4%)	156 (37.5%)	72 (17.3%)

In general, the overall mean agreement of the Jordanian users of mobile banking apps to the effect of social influence on their decision to use and prescribe to banking services, ("*People who have influence on my behavior think that I should use the Mobile banking app*"). Views about mobile banking apps was generally between undecided to agree, with an overall mean equivalent to 3.47 out of 5, which is closer to being uncertain when assessed collectively. In particular, Jordanian mobile banking users rated their agreement to whether other people influenced their decision to use these apps at 3.6 out of 5, denoting they generally agreed, with a few of them (5.3%) reporting they disagreed totally with the existence of such influence. nevertheless (11.1%) disagreed, and (26.7%) were unsure. But, the remainder also either agreed (36.6%), or strongly agreed (20.7%).

By adding those who agreed and those who strongly agreed to the presence of effect of other people on their choice of using mobile banking apps, it shows the majority agreed. Equally, the responses of Jordanian users to the question *("I use Mobile banking app because people who are important to me already used it")* was that their collective agreement fell between uncertainty and agreement, with a mean of 3.4 out of a maximum 5 points, denoting they generally were closer to uncertain than agreeing to whether they opted to use the such apps because other important people used it too. Clearly (5.3%) of them strongly disagreed, another proportion of them (17.1%) disagreed too, and the rest were either unsure (24.8%), agreed (35.8%) or strongly agreed (17.1%). Notably, their overall opinion remained between uncertainty and agreement.

Also, the overall agreement to whether *("My friends and family value the use of Mobile banking app")* was between uncertainty and agreement in general, with an overall mean of 3.4 out of a maximum 5 points, denoting their overall feeling was closer to uncertainty than agreement, but their agreement responses were distributed as follows: (7%) disagreed strongly, (13.9%) also disagreed, and (34.6%) disagreed. However, the remainder of the sample either agreed (34.6%) or strongly agreed (17.1%). Clearly, their responses were quite variable, but generally the largest proportion of them were either uncertain or in agreement on the effect of their friends and family who valued mobile banking apps on their actual usage of such apps.

Interestingly, but not too differently, their overall agreement to whether they opted to use mobile banking apps due to the fashionable image of using them, (*"Do you find using of Mobile banking app fashionable"*) was rated with a mean agreement of 3.4 out of 5 too, denoting they collectively were between being either unsure to agree or in agreement to whether their use of such apps was simply a fashion. Response rates were as following: several of them disagreed strongly (5.8%), and another proportion disagreed (15.9%), also (23.6%) were unsure/ undecided, but the remainder were either in agreement (37.5%) or in strong agreement (17.1%). Admittedly, a reasonable proportion agreed they had used mobile banking apps due to the fashionable reason for using them.

In the same manner, their overall mean agreement to whether using such apps gives them a distinct image/status "*I think the use of Mobile banking app gives me distinct status.*", was between unsure to agree (a mean of 3.5 out of maximum 5 points), denoting their overall agreement that the distinct appearance of being a user of mobile banking apps was one of those psycho-social reasons to affect the actual usage of such apps. It is clear that a few of them disagreed strongly (3.8%), others disagreed (13.9%) and a reasonable proportion were also undecided/unsure (27.4%), but the remainder were in agreement (37.5%) or in total agreement (17.3%). In simple words, a clear majority of Jordanian mobile banking users (37.5% + 17.3% = 54.8%) agreed that they used such apps due to the distinctive appearance of using them.

6.6.3.4 Mobile Performance Risk (MPR):

The users of mobile banking apps in Jordan were asked to rate five statements on an agreement scale between 1-5. The five statements were about the mobiles' performance to remain without crashes, extra cost, limited device' storage, short battery durability, inclusion of confidential information about one's identification, and the mobile devices' risk of theft and risk of being lost/stolen. As can be seen in table 6.11below, the overall means and standard deviations of the 5-items that comprised the Mobile performance risk are displayed, beside the percentages and frequencies of people's responses to the agreement scale. In general, the overall mean of the perceived risk of mobile devices' performance was equal to 3.5 out of 5, indicating that people generally were between undecided to agreeing about mobile device performance risk.

Unquestionably, the overall agreement level to whether mobile devices were subject to crashes "*A disruption of the usage of the mobile data probably happens at any time*" was rated with an overall agreement level of 3.5 out of a maximum 5 points, denoting that mobile banking apps users were between agreeing to being undecided about the devices' disruptions, indicating they believed these mobile devices probably be crashed, and were generally under the risk of disruption. To explain, a few of them strongly disagreed with that statement (4.6%), a few more disagreed (16.3%), and another proportion was

undecided (23.3%), but the rest were either in agreement that disruption might take place at any time to these devices (36.5%), or strongly agreed (19.2%).

Furthermore, the respondents' overall agreement level to whether "*The use of mobile data packets is costly.*", was equal to 3.5 out of a maximum 5 points, denoting they were generally between agreeing to uncertain with the high expense of these data packets, but only (5.5%) strongly disagreed. (15.6%) more also disagreed, and another (24%) were undecided, leaving (38.7%) who agreed and the rest who were in strong agreement (16.1%) that these packets were expensive. Clearly, the majority of them either agreed or strongly agreed that these packets were highly expensive.

Table 6.11: Mobile banking Apps Users Responses to Mobile performance risk. N= 416.

Item#		Mean(SD)	S.Disagree	Disagree	Neutral	Agree	S.Agree
	Mobile performance Risks (MPR)	**3.5 (0.84)**					
1	A disruption of the usage of the mobile data probably happens at any time.	3.5 (1.1)	19 (4.6%)	68 (16.3%)	97 (23.3%)	152 (36.5%)	80 (19.2%)
2	The use of mobile data packets is costly.	3.4 (1.1)	23 (5.5% #)	65 (15.6%)	100 (24%)	161 (38.7%)	67(16.1%)
3	The mobile storage capacity is small.	3.4 (1.1)	22 (5.3%)	81 (19.5%)	103 (24.8%)	136 (32.7%)	74 (17.8%)
4	The mobiles' battery life is too short.	3.4 (1.1)	26 (6.3%)	75 (18%)	104 (25%)	142 (34.1%)	69 (16.6%)
5	The mobile device may contain private and personal data.	3.6 (1.1)	15 (3.6%)	47 (11.3%)	103 (24.8%)	162 (38.6%)	89 (21.4%)
6	The mobile device maybe exposure to lose or theft.	3.7 (1.1)	17 (4.1%)	46 (11.1%)	94 (22.6%)	166 (39.9%)	93 (22.4%)

In addition, the respondents rated their agreement level to the question "*The mobile storage capacity is small.*" with an overall mean agreement of 3.4 out of maximum 5 points, denoting they were generally between undecided to agreeing that the capacity of their devices were small, but notably only (5.3%) strongly disagreed, (19.5%) more also disagreed, and another (24.8%) were undecided. Another (32.7%) % agreed and the rest were in strong agreement (16.1%) that these device's capacity was small. Evidently, most of them either agreed or strongly agreed with the statement.

Moreover, the respondents had an overall agreement level with *"The mobiles' battery life is too short."* equivalent to 3.4 out of 5, highlighting the fact that they generally were between uncertain to agreeing that the batteries were short-lived. Moreover about (6.3%) of them strongly disagreed, and another large proportion of them disagreed (18%). However, a quarter of them exactly (25%) were uncertain, and the rest either agreed (34.1%) or strongly agreed (16.6%) This highlights the fact that the majority were between agreement to strong agreement with the short battery life of these devices.

Correspondingly, the overall mean agreement level to whether *"The mobile device may contain private and personal data."*, was equivalent to 3.6 out of 5, denoting they generally were either uncertain or in agreement, but closer to agreeing on average. However, about (3.6%) strongly agreed that these devices may contain confidential information that may pose risk of leaking such information. Another proportion also disagreed (11.3%), and even more (24.8%) were uncertain/neutral, but the rest of them either agreed (38.6%) or strongly agreed (21.4%).

Moreover, the Jordanian mobile banking users rated the statement, *"The mobile device may be exposed to being lost or theft."* with an overall agreement level of 3.7 out of 5, highlighting their general agreement to the likelihood of these devices could be lost /stolen due to their smaller size and portability comparing to desktop computers for example. Over half of the sample generally agreed to this statement, but in detail (22.4%) strongly agreed, another (39.9%) agreed, and the remaining people were either undecided (22.6%), disagreed

(11.1%) or strongly disagreed (4.1%). It is clear that the majority believed in the susceptibility of these devices to be theft or lost.

6.6.3.5 Mobile Banking Apps Quality (AQ):

the Jordanian respondents in this questionnaire were asked to rate the overall quality of the mobile banking apps they used for conducting banking transactions on an agreement Likert-scale between 1 and 5, with five denoting strongly agree as shown in table 6.12 below. They reported an overall quality rating of the mobile banking apps equivalent to 3.6 out of 5, denoting they were nearly between undecided and agreeing on the quality of these apps. In brief, their overall agreement to the *statement "I find the process of completion of the task on Mobile banking app needs a few clicks (screen touches)"*, was equal to 3.4 out of 5, denoting they were between uncertain to agreeing that these apps required few steps to be completed.

A few of them however, strongly disagreed (3.4%), and a slightly higher proportion (10.1%) disagreed, with the largest group (41.8%) reporting they were uncertain, and the rest either agreeing (41.8%) or strongly agreeing (18.3%). It is evident that most of them either agreed or strongly agreed that the speed of completing a task using these apps required only a few clicks. Likewise, the overall mean agreement level to whether "*The app of Mobile banking suffers from unexpected shutdown problems*", was equivalent to 3.4 out of 5, denoting they generally were either uncertain or in agreement, but closer to uncertainty.

Notably, about (4.6%) strongly disagreed that these devices unexpectedly shut down, another proportion also disagreed (17.8%), and a slightly larger proportion (26%) were uncertain/neutral, but the rest of them either agreed (36.8%) or strongly agreed (14.8%). However, the overall agreement level to whether mobile banking apps were easy and simple to navigate "*Mobile banking app looks simple to navigate.*" produced an overall agreement level of 3.7 out of a maximum 5 points, indicating that Jordanian banking users were between agreeing to being undecided about simplicity of these apps, denoting they believed these apps could be simple to use.

Furthermore, a small group strongly disagreed with the above-mentioned statement (3.1%), few more disagreed (13.7%), and another proportion was undecided (21.9%). The remainder was either in agreement with the simplicity of these apps (40.6%), or in strong agreement (20.7%). Additionally, the overall rating with regards to the loading speed of these apps was rated with an overall mean of 3.7 out of 5, when respondents were asked to agree or disagree with *"Mobile banking app loads quickly"*, denoting they were close to agreeing in general, with only a few (3.1%) reporting they strongly disagreed. another small proportion disagreed (10.6%), and (26%) were uncertain, but also (38.5%) agreed and the rest (21.9%) strongly agreed on the fast response of these apps.

Moreover, respondents rated *"The content of the Mobile banking app is useful."* with an overall agreement equivalent to 3.7 out of 5 points, denoting their overall agreement to the usefulness of the content of these apps. A few of them strongly disagreed (3.6%), other (8.9%) also disagreed, and some of them reported they were undecided (22.4%). The rest either agreed (45.2%) or strongly agreed (20%). In general, a clear majority reported they either agreed or strongly agreed with the usefulness of a mobile banking apps content.

Likewise, the overall mean agreement level to whether *"The content of the Mobile banking app is clear."*, was equivalent to 3.6 out of 5, denoting they generally respondents were either uncertain or in an agreement, but closer to agreement on average. However, about (2.4%) strongly disagreed the clarity of the content on mobile banking apps. Another proportion also disagreed (11.8%), while others also reported they (26.9%) were uncertain/ neutral. Nevertheless, the rest of them either agreed (36.9%) or strongly agreed (20%). Clearly, the majority agreed or strongly agreed on the clarity of the content on mobile banking apps.

Table 6.12: Users responses to mobile banking apps quality. N= 416.

Item#		Mean(SD)	S.Disagree	Disagree	Neutral	Agree	S.Agree
	M-banking app quality (AQ)	**3.53(0.67)**					
1	I find the process of completion of the task on M-banking app needs a few clicks (screen touches).	3.62 (1)	14 (3.4%)	42 (10.1%)	110 (26.4%)	174 (41.8%)	76 (18.3%)
2	*The app of M-banking suffers from unexpected shutdown problems.	3.4 (1.1)	19 (4.6%)	74 (17.8%)	108(26%)	153 (36.8%)	62 (14.8%)
3	I think the availability of the access to M-banking app is 24/7.	3.7 (1)	13 (3.1%)	42 (10.1%)	104 (25%)	153 (36.8%)	104 (25%)
4	M-banking app looks simple to navigate.	3.62 (1.1)	13 (3.1%)	57 (13.7%)	91 (21.9%)	169 (40.6%)	86 (20.7%)
5	M-banking app loads quickly.	3.65 (1)	14 (3.1%)	44 (10.6%)	108 (26%)	160 (38.5%)	91 (21.9%)
6	The content of the M-banking app is useful.	3.69 (1)	15 (3.6%)	37 (8.9%)	93 (22.4%)	188 (45.2%)	83 (20%)
7	The content of the M-banking app is clear.	3.62 (1.1)	10 (2.4%)	49 (11.8%)	112 (26.9%)	162 (38.9%)	83 (20%)
8	M-banking app updates regularly.	3.65(1)	12 (2.9%)	47 (11.3%)	106 (25.5%)	161 (38.7%)	90 (21.6%)
9	The M-banking app looks attractive.	3.51 (1.1)	24 (5.8%)	47 (11.3%)	112 (26.9%)	159 (38.2%)	74 (17.8%)
10	The M-banking app looks organized.	3.53 (1)	20 (4.8%)	50 (12%)	102 (24.5%)	175 (42.8%)	66 (15.9%)
11	The M-banking app adapts automatically with the screen size of the mobile.	3.59 (1)	14 (3.4%)	43 (10.3%)	112 (26.9%)	176 (42.3%)	71 (17.1%)
12	The M-banking app uses suitable colours.	3.57 (1)	11 (2.6%)	52 (12.5%)	112 (26.9%)	170 (40.9%)	71 (17.1%)
13	On the M-banking app, I can find guidelines about customer policies such as privacy and disputes.	3.5 (1.1)	15 (3.6%)	55 (13.2%)	120 (28.8%)	146 (35.1%)	80 (19.3%)

Moreover, the overall agreement to whether "Mobile banking app updates regularly" was between uncertainty and agreement in general, with an overall

mean of 3.7 out of a maximum 5 points. The overall average was between uncertainty to agreement, but their agreement responses were distributed as follows: (2.9%) disagreed strongly, (11.3%) also disagreed, and (25.5%) was uncertain. However, the remainder of the sample either agreed (38.7%) or strongly agreed (21.6%), clearly their responses were quite variable, but mostly the largest proportion of the respondents agreed or strongly agreed that mobile banking apps updates regularly.

The level of the mobile banking apps had attractive features (*"The Mobile banking apps looks attractive."*) were rated with an agreement level of 3.5 out of 5, denoting that people rated them between uncertainty and agreement in general, but (5.8%) strongly disagreed that they are attractive, a few more also disagreed (11.3%), and another proportion (26.9%) were uncertain. However, the remainder either agreed (38.2%) or strongly agreed (17.8%). Moreover, the respondents rated the item *"The Mobile banking app looks organized"*, with an overall mean agreement of 3.5 out 5, denoting they were generally between uncertain and agreeing on average to whether these apps were organized. A few strongly disagreed (4.8%), another proportion disagreed (12%), while others were uncertain (24%). The remainder agreed (42.8%), or strongly agreed (15.9%). notably, the majority agreed with the statement that the mobile banking apps looks organized.

In the same token, the users of mobile banking apps were also asked to rate such apps regarding to its ability to adjust to screen sizes *"The Mobile banking app adapts automatically with the screen size of the mobile."* It showed an overall mean agreement of 3.6 out of 5, indicating overall agreement of these respondents on the adaptability of these apps to various mobile screen sizes. However, a few (3.4%) strongly disagreed, and another (10.3%) disagreed, while (25.9%) were uncertain/unsure. The remainder either agreeing (42.3%), or strongly agreeing (17.1%) on the adaptability of these apps to various mobile screen sizes.

Moreover, the users of mobile banking apps were also asked about their overall agreement on the level of the suitability of the colors of these apps *"The Mobile banking app uses suitable colors."*, which was rated with a collective mean of

3.6 out of 5, denoting that people were generally between undecided to agreeing, but closer to agreeing in general that such apps displayed suitable colors. A few of them, however, disagreed strongly (2.6%), another proportion disagreed (12.5%) and another proportion were undecided (26.9%). In addition, other respondents either agreed (40.9%), or strongly agreed (17.1%).

Lastly, the overall agreement of the respondents to the adequacy of instructions on mobile banking apps "*On the Mobile banking app, I can find guidelines about customer policies such as privacy and disputes.*" was rated with a collective mean of 3.5 out of 5. Denoting that people in general were between undecided and agreeing, with a few of the respondents disagreeing strongly (3.6%), or disagreeing (13.2%), another proportion (28.8%) were unsure, but the rest either agreed (35.1%) or strongly agreed (19.3%). Notably, people were between undecided and agreeing on the adequacy of the information of policies and client guidelines over such financial or privacy related disputes.

6.6.3.6 Technology related anxiety:

As previously-mentioned in section 6.5; after restructuring the items of security Risk and transactional Risk based on the factor analysis, three new distinct concepts were obtained, which were: technology related anxiety, security risk and transactional risk as illustrated previously in table 6.3. The means and standard deviations of each of these items that comprised each of the three concepts were computed beside their overall means and standard deviations. In this subsection and the following two subsections there is a detailed description on the frequencies and percentages of agreement responses of each item.

Table 6.13 below shows the overall rating of technology-related-anxiety issues resulting from using the mobile banking apps. The Jordanian users of such apps had an overall agreement of 3.3 out of 5 to whether mobile banking apps were not reliable, "*I fear that apps of Mobile banking technology are not reliable.*", denoting they were collectively between uncertain and agreeing that these apps could be less than reliable.

However, a few of them disagreed strongly (7.7%) denoting that they tended to believe in the reliability of these apps, also another quite higher proportion – nearly the fifth- of them (19.7%) disagreed, and another proportion were undecided (28.6%), while the rest agreeing (30.5%) and strongly agreeing (13.6%) with the non-reliability of these apps. It is evident, that a position somewhere between uncertainty to agreeing was reported by the majority of the respondents about the reliability of these apps.

Moreover, when these respondents were asked to rate their agreement level to whether *"I am worried the Mobile banking app cannot verify the actual completion of the transaction."*), their overall agreement was 3.2, indicating their uncertainty about this piece of information in terms of the inability of these apps to verify the process of actual completion of transactions. However, (5.5%) strongly disagreed, another quite substantial proportion (23.3%) also disagreed, a few more were also uncertain (25.7%), highlighting that a reasonable number of them were uncertain, but the rest either agreed (31.3%) or strongly agreed (14.2%) that these apps were unable to verify the completion process of transactions.

On the other hand, the respondents' overall agreement to whether the transactions would be executed as expected by the users *"I am unsure that transactions on Mobile banking app will take place as I expect"*), was rated with an overall mean of agreement equal to 3.3 out of 5, denoting the overall uncertainty of people about this aspect. Interestingly, nearly five percent (4.8%) of them responded with strong disagreement, and another reasonable proportion responded with disagreement (21.6%), denoting that some of these clients did not believe that these requests were executed as they expected, but also (27.6%) were uncertain, with the remainder comprising those who agreed (31%) or, strongly agreed (14.9%).

Notably, people were generally between uncertain to agreeing with whether these requests were carried out as they expected them to be done.

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Moreover, the Jordanian users of such mobile apps collectively agreed with an overall mean of 3.4 out of 5 to whether *"I would not feel secure by passing my sensitive information via the app of Mobile banking."*. This suggests respondents felt the mobile banking interfaces were not secure, denoting that their overall opinion was between uncertain to agreeing that such apps securely passed sensitive information via their mobile device. However, very few of them strongly disagreed (1.1%), another proportion (4.6%) disagreed, and some were also uncertain (18%), with the rest either agreed (34.9%) or strongly agreed (15.6%) that such apps could secure their sensitive information.

Moreover, the respondents' overall agreement to whether reports and news on security of mobile banking apps worried them *("The reports and news about Mobile banking fraud worry me about the security of mobile banking")* was equal to 3.4 out of 5, denoting they generally were between undecided and agreeing, but (7%) strongly disagreed, (14.4%) also disagreed. a few more were also uncertain (24.5%), highlighting that a reasonable number of them were uncertain on the effect of such security news and alerts about mobile banking apps. However, the rest either agreed (36.3%) or strongly agreed (17.8%) that these reports about security issues pertinent to Mobile banking apps worried them.

The overall agreement of the respondents to whether they used their mobile banking apps only for viewing their balance but not executing transactions (*"I prefer to use Mobile banking app only for non-transactional tasks i.e. Only for viewing balance, transactions, etc.)"*, was rated with an overall mean agreement level of *3.3,* highlights the fact that they were collectively close to being unsure. Interestingly, some of them strongly disagreed (4.8%), many more disagreed (18.3%), also (29.3%) were undecided, but the rest either agreed (30%) or strongly agreed (17.5%).

Similarly, the mobile banking users in Jordan rated their agreement level to whether *"I find it risky to do large amount of money transactions on mobile banking app."*, with an overall agreement level of 3.4 out of 5, also highlighting their collective uncertainty on the fact that they found these apps not secure

enough to remit enormous amounts of money. Of these, 4.1% strongly disagreed, also more of them disagreed (17.5%), with another (34.1%) being undecided, but the rest either agreed (34.1%) or agreed strongly (17.3%). This highlights the uncertainty among Jordanian mobile banking users regarding trust in such apps within the context of executing transactions involving relatively enormous amounts of money.

Table 6.13: Users responses Technology-related anxiety. N= 416.

Item#		Mean(SD)	S.Disagree	Disagree	Neutral	Agree	S.Agree
	Technology-related anxiety	**3.3 (0.84)**					
1	I fear that apps of M-banking technology are not reliable.	3.3(1.1)	32 (7.7%)	82 (19.7%)	119 (28.6%)	127 (30.5%)	56 (13.6%)
2	I am worried the M-banking app cannot verify the actual completion of the transaction.	3.2 (1.1)	23 (5.5%)	97 (23.3%)	107 (25.7%)	130 (31.3%)	59 (14.2%)
3	I am unsure that transactions on M-banking app will take place as I expect.	3.3 (1.1)	20 (4.8%)	90 (21.6%)	115 (27.6%)	129 (31%)	62 (14.9%)
4	I would not feel secure by passing my sensitive information via the app of M-banking.	3.4 (1.1)	19 (4.6%)	75 (18%)	112 (26.9%)	145 (34.9%)	65 (15.6%)
5	The reports and news about M-banking fraud worry me about the security of M-banking.	3.4 (1.1)	29 (7%)	60 (14.4%)	102 (24.5%)	151 (36.3%)	74 (17.8%)
6	I prefer to use M-banking app only for non-transactional tasks (ie. Only for viewing balance, transactions, etc.)	3.3 (1.1)	20 (4.8%)	76 (18.3%)	122 (29.3%)	125 (30%)	73 (17.5%)
7	find it risky to do large amount of money transactions on M-banking app.	3.4 (1.1)	17 (4.1%)	73 (17.5%)	112 (26.9%)	142 (34.1%)	72 (17.3%)

6.6.3.7 Mobile banking apps security risk:

As shown in table 6.14, people's view on the security of these apps was rated with an overall mean agreement level of 3.5 out of 5, they were between uncertainty and agreement on their safety for transactions information, user details, identity verification, network security, and online security features of such apps. In brief, when people were asked to rate their agreement level to whether *"Only authorized users are able to access to secret information on Mobile banking app")*, the overall mean agreement was 3.5 out of 5, denoting people generally were between uncertain and agreeing on whether only authorized people could access their private banking details.

Nonetheless, a few of them strongly disagreed (3.4%), a few more disagreed (16.1%), with the rest either reporting uncertainty (30.8%), agreeing (34.1%) or strongly agreeing (15.6%). Notably, the majority remained between uncertain and agreement on the ability of unauthorized people to access client's secret information. Likewise, the overall agreement to whether *"Mobile banking app ascertains the identity of user every single login"*, was 3.5 out of 5, highlights the fact that people generally agreed but some were uncertain. It is notable that only (3.6%) strongly disagreed, while (15.4%) disagreed, a reasonably high proportion of them (26.2%) were uncertain, but also more than a third (36.3%) agreed and the rest (18.5%) strongly agreed.

Nonetheless, people's agreement to whether *"I believe my bank information is well secured by the provider of Mobile banking app"* was rated with a mean of 3.5 out of 5, denoting they were overall between uncertainty and agreement with the statement. (3.3%) of them strongly disagreed, a larger proportion (13.7%) disagreed, while another reasonably high proportion of them (29.9%) were uncertain. However, (39.9%) agreed and the rest (13.5%) strongly agreed. Notably, a reasonable proportion of these users were uncertain, but a majority either agreed or strongly agreed to the security of the Mobile banking apps.

Also, when people were asked to rate their agreement level to whether *"1 I think that Mobile banking app has sufficient security features"*, the overall mean agreement was 3.4 out of 5, denoting people generally were between

uncertain to agreeing on whether these mobile banking apps were sufficiently secure. In terms of percentages, a few of them strongly disagreed (4.6%), a few more also disagreed (15.1%), with the rest either reporting uncertainty (23.6%), agreement (41.3%) or strong agreement (15.4%). A majority remained between agreement and strong agreement on that mobile banking apps has sufficient security features but also several people were uncertain and a few disagreed with the sufficiency of security features of such apps.

Table 6.14: Users responses of security risk. N= 416.

Item#		Mean(SD)	S.Disagree	Disagree	Neutral	Agree	S.Agree
	Security risk	**3.5(0.84)**					
1	Only authorized users are able to access to secret information on M-banking app.	3.5 (1)	14 (3.4%)	53 (12.7%)	115 (27.6%)	159 (38.2%)	75 (18%)
2	I think M-banking provider checks all Communications between the app and me for protection from hacking or eavesdropping.	3.4 (1)	14 (3.4%)	67 (16.1%)	128 (30.8%)	142 (34.1%)	65 (15.6%)
3	M-banking app ascertains the identity of user every single login.	3.5 (1)	15 (3.6%)	66 (15.4%)	109 (26.2%)	151 (36.3%)	77 (18.5%)
4	I believe my bank information is well secured by the provider of M-banking app.	3.5 (1)	16 (3.8%)	57 (13.7%)	121 (29.9%)	166 (39.9%)	56 (13.5%)
5	I think that M-banking app has sufficient security features.	3.5 (1.1)	19 (4.6%)	63 (15.1%)	98 (23.6%)	172 (41.3%)	64 (15.4%)

6.6.3.8 Transactional risk:

In brief, the overall mean of the three indicators that measured the mobile banking user's agreement on the presence of various verification and, identity confirming beside the internet environment security -as a third party- with regards to transaction protection was computed. Using the mean of the three

indicators, the overall mean agreement was 3.4 out 5, denoting people were collectively between undecided to agreeing in general.

But, when the Mobile banking response was evaluated to *whether "I think Mobile banking app will not deny the transaction that occurred by me."*, the overall mean agreement was = 3.3 out of 5, highlighting the fact that people generally were undecided to agreeing, but prominently closer to being undecided. This was confirmed with the fact that (4.3%) strongly disagreed, (18.3%) disagreed. However, many people were uncertain (32%) but most agreed (33.9%) and the rest (11.5%) strongly agreed to this fact.

The overall agreement level to whether *"Mobile banking app requires one-time-passcode (OTP) to perform every transaction",* was 3.5 out 5, highlighting that people were generally between being undecided and agreeing. It is notable that (7%) strongly disagreed, (14.9%) disagreed, but (24.3%) were uncertain. The remainder responding with agree (29.3%) or strongly agree (24.5%). Clearly, people were generally uncertain on the requirements of one- time-passcode, but the largest proportion agreed or strongly agreed.

Lastly, the overall mean agreement level of people to whether *"Internet providers usually make sure that transactional information is protected from accidentally changed or lost"* was rated with a collective mean of 3.3 out of 5, denoting that generally people were between being between uncertain and agreeing. In percentage terms, (5%) strongly disagreed, four times more (20.9%) disagreed, also (26.3%) were uncertain but (32.2%) agreed, and the rest were strongly in agreement (15.6%) with the fact that internet providers make some efforts and protective measures to ensure the transactional security of the information communicated through their networks. Reasonably, most people believed that Internet providers tried to secure their networks and the financial processes that pass through them, but a reasonable number were uncertain too, with an equal number of people who disagreed.

Table 6.15a: Users responses of Transactional risk. N= 416.

	Transactional Risk	3.4(0.94)					
1	I think M-banking app will not deny the transaction that occurred by me.	3.3 (1.03)	18 (4.3%)	76 (18.3%)	133 (32%)	141 (33.9%)	48 (11.5%)
2	M-banking app requires one-time-passcode (OTP) to perform every transaction.	3.5 (1.2)	29 (7%)	62 (14.9%)	101 (24.3%)	122 (29.3%)	102 (24.5%)
3	Internet providers usually make sure that transactional information is protected from accidentally changed or lost.	3.3 (1.1)	21 (5%)	87 (20.9%)	109 (26.2%)	134 (32.2%)	65 (15.6%)

6.6.4 Correlations among the conceptual model's constructs

Due to the ordinal nature of the frequency of the usage of the mobile banking apps and the associated variables, the Spearman's rho correlation test was used to assess the associations between the factors that affect the usage of mobile banking apps and the actual usage of such apps as shown in table 6.15a (Kline, 2005). This test displayed people's greater perceptions of performance expectancy were significantly associated with greater use of mobile banking apps, rho=0.48, p<0.01. Also, people's greater perceptions on effort expectancy was associated significantly with greater reported use of these apps as well, rho= 0.46, p<0.01. In the same manner, greater perceived social influence was significantly associated with greater usage of the mobile banking apps, denoting that a larger perception on social influence of others was associated with greater usage of the mobile banking apps on average, rho=0.29, p<0.001.

Nonetheless, greater mobile performance risk was significantly associated with less usage of the mobile banking apps on average, denoting that greater perceptions of performance risk were associated with less usage of the mobile banking apps in general. However, the association was also very weak, rho = -0.21, p<0.01. On the other hand, greater mobile banking app quality was significantly associated with greater usage of the mobile banking apps,

rho=0.53, p<0.01. Otherwise, there was a very weak significant association between people's perceived technology related anxiety and the overall usage frequency of these mobile banking apps, rho=0.11, p<.10.

Furthermore, people's greater perception of the security risk of mobile banking apps was associated with greater reported usage of mobile banking apps on average, rho= 0.38, p<0.01. Also, there was a significant association between transactional risk and the rate of using mobile banking apps, so that a greater sense of transactional risk-free networks was associated with greater reported use of mobile banking apps, rho=0.33, p<0.01.

On the other hand, greater sense of performance expectancy was significantly associated with effort expectancy, rho=0.72, p<0.001. Moreover, greater perceived social influence was significantly associated with performance expectancy, r=0.60, p<0.01. In addition, greater mobile performance risk was significantly associated with lower levels of performance expectancy, rho= -0.52, p<0.01.

Moreover, greater perceptions of mobile banking application quality were associated with greater performance expectancy, r=0.74, p<0.01, and greater technology associated anxiety was associated with greater performance expectancy, rho=0.32, p<0.001. Also, that greater sense of mobile banking network security was associated with greater performance expectancy as well, rho = 0.55, p<0.01. Notwithstanding these figures, greater perceptions of transactional risks were associated with greater performance expectancy, rho= 0.38, p<0.010.

Greater social influence was significantly associated with greater effort expectancy, rho=0.58, p<0.01. Moreover, greater perceived mobile performance risk was significantly associated with less effort expectancy, rho= -0.45, p <0.01. Greater mobile banking app quality was significantly associated with greater perceived effort expectancy, rho=0.69, and greater perceptions of technology related anxiety were significantly associated with greater effort expectancy. In addition, greater perceived   security of the mobile banking

networks was associated with greater perceptions on effort expectancy, rho= 0.57, p<0.01. Moreover, greater perceptions on transactional risks were associated significantly with greater effort expectancy on average, rho= .396, P<0.01.

Furthermore, greater perceptions of mobile performance risk were significantly correlated with less social influence, rho= -0.66, p<0.001. However, greater perceptions of mobile banking app quality were significantly correlated with higher perceived social influence, Rho=0.59, p<0.001. In addition, greater perceived technology related anxiety was significantly associated with higher sense of social influence, rho=0.43, p<0.01. In the same manner, greater perceptions of mobile networking security were associated with higher reported social influence, rho=0.50, p<0.001.

In addition to the above, greater reported sense of transaction risk was associated with higher perceived social influence, rho=0.32, p<0.01. In addition, mobile performance risk was negatively associated with mobile banking app quality, perceived technology related anxiety, and with security and transactional risks. As such, greater perceived mobile performance risk was significantly associated with lower perceptions of mobile banking app quality; moreover, less technology related anxiety, also less sense of security and transactional risks, respectively. Similarly, higher perceived technology related anxiety was significantly associated with greater mobile banking app quality, rho=0.41, p<0.01 and higher perceived sense of mobile networking security was significantly associated with greater sense of mobile banking app quality, rho=0.71, p<0.01. Moreover, greater sense of transactional risk was associated with greater sense of mobile banking app quality, rho= 0.55, p<0.01.

Finally, a greater sense of security risk was associated with a greater sense of technology related anxiety, with an overall correlation coefficient = 0.52, denoting that people with higher anxiety levels from using technology reported greater concerns over security risks with the mobile banking networks. Similarly, a greater sense of transactional risk was also associated with greater technology related anxiety, rho=0.52 and greater sense of transactional risk-free

bank was also associated significantly with greater sense of security risk, rho=0.62, p<0.01.

Table 6.15b: Spearman's rho (ρ) correlation of conceptual model's constructs applications.

Constructs	(Usage)	PE	EE	SI	MPR	AQ	ANX	SR
PE	.482**							
EE	.461**	.716**						
SI	.292**	.600**	.584**					
MPR	-.207**	-.521**	-.449**	-.656**				
(AQ)	.530**	.735**	.690**	.596**	-.511**			
(ANX)	.111*	.322**	.272**	.428**	-.627**	.410**		
SR	.373**	.547**	.571**	.498**	-.476**	.708**	.516**	
TR	.325**	.382**	.396**	.323**	.365**	.554**	.521**	.617**

Notes: n =416.
** Correlation is significant at the 0.01 level (two-tailed).
* Correlation is significant at the 0.05 level (two-tailed).

In conclusion, the present research hypothesized a positive and negative association between the factors that influence the usage of mobile banking apps and the actual usage of such apps as detailed in chapter 4, particularly table 4.4. As illustrated above about such an association emerged when the correlation was tested individually and collectively among these variable as summarized in table 6.16.

Table 6.16: Hypothesized associations between dependent and independent variables.

Independent Variables	Dependent Variable	Expected association sign
Performance Expectancy (PE)	Usage	+
Effort Expectancy(EE)	Usage	+
Social influence (SI)	Usage	+
Mobile performance Risk (MPR)	Usage	_
App quality (AQ)	Usage	+
Technology Related Anxiety (ANX)	Usage	_
App Security Risk (ASR)	Usage	+
App Transactional risk (ATR)	Usage	_

6.4 Multivariate regression analysis

To understand the above-mentioned information in the previous subsection about the associations between the dependent and independent variables, a multivariate linear regression was employed. In general, regression analysis is commonly employed to identify the relation between independent and dependent variables. Such analysis produces predictions that show the degree of the effect of the independent variables on the dependent variable (Tabachnick & Fidell, 2013). There are various techniques of regression analysis such as ordinal, linear and logistic regression.

The regression analysis was employed due to the nature of the current study of investigating the factors that affect the usage of mobile banking apps in Jordan. This usage agrees with what is basically assumed by Field (2009) about multiple regression according to predicting the residual relationship between dependent variable and one or more independent variables. A Z-standardized score was created for each of the tested variables. The standardized score resulted in a normally distributed variable with a mean=0 and standard deviation = 1, with the intent of eliminating the collinearity between the means

of these variables. As such, the model was specified with the rate of mobile banking apps usage as a dependent variable.

The model suggested that at least one, or more, of the included factors had a significant association (i.e. relationship) with the frequency of the usage of mobile banking apps, f= 27.91, p<0.001. This denotes that these factors collectively explained a total variation equivalent to 59.5% of people's reported frequency of using the mobile banking apps, (Multiple R= 59.5%), as shown in table 6.17 below. However, the adjusted R-squared value suggested that these variables collectively explained a total of (35.4%) due to including numerous variables in the model. Nonetheless, this suggested that the model was accurate with normally distributed error and the (predictor variable: subject ratio) was equal to (1:46), allowing the sample size to be deemed adequate for the multivariate linear regression technique (Tabachnick & Fidell, 2013).

Table 6.17: Model summary

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	R Square Change	F Change	df1	df2	Sig. F Change
1	.595[a]	.354	.342	.971	.354	27.905	8	407	.000

The columns "R Square Change", "F Change", "df1", "df2", "Sig. F Change" are grouped under the header "Change Statistics".

a. Predictors: (Constant), ZtransacRisk Zscore: transactional risk, Zm.soc.influnece Zscore: Social Influence Mean, Ztech_related_anxiety Zscore: Worry from m-Banking Apps safet, Zm.EE Zscore: Effort Expectancy Mean, Z_security Zscore: trust/security with m-banking, Zmoble.perf.risks_mup2mean Zscore: Mobile usage perceived Usefulness, Zm.Pe Zscore: Performance Expectancy Mean, Zm.app_qual Zscore: M-banking app quality (AQ)

b. Dependent Variable: Usg_1 How frequent is your use of mobile banking?

Furthermore, to illustrate the results from the multivariate regression analysis, the full model analysis results, as shown in table 6.18 below, suggested that there was a significant association between the rate of using mobile apps and each of the following factors: performance expectancy, mobile banking application quality, technology-related anxiety, and transactional risk. However, there was an insignificant association between the usage of such apps and the following factors: effort expectancy, social influence, mobile performance risks, and the security risk. In detail, the model suggested that there was a significant positive association between performance expectancy

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and the reported frequency of the usage of the mobile banking apps, (t-value = 3.24, p<0.01), denoting that as people's performance expectancy increased their usage of the mobile apps also tended to increase. In short, the first hypothesis is approved.

Likewise, people's perceived mobile banking apps quality to have a significant positive association with mobile banking usage, (t-value=4.5, p<0.001), denoting that, after controlling for everything else in the model, the quality increased their usage of mobile banking apps. In brief, the fifth hypothesis is supported. Moreover, as can be noted in table 6.18 below, technology related anxiety had a significant negative association with the usage of such apps. This finding was obtained after considering everything else in the model as constant, (t-value= 2.88, p<0.01). In plain words, when people's technology related anxiety tended to increase, their mobile banking usage tended to decrease. In short, the eighth hypothesis is approved.

On the other hand, the transactional risk factor had a significant negative association with mobile banking usage after considering everything else in the model, denoting that as people perceived less transactional risk, their reported usage of mobile banking apps tended to increase, (t-value = 2.47, p<0.05). Shortly, the seventh hypothesis is approved. To sum up, as hypothesized previously, there was a positive association between the usage of mobile banking apps with performance expectancy. Likewise, there was a positive association between app quality and the usage of mobile banking apps. Moreover, there was also a significant negative association between transactional risk and usage, which in turn means people who reported transactional risk problems as less influential tended to report greater usage. Correspondingly, as expected there was a significant negative association between technology related anxiety and mobile banking app usage.

Contrary to expectations, there was no statistically significant association between either of (effort expectancy, social influence, mobile performance risks and security risk) and mobile banking app usage. However, it is noteworthy that the sign of association was negative for social influence,

denoting a slight negative association between social influence and the usage of such mobile apps. Mobile performance risk also influenced mobile banking apps usage slightly negatively. Similarly, people's perceived mobile application security risk had a negative sign as well, denoting that some people still perceived insecurity as a landmark precursor to using these mobile banking apps. Briefly, the hypotheses 2, 3, 4 and 6 are rejected.

Table 6.18: Multi-variate linear regression of the full model

	B	Std. Err.	Beta	t-value	p
(Constant)	3.063	.048		64.320	.000
Performance Expectancy PE	.294	.091	.245	3.241	.001
Effort Expectancy EE	.122	.085	.102	1.447	.149
Social Influence SI	-.053	.073	-.044	-.723	.470
App quality AQ	.428	.094	.358	4.543	.000
Mobile performance Risk MRP	.094	.078	.079	1.209	.227
Technology-related -Anxiety	-.204	.071	-.170	-2.884	.004
Security risk	-.022	.080	-.018	-.275	.783
Transactional risk	.159	.064	.133	2.470	.014

Notes: [a] n =416. † $p < .10$, * $p < .05$, ** $p < .01$, *** $p < .001$.

Finally, because the independent variables were measured using the same metric scale between 1-5, it is notable that such predictors (factors) of the usage of mobile banking apps can be ordered in terms of practicable importance in terms of regression using the standardized beta coefficients. A bigger magnitude absolute value of standardized beta denotes more practicable, relative importance of the predictor to the dependent variable (usage). In descending order of practicable regression importance to such usage, table 6.19 shows them ranked as follows: firstly, mobile banking app quality, followed by performance expectancy, then technology related anxiety, next transactional risk, then effort expectancy and mobile performance risk, these were also followed by social influence and security risk factors.

Table 6.19: Regression ranked factors affecting mobile banking application usage

Predictor	Rank	Standardized Beta value	Absolute value (Stnd. Beta)
App quality	1	0.357816893	0.357816893
Performance Expectancy	2	0.245469848	0.245469848
Technology-related -Anxiety	3	-0.170235328	0.170235328
Transactional risk	4	0.132891155	0.132891155
Effort Expectancy	5	0.102186953	0.102186953
Mobile performance Risks	6	0.078633064	0.078633064
Social Influence	7	-0.043875017	0.043875017
Security risk	8	-0.0184279	0.0184279

6.5 Moderating variables

It was hypothesized that there would be a moderating effect of the mobile device's screen size on people's perceptions of effort expectancy with regard to the usage of mobile banking. It was also proposed that screen size would have a moderating effect on the perception of mobile banking apps quality towards using such apps. Before these sub-hypotheses were tested using hierarchical regression, the study explored the influence of screen size for statistical differences on key respondent characteristics to improve the understanding of this variable.

To help us understand the joint relation between the moderator variable and the key concepts when assessed in a bi-variate manner (i.e., assessing the association between two variables together) a chi-squared test and the t-test of independent groups was used to assess the two type of screen sizes (small or large) for any significant statistical differences on the main economic-demographic and the mobile banking usage and perceptive measures (Tabachnick & Fidell, 2013). The results from these tests provided clearer understanding of the effect of this moderator factor (screen size), which will be even better when we have modelled it in the linear regression later. The results of these chi squared and t-tests are displayed in tables 6.20 below:

Table 6.20: Comparison between the effect of device's screen size upon the respondent's key perceptions and socio-economic characteristics N=416.

	Large Screen	_Small Screen_		
	n=330	**n =86**		
	Mean (SD)	**Mean (SD)**	**test statistic**	**p**
Sex: males	160 (45.5%)	43 (50%)	χ2(1) = 0.063	0.802
Marital status: Married	177 (53.6%)	42 (48.8%)	χ2(1) = 0.630	0.427
Age > 34 Years	155 (47 %)	37 (43%)	χ2(1) = 0.0428	0.513
Occupational status: Employed	232 (70.3%)	61 (59.3%)	χ2(1) = 3.7	0.051
Education> 12 years	294 (89.1%)	72 (83.7%)	χ2(1) =1.86	0.173
Mobile Usage Frequency	3.1 (1.2)	2.9 (1)	1.250	0.211
Performance Expectancy(PE)	3.9 (0.95)	3.5(0.99)	3.310	**0.001**
Effort Expectancy Mean	3.8 (0.91)	3.6 (0.68)	1.790	**0.074**
Social Influence Mean	3.4(0.90)	3.5 (0.84)	1.350	0.175
Mobile performance Risks-MUP	2.5 (0.85)	2.6 (0.83)	1.140	0.256
Mobile banking app quality (AQ)	3.6 (0.7)	3.4(0.64)	2.500	**0.013**
Technology Related Anxiety	3.3 (0.86)	3.3 (0.75)	0.014	0.989
Mobile banking Security	3.5 (0.84)	3.4 (0.82)	1.460	0.143
Transactional risk	3.4(0.95)	3.4 (0.92)	0.328	0.743

As shown in table 6.20, the chi squared test of independence showed that there was a statistically significant association between the users' occupation and the screen sizes they used to access their mobile banking apps. Those who were currently employed were significantly more inclined to report using large-screened devices (70.3%) devices than small-screened devices (59.3%), and the chi squared test of association showed that the relationship between occupation and the size of screens used for mobile banking was significant, p= 0.051. This denotes that people who were currently working were significantly more likely to use larger screens for accessing and navigating their mobile banking apps. However, the chi squared test showed that there were no statistically significant associations between people's marital status, their age, and their educational levels with the size of screen they used for mobile banking apps, as shown in table 6.20.

However, the t-test showed that respondents who reported they used large screen sized devices for their mobile banking apps reported significantly greater mobile performance expectancy (mean=3.9, sd=0.95) than those who reported using small-screened devices (mean= 3.5, sd= 0.99, p=0.001). Also, those respondents who reported using large screen devices for their mobile banking apps reported significantly greater app quality (AQ) (mean= 3.6, sd=0.7) than those who reported using small screen devices (mean=3.4, sd=0.64, p=0.013).

Moreover, those who used large-screened devices for mobile banking apps also perceived greater effort expectancy (mean=3.8, sd= 0.91) than those who reported using small-screened devices for mobile banking apps through the apps they used (mean= 3.6, sd=0.68). However, the t-test indicated that the difference was only slightly significant, (p=0.0704). Nonetheless, the t-test showed that there was no statistically significant effect of screen size on either of mobile usage frequency, social influence, mobile performance risk, technology related anxiety, security risk, and transactional risk.

In conclusion, there was no significant association between the gender of the respondent and their likelihood of using a large screen sized device for a mobile banking app, (p=0.802). Likewise, there was no significant association between the age (being older than 34 years or less) with the likelihood of using diverse sizes of screen, (p= 0.513). Correspondingly, marital status was not significantly associated with the size of the screen someone would use for their mobile banking, (p=0.427). Neither was an association found between someone's education and their preference to using a large/small screen sized device for their mobile banking as well, (p = 0.173). However, there was a statistically significant association between occupational status and the screen size used for m-banking, those who were generally currently employed (self and employed by other sectors) were more likely to use large-screen sized devices for their mobile banking services. Additionally, people who used larger screen sized devices for mobile banking apps tended to perceive significantly greater performance expectancy, mobile application quality, slightly greater effort expectancy but also had significantly greater socio-economic indices. Furthermore, occupational status (being currently employed/working person)

was significantly associated with a greater likelihood of using larger screens for mobile banking.

6.5.1 Screen size as a moderator between EE and Usage

To test for moderation between the effects of screen size, effort expectancy and the independent effects of these two predictors on people's reported rate of mobile banking application usage, standardized Z-scores were created for effort expectancy, to remove any collinearity associated between screen size and effort expectancy, resulting in a centralized effort expectancy variable with a mean of 0 and a standard deviation of 1. An interaction term between the dummy coded screen variable was then created, with 0= denoting small screen size, and 1=denoting large screen size, to create a standardized effort expectancy.

The Lilliefors's test of normality still shows negatively skewed effort expectancy, as found earlier. However, the Levenes test of homogeneity of variance showed that both effort expectancy and the frequency of using mobile apps had equal variances across the levels of screen size, making the assumptions of homogeneity of variance suitable (Field, 2009). Their distributions also approximated normality, with some few outliers who showed slight negative skewness in effort expectancy for the small screen size group.

Table 6.21: Hierarchical multiple linear regression model explaining the moderation relationship between effort expectancy and device screen size on usage frequency of mobile banking apps. N=416.

Stages	Predictors	B	Std. Err.	Standardized Beta	t-value	p	R^2
Stage-1	(Constant)	3.063	.052		59.316	.000	0.226
	Effort Expectancy	.571	.052	.477	11.045	.000	
Stage-2	(Constant)	3.016	.114		26.456	.000	0.224
	Effort Expectancy	.569	.052	.475	10.952	.000	
	Screen size= Large	.058	.128	.020	0.454	.650	
Stage-3	(Constant)	3.016	.116		26.082	.000	0.222
	Effort Expectancy	.569	.120	.475	4.744	.000	
	Screen size= Large	.058	.129	.020	.450	.653	
	Large screen* Effort expectancy.	.000	.133	.000	.002	.998	

As such, it was necessary to use a linear regression model to test the moderation and assess the residual error distribution after the fact to evaluate the effect of these minor departures. A hierarchical linear regression model was conducted in three blocks, as shown in the above table 6.21. The first block contained the standardized effort expectancy perception, followed by adding the large screen size dummy coded variable, then the last block added the interaction between standardized effort expectancy and screen size (Z-effort expectation, X Screen size = Large).

The first stage showed that there was a positive association between Z-effort expectancy, as found earlier, with an adjusted R squared of 0.23, $f_{(1, 415)} = 121.99$, $p<0.001$. Moreover, at the second stage, when the screen size= (large) was added to the model containing the standardized effort expectancy, the model's F-ratio test suggested a significant relationship between one or more of the included variables and the rate of mobile banking use. However, there was a drop in the f ratio to $f_{(2,415)} = 60.98$, $p<0.001$, with the model suggesting that the screen size was not significantly associated with the rate of using a

mobile banking apps (p= 0.650). However, effort expectancy remained significant with some slight drop in its associated t-value to (t-value=10.952, from previous t-value of = 11.04), p<0.001, denoting that after accounting for the large screen size effect, effort expectancy remained a significant predictor of the rate of mobile banking apps usage.

Nonetheless, at the last step, the product interaction moderation term (Z-effort expectation X Screen size = Large) was added to the model containing both the screen size and the standardized effort expectancy, and the resulting model was significant with a further drop in the F-ratio and the Multiple R squared and its adjusted values, f (3,415) = 45.2, p<0.001, multiple R squared= 0.22. The model suggested that after accounting for the effect of effort expectancy and screen size, the interaction moderation between both predictors on the rate of using mobile banking apps was not statistically significant, p=0.998, neither was the screen size, p=0.450. However, the Model Multiple R remained constant, denoting that the addition of the screen size and the moderation effect of screen size and effort expectancy did not add more explained variance in the rate of usage to effort expectancy above and over that explained by effort expectancy alone.

As such, contrary to expectations, there was no significant independent effect for screen size on rate of using mobile banking apps, neither was there a significant moderation effect between screen size and perception of effort expectancy of mobile banking apps on the rate of the usage of such apps according to the linear regression model. The model's residual error histogram and its associated P-P plot suggested that the error was approximately normally distributed, with very slight negative skewness.

6.5.1 Screen size as a moderator between AQ and Usage

To test for moderation between the effects of screen size and mobile banking app quality and the effects of these two predictors on people's reported rate of using mobile banking apps, standardized Z-scores for the mobile banking app

quality variable were created to centralize it in order to remove any collinearity associated between the screen size and the moderation interaction variable, resulting in a centralized effort expectancy variable with a mean of 0 and a standard deviation of 1.

As shown in table 6.22, an interaction term between the dummy coded screen variable was created, with 0= denoting small screen size, and 1=denoting large screen size, and the standardized app quality. The visual evaluation of the histogram of the app quality showed slight negative skewedness, but the distribution of the values approximated to a normal shape and the Levenes test of homogeneity of variance showed that both the mobile app quality variable and the usage frequency of mobile apps had equal variances across the levels of the screen size, making the assumptions of homogeneity of variance and normality across the two groups suitable to being tested using multivariate linear regression (Field, 2009).

Table 6.22: Hierarchical multiple linear regression model explaining the moderation relationship between app quality and device screen size on usage frequency of mobile banking apps. N=416.

Stage	Predictors	B	Std. Err.	Standardized Beta	t-value	p	R^2
Stage-1	(Constant)	3.062	.050		61.808	.000	0.289
	Mobile App quality(AQ)	.643	.050	.537	12.961	.000	
Stage-2	(Constant)	3.072	.110		27.992	.000	0.289
	Mobile App quality(AQ)	.644	.050	.538	12.861	.000	
	Screen size= Large	-.012	.123	-.004	-0.100	.920	
Stafe-3	(Constant)	3.041	.112		27.054	.000	0.291
	Mobile App quality(AQ)	.513	.115	.429	4.478	.000	
	Screen size= Large	.017	.125	.006	.134	.894	
	Large screen* Mobile App quality(AQ)	.161	.127	.120	1.261	.208	

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As a result, a hierarchical linear regression model was conducted in three blocks, as shown in the above table 6.22. The first block contained the standardized mobile App quality variable, followed by adding a large screen size dummy coded variable, then the last block added the interaction (moderator product) between the standardized mobile app quality and screen size, the (Z-effort expectation X Screen size = Large). The first stage showed that there was a positive association between Z-App quality, as found earlier in hypothesis 5, with an adjusted R squared equivalent to = 0.23, $f(1, 415) = 121.99$, $p<0.001$, denoting the positive association between mobile app quality(AQ) and the rate of usage of apps.

At the second stage, when the screen size = (large) was added to the model containing the mobile app quality (AQ) variable, the model's F-ratio test suggested a significant relationship between one or more of the included variables and the rate of mobile banking usage. However, there was a drop in the f ratio to $f(2,415) = 83.7$, $p<0.001$ as the screen size was added to the model, but the model also suggested that the screen size was not significantly associated with the rate of usage of mobile banking apps ($p= 0.650$). However, mobile app quality (AQ) remained significant with some slight drop in its associated t-value to (t-value = 12.861, from previous t-value of = 12.961), but it was still significant, ($p<0.001$) with the presence of the screen size, denoting that after accounting for the large screen size effect, the app quality factor remained a significant predictor of the rate of the usage of such banking apps.

Moreover, when the moderator product variable was added, the moderation between screen size and the mobile banking app quality (AQ) was also found to be non-significant. However, the surge of the moderator variable into the third stage was associated with a substantial drop in the significance of the perceived mobile banking apps quality (AQ) variable (t-value from previous stage t-value=12.861 to a t-value of 4.478). This denotes some slight moderation effect between screen size (being large) and mobile banking app quality (AQ), which translates to the fact that some mobile banking users who used large screen sized devices still used their mobile apps more frequently, but

the change in their rate of usage was not statistically different from their counterparts who used small-screened devices, p= 0.208.

In brief, contrary to expectations, the screen size did not have a significant moderation effect between mobile banking app quality AQ and the rate of app usage by Jordanian mobile banking users. However, a slight change (rise) in the total explained variance is noted as the screen size and the interaction term were added sequentially, the rise was approximately =3% in the Multiple R, denoting that these three variables collectively may provide slightly better understanding of how people used and perceived their bank's mobile apps quality. Noteworthy, the sign of the screen size was negative in the second stage, denoting that some people who used large screens (compared to those who used small screened devices) still used their apps less frequently. However, the effect was not statistically significant, p= 0.920. This negative effect becomes positive, however, when the interaction moderator is taken into account at stage 3.

6.6 Chapter Summary:

This chapter presents and analyses the data that were gathered by the current study's survey. Such data that has been gathered with the purpose of measuring the main factors that affect the usage of mobile banking apps by Jordanian customers. This chapter started by initial procedures of data analysis such as manipulating the issues of response rate, treatment of missing data, normality and reliability. Such basic analysis were used to assess the consistency of data in addition to preparing the data for further analysis, such as factor analysis and regression.

Furthermore, a factor validity test (factor analysis) was conducted. The technique of principal components analysis was used and in turn it revealed that each of the first five dimensions, namely: Performance Expectancy, Effort expectancy, Social Influence, Mobile performance Risk, and Mobile Application Quality, were unique factors that comprised a unity, and for all of them the factor analysis suggested that the intended concepts were measured

well. On the other hand, a new factor was extracted from each of two factors (Security risk and Transactional risk), namely this factor was Technology-Related-Anxiety.

In addition, descriptive analysis revealed the main statistics about the demographic profiles of the survey's respondents as well as the rates of the usage frequencies of the users of mobile banking apps in Jordan. Moreover, this chapter provides statistical information about the main factors of the conceptual model of the current research, these kinds of statistics have been further illustrated and summarized in the tables and figures listed among the chapter. Such descriptive analysis clarifies any potential ambiguity with the purpose of conducting some examination prior the regression analysis.

The multiple linear regression analysis was employed to test the model and revealed that some factors had a significant influence upon the usage of mobile banking apps in Jordan (Performance Expectancy, App Quality, and Technology-related Anxiety and Transactional risk). However, four other factors showed an insignificant effect upon the usage of such apps (Effort Expectancy, Social Influence, Mobile Performance Risk and Security Risk). Furthermore, the moderator (screen size) of the devices was tested to establish if it had a significant moderating effect upon some main factors toward the usage, which showed that there was no noteworthy influence of such a moderator to change the perceptions of users about the usage frequency of mobile banking apps.

Chapter 7: Discussion

7.1 Introduction

This chapter presents advanced explanation and justification of the results that were displayed in the previous chapter (Data Analysis). The empirical results that were obtained after conducting the main survey on the usage of mobile banking apps by Jordanian customers have been linked to the conceptual model and the theoretical hypotheses (as explained earlier in chapter 4, Conceptual Model). Linkages that have been created between the results obtained with what was theoretically hypothesised have been used to explain the actual usage of mobile banking apps, with adequate justification that refers to the previous studies in the same field. Furthermore, this chapter discusses the descriptive data of the demographic profiles and construct measurements, as reported by the survey's respondents.

Moreover, the reliability test results have been discussed and explained considering the common standards and threshold of such test and justified with regard to the previous literature in the field of technology acceptance. In addition, the factor analysis outcomes have been clarified and the extracting of a new factor (Technology related anxiety) has been explained. Moreover, the research main hypotheses have been tested and justified after conducting multiple linear regression on the research conceptual model. In addition, a summary of the supported and unsupported hypotheses has been listed alongside a discussion and comparison of the current study's result with the previous literature. Finally, the research model depicted to illustrate the important predictors that explain the usage of mobile banking apps by Jordanian customers.

7.2 Discussion of construct measurements

This section rationalises the research instrument that used to collect the required data about the model's construct. This data has been examined through the descriptive discussions and literature comparisons. Such data showed an ability to meet the standards and requirements of the reliability and validity tests, as

the following subsections explain. As mentioned in the previous chapter, there were 416 completed responses to the research's survey by Jordanian users of mobile banking apps. A small majority (51.2%) were male users, and the rest (48.8%) were female. The respondents were all adults and their age ranged between 18 and 64 years or older, since every bank account holder in Jordan must be aged over 18 years. Of these, (17.8%) of them were aged between (18-24 years), another (36.1%) were aged between (25-34 years), also another (28.8%) of them were aged between (35-44 years), with a few of them (13.7%) aged between (45-54 years) while even fewer (3.6%) were aged between (55-66 or more years). This indicates that (96.4 %) of the respondent were aged below 54 years, which agrees with the fact that the Jordanians form a young society (DOS, 2017) and the users of such apps are the younger rather than older aged people. Some statistics reveal that the percentage of mobile users in Jordan was 76% of Jordanian people who were aged over 15 years (Al Khasawneh, 2015).

Regarding the educational level of the respondents of the present survey, their educational background ranged between 'no schooling' to doctorate level, but in detail their levels of education were as follows: (3.4%) with no previous completed schooling, this ratio agrees with the statistics about the low level of illiteracy in Jordan, which is 6% (Petra, 2016). Next were those with primary school level (1.9%), then those who had completed their secondary education (6.7%) and those who were at least undergraduates, who comprised the majority (52.4%). This was followed by those who had their postgraduate education completed (26%) and the remainder responded they had been educated to a doctorate level (9.6%).

Moreover, their level of employment was assessed. The unemployed people comprised only (7.9%) of the sample, which agrees with the fact that there were some unemployed people among the Jordanians, which were about 18.2% of the total population at time of data collection (DOS, 2017). In addition, the majority were employed (56%) within either the public or private sectors. The rest were either self-employed (12%), retired (2.9%) or students (21.2%). Regarding usage, as shown in table 6.7 in the previous chapter most of the

respondents (92.1%) used their mobile phones to access mobile banking apps, and interestingly a few of them (7.9%) responded that they used their tablets. A majority also responded that their devices had large screens (79.3%) and the rest (20.7%) used devices with small screens. This obviously reveals that Jordanians prefer to use smart phones rather than tablets.

In addition, they prefer to use large screen sized devices rather than small ones, this agrees with the results of study conducted by Kim and Sundar (2014). It was found that larger screens lead the respondents to higher adoption comparing to other users who used small screen smart phones. Moreover, the researcher's point of view is that people prefer large screen smartphones to access their mobile banking apps due to the higher clarity of the large screens comparing to small ones, especially when they deal with financial transactions with numbers that must be shown clearly to be assured that the amount of the money they send/ receive is correct before completing their financial transactions securely.

Primarily, when the respondents were asked how frequently they used such apps to access their bank accounts for performing transactions or viewing purposes, a few (12%) answered they have never used it, another proportion (16.1%) responded they did not use them frequently, but a considerable proportion of them (41.8%) said they used these apps slightly frequently, and the remainder responded they have used them either frequently (43.7%) or very frequently (16.3%). This shows that (60%) of the respondents use mobile banking apps frequently, which means that such apps were widely adopted by users, who use them to access their banking accounts. In fact, such findings indicate that Jordanian bank customers who use mobile banking apps frequently find such apps beneficial in performing their banking transactions, which justifies their desire to use mobile banking apps as an alternative channel to other traditional banking channels. The researcher rationalises the reasons or features of mobility and expediency of mobile banking apps to be the main reasons behind the frequent usage of such apps by Jordanians. This agrees with the previous literature on this standpoint (Pu¨schel et al., 2010; Luo et al., 2010; Laukkanen, 2007).

7.2.2 Construct reliability:

Bhattacherjee (2012, p. 56) defined reliability as "the degree to which the measure of a construct is consistent or dependable." Data of this research was tested, as shown in table 7.1, to assure an adequate level of reliability using Cronbach's alpha test of internal consistency by using SPSS (Cronbach, 1951). The 49-item questionnaire had an overall Cronbach's alpha of = 0.97, denoting that people answered these questions consistently, and that the questionnaire in general was able to measure these concepts equally for most people in the questionnaire, a Cronbach's alpha value of 0.7 and above is desirable as suggested by Hair et al. (1995). The highest value of Cronbach's alpha was 0.93, while the lowest value was 0.85, which is higher than the threshold of 0.7 of reliability (Nunnally, 1978). However, each sub-concept's internal consistency was analysed separately, as shown in table 7.1. The performance expectancy (PE) questionnaire was measured with six items, and it had an overall Cronbach's alpha value of =0.93, denoting that the six items measured people's responses on performance expectancy reliably.

Likewise, the effort expectancy (EE) questionnaire comprised four items whose Cronbach's alpha was 0.86, denoting that these indicators were internally consistent and measured the concepts' reliably. In the same manner, social influence comprised five indicators, and its measure of internal consistency was 0.86, denoting it was reliably read and understood by people. Also, the six-item mobile performance risk MPR concept was also internally consistent, with a Cronbach's alpha of 0.86. The mobile banking apps quality AQ, however, was measured using a 13-item long questionnaire, as such its test of internal consistency also suggested that it was reliable, with a Cronbach's alpha of 0.92.

In addition, the remaining three sub-concepts: mobile banking apps security risk (ASR); mobile banking app transactional risk (ATR); and the technology related anxiety (ANX) were also internally consistent when tested separately, with their overall Cronbach's alpha tests suggesting they were all reliable too, (Cronbach's alpha of 0.86, 0.85, and 0.87, respectively).

The same value of internal consistency and reliability has been found by other previous studies. For example, Venkatesh et al. (2012), found that the construct performance expectancy and social influence scored values of Cronbach's alpha; 0.88 and 0.82 respectively.

Furthermore, other previous studies have reported values that ranged between 0.78 to 0.96 of the constructs of performance expectancy, effort expectancy and social influences such as the study by Chiu et al. (2010) about the adoption of self-service kiosks. Other factors, such as perceived risk, have been reported at a value of 0.73, as found by AbuShanab et al. (2010) in their study of the usage of internet banking services in Jordan. Moreover, Martins et al. (2014) reported that the constructs of performance expectancy, effort expectancy, social influence and perceived risks have Cronbach's alpha values ranging between 0.87 and 0.99. By the same token Al Qeisi and Al-Abdallah (2014) reported similar values about app quality in their study into the usage of internet banking in UK.

Table 7.1: The Internal Consistency and Reliability Testing of the Questionnaire. N=416.

Constructs	Cronbach's alpha (α) (> 0.70)
Performance Expectancy (PE)	0.93
Effort Expectancy (EE)	0.86
Social influence (SI)	0.86
Mobile performance Risk (MPR)	0.86
Mobile banking app quality (AQ)	0.92
Technology Related Anxiety (ANX)	0.87
Mobile banking app Security Risk(ASR)	0.86
Mobile banking app Transactional risk (ATR)	0.85

7.2.3 Construct factorial validity:

The aim of this study, as mentioned in chapter one of the present thesis, is to develop a model that is capable of providing a valid logical prediction of the usage of mobile banking apps based on theoretical evidence and causal relationships among the aforementioned factors. Therefore, factor analysis and correlation matrix tests have been conducted in this research, which are common techniques that are widely used to test construct validity (Hair et al., 2006). Moreover, other requirements to conduct such factorial validity analysis are the availability of at least 10 observations for each construct, with a minimum sample of 50 observations, according to Hair et al. (2006). The sample size of the current research was 416, which is adequate for using factor analysis.

Principal Components Analysis (PCA) was applied as a factor analysis tool, which was used to assess the factorial validity of the questionnaire's items to measure the model's constructs. The 49-items questionnaire would theoretically be comprised of seven latent factors (dimensions). These dimensions were expected to measure respondents' beliefs, thoughts and their effects upon the use of mobile banking apps, namely they were: performance expectancy, effort expectancy, social influence, mobile performance risk, app quality, app security risk, and app transactional risk.

 The factor analysis revealed that all the first five factors (performance expectancy, effort expectancy, social influence, mobile performance risk and app quality) represented a unique single dimension, as was evident from their initial solution, scree plots and the total explained variances, signaling that each of them made a unity of one factor, as can be seen in the figures/tables below. Simply, these concepts reliably measured the intended constructs accurately. Their overall mean, which can be computed by obtaining the overall mean of the indicators comprising each of them separately, would characterize them well in the further analysis to be conducted later, such as regression tests.

Conversely, analyzing the last two dimensions separately (Apps security risk, and Apps transactional risk) led to various non-simple, meaningful and

interpretable structures, which were analyzed by combining them all together in one analysis (De Coster, 1998). This means there was a need to add the items (15 questions) of both abovementioned constructs in one analysis, assuming that they all measured one main concept. The resulting solution, as seen in table 7.2, was adequate according to Kaiser-Meyer-Olkin (KMO) test, which is an alternative technique to check sample adequacy. KMO denotes the ratio of square correlation between variables to the square partial correlation (Kaiser, 1970).

The KMO values vary between one and zero and the closest value to one is more suitable to conducting the factor analysis. As the KMO value was=0.902 (as seen in table 7.2), this proves the appropriateness of using factor analysis. Bartlett's test of sphericity produced the result that X^2 (105) = 3116.9, p<0.001, denoting the sample adequacy for using the principal components matrix and that the correlation matrix between these indicators was an identity matrix. As such, PCA was deemed acceptable, but the factor solution was rotated using the Promax rotation method, to allow the correlation of these concepts to be measured, because they were in reality correlated.

Table 7.2: Sampling adequacy for PCA

K-M-O	0.90.2
Bartlett's test.	$X^2(105)$ =3116, p<0.001.
Determinant	>0.0001

As shown by the evidence in Table 7.3, the rotated factors analysis pattern matrix, and as shown in figure 7.1 the accompanying Cassilith Scree plot-1, these 15 questions/items comprised three distinct latent factors rather than two distinct factors, and these three factors in total accounted for 63.4% of the variations in the mobile banking apps responses to the 15 items analyzed (Field, 2017). However, the first factor explained the first 44.2% of the variations in people's responses, and the second factor successively explained 11.8% of the variations in people's response and the last (i.e. the third factor) explained 7.4%

of the variations; adding these explained variances up resulted in the total explained variance of 63.4%.

Figure 7.1: Scree plot of PCA analysis (security risk and transactional risk)
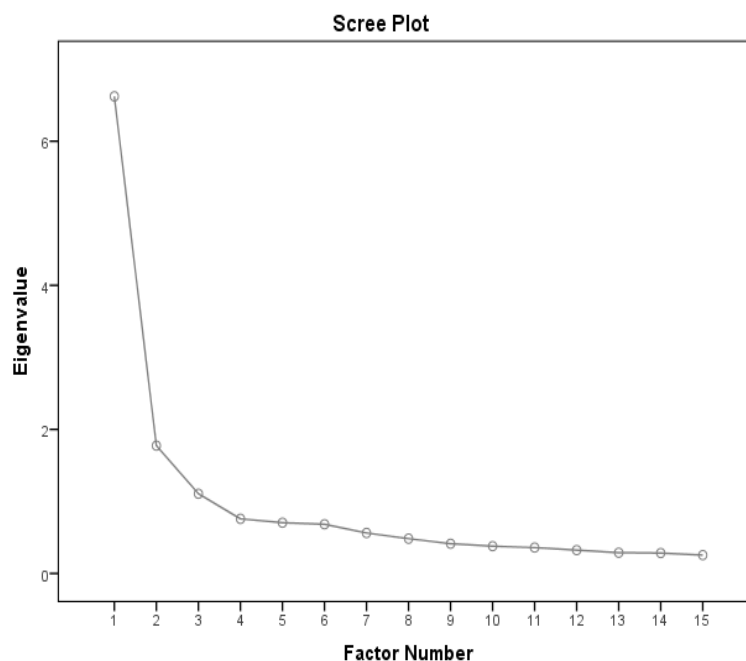
It was clear that items that measured users' worry and anxiety from the potential problems associated with technology that might arise from using mobile banking apps were arranged under one latent factor, which is factor-1, with items loading (correlating) with this factor denoting their overall association with this dimension. Those items that measured the respondents' security risk of the mobile banking apps also coalesced significantly (i.e. correlated) with factor-2, and the last three items that measured the respondents' perceptions of Transactional risk also loaded (i.e., correlated) well to factor-3. To sum up, these latent factors were renamed as (factor-1=Technology Related Anxiety, factor-2= Security risk, and factor-3= Transactional Risk), as shown in the rotated factor analysis pattern matrix in table 7.3 below.

Table 7.3: Rotated Factors Pattern Matrix

	Components/ factors		
	Anxiety	Security Risk	Transactional Risk
I fear that apps of Mobile banking technology are not reliable.	.855		
I am worried the Mobile banking app cannot verify the actual completion of the transaction.	.800		
I am unsure that transactions on Mobile banking app will take place as I expect.	.753		
I would not feel secure by passing my sensitive information via the app of M-banking.	.635		
The reports and news about Mobile banking fraud worry me about the security of M-banking.	.552		
I prefer to use Mobile banking app only for non-transactional tasks (i.e. only for viewing balance, transactions, etc.)	.488		.341
I find it risky to do large amount of money transactions on Mobile banking app.	.479		
Only authorized users are able to access to secret information on Mobile banking app.		.833	
I think Mobile banking provider checks all Communications between the app and me for protection from hacking or eavesdropping.		.738	
Mobile banking app ascertains the identity of user every single login.		.703	
I believe my bank information is well secured by the provider of Mobile banking app.		.659	
I think that Mobile banking app has sufficient security features.		.649	
I think Mobile banking app will not deny the transaction that occurred by me.			.786
Mobile banking app requires one-time-passcode (OTP) to perform every transaction.			.661
Internet providers usually make sure that transactional information is protected from accidentally changed or lost.			.645
Extraction Method: Maximum Likelihood. Rotation Method: Promax with Kaiser Normalization.			
Rotation converged in 6 iterations.			

Moreover, when the correlations between these newly generated concepts were analyzed, as can be seen also in the inter-factor correlation matrix table 7.4 below, greater technology-related-anxiety was significantly associated with greater perceptions of security risk issues that might come up while using such apps, r= 0.55, p<0.01.

Table 7.4: Factor Correlation Matrix

Factor	Anxiety	Security Risk
Security Risk	.547	
Transaction Risk	.563	.642
Extraction Method: Maximum Likelihood. Rotation Method: Promax with Kaiser Normalization.		

Also, increased perceptions of transactional risk were significantly associated with increased technology associated anxiety, r=0.56, p<0.001, but also increased perceptions of transactional risk was also significantly associated with increased perceptions of security issues that accompany the use of mobile banking apps in general, r=0.64, p<0.01.

Table 7.5: Total variance explained by the three factors

Factor	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total
1	6.623	44.155	44.155	6.169	41.127	41.127	4.912
2	1.774	11.828	55.983	1.333	8.888	50.016	4.912
3	1.107	7.382	63.365	.660	4.401	54.416	4.310
4	.758	5.056	68.421				
5	.705	4.700	73.121				
6	.683	4.551	77.672				
7	.562	3.747	81.419				
8	.483	3.221	84.640				
9	.413	2.756	87.396				
10	.379	2.527	89.923				
11	.359	2.395	92.318				
12	.325	2.164	94.482				
13	.289	1.924	96.406				
14	.284	1.892	98.299				
15	.255	1.701	100.000				
Extraction Method: Maximum Likelihood.							
a. When factors are correlated, sums of squared loadings cannot be added to obtain a total variance.							

To go over the main points, the principal components analysis revealed that each of the first five dimensions, namely: performance expectancy, effort expectancy, social influence, mobile performance risk, and mobile application quality, were unique factors that comprised a unity, and for all of them the factor analysis suggested that the intended concepts were measured well. However, the factor analysis also showed that the last 15 indicators that measured the constructs (security risk and transactional risk), diverged into three meaningful solutions, resulting in an extraction of a new concept, which is designated as Technology-Related-Anxiety, besides the original concepts (security and transactional risks). It was intended to group the items that comprised each of these latent factors and distinctively characterize their overall mean in the analysis. As such, separate composite scores for each of these newly identified

factors were computed and used in further analysis, such as the regression analysis that will be presented later in this chapter.

7.3 Discussion of the research hypotheses

This section discusses the main results of the research hypotheses testing. As discussed in Chapter Four, section 4.4.1, ten research hypotheses were proposed to prove the relationships between eight independent factors (performance expectancy, effort expectancy, social influence, mobile performance risk, app quality, security risk, transactional risk and technology related anxiety) and one dependent factor (usage behaviour). In addition, there were two research sub-hypotheses proposed to demonstrate the moderating effect of the Screen Size factor on the relationships between usage and other two factors (effort expectancy, app quality).

Hypotheses testing represents an important aspect to be examined after conducting regression analysis. As a rule of thumb, the p value should be no more than 0.05 (Hair et al., 2006). According to this basis, the decision was made to support or reject any hypothesis, as summarised in Table 7.6.

7.3.1 Performance Expectancy

H1: The usage of mobile banking apps by Jordanians will be positively affected by performance expectancy.

As considered earlier, performance expectancy is recognised as having a profound effect on the overall usage of mobile banking apps as displayed by customers. Importantly, a positive link was established between performance expectancy and the recognised frequency of such usage across mobile banking apps, demonstrating a t-value of 3.24, $p<0.01$, which therefore signifies that the above hypothesis is supported, as shown in table 7.6 below. Therefore, alongside the increase in people's performance expectancy, mobile banking app use also increases.

Otherwise stated, customers in Jordan were found to be more inclined to use such apps if they believed them to add a greater degree of effectiveness,

productivity and usefulness to their day-to-day lives. This could be owing to the propensity of such apps to facilitate convenience, thereby enabling customers to gain access to services of a higher quality (i.e. balance enquiries, fund transfers, paying bills) without there being any recognised hindrances or restrictions in terms of time or location (Curran & Meuter, 2005). Owing to the fact that customers believe benefits will be derived from the use of such apps, there is the suggestion that intention of use will increase.

From a theoretical standpoint, such findings are seen to be well aligned with previous works in the field of electronic banking solutions, which have focused on testing and approving performance expectancy or otherwise have come to garner insight into factors such as perceived usefulness and relative advantage as pivotal factors establishing the overall intention of a person to use electronic banking solutions, for example. More specifically, most work in this arena has adopted UTAUT as a theoretical underpinning in conceptual frameworks and has further validated performance expectancy as a significant influential driver in behavioural intention (Martins et al., 2014; Riffai et al., 2012; Yu, 2012; Foon & Fah, 2011; AbuShanab et al., 2010; Chiu et al., 2010).

Moreover, self-service technologies have come to be acknowledged as the friendliest, most innovative, integral and productive in line with the lives of customers, in contrast with more conventional options, which commonly require additional effort and time to be invested by consumers if they are to obtain the same services (AbuShanab et al., 2010; Aladwani, 2001). Essentially, the causal link identified between performance expectancy and technology implementation, as outlined in other works, has been recognised as having a value adequate to be viewed as significant. In the work of AbuShanab et al. (2010), for example, the implementation of internet banking in Jordan was analysed and found to account for the t-value of 3.33 and $p<0.05$.

Importantly, an additional work examined the overall usage of mobile banking (Yu, 2012), with the scholar suggesting a notable influence of performance expectancy in line with innovation. In the same vein, it was stated by Foon & Fah (2011) that the path between performance expectancy and customers' intention to use mobile banking demonstrated an adequate value. Upon closer examination of such values, there is the clear implication that different factors

may be associated with functional utilities (performance expectancy); these have consistency been recognised as the key focal point for consumers when devising their overall intention to use SST. As such, this has provided additional support in regards to performance expectancy's inclusion in the conceptual framework, in addition to providing additional evidence for the current results.

Nonetheless, a number of the factors associated with performance expectancy, including perceived usefulness, as suggested in the work of Davis et al. (1989) in TAM, have received much validation as being a key aspect in the prediction of acceptance in relation to electronic banking channels. This support for the role of perceived usefulness can be seen when reviewing mobile banking literature, as in the studies of Hanafizadeh et al. (2014), Wessels & Drennan (2010), Riquelme & Rios (2010), and others.

7.3.2 Effort Expectancy

H2: The usage of M-banking apps by Jordanians will be positively affected by effort expectancy.

Effort expectancy is recognised, in this work, as pertaining to the degree of perceptions of customers in regards the difficulty or ease of use of mobile banking apps (Venkatesh et al., 2003). The use of such technology necessitates customers in completion various tasks without any help; subsequently, it may be seen that effort expectancy plays a critical role in establishing the overall intention of customers to use technology. From a theoretical standpoint, effort expectancy, when captured through different factors, such as complexity and perceived ease of use, for example, has undergone much comprehensive and in-depth testing and has been recognised as a critical predictor in the behavioural intention to use various different types of innovation, including mobile banking, as noted in Chapter Four. Notwithstanding this, the empirical findings from the current work go against the findings garnered in other works, such as that of Venkatesh et al. (2003), owing to there being no statistically significant link identified between effort expectancy and the usage of mobile banking apps, t-value = 1.447 and p>.05. Therefore, the above hypothesis is not supported, as shown in table 7.6 below.

In line with the various works carried out previously that have highlighted UTAUT as a guiding theory in their frameworks, providing the role of effort expectancy in line with behavioural intention with support, as in the case of Martins et al. (2014), effort expectancy has been identified as the most influential factor amongst those factors in the UTAUT when striving to predict behavioural intention in line with internet banking use. Furthermore, it was found that effort expectancy was able to predict 0.17 of variance in behavioural intention, specifically in regards the use of online banking, as noted in the work by Riffai et al. (2012). Furthermore, a number of factors comparable with effort expectancy, such as perceived ease of use, has been commonly acknowledging as an essential factor in technology acceptance. As an example, in the work of Al-Smadi (2012), which examined customers' adoption of internet banking in the context of Jordan, the role carried out by perceived ease of use in influencing the attitudes of customers in relation to such technologies received validation.

On the other hand, when taking into account technology adoption overall, the factor of effort expectancy was seen to highlight an insignificant effect in relation to system use intentions, as has been further supported in other works (e.g. Al-Gahtani et al., 2007). In this vein, Davis (1989) challenged a number of other findings to support ease of use as being a direct determinant of usage. Otherwise stated, individuals could potentially fail to consider the degree to which difficulty or ease of use is inherent in the targeted system should the utilities and benefits, such as entrainment and efficiency through system use, be found to be more significant. Accordingly, in consideration of useful and highly innovative technologies, such as in the case of mobile banking apps, people are less likely to be concerned by the different issues pertaining to complexity or ease of use in relation to technology; this is also supported in the study by Yu (2012), who also downplays the influence of effort expectancy on customers' intention to use mobile banking.

Moreover, Wessels & Drennanm (2010) determined in their work that perceived ease of use did not have the capacity to describe any degree of variance in the intention of customers to use mobile banking. In this same vein, the work conducted by Zhou et al. (2010) established effort expectancy as being

the least significant factor in estimating mobile banking adoption. In the specific context of Jordan, a negative but non-significant link has been identified between effort expectancy and customers' intention to use internet banking (AbuShanab et al., 2010). A number of other scholars have also recognised the non-significant influence of effort expectancy or associated aspects on behavioural intention, as in the cases of Wessels & Drennan (2010), Curran & Meuter (2007), Park (2006), Brown et al. (2003) and Tan and Teo (2000).

H2a: Mobile screen size moderates the effect of effort expectancy upon the usage of mobile banking apps

A large part of literature in both psychology and communication fields has systematically found that an increase in screen size positively impacts the cognitive domain of user perceptions, such as: user satisfaction, and acceptance of such technology. In the current research the mobile screen size was hypothesized to have a moderating effect between the usage and effort expectancy factors. The empirical results of this research show that the effect of effort expectancy and screen size, the interaction moderation between both predictors on the rate of using the mobile banking apps was not statistically significant, $p=0.998$, neither was the screen size, $p=0.450$.

However, the Model Multiple R remained constant, denoting that the addition of the screen size and the moderation effect of screen size and effort expectancy did not add more explained variance in the rate of usage to effort expectancy over and above that explained by effort expectancy alone. As such, contrary to expectations, there was no significant independent effect for screen size on rate of using mobile banking apps, neither was there a significant moderation effect between screen size and perception of effort expectancy of mobile banking apps on the rate of the usage of such apps, according to the linear regression model. The current results contradict what was hypothesized before and contradict previous studies such as Detenber & Reeves, (1996), and Maniar, Bennett, Hand and Allan (2008).

7.3.3 Social Influence

H3: The usage of M-banking apps by Jordanians will be positively affected by social influence.

The extent to which a person holds the view that others' opinions are relevant in their adoption of modern technology is the definition of social influence (Venkatesh et al., 2003). In line with the key assumptions inherent in the UTAUT model, the present work suggests social influences as a positive element affecting the usage of mobile banking apps amongst customers in Jordan. Nonetheless, the empirical findings of the present work show no statistically significant link between social influence and the use of the mobile banking app (t value = $-.723$, p>.05), with the link recognised as negative, meaning that respondents are not concerned with the different aspects linked to social factors owing to their perceived lesser influence in relation to others' opinions and their use of such technology. Therefore, the above hypothesis is not supported, as shown in table 7.6 below.

A number of factors comparable to the social influence factor have been recognised, as in the case of reference group, image and subjective norm. In this regard, the argument has been posed by Titah & Barki (2009) regarding the substitute role of subjective norms and attitudes in predicting the behavioural intention in line with technology. Furthermore, it has been stated in the study of Carlsson et al. (2006) that social influences are seen to be ineffective and lacking strength when other aspects are included in the conceptual model, such as technology anxiety and performance expectancy. More specifically, mobile banking is recognised as being in the early stages in the Jordanian context, especially when combined with the awareness of such systems in society, which remains low (Al-Rfou, 2013). Accordingly, customers are expected to demonstrate greater independence in decision-making when it comes to electronic banking service use, and therefore are more selective in the information stemming from the social system in this regard (Tan & Teo, 2000).

Nonetheless, as has been highlighted in the work of Venkatesh et al. (2003), the effect of the role associated with social influences is commonly expected to be more fundamental in terms of affecting behavioural intention amongst older

populations, with a lower wealth of experience. However, in specific consideration to the present work, most subjects are seen to be young, educated, and well-experienced in the use of computers and the internet, which therefore positions them as being less vulnerable to social influences and their effects. Furthermore, the adoption of mobile banking apps amongst customers in Jordan is non-compulsory, meaning social influences might be seen to lose their effect when contrasted alongside the mandatory context, as noted in the work of Venkatesh et al. (2003).

In Jordan specifically, there are a number of ways by which negative and non-significant influences could be explained and associated with the low level of promotional campaigns in relation to online banking channels, which further outweighs the negative effect of the evaluations and viewpoints of people, either through the benefits or mere presence of such channels (Al-Rfou, 2013; Al-Majali, 2011; Al-Sukkar & Hasan, 2005; Salhieh et al., 2011). Accordingly, in Jordan in particular, it may be feasible to identify social influences as having negative and weak effects on the overall willingness of customers to adopt SST banking mediums. Nonetheless, the findings demonstrated in the present work regarding social influences were seen to differ when compared with those of other works that have adopted UTAUT as a guiding framework, as in the cases of Martins et al. (2014), Yu (2012) and Foon & Fah (2011), all of which have provided support for the role played by social influences on behavioural intention.

7.3.4 Mobile Performance Risk

H4: The usage of M-banking apps by Jordanians will be negatively affected by their mobile performance risk.

Overall, performance risk may be recognised as the potential of a failure to arise stemming from product purchase (Laroche et al., 2004). If a customer is to experience performance risk, there first is the need for there to be some background knowledge pertaining to the system, which, in turn, develops a number of expectations. However, mobile banking is recognised through asymmetric data, in addition to a lack of personal interaction, which therefore causes problems to arise in terms of rectifying errors. Such factors are responsible for lowering trust in the performance of e-banking; this can result

in performance risk, as noted in the 2006 work of Littler & Melanthiou. In the present work, the empirical results go against the prior literature in this domain, finding no statistical association between mobile performance risk and the use of mobile banking apps (t-value = 1.209, p>.05), therefore, the above hypothesis is not supported, as shown in table 7.6 below.

As such, the present work goes against the findings derived by Nicolaou et al. (2013), which emphasise that the perceptions of customers in e-service could potentially impact the adoption of a product or service. Accordingly, this work contradicts what was determined by Littler & Melanthiou (2006) as critical whilst establishing other types of performance risk, both technical and non-technical in nature. As an example, one of the newly identified performance risks in the present work is that of product/service inconsistency in their offerings, both online and in stores, with customers stating that better offers on various products, including loans, were achieved when speaking to someone in-branch rather than through online channels. This essentially validates the relationship management element associated with in-branch banking, as recognised in relation to various cultural considerations, which ultimately heightens the perception of risk in mobile banking.

When considering the brick and mortar compared with online channels, consistency has been noted in a number of works, although the majority of these have come to recognise online channels as being less expensive when compared with in-store or in-branch solutions as a result of higher overheads and costs associated with brick and mortar establishments. In contrast, it has been seen that in the banking sector in Jordan, online offers are costlier with customers benefitting from long-term relationships with banks in an effort to derive lower-cost offers.

This study contradicts the conclusions drawn it the work of Littler & Melanthiou (2006), which are lacking in consideration towards personal interactions in the online environment amongst users, which results in increased perceptions of risk in the case of the online environment. This study further goes against the view that inadequate technical performance of expectations pertaining to technological problems result in greater perceptions of risk. In this regard, when poor performance is demonstrated by the infrastructure, as noted

in the studies of Masocha et al. (2011) and Kolodinsky et al. (2004), a significant performance risk is witnessed as affecting risk perceptions. In this work, the subjects noted a number of different technical risks, including the server failing halfway through a transaction, which further increased the perceptions of risk in the domain of e-banking.

7.3.5 App Quality

H5: The usage of M-banking app is positively influenced by the application's quality.

The definition afforded to mobile banking apps or the quality of software may be considered as the degree to which the application's most-desired features are incorporated into an m-banking system so as to improve its overall performance and accordingly fulfil the specifications and requirements of the user (Fitzpatrick, 1996). In the present work, the empirical findings emphasise the quality of mobile banking apps as having a profound positive association with the overall usage of mobile banking (t-value = 4.5, $p<0.001$). This result shows that, after controlling for everything else in the model, app quality was found to achieve an increase in mobile banking app usage, which in turn supports the above hypothesis, as shown in table 7.6 below. This finding is in line with that of Aladwani (2006), where the quality dimension underwent empirical testing within the online context and TAM framework (Aladwani, 2006). In this same way, it was found in the work of Nelson et al. (2005) that information and system quality have a profound and significant impact on system use.

Moreover, the present work replaces the construct of facilitating conditions in the original UTAUT framework, with app quality. In the view of Venkatesh et al. (2008), facilitating conditions is a construct that reflects the perceptions of a person in regards their own control over a behaviour. They further note that, overall, facilitating conditions may be seen to refer to the perceptions of a person concerning the technological or organisational resources with the potential to eradicate or merely minimise the obstacles associated with system use. Moreover, as stated in UTAUT, facilitating conditions highlight the importance of external factors, including resources, for example, and their

impact on usage without behavioural intention acting as a mediating factor (Venkatesh et al., 2003). Furthermore, MacFarland and Hamilton (2004) state that system quality has a notable effect on the overall usage of the system, whilst other results emphasise technical quality as affecting the inclination of customers to make online purchases (Aladwani, 2006). Similar findings may be seen in the study of Bauer et al. (2006).

Moreover, in a further work pertaining to the adoption and use of e-services, as completed by Al-Ghaith et al. (2010), it was determined that adoption is established through service quality, which is viewed as a fundamental factor. Moreover, in research pertaining to e-government services in the United Kingdom, Gilbert et al. (2004) recognise information quality as being pivotal in e-government adoption. The use of such electronic services-based solutions is seen to be influenced by the overall satisfaction of users, which is notably affected by high-quality service (Gilbert et al., 2004; Kumar et al., 2007). In a comparable vein, various other works provide support for such findings through the suggestion that technological infrastructure is required in order to support people in the implementation of innovation whilst eradicating any obstacles seen to hinder the use of technology (Van Dijk et al., 2008; Venkatesh et al., 2003).

In contrast, it has been argued in the works of Delon & Mclean (1992, 2003) that information quality and system quality do not have a direct or significant impact on system usage, but rather can affect the intention to use as opposed to actual use. Comparably, the suggestion is made by Davis (1989) that system quality might not affect usage as an external factor directly or significantly, but may do so indirectly through the presence of perceived ease of use and perceived usefulness beliefs. Furthermore, the present findings go against those derived by other works, as in the case of Shareef et al. (2011), who examined e-government use and accordingly identified a non-significant link between adoption and information quality.

H5a: The influence of the quality of an application on the usage of M-banking apps in Jordan will be moderated by the size of mobile screen.

Fields of psychology and communication literature have found that an increase in screen size positively impacts the cognitive domain of user perceptions in areas such as the adoption or acceptance of such technology. The current research's empirical results show that the moderation between screen size and the mobile banking App quality (AQ) was found to be non-significant. However, there was some slight moderation effect between screen size (being large) and mobile banking App quality (AQ), which translates to the fact that some mobile banking users who used large screen sized devices used their mobile apps more frequently, but the change in their rate of usage, was not statistically different from their counterparts who used small-screened devices.

In brief, contrary to expectations, screen size did not have a significant moderation effect between mobile banking App Quality (AQ) and the rate of app usage by Jordanian mobile banking users. However, a slight change (rise) in the total explained variance was noted: when the screen size and the interaction term were added sequentially, the rise was approximately =3% in the Multiple R, denoting that these three variables collectively may provide slightly better understanding of how people used and perceived their bank's mobile apps quality. It is noteworthy that some people who used small screens (compared to those who used large screened devices) used their apps less frequently. The current research result agrees with a previous study that stated large screen size affected the perceptual process by providing users more obvious reality compared to a small screen (Nabi & Oliver, 2009, pp. 545-560). However, the effect was not statistically significant, p= 0.920. The current results contradict what was hypothesized before and also contradict previous studies (Detenber & Reeves, 1996; Maniar, Bennett, Hand & Allan, 2008).

7.3.6 App Security Risk

H6: The usage of M-banking apps by Jordanians will be negatively affected by security risk.

Security risk embodies the concerns and risks perceived by users in regards their financial and personal data being intercepted without consent (Ndloovu & Sigola, 2013). Despite the fact that a number of works validate the effects of security risk on technology acceptance and use, the empirical findings in this

work show a negative but not statistically significant link between security risk and mobile banking apps usage (t-value = −.275, p>.05). Therefore, the above hypothesis is not supported, as shown in table 7.6 below. This study is in line with the findings of Rotchanakitumnuai & Speece (2003), which states that people involved with large-scale and well-known banks are not as likely to consider e-banking risks.

Nonetheless, the aforementioned results do go against other literature, as can be seen in the cases of Angelakopoulos & Mihiotis (2011), Auta (2010) and Gibson (2011), which show that a reduction in perceived security risks results in e-banking adoption. Moreover, the present work's derived findings do not align with those of Huang et al. (2011), who show that e-banking adoption may be affected by a lack of awareness regarding privacy and security. In this same vein, the present work challenges the findings in the work of Choplin et al. (2011).

Moreover, as explained in table 4.1 in Chapter 4, there are many of previous studies that relate the low usage or adoption of technologies to increased security risk, such as Al-Tarawneh et al. (2017); Li (2012); Demirdogen et al. (2010); Gelderman et al. (2011); Masocha et al. (2011); Lin and Hsieh (2011); Chen et al. (2008); Jaruwachirathanakul and Fink (2005). Furthermore, the current results in general contradict the literature of this aspect but there are some previous studies that agree with what was found in the present study, such as Kolodinsky et al. (2004) and Pikkarainen et al. (2004)

7.3.7 App Transactional Risk
H7: The usage of M-banking apps by Jordanians will be negatively affected by transactional risk.

The beliefs held by customers that mobile banking apps have the propensity to carry out secure transactions and can do so safely is a commonly held belief, with transactional risks inherent in e-banking seen to refer to the risk that transactions will not be carried out as intended or may experience errors (Ruiz-Mafe et al., 2009). The present work emphasises transactional risk as having a significant negative link with mobile banking usage when taking into account all other elements in the framework, showing that, with a lower degree of

transactional risk perceived by users, there was an increased use of mobile banking apps (t-value = 2.47, p<0.05). Otherwise stated, this work finds that a lower perception of risk results in increased mobile banking app use amongst Jordanians and in turn, hypothesis H7 is supported, as shown in table 7.6 below

In the view of Reichheld & Schefter (2000), they afford customers the ability to view transactions results in lower feelings of apprehension and greater control. On the other hand, customers are required to share much data when completing transactions, which can induce feelings of risk in regards their chances of being defrauded (Yoon, 2002). However, in the case of a physical branch, customers are not required to share as much information, meaning they feel more at ease and as being less at risk. As a result, customers consider in-branch transactions to be a safer option.

In this vein, prior works provides further support for such findings, with the suggestion made that intention to use electronic systems is predominantly established by internet trust; in turn, this decreases transactional risk (Belanger & Carter, 2008). In the present work, transactional risk may be measured so as to establish mobile app use as a dependable channel that could affect the inclination of Jordanian customers to make use of mobile banking apps. As an example, various previous works suggest that uncertainty linked to internet shopping may be decreased in Arab countries with a culture of high uncertainty, should a greater degree of attention be directed towards those solutions that could reduce this factor, meaning e-commerce could be used more widely and successfully (El Said & Galal-Edeen, 2009).

7.3.8 Technology Related Anxiety

H8: The usage of M-banking apps by Jordanians will be negatively affected by technology related anxiety.

Technology related anxiety refers to the response to perceived threats from technology and its effects on the user's decision to accept or resist a technology (Kummer, Recker & Bick, 2017). Technology related anxiety includes negative emotions and fears related with any electronic or computerized systems. The current research findings show that technology related anxiety had a significant

negative association with the usage of such apps. This finding was obtained after considering everything else in the model as constant, (t-value= 2.88, p<0.01). In plain words, when people's technology related anxiety tended to increase, their mobile banking usage tended to decrease. It is worthwhile to mention that this factor (technology related anxiety) has not been researched adequately in electronic banking services and particularly in the context of mobile banking apps. Such results prove the above hypothesis to be supported, as shown in table 7.6 below

There are some previous studies related to technology acceptance field that reported findings about the relationship between technology anxiety and the usage or adoption of such technologies, such as the findings found by Lee (2010) who reported that there was a negative impact of technology related anxiety on the adoption of mobile financial apps, which agree with the findings of the current research. Furthermore, there was a significant negative effect of technology related anxiety on the usage of sensor-based technology in Germany and Australia, as reported by Kummer, Recker and Bick (2017). By the same token, Wang (2007) reported the significant negative influence of computer anxiety when developing his "Development and validation of a mobile computer anxiety scale".

Furthermore, some results of the study about the adoption of e-learning indicates that greater technology related anxiety is negatively related with perceived ease of use (PEOU) (Jon-Chao et al., 2012). In addition, similar to the context of mobile banking services, a study conducted in the context of the usage of self-service technology revealed that technology related anxiety had a significant negative influence on the usage of such self-service (Meuter, Ostrom, Bitner & Roundtree, 2003). Such findings also agree with what was found by the current research.

Moreover, there are other previous studies that have investigated the relation between technology related anxiety and technology acceptance/usage in multiple contexts. Most of their findings agree with what was found in the current study, as technology related anxiety has a significant negative

association with usage, such as in Lee et al. (2010); Forsythe (2009); Chen et al. (2008); Hwang and Kim (2007); Kim and Meuter et al. (2005). On the other hand, there are few studies that contradict what was found by the present study. For example, Lee and Yang (2013) reported that there was no significant association between technology related anxiety and technology adoption.

Table 7.6: Summary of hypotheses testing results

Independent Variables	Dependent Variable	Expected association sign	Result
Performance Expectancy (PE)	Usage	+	Supported
Effort Expectancy(EE)	Usage	+	Not supported
Social influence (SI)	Usage	+	Not supported
Mobile performance Risk (MPR)	Usage	_	Not supported
App quality (AQ)	Usage	+	Supported
Technology Related Anxiety (ANX)	Usage	_	Supported
App Security Risk (ASR)	Usage	+	Not supported
App Transactional risk (ATR)	Usage	_	Supported

7.4 Research model

This research has examined the usage of mobile banking apps in Jordan. As mentioned earlier in chapter one and four, an adaptive form of the unified theory of acceptance and use of technology UTAUT has been applied to develop and validate the research model. Internal consistency of the factors of this model has been measured using Cronbach's Alpha and it was 0.97, which indicates an adequate to high level of reliability. After that, factor analysis was conducted to test the factorial validity of the model's constructs. The factor analysis resulted in a new factor, which is technology related anxiety.

After testing the aforementioned hypotheses using multiple regression analysis, there was a significant association between the rate of using mobile apps and each of the following factors: performance expectancy, mobile banking

application quality, technology-related anxiety, and transactional risk. However, there was an insignificant association between the usage of such apps and the following factors: effort expectancy, social influence, mobile performance risks, and security risk, as shown in table 7.6.

Because the independent variables were measured using the same metric scale between 1-5, it is notable that such predictors (factors) of the usage of mobile banking apps can be ordered in terms of practicable importance in terms of regression using the standardized beta coefficients. A bigger magnitude absolute value of standardized beta denotes more practicable relative importance of the predictor of the dependent variable (usage). In descending order of practicable regression importance to such usage, table 7.7 shows them ranked as follows: firstly, mobile banking app quality, followed by performance expectancy, then technology related anxiety, next transactional risk, then effort expectancy and mobile performance risk, these were also followed by social influence and security risk factors.

Table 7.7 Model's factor ranking

Predictor	Rank	Standardized Beta value	Absolute value (Stnd. Beta)
App quality	1	0.357816893	0.357816893
Performance Expectancy	2	0.245469848	0.245469848
Technology-related -Anxiety	3	-0.170235328	0.170235328
Transactional risk	4	0.132891155	0.132891155
Effort Expectancy	5	0.102186953	0.102186953
Mobile performance Risks	6	0.078633064	0.078633064
Social Influence	7	-0.043875017	0.043875017
Security risk	8	-0.0184279	0.0184279

The model suggested that at least one, or more, of the included factors had a significant association (i.e. relationship) with the frequency of mobile banking apps usage, f $(8,815) = 27.91$, $p<0.001$. This denotes that these factors collectively explained a total variation equivalent to 59.5% of people's reported frequency of using the mobile banking apps, (Multiple R= 59.5%) as shown in table 6.17 in the previous chapter. However, the adjusted R-squared value suggested that these variables collectively explained a total of (35.4%) due to

including numerous variables in the model. Nonetheless, this suggested that the model was accurate with normally distributed error and the (predictor variable: subject ratio) was equal to (1:46) deeming the sample size adequate for the multivariate linear regression technique (Tabachnick & Fidell, 2013). The current empirical results highly support the adequacy of UTAUT factors (Venkatesh et al., 2003), and other factors, to predict and explain customers' usage of mobile banking apps in Jordan.

Based on the aforesaid results and justifications the proposed research model in chapter 4 figure 4.1 has been modified as depicted in figure 7.2, to illustrate the important predictors that explain the usage of mobile banking apps by Jordanian customers.

Noteworthy, the researcher conducted some informal-review of the research revised model. This has been conducted via internet interviews with three of online banking specialists in Jordan from Arab bank and Cairo-Amman bank. All of the interviewees agreed with the results of the final research model. Nevertheless, they suggested considering other factors to be influential on the adoption of mobile banking apps such as the trust and IT infrastructure. However, it was one of the limitations during this research; which is the lack of conducting in-depth qualitative analysis to evaluate the final model. This has been considered as one of the limitations of this study, as mentioned in Chapter 8 in both of the research limitation and future research sections.

Figure 7.1 Research Final Model
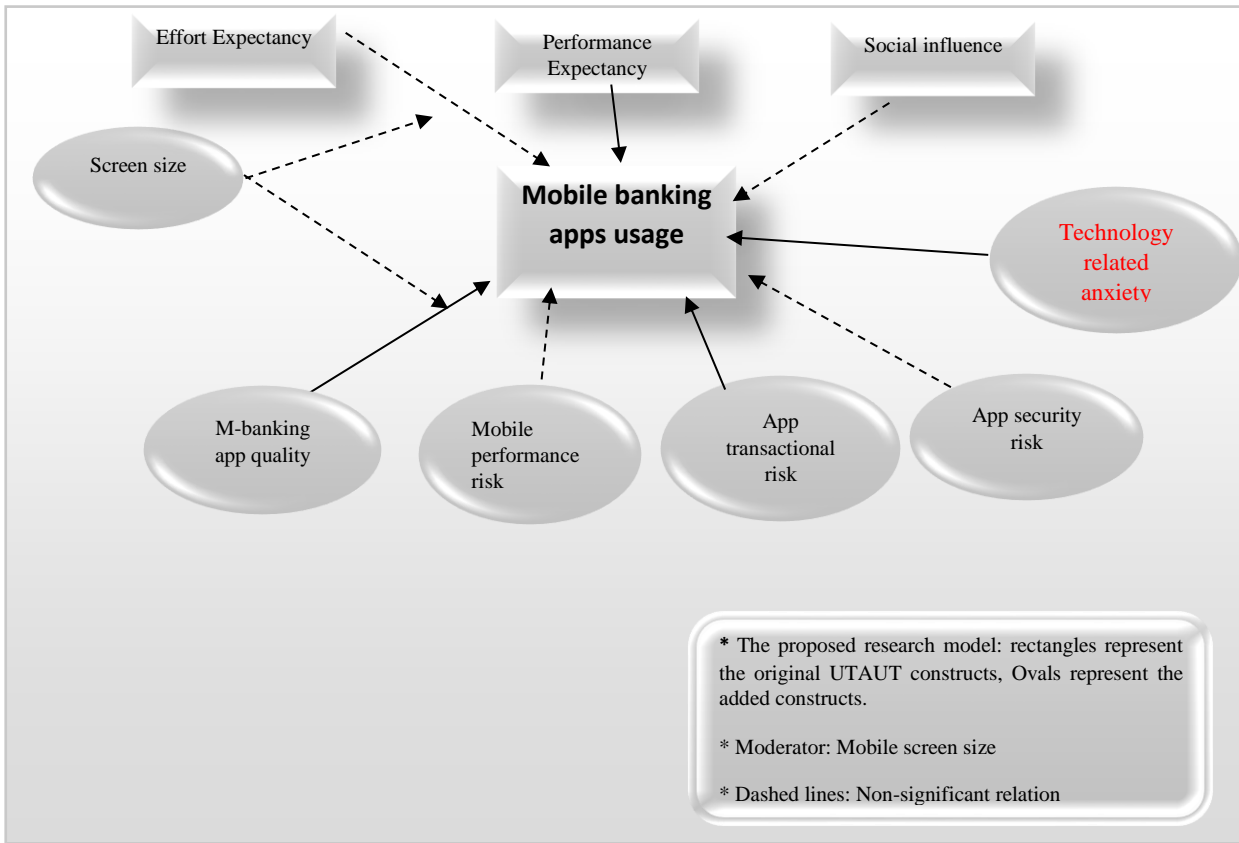
7.5 Chapter Summary

This chapter discusses the main results that have been gathered from the survey's respondents. Such empirical results have been displayed and presented in the previous chapter in form of figures and tables. This chapter discusses the results of construct measurements, including the demographic profiles of the survey's respondents followed by illustrating the reliability analysis of the main constructs. Moreover, the factorial validity of the scales has been discussed in depth and this chapter provides an illustration and justifications about the factor analysis results. In addition, it justifies the results of extracting a new factor, which is technology related anxiety and which has been extracted from previous two factors (security risk, transactional risk). Furthermore, there is an in-depth discussion of the research hypotheses. Therefore, the conceptual model was validated in the current study after conducting multiple linear regression. The descriptive results of both the demographic variables and the conceptual model main factors have been discussed and related to previous studies.

In conclusion, mobile banking app quality factor was the most significant factor that influences the usage of such apps, followed by performance expectancy technology, related anxiety and transactional risk. On the other hand, the factors of effort expectancy, mobile performance risk, security risk and social influence were all revealed to have no significant influence on the usage of the mobile banking apps, as the results of multiple linear regression analysis revealed. This chapter provides an integrated model to predict the usage of mobile banking apps by Jordanian customers.

Chapter 8: Conclusion

8.1 Introduction

In the previous chapters the literature, conceptual model, methodological aspects, statistical results and discussion have been completed and illustrated. This chapter presents an overview of the current study. Besides, it provides further illustration and explanation about the main contributions that have been achieved in this research in the light of the overall research aim, objectives and questions. Moreover, this chapter provides theoretical and practical implications that are considered in the light of the research's final results. Finally, the limitations that faced the current study are presented in this chapter as well as suggestions for future research directions in the area of the usage/adoption of mobile banking apps.

8.2 Research overview

Mobile banking or M-banking is one of the latest mobile technological booms. While banks offer many effective channels to deliver their banking services, such as automated teller machines (ATM), tele-banking and internet banking, they are still seeking better efficiency to improve the quality of their services by allowing people to have access to their bank accounts and perform transactions anytime and anywhere (Zhou, 2012). Mobile banking, as the latest delivery channel established by banks in many countries across the world, is likely to have a significant effect on the banking market (Safeena et al., 2012).

The banking sector across the world is seeking to benefit from the technological boom, particularly in the field of mobile and smartphone solutions, in order to save costs and increase customer satisfaction. Media reports such as Juniper Research (2013) have shown that more than 1 billion people are estimated to use mobile banking worldwide by 2017. Furthermore, by the increasing number of mobile telecommunication subscribers globally, the market of mobile banking services witnesses more expanding and attracting of wide-range of banks customers (Alalwan, Dwivedi & Rana, 2017). The Jordanian banking sector is a highly competitive market and in order to utilise the benefits of the

new global boom in such technologies, self-service technology banking channels have been adopted and implemented.

In this context, large amounts of money and resources have been invested; for example, approximately $182 million was invested to update internet banking services (Al-Majali, 2011; Association of Banks in Jordan, 2010; Migdadi, 2012). Despite the large amounts of effort and money being invested, the adoption of electronic banking services in Jordan is not in line with what was expected and Jordanian banking customers are still slow to adopt these technologies (Alalwan et al., 2017; Alalwan et al., 2016; Al-Rfou, 2013; Al-Smadi, 2012; Al-Majali, 2011). For example, statistics provided by some of the largest banks in Jordan (Arab Bank and HSBC) suggest that only 1.65% of Jordanian bank customers have adopted Mobile banking (Awwad and Ghadi, 2010). Even though the number of mobile subscribers surpassed 10 million people (Jordan-BuddeComm, 2017), the usage rate of mobile banking services in Jordan is still low and the banks customers show less interest and motivation to adopt such technologies (Alalwan et al., 2017; Al-Tarawneh, 2016; Alalwan et al., 2016).

Because it is in the early stages of deployment and implementation, mobile banking-related issues are yet to be examined empirically in the Jordanian context (Alalwan et al., 2017; Al-Tarawneh, 2016; Khraim et al., 2011; Awwad and Ghadi, 2010). Moreover, there is a dearth of literature addressing customer intention and usage of mobile banking by Jordanian banking customers (Awwad and Ghadi, 2010; Khraim et al., 2011; Shammot and Al-Shaikh, 2008). So the present study is devoted to demonstrating the main factors that influence the usage of mobile banking apps by Jordanians and provides a research model able to predict the usage of such technology, as well as enriching the literature of empirical studies in the Jordanian context in this area of research.

As mentioned earlier in this study, the prior seven chapters that have been devoted to covering all literature, theoretical, methodological, statistical aspects that have led toward reaching the final conclusions and contributions gained by

the present study. Furthermore, a brief description of each chapter is presented as follows:

Chapter 1: This chapter provided a general overview of the research and presented the importance of the study, as well as the research problem. In addition, this chapter stated the overall aim of the current research and explained the objectives that this research seeks to achieve by answering the main research questions. Moreover, this chapter provided a clear plan of how to prepare and order the rest of chapters in the current thesis.

Chapter 2: In this chapter, a description of the research background was provided. In particular, there was an overview and definitions of mobile banking, comparison between mobile banking and internet banking, mobile banking versus mobile money and mobile payments, and an explanation of mobile banking types. Furthermore, this chapter aimed to define, distinguish and explain the concept of mobile banking services and their types. In addition, it provided information about the country of study, such as Jordan's country profile, Jordan's ICT sector and a brief history of mobile banking in Jordan.

Chapter 3: This chapter provided a theoretical background about the adoption of mobile banking apps by Jordanian customers. In turn, it proposed a research model that explains the usage behaviour of such technology by bank customers. Consequently, this chapter began with a theoretical overview about the technology acceptance theories and models, which included a review of previous studies related to the adoption and usage of such technology and other similar technologies. Later, illustration and justification of the research's theory selection was provided.

Chapter 4: This chapter introduced the conceptual model, which predicts the usage of mobile banking apps by Jordanian customers. Therefore, the chapter was initially developed based on the literature review chapter. The conceptual model's constructs were distilled and captured from reviews and discussions of the principal theories and exemplars in the area of technology acceptance. This chapter proposed and justified the conceptual model and hypotheses

development by providing an overview of the best known constructs in electronic banking literature, as well as providing justification for the selection and mapping of the research constructs. Moreover, the development of the hypotheses was explained and the proposed research model depicted.

Chapter 5: This chapter illustrates the research paradigm and approach by critically reviewing the related literature across the technology acceptance and information systems disciplines. The most commonly adopted research paradigms and methodologies were reviewed to illustrate how the researcher selected the appropriate research paradigm, approach, philosophy, methodology and methods, and in turn to justify the selection of a positivist paradigm for the current study and explain the adoption of a quantitative approach as an appropriate research approach for testing and validating the research hypotheses and constructs of the proposed research model. In addition, this chapter justified the selection of a field survey as a research method for the current study.

In addition, this chapter detailed the related aspects of the research survey, such as the data collection method and sampling process. For example, justifying the selection of an online questionnaire as the most suitable data collection method for gathering the targeted data. Likewise, this chapter revealed the selection of convenience sampling as an appropriate technique that suites the current research sample in terms of accessing the customers of Jordanian banks. Moreover, the design and development of the research instrument was detailed within this chapter by illustrating the measurement items, question contents, pilot study, and translation process. The final survey process was explained in this chapter, in addition to the data analysis process that was used. Furthermore, the procedure of the pilot study were explained together with its validity and reliability, as well as the design of the questionnaire. Finally, ethical considerations and issues underpinning the research stages were also discussed.

Chapter 6: This chapter presented the data that was gathered by the research's survey questionnaire as well as the statistical analysis that was used to analyse such data. In addition to presenting the data, this chapter validated and tested

the research conceptual model by statistically testing the research's hypotheses, which hypothesized the influence of the model's factors on the usage of mobile banking apps within the context of Jordanian banks. Furthermore, the statistical aspects were clarified, such as the normality, correlation, factor analysis and regression analysis. In addition, this chapter displayed and illustrated the demographic data and provided descriptive analysis based on the participants' profiles and in light of the measurement items of the conceptual framework factors.

Chapter 7: This chapter presented advanced explanation and justification of the results that were displayed in the chapter of data analysis. The empirical results that were obtained after conducting the main survey on the usage of mobile banking apps by Jordanian customers were linked to the conceptual model and the theoretical hypotheses. Linkages were created between the results obtained with what was theoretically hypothesised, which were used to explain the actual usage of mobile banking apps, with adequate justification referring to the previous studies in the same field. Furthermore, this chapter discussed the descriptive data of the demographic profiles and construct measurements, as reported by the survey's respondents.

Moreover, the reliability test results were discussed and explained considering the common standards and thresholds of such tests and justified with regard to the previous literature in the field of technology acceptance. In addition, the factor analysis outcomes were clarified and the extraction of a new factor (technology related anxiety) was explained. Moreover, the research's main hypotheses were tested and justified after conducting multiple linear regression on the research conceptual model. In addition, a summary of the supported and unsupported hypotheses was listed alongside a discussion and comparison of the current study's result with previous literature. Finally, the research model was depicted to illustrate the important predictors that explain the usage of mobile banking apps by Jordanian customers.

8.3 Main research conclusions

- A number of beliefs, perceptions, and risks related to socio-psychological, technical and quality factors have been addressed their influence on the usage of mobile banking apps in the Jordanian context has been examined.

- A number of theories and models in the field of technology acceptance were reviewed. As a result of the literature review, the Unified Theory of Acceptance and Use of Technology was selected to be the most suitable theoretical base to apply to the proposed research model in the present study.

- Construct analyses and mapping were conducted, as well as some exploratory interviews, which resulted in discovering the following external factors: mobile performance risk, quality of apps, security risk and transactional risk. All such factors were subsequently implemented into the current research's conceptual model, alongside other UTAUT constructs such as performance expectancy, effort expectancy and social influence. Therefore, the first question of this research "What are the situated factors which may influence the usage of mobile banking apps by Jordanians from the perspective of bank customers" was answered.

- A new factor was extracted by the factor analysis from each of two factors (Security risk and Transactional risk), namely this factor was Technology-Related Anxiety.

- Eight independent variables (Performance expectancy, Effort expectancy, Social influence, Mobile performance risk, App quality, Security risk, Transactional risk and Technology related anxiety) were hypothesized to affect one dependent variable (Usage).

- One moderating factor (Screen size) was hypothesized to moderate the effects of the independent factors (Effort expectancy and App quality) upon the dependent factor (Usage).

- The current research aims to develop a conceptual model to predict the usage of mobile banking apps in Jordan. An adapted form of the Unified Theory of Acceptance and Use of Technology (UTAUT) model was designed in this regard. This model was able to explain a total variation equivalent to 59.5% of people's reported frequency of mobile banking apps usage. Thus, it answers the second question of the present study, which is: "What is the capability of the adapted UTAUT model to predict usage behaviour of mobile banking apps by Jordanians".

- The regression analysis reported that there was a significant association between the rate of using mobile apps and each of the following factors: performance expectancy, mobile banking application quality, technology-related anxiety, and transactional risk.

- The regression analysis revealed that there was an insignificant association between the usage of such apps and the following factors: effort expectancy, social influence, mobile performance risks, and security risk.

- In descending order of practicable regression importance to the usage of mobile banking apps, the aforementioned independent factors ranked as follows: firstly, App Quality (AQ), followed by Performance Expectancy (PE), then Technology-Related Anxiety (ANX), next Transactional Risk (TR), then Effort Expectancy (EE) and Mobile Performance Risk (MPR), these were also followed by Social Influence (SI) and Security Risk Factors (SR).

- There was no significant independent effect for Screen Size on rate of using mobile banking apps, neither was there a significant moderation effect between Screen Size and perception of effort expectancy of mobile banking apps on the rate of the usage of such apps. By the same token, the Screen Size did not have a significant moderation effect between mobile banking app quality and the rate of app usage by Jordanian mobile banking users.

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The overall aim of this research is twofold: firstly, to explore and analyse the factors influencing the usage of mobile banking apps in Jordan; and to develop an extension of the Unified Theory of Acceptance and Use of Technology (UTAUT) model. Therefore, this research investigates the bank customers' perspectives and beliefs from the social, psychological, financial, and technical dimensions. The first objective of this study, "*to identify the factors that influence bank customers' usage of mobile banking apps from the perspective of customers*", was achieved by the current study particularly in chapters 3 and 4. Furthermore, the second objective of this study "*to develop and test an adapted form of the UTAUT model in terms of predicting the adoption of mobile banking in Jordan*" was achieved by the present research particularly in chapters 5, 6, and 7.

While chapter 1 and 2 provided an overview of the research background, a general definition of online and mobile banking services was provided along with introducing specified definitions of the types of mobile banking and particularly mobile banking apps that are to be examined in this study. This conceptual background to the related aspect of the research topic provided a solid base to answer the research questions and achieve the overall aim of the present research.

8.4 Research contribution

The present research's findings contributed to the field of the technology acceptance and electronic banking in general, and particularly in mobile banking services. Such contributions were presented through enriching both the theoretical and practical dimensions of the knowledge in the above-mentioned fields of study. The present study's contribution was achieved by the examination of the customers' perspectives and characteristics, which enlarged the researcher's understanding about the important and common phenomena across the usage of mobile banking services.

The main contribution of the current study is developing a conceptual model that predicts the usage of mobile banking apps in Jordan. An adapted form of the Unified Theory of Acceptance and Use of Technology (UTAUT) model was designed in this regard. This model was able to explain a total variation equivalent to 59.5% of people's reported frequency of mobile banking apps usage. Furthermore, a new factor was extracted by the factor analysis from each of two factors (Security risk and Transactional risk), namely this factor was Technology-Related Anxiety.

However, the main contribution was divided and categorised into theoretical contributions and practical implications, as stated in the following sub-sections.

8.4.1 Theoretical contributions

At the outset, the current research contributed in providing broad integration between the mobile banking area with other closely related areas of the literature on information systems, such as self-service technology, internet/online banking, e-learning, e-healthcare systems, etc. Furthermore, the present study researched the most prevalent factors that influence the acceptance and use of electronic banking services in Jordan, such as internet banking and mobile banking.

After conducting a systematic review of the related literature, the main factors that influence the usage of mobile banking apps were determined. Therefore, this enabled the present study to draw a broader understanding of the customers' interaction with such technology. This represents a considerable contribution to the current literature, as it is important to understand the attractive features that attract the customers to adopt such technologies. This understanding helps the service providers (Banks) to focus on important traits on banking services and presenting such traits in an attractive manner (Curran and Meuter, 2007).

Moreover, the current research reviews the main theories and models in the field of technology acceptance. These theories have been critically reviewed

and compared in light of the current research aim. the UTAUT model selected in this research in an attempt to enhance the understanding of the usage of mobile banking in Jordan from the perspectives of banks' customers by developing and testing an adapted conceptual model of the UTAUT model in terms of prediction.

Notably, the majority of these theories and models focus on behavioural intention rather than the actual behaviour (usage) (Venkatesh et al., 2003). However, this research concentrates on the usage of mobile banking, because that system usage is a fundamental construct in information system research (Lallmahomed, Ab.Rahim, Ibrahim & Rahman, 2013). Even though the importance of this construct, still has not been researched adequately despite having been mentioned in the literature since the 1970s (Lucas, 1973). In addition, this research targets "actual users" of mobile banking apps in Jordan, there is no necessity to study their behavioural intention because the actual behaviour (usage) has already been happening, which mitigates and may conceal totally the effect of intention. Another reason, after reviewing the literature on technology acceptance, it is obvious as aforementioned in chapters 3 and 4, that most researchers reporting on their models' prediction power was disproportionately based on users' behavioural intention, while there is a huge gap between intention and actual behaviour.

The current research contributes in filling the gap in the literature by enlarging the understanding of the usage construct as an essential component to update systems (DeLone & McLean, 2003). Also, behavioural intentions to use such technology are only important in the early stages of system implementation. In contrast, in the evaluation and validation stages of such technology, the actual behaviour (usage) provides robust insights for the service provider by revealing information about the systems' strengths and weaknesses. It is noteworthy that mobile banking services in Jordan exceeded the stages early stages of implementing such technology and there is a need to evaluate and validate it based on users' real experience (usage).

Furthermore, one of the main contributions of the current research has been to focus on mobile banking apps. Almost all previous studies about mobile banking were not specific about one type of mobile banking solution and they studied mobile banking services in general (Alalwan et al., 2017; Al-Tarawneh, 2016; Khraim et al., 2011), while in reality there are various different types of mobile banking solutions such as SMS- based and web-based mobile banking, as mentioned earlier in chapter two. The current study contributes to enhancing understanding in this regard by presenting the differences among the various types of mobile banking services and provides more attention to mobile banking apps.

Nowadays, mobile apps/smartphone apps are the current trend in multiple technologies across various industries due to the technological boom in the smartphones market (Al-Tarawneh, 2017). Consequently, services providers face a new demand to develop specific mobile apps software to satisfy the requirements and needs of the current mobile users (Pentina, Zhang, Bata, & Chen, 2016; TechCrunch, 2014). Therefore, there was a need to benefit from the mobility, simplicity, accessibility and compatibility of such apps in the interest of banking services and to distinguish the unique nature of the usage of such apps from other mobile banking types such as SMS-based or mobile web-based banking services. The majority of previous studies have focused on mobile banking in general, but few researchers have worked on this issue specifically (Al-Tarawneh, 2017; Veríssimo, 2016; Fenu et al., 2015). In the Jordanian context, there have been no previous studies that have focused specifically on mobile banking apps, the current study can be considered as the initiator of this research direction to focus mainly on the usage of mobile banking apps in the Jordanian context.

In addition, mobile apps are generally classified into two main categories, based on their core functions: in one category are utilitarian apps such as business scheduling, order-tracking, stock trading, translators and banking; and the other category comprises hedonic apps such as downloadable images/music apps, games, chatting apps, social media apps (Kim & Hwang, 2012). The current study contributes to the related literature by testing the usage of mobile banking

apps through an adapted form of UTAUT in the utilitarian context rather than the hedonic context. For example, the extension of the original UTAUT, which is known as UTAUT2 by the same authors of the original theory Venkatesh et al. (2012); applied the theory in the context of internet usage in general without distinguishing between utilitarian and hedonic uses. The current study covers this gap by approving the applicability of UTAUT specifically in the utilitarian context.

Notably, the majority of the previous studies in such area of the knowledge have applied and tested technology acceptance models and theories, including UTAUT in the organisational context (Venkatesh et al., 2003). Thus, there is a criticism over UTAUT's applicability within other contexts, such as users or customers contexts. In this regards, Venkatesh et al. (2012) developed UTAUT2, which examined technology acceptance from the perspective of mobile internet users. UTAUT2 selected the previous UTAUT model as a theoretical basis for their conceptual model. Therefore, the current research provided considerable contributions in two areas: firstly, confirming the applicability of UTAUT in the banking customers' context in Jordan. Secondly, the current conceptual model is grounded on a theoretical basis that has already been approved by UTAUT2 to be appropriate within the customers' context and has the ability to explain the usage of mobile banking apps in Jordan.

To sum up, the present research makes an important contribution in expanding the applicability of the UTAUT model, because it was examined within multi-intersected contexts. This study is very specific; it tests mobile banking services in the context of mobile/smartphone apps rather than general mobile banking services. It specifies such apps as being within the context of utilitarian apps instead of hedonic apps. In addition, the conceptual model is tested in the context of customers rather than the organisational context. Finally, the usage of such technology is examined in a developing country context, which is the Jordanian context. Therefore, the current study provides substantial contributions to both information systems and technology acceptance literature.

This leads to conclusion that: firstly, adoption of mobile banking apps in developing Arab countries was considered, and emphasised the need to focus upon the perspectives of customers rather than organisations only. Secondly, the study findings place an emphasis of the generalizability of the research model in similar countries. This has also been justified statistically, as the results of the multiple linear regression test show in chapter six, table 6.17: the difference between R Square and Adjusted R Square is (0.012). This approves the ability of the current research model to be generalized, as Field (2013, P336) states that "the adjusted R Square gives us some idea of how well our model generalizes and ideally we would like its value to be the same as, or very close to, the value of R Square". This clearly shows that the generalizability and cross-validity of the current research model is very good.

As mentioned earlier in chapter 4, despite the adequacy of UTAUT in predicting and explaining the usage of new technologies, there was a need to add new factors alongside UTAUT's main factors (performance expectancy, effort expectancy, social influence and facilitating conditions). Importantly, the factor of facilitating conditions was broken down into two new captured/related factors (App quality and Mobile/device performance). Moreover, based on the systematic literature survey and based on the exploratory interviews and pilot study, two new factors were added to the main above-mentioned factors, which are Apps transactional risk and Apps security risk, and then a new factor (Technology-related anxiety) was extracted from these two factors after conducting the exploratory factor analysis, as explained in chapter 6. Thus, the current research contributes significantly in extending the theoretical boundary of the UTAUT model. This agrees with Venkatesh et al. (2003, 2012), who recommend the future research should identify other related constructs that may enhance UTAUT's applicability to encompass a broader range of customers in various technology contexts.

Another considerable contribution is presented by this study in terms of the factor analysis conducted to split numerous Likert-scale items (15 items) related to both constructs (security risk and transactional risk), which in turn revealed a new factor named Technology-related-anxiety. The new, extracted

factor provides a new contribution in the literature of technology acceptance. Remarkably, this new factor has significant influence on the usage of mobile banking apps in the Jordanian context, as illustrated in chapters 6 and 7. Only a few previous studies have theoretically demonstrated this relationship between technology-related anxiety and the usage of mobile banking apps.

Furthermore, the current study provides a substantial contribution that is supported by empirical results from statistical analysis, which approves the reliability, validity and applicability of the research model. The model suggested that at least one, or more, of the included factors had a significant association (i.e. relationship) with the frequency of mobile banking apps usage. Moreover, these factors collectively explained a total variation equivalent to 59.5% of people's reported frequency of using mobile banking apps, (Multiple R= 59.5%), as shown in table 6.17 in chapter six. The current empirical results contribute by highly supporting the adequacy of UTAUT factors (Venkatesh et al., 2003), and other factors, to predict and explain customers' usage of mobile banking apps in Jordan.

8.4.2 Practical implications

As mentioned previously in chapter two, the growing and widespread use of smartphones has resulted in the extensive adoption of mobile software/apps, and increased the number of people who are familiar with using such technology (Hsiao et al., 2016). Nowadays many businesses among diverse industries adopt mobile apps when they provide their services because of the exclusive benefits they can gain by using these apps, such as improved customer service, more specific targeting of customers, and enhancing customer relationship management (Pentina et al., 2016; IAB, 2015).

The banking sector across the world, like other industries, is investing to enhance the mobility of their services, and the expected return of this investment has appeared in various forms such as better customer loyalty, attracting new customers and retaining the current customers, which helped banks in achieving extra revenue and reducing some costs and saving cost and effort for customers as well (Fenu & Pau, 2015). However, the utilisation of

such apps to perform banking transactions by bank customers is still less than expected (Shaikh & Karjaluoto, 2015).

While banks investing heavily in such apps to enhance customer value and recognise that customers' satisfaction is the main target of their business strategies, this creates a need to recognise how mobile banking will add value to customers. Therefore, there is a real need to study all the factors that enhance it from the perspectives of bank customers (Veríssimo, 2016). In the Jordanian banking sector, despite large amounts of effort and money being invested, the adoption of online/mobile banking services in Jordan is not in line with what was expected and Jordanian banking customers have been slow in adopting these technologies (Alalwan et al., 2017; Alalwan et al., 2016; Al-Majali, 2011; Al-Rfou, 2013; Al-Smadi, 2012).

This subsection provides practical implications to the service providers (Jordanian banks). These implications are derived from the empirical results of the current study. They are practical implications that may enable the Jordanian banks to have deeper understanding about the factors that affect the adoption/usage of mobile banking apps. Thus, the current research provides the banking services with a suggested solution and practices to apply with the aim of enabling them to enhance their service quality and to avoid any potential non-feasible investment in developing and updating such technology.

According to the empirical results of the current study, app quality has the most significant effect on the usage of mobile banking apps. Furthermore, MacFarland and Hamilton (2004) state that system quality has a notable effect on the overall usage of the system. This indicates that the mobile banking services provider has to focus on the design, system and information quality of mobile banking systems. Academically and practicably, there is always an agreement that the design of electronic banking channels has to develop further attention from the providers of such technologies (Simintiras et al., 2014; Shareef et al., 2011). This point argues that, if these channels are designed properly and based on a high standard as well as presented in an attractive and friendly interface, customers will be motivated to accept and use such

technologies with less time and effort (Simintiras et al., 2014; Shareef et al., 2011; Chiu et al., 2010).

Furthermore, Jordanian banks should concentrate on the quality of the technical and informational aspects of their mobile banking apps alongside the design aspects. The quality of such technological infrastructure has a strong influence on the adoption of this technology by bank customers, as proved by the empirical results of the current study and other studies (Shareef et al., 2014; Simintiras et al., 2014; Alryalat et al., 2013; Dwivedi et al., 2013).

Moreover, as shown in chapter 7 in table 7.7, Performance expectancy has the second rank after the App quality factor as a significant influence on the usage of mobile banking apps. Thus, banks should be obliged to assure the efficiency of financial transactions that are provided by their mobile banking apps to convince the users of these apps and meet their expectations about the performance of such apps (Simintiras et al., 2014; Chiu et al., 2010; Shareef et al., 2011). Practically, the banks also have to extend the range of alternatives of their financial services, maintaining the durability and availability of such technology to benefit from the significant effect of the role of Performance expectancy on customers' usage frequency.

By the same token, as shown in chapter 7, regarding the model's factor rankings the factors of Technology-related anxiety and the Transactional risk come after App quality and Performance expectancy respectively, in term of their significant influence on the usage of mobile banking apps. This indicates that Jordanian banks have to plan to educate their customers about mobile banking services. Such plans may comprise personal contact with banks clients or practical programmes to eliminate the fears and concerns about the usage of such apps. The banks should also run promotional campaigns to raise the awareness about the usage of mobile banking and provide explanations and guarantees about the security of such electronic financial channels. The Jordanian banks need to direct attention and effort to this issue to mitigate the effect of the negative impression that is given by the media about fraud and financial crimes over internet financial channels.

Furthermore, transactional risk refers to a feeling of the customer that there is a risk that transactions will not be carried out as intended or may experience errors (Ruiz-Mafe et al., 2009). As explained before in chapters six and seven, the empirical results of the current study show there is a negative significant influence of Transactional risk on usage. Therefore, such risk should be alleviated by having additional cooperation and coordination between the Jordanian banks to have similar or unified standards to conducting financial transactions, which would help customers who use more than one banks follow similar procedures in performing their transactions and avoid any confusion resulting from the different procedures of different banks. Such effective co-operation amongst Jordanian banks should also be spread-out to encompass the internet and mobile network providers to help in providing higher quality mobile banking services for banks as well as making customers' access to mobile banking apps easier and faster (Shareef et al., 2014; Simintiras et al., 2014).

Even though there was a non-significant influence of Mobile performance risk, as shown by the empirical results of the present research, this factor should still be recognised as having the potential to restrict of the use of apps for purchases (Laroche et al., 2004). Thus, the Jordanian banks should take into account the nature or the usability features of mobile devices. As mentioned earlier in chapter 4, there are some concerns about using mobile devices in general, such as unexpected disruption, limited storage, non-durable battery etc., this should attract the developers of mobile banking apps to consider these features alongside the sensitivity of customers to conducting financial transactions through such mobile devices. For instance, to consider the size of the app to fit with common storage sizes that exist in average or low quality mobiles. In addition, these apps should not be battery consuming and slow loading. Likewise, the apps should offer immediate backup and save ongoing transactions in case of unexpected shut-down or disruption happening.

The current research suggests translating the current conceptual model into a software/programme by some programming language. This may help the banks to use their database to import the required data about customers into this

software to have a deeper understanding about the characteristics of their customers and predict their future behaviour towards using such apps, or similar financial innovations in the future. This kind of simulation to explain the potential usage of future innovations will help the banks to draw more precise feasibility studies about investing in this direction.

Finally, the descriptive analysis of the demographic profiles of the respondents of the current research shows that a considerable portion of them were highly educated and employed. This means almost all of the sample in this research had a high willingness to adopt such technology and moving them to be regular or frequent users of such services will not be costly and difficult (Akinci et al., 2004). Therefore, this study suggests the Jordanian banks create an effective marketing strategy to interact in a worthwhile way with such customers. This could be through personal communication to convince to use mobile banking apps, as suggested by Laukkanen et al. (2009). Moreover, the banks are recommended to allow their customers to use trial-versions of these apps, so they can overcome their fears towards using new innovations and give them a positive experience to be aware of the benefits of using mobile banking apps.

8.5 Research limitations

Despite the fact that the current research contributed advantageously to the literature of technology acceptance and mobile banking, there were a number of limitations of the findings of the current study. For example, the present study uses an online survey among a convenience sample in Jordan. The current study's sample is described as young, educated, employed respondents; this was due to the use of online survey which was limited to internet users, who tend to be younger, with an income and well-educated. Therefore, the generalisability and applicability of the present study perhaps will be negatively affected when applied to another context or segment of the population. Also, this study was conducted based on the perspectives of customers only, so it perhaps does not capture the full horizon of the main factors that influence the usage of mobile banking apps in Jordan

As mentioned previously, this research focuses on the usage of mobile banking apps in Jordan. One of the limitations in this study was the access to information related to the usage frequencies of the customers, because the banks were very unwilling to provide any access to their statistics or information for some security, privacy and safety issues of their customers. Furthermore, the current study targets the adopters/users of the mobile banking apps and disregards other potential user or rejecters of such technology. Studying other customers in future will provide a clearer picture about the main barriers and restrictions toward using such services.

Furthermore, one of the limitations of the current study is the lack of qualitative analysis to evaluate the final version of the research model. Actually this was due to limited available resources because the nature of this study (Student self-funded study), which in turn reflects in rising concerns in the light of time and cost. So this resulted in the difficulty of employing qualitative research. As a result, the main attentiveness of the current study was on using the quantitative approach. Therefore, this restricted the current study to have a clearer look by studying more factors related to the Jordanian customers' usage towards mobile banking apps.

8.6 Future research

As mentioned in the previous section, there are some limitations of the current study. These limitations could be considered as future research interests to other researchers. For example, the current research followed a statistical, quantitative approach only to gain empirical results about the main factors in this study. However, future studies could be able to extend the understanding of such factors about the usage of mobile banking by conducting some qualitative methods, such as in-depth interviews to gather more information about the beliefs and perceptions of customers.

Furthermore, the current conceptual model in this study could be applied to a larger sample in Jordan or other developing countries and could involve other non-internet users by using a self-administered questionnaire (face-to-face)

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instead of an electronic one. In addition, the present conceptual model could be applied within different contexts of electronic banking channels, and beyond that it is worthwhile to test this model in other technology contexts.

A moderating variable (Screen Size) is highlighted, yet it was not significant in the current study, but it is noteworthy to direct more attention by future researchers toward this factor. In addition, the type of mobile device (smartphone/tablet) could be considered as a moderating variable in future research. Moreover, the range of risk perceptions could be widened by future research; for example, to study the effects of psychological, social and financial risk upon the usage/adoption of technology.

Further research could study in-depth the factor (App Quality). For example, this factor could be divided into more specific sub-factors such as App content quality, App design quality, App technical quality and App information quality. These suggested sub-factors may give clearer image about the influence of this factor on the usage of mobile banking apps. Moreover, the future work could add the demographic variables to test the applicability of the current model in the present of such factors.

8.7 Chapter summary

The present chapter presents an overview, main conclusions and the contributions about the content and findings of the preceding chapters, which comprise the current thesis. Therefore, this chapter provides an overview of the previous chapters and main conclusions that were accredited during the current research. Moreover, the chapter clarifies the main contributions that were achieved by this research as well as categorises the contributions into two parts: theoretical contributions, and practical implementations. Furthermore, the research aim, objectives and questions were achieved and answered through the research conclusions and contributions.

This chapter spotlights the main limitations and obstacles that the current research encountered. Finally, future research ideas and directions are

suggested by the author to add more empirical and theoretical contribution to knowledge in the area of the adoption of the mobile banking in Jordan.

References

Abbad, M. M., Morris, D., and De Nahlik, C. (2009). Looking under the bonnet: Factors affecting student adoption of e-learning systems in Jordan. *The International Review of Research in Open and Distance Learning*, *10*(2), 1-24.

Abousaber, I. and Papazafeiropoulou, A. (2011). The impact of organisational culture on Wimax adoption by Saudi SMEs. In *Proceedings of European, Mediterranean & Middle Eastern Conference on Information Systems EMCIS*, 30th-31st May 2011, Athens, Greece.

AbuShanab, E. and Pearson, M. (2009). Internet Banking in Jordan: An Arabic instrument validation process. *International Arab Journal of Information Technology*, *6*(3), 235-244.

AbuShanab, E., Pearson, M., and Setterstrom, A. J. (2010). Internet banking and customers' acceptance in Jordan: The unified model's perspective. *Communications of the Association for Information Systems*, *26*(1), 493-524.

Addustour. (2012). *E-crimes and law.* Available at: http://www.addustour.com/. Accessed: 14.12.12.

Agarwal, R. and Karahanna, E. (2000). Time flies when you're having fun: Cognitive absorption and beliefs about information technology usage. *MIS Quarterly*, *24*(4), 665-694.

Agarwal, S. and Teas, R. K. (2001). Perceived value: Mediating role of perceived risk. *Journal of Marketing Theory and Practice*, *9*(4), 1-14.

Agrawal, R. and Prasad, J. (1999). Are individual differences germane to the acceptance of new information technologies*?*. *Decision Sciences*, *30*(2), 361-391.

Ahmad, R. and Buttle, F. (2002). Retaining telephone banking customers at Frontier Bank. *International Journal of Bank Marketing, 20*(1), 5-16.

Ajzen, I. (1985). *From intentions to actions: A theory of planned behavior*. In J. Kuhland J. Beckman (Eds.), *Action-Control: From Cognition to Behavior* (pp. 11-39). Heidelberg: Springer.

Ajzen, I. (1991). The theory of planned behaviour. *Organizational Behaviour and Human Decision Processes*, *50*(2), 179-219.

Ajzen, I. and Fishbein, M. (1980). *Understanding attitudes and predicting social behaviour*. Englewood Cliffs, NJ: Prentice Hall Inc.

Akhlaq, A. and Ahmed, E. (2013). The effect of motivation on trust in the acceptance of internet banking in a low income country. *International Journal of Bank Marketing*, *31*(2), 115-125.

Akhlaq, M. A. and Shah, A. (2011). Internet banking in Pakistan: Finding complexities. *Journal of Internet Banking and Commerce*, *16*(1), 1-14.

Akinci, S., Aksoy, S., and Atilgan, E. (2004). Adoption of internet banking among sophisticated consumer segments in an advanced developing country. *International Journal of Bank Marketing*, *22*(3), 212-232.

Akturan, U. and Tezcan, N. (2012). Mobile banking adoption of the youth market: Perceptions and intentions. *Marketing Intelligence and Planning, 30*(4), 444- 459.

Aladwani, A. M. (2001). Online banking: A field study of drivers, development challenges, and expectations. *International Journal of Information Management*, *21*(3), 213-225.

Alalwan, A., Dwivedi, Y., & Rana, N. (2017). Factors influencing adoption of mobile banking by Jordanian bank customers: Extending UTAUT2 with trust. *International Journal of Information Management*, *37*(3), 99-110. http://dx.doi.org/10.1016/j.ijinfomgt.2017.01.002

Alalwan, A., Dwivedi, Y., Rana, N., & Williams, M. (2016). Consumer adoption of mobile banking in Jordan. *Journal of Enterprise Information Management*, *29*(1), 118-139. http://dx.doi.org/10.1108/jeim-04-2015-0035

Alamro, S., & Tarawneh, S. A. (2011). Factors Affecting E-Commerce Adoption in Jordanian SMEs. *European Journal of Scientific Research*, *64*(4).EBESCO

Alampay, E. Mobile Banking, Mobile Money and Telecommunication Regulations. *SSRN Electronic Journal*. http://dx.doi.org/10.2139/ssrn.1618166

Al-Ashban, A. A. and Burney, M. A. (2001). Customer adoption of Telebanking technology: The case of Saudi Arabia. *International Journal of Bank Marketing*, *13*(5), 191-201.

Aldás-Manzano, J., Lassala-Navarré, C., Ruiz-Mafé, C., and Sanz-Blas, S. (2009). The role of consumer innovativeness and perceived risk in online banking usage. *International Journal of Bank Marketing*, *27*(1), 53-75.

Al-Debei, M. M., Al-Lozi, E., and Papazafeiropoulou, A. (2013). Why people keep coming back to Facebook: Explaining and predicting continuance participation from an extended theory of planned behaviour perspective. *Decision Support Systems*, *55*(1), 43-54.

Al-Gahtani, S. S. (2011). Modelling the electronic transactions acceptance using extended technology acceptance model. *Applied Computing and Informatics*, *9*(1), 47-77.

Al-Gahtani, S. S., Hubona, G. S., and Wang, J. (2007). Information technology (IT) in Saudi Arabia: Culture and the acceptance and use of IT. *Information & Management*, *44*(8), 681-691.

Alghad. (2014). 400 cybercrime within three months. Available from: http://www. alghad.com/articles/513291-400.Accessed: 16.06.14.

Al-Hawari, M. and Ward, T. (2006). The effect of automated service quality on Australian banks' financial performance and the mediating role of customer satisfaction. *Marketing Intelligence & Planning*, *24*(2), 127-147.

Al-Hawari, M., Ward, T., and Newby, L. (2009). The relationship between service quality and retention within the automated and traditional contexts of retail banking. *Journal of Service Management*, *20*(4), 455-472.

Al-Jabri, I. M. and Sohail, M. S. (2012). Mobile banking adoption: Application of diffusion of innovation theory. *Journal of Electronic Commerce Research*, *13*(4), 379-391.

Al Khasawneh, M. (2015). An Empirical Examination of Consumer Adoption of Mobile Banking (M-Banking) in Jordan. *Journal of Internet Commerce*, *14*(3), 341-362. http://dx.doi.org/10.1080/15332861.2015.1045288

Al-Lozi, E. and Papazafeiropoulou, A. (2012). Intention-based models: The theory of planned behavior within the context of IS. In Y. K. Dwivedi, M. R. Wade L. Schneberger (Eds.), *Information Systems Theory, 2012, 29,* 219-239, New York: Springer.

Al-Majali, M. (2011). The use of theory reasoned of action to study information technology in Jordan. *Journal of Internet Banking and Commerce*, *16*(2), 1-13.

Al-Majali, M. and Mat, N. K. N. (2010). Application of decomposed theory of planned behavior on Internet banking adoption in Jordan. *Journal of Internet Banking and Commerce*, *15*(2), 1-7.

Al-Qeisi, K. and Abdallah, G. (2013). Internet banking adoption in Jordan: A behavioral approach. *International Journal of Marketing Studies*, *5*(6), 84-107.

Al Qeisi, K., and Al-Abdallah, G. (2014). Website Design and Usage Behaviour: An Application of the UTAUT Model for Internet Banking in UK. *International Journal of Marketing Studies*, *6*(1). http://dx.doi.org/10.5539/ijms.v6n1p75

Al-Qirim, N. (2007). The Adoption and Diffusion of E-Commerce in Developing Countries: The Case of an NGO in Jordan. *Information Technology for Development*, *13*(2), 107-131. doi:10.1002/itdj.20053 Retrieved from http://www.interscience.wiley.com

Alrai. (2012). Captured hacker foreigners trying access to banks in Jordan. Available from: http://www.alrai.com/article/505801.html. Accessed: 16.06.14.

Al-Rfou, A. N. (2013). The usage of Internet banking evidence from Jordan. *Asian Economic and Financial Review*, *3*(5), 614-623

Alryalat, M., Dwivedi, Y. K., and Williams, M. D. (2012). A conceptual model for

examining E-government adoption in Jordan. *International Journal of Electronic Government Research*, *8*(2), 1-31.

Alryalat, M., Dwivedi, Y. K., and Williams, M. D. (2013). Examining Jordanian citizens' intention to adopt electronic government. *Electronic Government, an International Journal*, *10*(3), 324-342.

Alshehri, M., Drew, S. Alhussain, T., and Alghamdi, R. (2012). The effects of website quality on adoption of e-Government service: An empirical study applying UTAUT model using SEM. In *23^{rd}Australasian Conference on Information Systems,* 3rd-5th December 2012. Geelong.

Al shubaki, V. M., & O. (2011). An analysis of Internet Banking in Jordan. *International Journal of Business and Social Science*, *2*(20).

Al-Smadi, M. O. (2012). Factors affecting adoption of electronic banking: An analysis of the perspectives of banks' customers. *International Journal of Business and Social Science, 3*(17), 294-309.

Al-Somali, S., Gholami, R., and Clegg, B. (2009). An investigation into the acceptance of online banking in Saudi Arabia. *Journal of Business Research*, *29*(2), 130- 141.

Al Sukkar, A. and Hasan, H. (2005). Toward a model for the acceptance of Internet banking in developing countries. *Information Technology for Development*, *11*(4), 381-398.

Al-Tarawneh, J. (2016). Factors influencing the adoption of Mobile banking services in Jordan from the perspective of customers: Overview and Pilot study. *International Journal of Scientific And Research Publications (IJSRP)*, *6*(9).

Al-Tarawneh, J., Gear, T., Elshamly, A., & Darwish, T. (2017). The effect of Security issue on the usage of mobile banking apps in Jordan. In *4th International Conference on Business, Education, Law and Interdisciplinary Studies*. London: Dignified Researchers in Humanities and Social Sciences.

Amin, H. (2007). Internet banking adoption among young intellectuals. *Journal of Internet Banking & Commerce*, *12*(3), 1-13.

Amin, H., Hamid, M. R. A., Lada, S., and Anis, Z. (2008). The adoption of mobile banking in Malaysia: The case of Bank Islam Malaysia Berhad. *International Journal of Business and Society, 19*(2), 43-53.

Anderson, J. C. and Gerbing, D. W. (1982). Some methods for respecifying measurement models to obtain unidimensional construct measurement. *Journal of Marketing Research*, *19*, 453-460.

Anderson, J. C. and Gerbing, D. W. (1984). The effect of sampling error on convergence, improper solutions, and goodness-of-fit indices for maximum likelihood confirmatory factor analysis. *Psychometrika*, *49*(2), 155-173.

Arambewela, R. and Hall, J. (2009). An empirical model of international student satisfaction. *Asia Pacific Journal of Marketing and Logistics*, *21*(4), 555-569.

Arbuckle, J. L. (2005). *Amos 6.0 user's guide*. Chicago, IL: SPSS Inc.

Arbuckle, J. L. (2010). *IBM SPSS Amos 19 user's guide*. Crawfordville, FL: Amos Development Corporation.

Armitage, C. J. and Conner, M. (2001). Efficacy of the theory of planned behaviour: A meta-analytic review. *British Journal of Social Psychology*, *40*(4), 471-499.

Association of Banks in Jordan. (2010). *Annual report of Association Bank: Development of the Jordanian banking sector (2000 - 2010).* Available from: http://abj.org.jo/public/English.aspx?Lang=1&Page_Id=2129&Menu_ID=182. Accessed: 11.04.12.

Awwad, M. S. and Ghadi, M. Y. (2010). Investigating of factors influencing the intention to adopt mobile banking services in Jordan. *Dirasat: Administrative Sciences*, *37*(2), 545-556.

Ayouby, R. and Croteau, A. M. (2009). Acculturation to the global culture as moderator to subjective norm and Internet adoption. In *Proceedings of the 42nd Hawaii International Conference on System Sciences HICSS,* 5th-8th January 2009, Big Island, Hawaii, USA. IEEE.

Azzam, Z. A. and Alramahi, N. M. (2010). Effect of electronic interactive technologies usage on services marketing activities empirical study on banking sector in

Jordan. *International Arab Journal of e-Technology*, *1*(4), 154-163.

Bagozzi, R. P. (1981). Evaluating structural equation models with unobservable variables and measurement error: A comment. *Journal of Marketing Research, 18*(3), 375-381.

Bagozzi, R. P. (2007). The legacy of the technology acceptance model and a proposal for a paradigm shift. *Journal of the AIS, 8*(4), 244-254.

Bagozzi, R. P. and Yi, Y. (1988). On the evaluation of structural equation models. *Journal of the Academy of Marketing Science*, *16*(1), 74-94.

Bai, B., Law, R., and Wen, I. (2008). The impact of website quality on customer satisfaction and purchase intentions: Evidence from Chinese online visitors. *International Journal of Hospitality Management*, *27*(3), 391-402.

Bamberg, S., Ajzen, I., and Schmidt, P. (2003). Choice of travel mode in the theory of planned behavior: The roles of past behavior, habit, and reasoned action. *Basic and Applied Social Psychology*, *25*(3), 175-187.

Bandura, A. (1982). Self-efficacy mechanism in human agency. *American Psychologist*, *37*(2), 122-147.

Bandura, A. (1986). *Social foundations of thought and action: A social cognitive theory*. Englewood Cliffs, NJ: Prentice Hall.

Bank of Jordan. (2014). *Bank of Jordan Mobile banking*. Available from: https://itunes. apple.com/us/app/bank-of-jordan-mobilebanking/id852392335?mt=8.Accessed**:** 15.04.14.

Barnes, S. & Corbitt, B. (2003). Mobile banking: concept and potential. International Journal Of Mobile Communications, 1(3), 273. http://dx.doi.org/10.1504/ijmc.2003.003494

Barua, A. C. and Whinston, A. B. (1996). Creating a collaboratory in cyberspace: Theoretical foundation and an implementation. *Journal of Organizational Computing*, *5*(4), 417-442.

Basabe, N., Paez, D., Valencia, J., Gonzalez, J. L., Rimé, B., and Diener, E. (2002). Cultural dimensions, socioeconomic development, climate, and emotional hedonic level. *Cognition & Emotion*, *16*(1), 103-125.

Bateson, J. (1985). Self-service consumer: An exploratory study. *Journal of Retailing*, *61*(3), 49-76.

Bateson, J. and Hui, M. (1987). Perceived control as a crucial perceptual dimension of the service experience: An experimental study. In C. Surprenant, *Add value to your service* (pp. 187-192). Chicago: American Marketing Association.

BBC Arabic. (2009). Start using Iris recognition technology in ATMS by the Jordanian banks. Available from: http://www.bbc.co.uk/arabic/middleeast/2009/10/091013_om_ jordan_bank_tc2.shtml. Accessed: 16.06.14.

Beatson, A., Coote, L. V., and Rudd, J. M. (2006). Determining consumer satisfaction and commitment through self-service technology and personal service usage. *Journal of Marketing Management*, *22*(7/8), 853-882.

Benbasat, I. and Barki, H. (2007). Quo vadis, TAM?. *Journal of the Association of Information Systems*, *8*(4), 211-218

Bendapudi, N. and Leone, R. P. (2003). Psychological implications of customer participation in co-production. *Journal of Marketing*, *67*(1), 14-28.

Bentler, P. M. (1990). Comparative fit indexes in structural models. *Psychological Bulletin*, *107*(2), 238.

Bentler, P. M. and Bonnet, D. C, (1980). Significance tests and goodness of fit in the analysis of covariance structures. *Psychological Bulletin*, *88*(3), 588-606.

Berger, S. C. (2007). Online banking customers: Insights from Germany. *Journal of Internet Banking and Commerce*, *12*(1), 1-6.

Berger, S. C. (2009). Self-service technology for sales purposes in branch banking: The impact of personality and relationship on consumer adoption. *International Journal of Bank Marketing*, *27*(7), 488-505.

Berthon, P. R., Pitt, L. F., Plangger, K., and Shapiro, D. (2012). Marketing meets Web 2.0, social media, and creative consumers: Implications for international marketing strategy. *Business Horizons*, 55(3), 261-271.

Bhaskar, R. A. (1989). A Critical Introduction to Contemporary Philosophy. In *Reclaiming Reality*. London, UK: Verso.

Bhattacherjee, A. (2012). *Social science research: Principles, methods, and practices*. (2nd Ed.). Florida, USA: AnolBhattacherjee.

Bitner, M. J. (1990). Evaluating service encounters: The effect of physical surroundings and employee responses. *Journal of Marketing*, 5(2), 69-82.

Bitner, M. J. (2001). Service and technology: Opportunities and paradoxes. *Managing Service Quality*, 11(6), 375-379.

Bitner, M. J., Brown, S. W., and Meuter, M. L. (2000). Technology infusion in service encounters. *Journal of the Academy of Marketing Science*, 28(1), 138-149.

Bitner, M. J., Ostrom, A. L., and Meuter, M. L. (2002). Implementing successful self-service technologies. *Academy of Management Executive*, 16(4), 96-108.

Bitner, M. J., Zeithaml, V. A., and Gremler, D. D. (2010). Technology's impact on the gaps model of service quality. In *Handbook of service science* (pp.197-218). USA: Springer.

Bitner, M. J., Faranda, W. T., Hubbert, A. R., and Zeithaml, V. A. (1997). Customer contributions and roles in service delivery. *International Journal of Service Industry Management*, 8(3), 193-205.

Black, N. J., Lockett, A., Ennew, C., Winklhofer, H., and McKechnie, S. (2002). Modelling consumer choice of distribution channels: An illustration from financial services. *International Journal of Bank Marketing*, 20(4), 161-173.

Black, N. J., Lockett, A., Winklhofer, H., and Ennew, C. (2001). The adoption of Internet financial services: A qualitative study. *International Journal of Retail & Distribution Management, 29*(8), 390-398.

Bobbitt, L. M. and Dabholkar, P. A. (2001). Integrating attitudinal theories to understand and predict use of technology-based self-service. *International Journal of Service Industry Management*, 12(5), 423-450.

Bollen, K. A. (1987). Outliers and improper solutions: A confirmatory factor analysis example. *Sociological Methods & Research*, 15(4), 375-384.

Bouazzouni, M., Conchon, E., & Peyrard, F. (2018). Trusted mobile computing: An overview of existing solutions. Future Generation Computer Systems, 80, 596-612. http://dx.doi.org/10.1016/j.future.2016.05.033

Boudreau, M., Gefen, D., and Straub, D. (2001). Validation in IS research: A state-of-the art assessment. *MIS Quarterly*, *25*(1), 1-23.

Bradley, J. (2011). If we build it they will come?. The technology acceptance model. *Information Systems Theory: Explaining and Predicting Our Digital Society, 1*(28), 19-36.

Brislin, R. (1976). Comparative research methodology: Cross-cultural studies. *International Journal of Psychology*, *11*(3), 215-229.

Brislin, R. W., Lonner, W., and Thorndike, R. M. (1973). *Cross-cultural research methods*. New York: Wiley-Interscience.

Brown, M., Pope, N., and Voges, K. (2003). Buying or browsing? An exploration of shopping orientations and online purchase intention. *European Journal of Marketing, 37*(10/11), 1666-1684.

Brown, S. A. and Venkatesh, V. (2005). Model of adoption of technology in the household: A baseline model test and extension incorporating household life cycle. *MIS Quarterly, 29*(4), 399-426.

Brown, T. A. (2006). *Confirmatory factor analysis for applied research*. New York, NY: Guilford Press.

Bryman, A. (2001). *Social research methods.* Oxford: Oxford University Press.

Bryman, A. (2004). *Social research methods*. Oxford: Oxford University Press.

Bryman, A. and Bell, E. (2003). *Business research methods*. Oxford: Oxford University Press.

Bryman, A. and Bell, E. (2007). *Business research methods*. (2nd Ed.). Oxford: Oxford University Press.

Burton-Jones, A. and Hubona, G. S. (2006). The mediation of external variables in the technology acceptance model. *Information & Management*, *43*(6), 706-717.

BuddeComm *Jordan - Telecoms, Mobile and Broadband - Statistics and Analyses* -. (2017). *Budde.com.au*. Retrieved 1 September 2017, from

https://www.budde.com.au/Research/Jordan-Telecoms-Mobile-and-Broadband-Statistics-and-Analyses

Byrne, B. (1998). *Structural equation modeling with LISREL, PRELIS and SIMPLIS: Basic concepts, applications and programming*. Hillsdale, NJ: Lawrence Erlbaum Associates Inc.

Byrne, B. (2001) *Structural equation modeling*. Hillsdale, NJ: Lawrence Erlbaum Associates Inc.

Byrne, B. (2010). *Structural equation modeling: Basic concepts, applications and programming*. (6th Ed.). New York, USA: Taylor & Francis Group.

Calisir, F. and Gumussoy, C. A. (2008). Internet banking versus other banking channels: Young consumers' view. *International Journal of Information Management*, *28*(3), 215-221.

Campbell, J. (1982). Editorial: some remarks from the outgoing editor. *Journal of Applied Psychology*, *67*(6), 691-700.

Campbell, D. and Frei, F. (2009). Cost structure, customer profitability, and retention implications of self-service distribution channels: Evidence from customer behaviour in an online banking channel. *Management Science*, *56*(1), 4-24.

Capgemini UK. (2016). *World Payments Report 2016*. Retrieved 1 December 2016, from https://www.capgemini.com/gb-en/resources/world-payments-report-2016/

Carlsson, C., Carlsson, J., Hyvonen, K., Puhakainen, J., and Walden, P. (2006). Adoption of mobile devices/services - searching for answers with the UTAUT. In *Proceedings of the 39th Annual Hawaii International Conference on System Sciences HICSS'06,* 4th-7th January 2006, Hawaii. IEEE.

Carlzon. J. (1987). *Moments of truth.* Cambridge, Massachusetts: Ballinger Publishing Company.

Carmines, E. G. and McIver, J. P. (1981). Analysing models with unobserved variables: Analysis of covariance structure. In G. W. Bohrnstedtand E. F. Borgatta (Eds.),

Social measurement: Current issues. Beverly Hills: Sage Publications Ltd.

Casaló, L. V., Flavián, C., and Guinalíu, M. (2007). The role of security, privacy, usability and reputation in the development of online banking. *Online Information Review*, *31*(5), 583-603.

Cassell, C. and Symon, G. (1994). *Qualitative methods in organizational research: A practical guide*. London: Sage Publications Ltd.

Castañeda, J. A., Muñoz-Leiva, F., and Luque, T. (2007). Web acceptance model (WAM): Moderating effects of user experience. *Information & Management*, *44*(4), 384-396.

Castillo, J. J. (2009). *Population sampling techniques*. Available at: https://explorable.com/ simple-random-sampling. Accessed: 30.03.13.

Champion, R. (2002). Sampling can produce solid findings. *Journal of Staff Development*, *23*(1), 62-63.

Chandio, F. H. (2011). *Studying acceptance of online banking information system: A structural equation model*. Thesis (PhD). Brunel University.

Chaffey, D. (2002). *Introduction to e-business and e-commerce. In E-business and E-commerce management*. (3rd Ed.). (p. 8). Edinburgh, UK: Pearson education limited.

Chandran, R. (2014). Pros and cons of Mobile banking. International Journal of Scientific and Research Publications, 4(10).

Chang, C. H. (2011). The influence of user's trait on public e-service usage: A self-service technology perspective. *Asian Social Science*, *7*(7), 3-11.

Chang, H. L. and Yang, C. H. (2008). Do airline self-service check-in kiosks meet the needs of passengers?. *Tourism Management*, *29*(5), 980-993.

Chang, M. K. and Cheung, W. (2001). Determinants of the intention to use Internet/WWW at Work: A confirmatory study. *Information and Management*, *39*(1), 1-14.

Chang, M. K., Cheung, W., Cheng, C. H., and Yeung, J. H. (2008). Understanding ERP system adoption from the user's perspective. *International Journal of Production Economics*, *113*(2), 928-942.

Chau, P. Y. (1997). Re-examining a model for evaluating information center success using a structural equation modeling approach. *Decision Sciences*, *28*(2), 309-334.

Chen, Z. and Dubinsky, A. J. (2003). A conceptual model of perceived customer value in e-commerce: A preliminary investigation. *Psychology & Marketing*, *20*(4), 323-347.

Chen, C. W. and Huang, E. (2006). Predicting taxpayers' acceptance of online taxation use. In *Proceedings of the 5th WSEAS International Conference on E-Activities*, 20th-22nd November 2006, Venice, Italy, 323-328.

Chen, S. C. and Li, S. H. (2010). Consumer adoption of e-service: Integrating technology readiness with the theory of planned behavior. *African Journal of Business Management, 4*(16), 3556-3563.

Chen, L. D. and Tan, J. (2004). Technology adaptation in E-commerce: Key determinants of virtual stores acceptance. *European Management Journal*, *22*(1), 74-86.

Chen, S. C., Chen, H. H., and Chen, M. F. (2009). Determinants of satisfaction and continuance intention towards self-service technologies. *Industrial Management and Data System*, *109*(9), 1248-1263.

Chen, L. D., Gillenson, M. L., and Sherrell, D. L. (2002). Enticing online consumers: An extended technology acceptance perspective. *Information and Management*, *39*(8), 705-719.

Chen, H., Papazafeiropoulou, A., and Wu, C. (2012). An e-government initiative to support supply chain integration for small to medium sized enterprises: Successes and challenges. *ACM SIGMIS Database*, *42*(4), 63-80.

Chen, K. C., Lin, S. Y., Chen, C. Y., and Wang, C. F. (2008). Perspective service innovation to self-service technologies attitude impact factors. In *Proceedings of 4th IEEE International Conference on Management of Innovation and Technology, ICMIT,* 21st -24th September 2008, Bangkok, Thailand. IEEE.

Chen, H., Papazafeiropoulou, A. Duan, Y., and Chen, T. K. (2013). The antecedents and outcomes of brand experience on the social networking site. In *Proceedings of the 21st European Conference on Information Systems ECIS 2013*, 5th-8th June, Utrecht, The Netherlands.

Chen, H., Papazafeiropoulou, A. Chen, T. K. Duan, Y., and Liu, H. W. (2014). Exploring the commercial value of social networks: Enhancing consumers' brand experience through Facebook pages. *Journal of Enterprise Information Management*, *27*(5), 576-598.

Cheng, T. C., Lam, D. Y., and Yeung, A. C. (2006a). Adoption of Internet banking: An empirical study in Hong Kong. *Decision Support Systems*, *42*(3), 1558-1572.

Cheng, D., Liu, G., and Qian, C. (2008). On determinants of user acceptance of Internet banking: A theoretical framework and empirical study. In *Proceedings of Advanced Management of Information for Globalized Enterprises AMIGE,* 28th-29th September 2008, Beijing, China. IEEE.

Cheng, J. M., Sheen, G. J., and Lou, G. C. (2006b). Consumer acceptance of the Internet as a channel of distribution in Taiwan - a channel function perspective. *Technovation*, *26*(7), 856-864.

Childers, T. L., Carr, C. L., Peck, J., and Carson, S. (2002). Hedonic and utilitarian motivations for online retail shopping behavior. *Journal of Retailing*, *77*(4), 511-535.

Chin, A., Harris, M., & Brookshire, R. (2018). A bidirectional perspective of trust and risk in determining factors that influence mobile app installation. International Journal Of Information Management, 39, 49-59. http://dx.doi.org/10.1016/j.ijinfomgt.2017.11.010

Chiou, J. S. and Shen, C. C. (2012). The antecedents of online financial service adoption: The impact of physical banking services on Internet banking acceptance. *Behaviour & Information Technology, 31*(9), 859-871.

Chiu, Y., Fang, S., and Tseng, C. (2010). Early versus potential adopters: Exploring the antecedents of use intention in the context of retail service innovations. *International Journal of Retail and Distribution Management, 38*(6), 443-459.

Cho, H. and Fiorito, S. (2010). Self-service technology in retailing: The case of retail kiosks. *Symphonya Emerging Issues in Management, 5*(1), 43-56.

Chong, A. Y. L. (2013). Predicting m-commerce adoption determinants: A neural network approach. *Expert Systems with Applications*, *40*(2), 523-530.

Choudrie, J. and Dwivedi, Y. K. (2005). Investigating the research approach for examining the technology adoption in the household. *Journal of Research Practice, 1*(1), 1-12.

Choudrie, J. and Dwivedi, Y. K. (2006). Investigating factors influencing adoption of broadband in the household. *Journal of Computer Information Systems*, *46*(4), 25-34.

Cia.gov. (2015). The World Factbook — Central Intelligence Agency. [Online] Available at: https://www.cia.gov/library/publications/the-world-factbook/geos/sa.html.

Churchill, G. A. (1995). *Marketing research methodological foundation.* (6th Ed.). Orlando, Florida: The Dryden Press.

Coakes, S. J. (2006). *SPSS: Analysis without anguish: Version 14.0 for Windows.* Milton, Qld: John Wiley & Sons.

Collis, J. and Hussey, R. (2003). *Business research: A practical guide for undergraduate and postgraduate students*. (2nd Ed.). Palgrave Macmillan.

Comford, T. and Smithson, S. (1996). *Project research in information systems: A student's guide*. London: Macmillan Press Ltd.

Compeau, D. and Higgins, C. (1995) Application of social cognitive theory to training for computer skills. *Information Systems Research*, *6*(2), 118-143.

ComScore. (2012). 1 in 4 Internet users access banking sites globally. Available from: https://www.comscore.com/Insights/Data-Mine/1-in-4-Internet-Users-Access-Banking-Sites-Globally. Accessed: 14.08.14.

Constantiou, I. D., Papazafeiropoulou, A., and Vendelo, M. T. (2009). Does culture affect the adoption of advanced mobile services?. A comparative study of young adults' perceptions in Denmark and the UK. *ACM SIGMIS Database*, *40*(4), 132-147.

Coorley, W. W. (1978). Explanatory observation studies. *Educational Researcher*, 9-15.

Crabbe, M., Standing, C., Standing, S., and Karjaluoto, H. (2009). An adoption model for mobile banking in Ghana. *International Journal of Mobile Communications*, *7*(5), 515-543.

Creswell, J. W. (1994). *Research design: Qualitative and quantitative approaches.* Thousand Oaks, California: Sage Publications Ltd.

Creswell, J. W. (2003). *Research design: Quantitative, qualitative, and mixed method approaches*. Thousand Oaks, California: Sage Publications Ltd.

Cronbach, L. J. (1951). Coefficient alpha and the internal structural of tests. *Psychometrica*, *16*(3), 297-334.

Crotty, M. (2005). Conceptual Foundations of Social Research Methods. *Teaching Sociology*. Doi: 10.1177/0092055X0503300219

Cruz, P., Neto, L. B. F., Munoz-Gallego, P., and Laukkanen, T. (2010). Mobile banking rollout in emerging markets: Evidence from Brazil. *International Journal of Bank Marketing*, *28*(5), 342-371.

Cuevas, J. (1998). The Internet banking horizon: Bleak or bright for community banks?. *Journal of Internet Banking and Commerce, 3*(3), 9811-9814.

Cunningham, L. F., Young, C. E., and Gerlach, J. (2009). A comparison of consumer views of traditional services and self-service technologies. *Journal of Services Marketing, 23*(1), 1-23.

Cunningham, L. F., Gerlach, J. H., Harper, M. D., and Young, C. E. (2005). Perceived risk and the consumer buying process: Internet airline reservations. *International Journal of Service Industry Management*, *16*(4), 357-372.

Curran, J. M. and Meuter, M. L. (2005). Self-service technology adoption: Comparing three technologies. *Journal of Services Marketing*, *19*(2), 103-113.

Curran, J. M. and Meuter, M. L. (2007). Encouraging existing customers to switch to self-service technologies: put a little fun in their lives. *Journal of Marketing Theory and Practice*, *15*(4), 283-298.

Curran, J. M., Meuter, M. L., and Surprenant, C. F. (2003). Intentions to use self-service technologies: A confluence of multiple attitudes. *Journal of Service Research*, *5*(3), 209-224.

Dabholkar, P. A. (1992). Consumer evaluation in new technology-based self-service options: An investigation of alternative models of service quality. *International Journal of Research in Marketing*, *13*(1), 29-51.

Dabholkar, P. A. (1994). Incorporating choice into an attitudinal framework: Analysing models of mental comparison processes. *Journal of Consumer Research*, *21*(1), 100-118.

Dabholkar, P. A. (1996). Consumer evaluations of new technology-based self-service options: An investigation of alternative models of service quality. *International Journal of Research in Marketing, 13*(1), 29-51.

Dabholkar, P. A. and Bagozzi, R. P. (2002). An attitudinal model of technology-based self-service: Moderating effects of consumer traits and situational factors. *Journal of the Academy of Marketing Science*, *30*(3), 184-201.

Dabholkar, P. A. and Spaid, B. I. (2012). Service failure and recovery in using technology-based self-service: Effects on user attributions and satisfaction. *Service Industries Journal*, *32*(9), 1415-1432.

Dabholkar, P. A., Bobbitt, M. L., and Lee, E. J. (2003). Understanding consumer motivation and behavior related to self-scanning in retailing: Implications for strategy and research on technology based self-service. *International Journal of Service Industry Management*, *14*(1), 59-95.

Dahlberg, T. and Oorni, A. (2007). Understanding changes in consumer payment habits-do mobile payments and electronic invoices attract consumers? In *Proceedings of the 40th Annual Hawaii International Conference on System Sciences HICSS*, 3rd-6th January 2007, Waikoloa, Hawaii.

Dasgupta, S., Paul, R., and Fuloria, S. (2011). Factors affecting behavioral intentions towards mobile banking usage: Empirical evidence from India. *Romanian Journal of Marketing*, *3*(1), 6-28.

Datamonitor. (2009). *Mobile banking: Over-hyped gimmick or credible 21st century banking channel?*. New York: Datamonitor.

Davies, B., Baron, S., and Harris, K. (1999). Observable oral participation in the servuction system: Toward a content and process model. *Journal of Business Research*, *44*(1), 47-53.

Davis, F. D. Bagozzi, R. P. and Warshaw, P. R. (1989). User acceptance of computer technology: A comparison of two theoretical models. *Management Science*, *35*(8), 982-1003.

Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Quarterly*, *13*(3), 318-339.

Davis, F. D. and Venkatesh, V. (1996). A critical assessment of potential measurement biases in the technology acceptance model: Three experiments. *International Journal of Human-Computer Studies*, *45*(1), 19-45.

Davis, F. D. and Venkatesh, V. (2004). Toward pre-prototype user acceptance testing of new information systems: implications for software project management. *Engineering Management,* IEEE Transactions, *51*(1), 31-46.

Davis, F. D., Bagozzi, R. P., and Warshaw, P. R. (1992). Extrinsic and intrinsic motivation to use computers in the workplace. *Journal of Applied Social Psychology*, *22*(14), 1111- 1132.

De Vaus, D. A. (2002). *Surveys in social research.* (5th Ed.). St Leonards, NSW: Allen and Unwin.

Dean, D. H. (2008). Shopper age and the use of self-service technologies. *Managing Service Quality*, *18*(3), 225-238.

DeCarlo, L. T. (1997). On the meaning and use of kurtosis. *Psychological Methods*, *2*(3), 292-307.

Deci, E. L. (1975). *Intrinsic motivation*. New York: Plenum.

DECO. (2010). *Bancos on-line: BiG e ActivoBank com mais clientes satisfeitos.* Retrieved from: http://www.deco.proteste.pt/dinheiro/nc/noticia/bancos-on-line-big-e-activo bank-com-mais-clientes-satisfeitosDECO.

DeCoster, J. (1998). *Overview of Factor Analysis. Stat-help.com*. Retrieved 24 April 2017, from http://www.stat-help.com/notes.html

Demirci Orel, F. D. and Kara, A. (2014). Supermarket self-checkout service quality, customer satisfaction, and loyalty: Empirical evidence from an emerging market. *Journal of Retailing and Consumer Services*, *21*(4), 188-129.

Denzin, N. Y. K. and Lincoln, Y. S. (1998). *Collecting and interpreting qualitative materials*. Thousand Oaks, California, USA: Sage Publications Ltd.

DeYoung, R., Lang, W. W., and Nolle, D. L. (2007). How the Internet affects output and performance at community banks. *Journal of Banking and Finance*, *31*(4), 1033-1060.

Diamantopoulos, A. and Siguaw, J. A. (2000). *Introducing LISREL*. London: Sage Publications Ltd.

Dillon, W. R., Kumar, A., and Mulani, N. (1987). Offending estimates in covariance structure analysis: Comments on the causes of and solutions to Heywood cases. *Psychological Bulletin*, *101*(1), 126.

Dillon, W. R., Madden, T., and Firtle, N. (1994). *Marketing research in a marketing environment*. New York: Irwin Publishing Company.

Dillon, W. R., Madden, T. J., and Firtle, N. H. (1993). *Essential of marketing research*. Ilinois: Irwin, Homewood.

Dimitriadis, S. and Kyrezis, N. (2011). The effect of trust, channel technology, and transaction type on the adoption of self-service bank channels. *The Service Industries Journal*, *31*(8), 1293-1310.

Dimitriadis, S., Kouremenos, A., and Kyrezis, N. (2011). Trust-based segmentation: Preliminary evidence from technology-enabled bank channels. *International Journal of Bank Marketing, 29*(1), 5-31.

Ding, D. X., Hu, P. J. H., and Sheng, O. R. L. (2011). E-SELFQUAL: A scale for measuring online self-service quality. *Journal of Business Research*, *64*(5), 508-515.

Ding, D. X., Verma, R., and Iqbal, Z. (2007). Self-service technology and online financial service choice. *International Journal of Service Industry Management*, *18*(3), 245-268.

Dishaw, M. T. and Strong, D. M. (1999). Extending the technology acceptance model with task-technology fit constructs. *Information & Management*, *36*(1), 9-21.

Dodds, W. B., Monroe, K. B., and Grewal, D. (1991). Effects of price, brand, and store information on buyers. *Journal of Marketing Research, 28*(3), 307-319.

Douglas, S. P. and Craig, C. S. (2007). Collaborative and iterative translation: An alternative approach to back translation. *Journal of International Marketing*, *15*(1), 30-43.

Downs, G. W. and Mohr, L. B. (1976). Conceptual issues in the study of innovation. *Administrative Science Quarterly*, *21*(4), 700-714.

Donner, J. and Tellez, C. (2008). "Mobile banking and economic development: Linking adoption, impact, and use", Asian Journal of Communication, 18(4), 318-32

DOS. (2017). *Dos.gov.jo*. Retrieved 21 April 2017, from http://www.dos.gov.jo

Dunn, S. C., Seaker, R. F., and Waller, M. A. (1994). Latent variables in business logistics research: Scale development and validation. *Journal of Business Logistics*, *15*(2), 145-172.

Durkin, M. (2007). On the role of bank staff in online customer purchase. *Marketing Intelligence & Planning Journal*. *25*(1), 82-97.

Durkin, M. and Howcroft, B. (2003). Relationship marketing in the banking sector: The impact of new technologies. *Marketing Intelligence & Planning*. *21*(1), 61-72.

Durkin, M., Jennings, D., Mulholland, G., and Worthington, S. (2008). Key influencers and inhibitors on adoption of the Internet for banking. *Journal of Retailing and Consumer Services*, *15*(5), 348-357.

Dwivedi, Y. K. and Irani, Z. (2009). Understanding the adopters and non-adopters of broadband. *Communications of the ACM, 52*(1), 122-125.

Dwivedi, Y. K. and Lal, B. (2007). Socio-economic determinants of broadband adoption. *Industrial Management & Data Systems*, *107*(5), 654-671.

Dwivedi, Y. K., Choudrie, J., and Brinkman, W. P. (2006). Development of a survey instrument to examine consumer adoption of broadband. *Industrial Management and Data Systems*, *106*(5), 700-718.

Dwivedi, Y. K., Kapoor, K. K., Williams, M. D., and Williams, J. (2013). RFID systems in libraries: An empirical examination of factors affecting system use and user satisfaction. *International Journal of Information Management*, *33*(2), 367-377.

Dwivedi, Y. K., Rana, N. P., Chen, H., and Williams, M. D. (2011). *A meta-analysis of the unified theory of acceptance and use of technology*. In M. Nuttgens, A. Gadatsch, K. Kautz, I. Schirmerand N. Blinn (Eds.), *Governance and sustainability in IS, IFIP AICT 366*, 155-170.

Easterby-Smith, M., Thorpe, R., and Lowe, A. (2002). *Management research: An introduction*. (2nd Ed.). London: Sage Publications Ltd.

El-Kasheir, D., Ashour, A., and Yacout, O. (2009). Factors affecting continued usage of Internet banking among Egyptian customers. *Communications of the IBIMA, 9*, 252-263.

Elliott, K. M. and Hall, M. C. (2005). Assessing consumers' propensity to embrace self-service technologies: Are there gender differences?. *The Marketing Management Journal*, *15*(2), 98-107.

Elwork, A., & Gutkin, T. (1985). The behavioral sciences in the computer age. *Computers In Human Behavior*, *1*(1), 3-18.

EMarketer. (2013). Social networking reaches nearly one in four around the world. Available from: http://www.emarketer.com/Article/Social-Networking-Reaches-Nearly-One-Four-Around-World/1009976. Accessed: 12.3.2015.

Eriksson, K. and Nilsson. D. (2007). Determinants of the continued use of self-service technology: The case of Internet banking. *Technovation*. *27*(4), 159-167.

Eriksson, K., Kerem, K., and Nilsson, D. (2005). Customer acceptance of Internet banking in Estonia. *International Journal of Bank Marketing*, *23*(2), 200-216.

Eriksson, K., Kerem, K., and Nilsson, D. (2008). The adoption of commercial innovations in the former Central and Eastern European markets. The case of Internet banking

in Estonia. *International Journal of Bank Marketing,* 26(3), 154-169.

Esman, F., Embi, R., and Jusoh, R. (2010). Usage of self-service technologies (SSTs): A case study of e-debit system at bursary UiTM shah alam. *International Journal of Instructional Technology and Distance Learning*, *7*(9), 23-33.

Facts About Jordan. (2016). The Jordanian e-Government. Retrieved 25 November 2015, fromhttp://www.jordan.gov.jo/wps/portal/!ut/p/b1/04_SjzQyMDUwtzC2MDDRj9CPyk ssy0xPLMnMz0vMAfGjzOLDL

Falk, R. F. and Miller, N. B. (1992). *A Primer for soft modeling*. Akron, OH: University of Akron Press.

Faqir, R. S. (2013). Cybercrimes in Jordan: A legal assessment on the effectiveness of information system crimes Law No (30) of 2010. *International Journal of Cyber Criminology*, *7*(1), 81-90.

Featherman, M. S. and Pavlou, P. A. (2003). Predicting e-services adoption: A perceived risk facets perspective. *International Journal of Human-Computer Studies*, *59*(4), 451-474.

Febraban-2017-report. (2017). Deloitte Brazil. Retrieved 1 October 2017, from https://www2.deloitte.com/br/pt/footerlinks/pressreleasespage/Febraban-2016.html

Fenu, G. & Pau, P. (2015). An Analysis of Features and Tendencies in Mobile Banking Apps. Procedia Computer Science, 56, 26-33. http://dx.doi.org/10.1016/j.procs.2015.07.177

Fine, G. A. and Elsbach, K. D. (2000). Ethnography and experiment in social psychological theory building: Tactics for integrating qualitative field data with quantitative lab data. *Journal of Experimental Social Psychology*, *36*(1), 51-76.

Field, A. (2013). Discovering Statistics Using IBM SPSS Statistics (4th ed.). London, United Kingdom: Sage Publications.

Field, a. (2017). Discovering statistics using IBM SPSS statistics. [s.l.]: *sage publications*

Fishbein, M. and Ajzen, I. (1975). *Belief, attitude, intention and behavior: An introduction to theory and research*. Reading, Massachusetts: Addison Wesley.

Fitzgerald, L. M. and Kiel, G. C. (2001). Applying a consumer acceptance of technology model to examine adoption of online purchasing. In S. Chettyand B. Collins (Eds.), *Proceedings of the Australian and New Zealand Marketing Academy Conference.* Auckland: ANZMAC.

Flavián, C., Guinaliu, M., and Torres, E. (2006). How bricks-and-mortar attributes affect online banking adoption. *International Journal of Bank Marketing*, *24*(6), 406-423.

Foon, Y. S. and Fah, B. C. Y. (2011). Internet banking adoption in Kuala Lumpur: An application of the UTAUT model. *International Journal of Business & Management*, *6*(4), 161-167.

Fornell, C. and Larcker, D. F. (1981). Evaluating structural equation models with unobservable variables and measurement error. *Journal of Marketing Research*, *18*(1), 39-50.

Fowler Jr., F. J. (2002). *Survey research methods*. London: Sage Publications Ltd.

Frazer, L. and Lawley, M. (2000). *Questionnaire design and administration: A practical guide*. Australia & Singapore: John Wiley & Sons.

Galliers, R. (1992). Issues, methods, and practical guidelines. In *Information systems research*. (2nd Ed.). Oxford, England: Blackwell Scientific Publications.

Gan, C., Clemes, M., Limsombunchai, V., and Weng, A. (2006). A logit analysis of electronic banking in New Zealand. *International Journal of Bank Marketing*, *24*(6), 360-383.

Gao, T. and Deng, Y. (2012). A study on users' acceptance behavior to mobile e-books application based on UTAUT model. In *Proceedings of International Conference on Computer Science and Automation Engineering Software Engineering and Service Science ICSESS,* 25th-27th May 2012, Zhangjiajie, China. IEEE.

Gay, L. R. and Airasian, P. (2000). *Educational research, competencies for analysis and application.* (6th Ed.). Merril: An Imprint of Prentice Hall.

Gefen, D. (2000). E-commerce: The role of familiarity and trust. *Omega*, *28*(6), 725- 737.

Gefen, D. and Straub, D. W. (2005). A practical guide to factorial validity using PLS-

Graph: Tutorial and annotated example. *Communications of the Association for Information Systems*, *16*(5), 91-109.

Gefen, D., Karahanna, E., and Straub, D. W. (2003). *T*rust and TAM in online shopping: An integrated model. *MIS Quarterly*, 27(1), 51-90.

Gefen, D., Straub, D. W., and Boudreau, M. C. (2000). Structural equation modeling and regression: Guidelines for research practice. *Communications of the Association for Information Systems*, *4*(7), 1-70.

Gelderman, C. J., Ghijsen, P. W., and Diemen, R. (2011). Choosing self- service technologies or interpersonal services: The impact of situational factors and technology-related attitudes. *Journal of Retailing and Consumer Services*, *18*(5), 414-421.

Gerbing, D. W. and Anderson, J. C. (1993). Monte Carlo evaluation of goodness-offitindices for structural equation modeling. In K. A. Bollenand S. J. Long (Eds.). *Testing Structural Equation Models*. Newbury Park: Sage Publications Ltd.

Gerrard, P. and Cunningham, J. B. (2003). Diffusion of Internet banking among Singapore consumers. *International of Bank Marketing*, *21*(1), 16-29.

Gerrard, P., Cunningham, J. B., and Devlin, J. F. (2006). Why consumers are not using Internet banking: A qualitative study. *Journal of Services Marketing*, *20*(3), 160-168.

Giesen, L. (2012). Man vs Machine: What does the future hold for self-service POS?. NRF Stores. Available from: http://www.stores.org/STORES%20Magazine%20January% 202012/ man-vs-machine. Accessed: 01.05.14.

Gills, J., & Johnson, P. (2002). *Research methods for managers*. (3rd Ed.). London, UK: Sage.

Globerson, S. and Maggard, M. J. (1991). A conceptual model of self-service. *International Journal of Operations & Production Management*, *11*(4), 33-44.

Gounaris, S. and Koritos C. (2008). Investigating the drivers of Internet banking adoption decision: A comparison of three alternative frameworks. *International Journal of Bank Marketing*, *26*(5), 282-304.

Gorman, G. E., & Clayton, P. (2005). *Qualitative research for the information professional*. (2nd Ed.). London, UK: Facet Publishing.

Grabner-Kräuter, S. and Faullant, R. (2008). Consumer acceptance of Internet banking: The influence of internet trust. *International Journal of Bank Marketing*, *26*(7), 483-504.

Gray, D. (2009). Doing Research in the Real World. (2nded). London, UK: Sage.

Groves, R. M. and Singer, E. (2004). Survey methodology. In J. S. House, F. T. Juster, R. Kahn, H. Schuman and E. Singer. *A telescope on society: Survey research and social science at the University of Michigan and beyond*. Ann Arbor, MI: University of Michigan Press.

Gu, J. C., Lee, S. C., and Suh, Y. H. (2009). Determinants of behavioral intention to mobile banking. *Expert Systems with Applications*, *36*(9), 11605-11616.

Guba, E. G. (1990). *The Paradigm dialog*. Newbury Park, CA: Sage Publications Ltd.

Guba, E. G. and Lincoln, Y. (1988) Do inquiry paradigms imply inquiry methodologies?. In D. M. Fetterman (Ed.), *Qualitative Approaches to Evaluation in Education*, (pp. 89-115), New York: Praeger Inc.

Guba, E. G. and Lincoln, Y. S. (1994). Competing paradigm in qualitative research. In N. K. Denzinand Y. S. Lincoln (Eds.), *Handbook of qualitative research*. London: Sage Publications Ltd.

Hair Jr., J. F., Bush, R. B., and Ortinau, D. J. (2003). *Marketing research within a changing information environment*. New York, NY: McGraw-Hill.

Hair Jr., J. F., Anderson, R. E., Tatham, R. L., and Black, W. C. (1995). *Multivariate data analysis with readings*. Englewood Cliffs, NJ: Prentice-Hall.

Hair Jr., J. F., Anderson, R. E., Tatham, R. L., and Black, W. C. (1998). *Multivariate data analysis*. (5th Ed.). Upper Saddle River, NJ: Prentice Hall.

Hair Jr., J. F., Black, W. C., Babin, B. J., and Anderson, R. E. (2014). *Multivariate data analysis: A global perspective.* (7th Ed.). Pearson Education International.

Hair Jr., J. F., Black, W., Babin, B., Anderson, R. E., and Tatham, R. (2006).

Multivariate data analysis. (6th Ed.). New Jersey: Prentice Hall.

Hale, J. L., Householder, B. J., and Greene, K. L. (2002). The theory of reasoned action. In J. P. Dillardand M. Phau (Eds.), *The persuasion handbook: Developments in theory and practic*e, (pp. 259-286). Thousand Oaks, CA: Sage Publications Ltd.

Hall, S. D., Ray, W. E., and Knight, L. E. (1999). Using Internet for retail access: Banks found lagging. *Journal of Retail Banking Services*, *21*, 51-55.

Han, S. and Baek, S. (2004). Antecedents and consequences of service quality in online banking: An application of the SERVQUAL instrument. *Advances in Consumer Research*, *31*(2), 208-14.

Hanafizadeh, P., Behboudi, M., Koshksaray, A. A., and Tabar, M. J. S. (2014). Mobile-banking adoption by Iranian bank clients. *Telematics and Informatics*, *31*(1), 62-78.

Harman, H. H. (1976). *Modern factor analysis*. (3rd Ed.). Chicago, IL: University of Chicago Press.

Harris, M. and Schaubroeck, J. (1990). Confirmatory modelling in organizational behaviour/ human resource management: Issues and applications. *Journal of Management*, *16*(2), 337-360.

Hayikader, S., Abd Hadi, F., & Ibrahim, J. (2016). Issues and Security Measures of Mobile Banking Apps. International Journal of Scientific And Research Publications, 6(1), 36.

Henery, G. K. (1990). Practical sampling. *Applied social research series ,21*.

Hernando, I. and Nieto, M. J. (2007). Is the Internet delivery channel changing banks' performance?. The case of Spanish banks. *Journal of Banking and Finance*, *31*(4), 1083-1099.

Hilton, T., Hughes, T., Little, E., and Marandi, E. (2013). Adopting self-service technology to do more with less. *Journal of Services Marketing*. *27*(1), 3-12.

Ho, S. and Ko, Y. (2008). Effect of self-service technology on customer value and

customer readiness: The case study of Internet banking. *Internet Research*, *18*(4), 427-446.

Hoehle, H. and Huff, S. (2009). Electronic banking channels and task-channel fit. In *Proceedings of the ICIS International Conference,* 15th-18th December 2009, Phoenix, Arizona.

Holmes-Smith, P., Coote, L., and Cunningham, E. (2006). *Structural equation modelling: From the fundamentals to advanced topics*. Melbourne: School Research, Evaluation and Measurement Services.

Hooper, D., Coughlan, J., and Mullen, M. R. (2008). Structural equation modelling: Guide- lines for determining model fit. *Electronic Journal of Business Research Methods*, *6*(1), 53-60.

Housing Bank. (2014). Housing Bank Mobile Banking. Available from: http://www.hbtf.com/wps/portal/!ut/p/c4/04_SB8K8xLLM9MSSzPy8xBz9CP0 os3h_T0tHQyNvA3d3C0dTA083A7cgX39HYwNzY_3g1Dz9gmxHRQBubBw e/.Accessed: 15.04.14.

Howard, M. and Worboys, C. (2003). Self-service – a contradiction in terms or customer-led choice?. *Journal of Consumer Behavior*, *2*(4), 382-392.

Howcroft, B., Hamilton, R., and Hewer, P. (2002). Consumer attitude and the usage and adoption of home-based banking in the United Kingdom. *The International Journal of Bank Marketing*, *20*(3), 111-121.

Howcroft, B., Hamilton, R., and Hewer, P. (2007). Customer involvement and interaction in retail banking: An examination of risk and confidence in the purchase of financial products. *Journal of Services Marketing*, *21*(7), 481-491.

Hsieh, C. T. (2005). Implementing self-service technology to gain competitive advantage. *Communications of IIMA*, *5*(1), 77-83.

Hung, C. S., Yen, D. C., and Ou, C. S. (2012). An empirical study of the relationship between a self-service technology investment and firm financial performance. *Journal of Engineering and Technology Management, 29*(1), 62-70.

Hussey, J. and Hussey, R. (1997). *Business research: A practical guide for undergraduate and postgraduate students.* New York: Palgrave.

Hwang, Y. and Kim, D. J. (2007). Customer self-service systems: The effects of perceived web quality with service contents on enjoyment, anxiety, and e-trust. *Decision Support Systems*, *43*(3), 746-760.

IHL Consulting Group. (2007). Consumers on track to spend $1.3 trillion a year at self-service machines by 2011. Available from: http://www.ihlservices.com/ihl/press_detail.cfm?PressReleaseID=55. Accessed: 15.08.14.

Im, I., Kim, Y., and Han, H. J. (2008). The effects of perceived risk and technology type on users' acceptance of technologies. *Information & Management*, *45*(1), 1-9.

Iqbal, S. and Qureshi, I. A. (2012). M-learning adoption: A perspective from a developing country. *The International Review of Research in Open and Distance Learning*, *13*(3), 147-164.

Iqbal, Z., Verma, R., and Baran, R. (2003). Understanding consumer choices and preferences in transaction-based e-services. *Journal of Service Research*, *6*(1), 51-65.

Irani, Z., Dwivedi, Y. K., and Williams, M. D. (2009). Understanding consumer adoption of broadband: An extension of the technology acceptance model. *Journal of the Operational Research Society*, *60*(10), 1322-1334.

Ivatury & Mas. (2008). *The Early Experience with Branchless Banking*. Retrieved 1 October 2017, from http://www.cgap.org/publications/early-experience-branchless-banking

Jahangir, N. and Begum, N. (2008).The role of perceived usefulness, perceived ease of use, security and privacy, and customer attitude to engender customer adaptation in the context of electronic banking. *African Journal of Business Management*, *2*(1), 32-40.

Jankowicz, A. D. (2005). *Business research projects*. (4th ed.). london, England: Thomson Learning.

Jaruwachirathanakul, B. and Fink, D. (2005). Internet banking adoption strategies for a developing country: The case of Thailand. *Internet Research*, *15*(3), 295-311.

Jayawardhena, C. and Foley, P. (2000). Changes in the banking sector – the case of Internet banking in the UK. *Internet Research*, *10*(1), 19-31.

Jayawardhena, C., Wright, L. T., and Dennis, C. (2007). Consumers Online: Intentions, orientations and segmentation. *International Journal of Retailing and Distribution Management*, *35*(6), 515-526.

Jeong, B. K. and Yoon, T. E. (2013). An empirical investigation on consumer acceptance of mobile banking services. *Business & Management Research*, *2*(1), 31-40.

Johnson, D. S., Bardhi, F., and Dunn, D. T. (2008). Understanding how technology paradoxes affect customer satisfaction with self-service technology: The role of performance ambiguity and trust in technology. *Psychology & Marketing*, *25*(5), 416-443.

Jon-Chao, H., Chan-Jer, H., Chien-Yun, D., Ming-Yueh, H., Pei-Hsin, L., & Lee, C. (2012). Technology Anxiety and Implicit Learning Ability Affect Technology Leadership to promote the use of Information Technology at Elementary Schools. *Procedia - Social And Behavioral Sciences*, 64, 555-563. http://dx.doi.org/10.1016/j.sbspro.2012.11.065

Jordan Ahli Bank. (2014). *Jordan Ahli Bank launches free Mobile banking application, Ahli Mobile*. Available from: http://www.ahli.com/Ahli_Launches_Free_Mobile_ Banking_Application_Ahli_Mobile.shtml. Accessed: 15.04.14.

Jordan News Agency. (2016). *Petra.gov.jo*. Retrieved 21 December 2016, from http://petra.gov.jo/

Jordanian Department of Statistics. (2011). Survey use of information technology in Amman, Jordan. Available from: http://www.dos.gov.jo/dos_home_a/main/Analysis_ Reports/ it_tech/tech_2009.pdf. Accessed: 11.04.12.

Jöreskog, K. G. and Sörbom, D. (1993). *LISREL 8 user's reference guide*. Chicago: Scientific Software.

Jöreskog, K. G. and Sörbom, D. (1996). *LISREL 8: User's Reference Guide*. Chicago: Scientific Software International.

Joseph, M. and Stone, G. (2003). An empirical evaluation of US bank customer perceptions of the impact of technology on service delivery in the banking sector. *International Journal of Retail & Distribution Management, 31*(4), 190- 202.

Jun, M. and Cai, S. (2001). The key determinants of internet banking service quality: A content analysis. *International Journal of Bank Marketing*, *19*(7), 276-291.

Juniper research. (2017). juniper research *mobile banking users to exceed 1.75 billion by 2019, representing 32% of the global adult POPULATION*. Retrieved 6 January 2017

Kaiser, H. (1970). A second generation little jiffy. *Psychometrika*, *35*(4), 401-415. http://dx.doi.org/10.1007/bf02291817

Kallweit, K., Spreer, P., and Toporowski, W. (2014). Why do customers use self-service information technologies in retail? The mediating effect of perceived service quality. *Journal of Retailing and Consumer Services*, *21*(3), 268-276.

Kaplan, B. and Maxwell, J. A. (1994). Qualitative research methods for evaluating computer information systems. In J. G. Anderson, C. E. Aydin and S. J. Jay (Eds.), *Evaluating health care information systems: Methods and applications.* Thousand Oaks, CA: Sage Publications Ltd.

Kapoor, K. K., Dwivedi, Y. K., and Williams, M. D. (2014). Examining the role of three sets of innovation attributes for determining adoption of the interbank mobile payment service. *Information Systems Frontiers*, 1-18. Doi:10.1007/s10796-014-9484-7.

Karjaluoto, H., Mattila, M., and Pento, T. (2002). Factors underlying attitude formation towards online banking in Finland. *International Journal of Bank Marketing*. *20*(6), 261-272.

Kawabata, M., Mallett, C. J., and Jackson, S. A. (2008). The flow state scale-2 and dispositional flow scale-2: Examination of factorial validity and reliability for Japanese adults. *Psychology of Sport and Exercise*, *9*(4), 465-485.

Keeling, K., McGoldrick, P., and Macaulay, L. (2006). Electronic kiosks in retail service delivery: Modelling customer acceptance. *Journal of Marketing Channels*, *12*(1/2), 49-75.

Kesharwani, A. and Bisht, S. S. (2012). The impact of trust and perceived risk on Internet banking adoption in India: An extension of technology acceptance model. *International Journal of Bank Marketing*, *30*(4), 303-322.

Khalifa, M. and Liu, V. (2007). Online consumer retention: Contingent effects of online shopping habit and online shopping experience. *European Journal of Information Systems*, *16*(6), 780-792.

Khraim, H. S., Shoubaki, Y. E., and Khraim, A. S. (2011). Factors affecting Jordanian consumers' adoption of mobile banking services. *International Journal of Business and Social Science*, *2*(20), 96-105.

Kim, J. and Forsythe, S. (2009). Adoption of sensory enabling technology for online apparel shopping. *European Journal of Marketing*, *43*(9/10), 1101-1120.

Kim, J. and Forsythe, S. (2010). Factors affecting adoption of product virtualization technology for online consumer electronics shopping. *International Journal of Retail & Distribution Management*, *38*(3), 190-204.

Kim, N. and Lee, M. (2014). Other customers in a service encounter: Examining the effect in a restaurant setting. *Journal of Services Marketing, 26*(1), 27-40.

Kim, K. K. and Prabhakar, B. (2004). Initial trust and the adoption of B2C e-commerce: The case of internet banking. *ACM Sigmis Database*, *35*(2), 50-64.

Kim, S. and Stoel, L. (2004). Dimensional hierarchy of retail website quality. *Information & Management*, *41*(5), 619-633.

Kim, M. J., Chung, N., and Lee, C. K. (2011). The effect of perceived trust on electronic commerce: Shopping online for tourism products and services in South Korea. *Tourism Management*, *32*(2), 256-265.

Kim, D. J., Ferrin, D. L., and Rao, H. R. (2008). A trust-based consumer decision- making model in electronic commerce: The role of trust, perceived risk, and their antecedents. *Decision Support Systems*, *44*(2), 544-564.

Kim, S. S., Malhotra, N. K., and Narasimhan, S. (2005). Two competing perspectives on automatic Use: A theoretical and empirical comparison. *Information Systems Research*, *16*(4), 418-432.

Kim, G., Shin, B. and Lee, H. G. (2009). Understanding dynamics between initial trust and usage intentions of mobile banking. *Information Systems Journal*, *19*(3), 283-311.

Kim, S., & Baek, T. (2018). Examining the antecedents and consequences of mobile app engagement. Telematics And Informatics, 35(1), 148-158. http://dx.doi.org/10.1016/j.tele.2017.10.008

King, N. (2004). "Using templates in the thematic analysis of texts." Essential guide to qualitative methods in organizational research: 256–270.

Koenig-Lewis, N., Palmer, A., and Moll, A. (2010). Predicting young consumers' take-up of mobile banking services. *International Journal of Bank Marketing*, *28*(5), 410-432.

Kokkinoua, A. and Cranage, D. A. (2013). Using self-service technology to reduce customer waiting times. *International Journal of Hospitality Management*, *33*, 435-445.

Kolodinsky, J. M., Hogarth, J. M., and Hilgert, M. A. (2004). The adoption of electronic banking technologies by US consumers. *The International Journal of Bank Marketing*, *22*(4), 238-259.

KPMG International. (2009). Consumers taking charge, consumers and convergence III – survey report. Available at: www.kpmg.com//en/IssuesAndInsights/Articles Publications/Documents/Consumers-and-Convergence-III.pdf. Accessed: 10.04.12.

Krishnaswami, O. R., &Satyaprasad, B. G. (2010). *business research methods*. mumba, india: global media. Retrieved from http://site.ebrary.com

Kuisma, T., Laukkanen, T., and Hiltunen, M. (2007). Mapping the reasons for resistance to Internet banking: A means-end approach. *International Journal of Information Management*, *27*(2), 75-85.

Kummer, T., Recker, J., & Bick, M. (2017). Technology-induced anxiety: Manifestations, cultural influences, and its effect on the adoption of sensor-based technology in German and Australian hospitals. *Information & Management*, *54*(1), 73-89. http://dx.doi.org/10.1016/j.im.2016.04.002

Kuo, Y. F., Wu, C. M., and Deng, W. J. (2009). The relationships among service quality, perceived value, customer satisfaction, and post-purchase intention in mobile value-added services. *Computers in Human Behavior*, *25*(4), 887-896.

Kwan, K. and E. Tsang (2001). .Realism and Constructivism in Strategy Research: A Critical Realist Response to Mir and Watson.. *Strategic Management Journal*. 22: 1163-1168.

Laforet, S. and Li, X. (2005). Consumers' attitudes towards online and mobile banking in China. *International Journal of Bank Marketing*, *23*(5), 362-380.

Lallmahomed, M., Ab.Rahim, N., Ibrahim, R., & Rahman, A. (2013). Predicting different conceptualizations of system use: Acceptance in hedonic volitional context (Facebook). *Computers In Human Behavior*, *29*(6), 2776-2787. http://dx.doi.org/10.1016/j.chb.2013.07.018

Lang, B. and Colgate, M. (2003). Relationship quality: On-line banking and the information technology gap. *International Journal of Bank Marketing, 21*(1), 29-37.

Lassar, W. M., Manolis, C., and Lassar, S. S. (2005). The relationship between consumer innovativeness, personal characteristics, and online banking adoption. *International Journal of Bank Marketing*, *23*(2), 176-199.

Laukkanen, T. (2007a). Customer preferred channel attributes in multi-channel electronic banking. *International Journal of Retail & Distribution Management*, *35*(5), 393-412.

Laukkanen, T. (2016). Internet vs Mobile banking: comparing customer value perceptions. *Business Process Management Journal, 13*(6), 788-797.

Laukkanen, T. and Cruz, P. (2009). Comparing consumer resistance to Mobile banking in Finland and Portugal. *E-Business and Telecommunications. 48*, 89-98.

Laukkanen, T. and Kantanen, T. (2006). Consumer value segments in Mobile bill paying. In *Proceedings of the Third International Conference on Information Technology: New Generations (ITNG'06),* 10th -12th April 2006, Las Vegas, USA. IEEE.

Laukkanen, T. and Lauronen, J. (2005). Consumer value creation in Mobile banking services. *International Journal of Mobile Communications*, *3*(4), 325-338.

Laukkanen, T. and Pasanen, M. (2008). Mobile banking innovators and early adopters: How they differ from other online users?. *Journal of Financial Services Marketing, 13*(2), 86-94.

Laukkanen, P., Sinkkonen, S., and Laukkanen, T. (2008). Consumer resistance to Internet banking: Postponers, opponents and rejectors. *The International Journal of Bank Marketing, 26*(6), 440-455.

Laukkanen, T., Sinkkonen, S., and Laukkanen, P. (2009). Communication strategies to overcome functional and psychological resistance to Internet banking. *International Journal of Information Management*, *29*(2), 111-118.

Laukkanen, T., Sinkkonen, S., Kivijärvi, M., and Laukkanen, P. (2007). Innovation resistance among mature consumers. *The Journal of Consumer Marketing, 24*(7), 419-427.

Lee, M. C. (2009). Factors influencing the adoption of Internet banking: An integration of TAM and TPB with perceived risk and perceived benefit. *Electronic Commerce Research and Applications*, *8*(3), 130-141.

Lee, J. and Allaway, A. (2002). A key to marketing financial services: The right mix of products, services, channels and customers. *Journal of Services Marketing*, *16*(3), 238-258.

Lee, K. C. and Chung, N. (2009a). Understanding factors affecting trust in and satisfaction with mobile banking in Korea: A modified DeLone and McLean's

model perspective. *Interacting with Computers*, *21*(5), 385-392.

Lee, K. C. and Chung, N. (2009b). Understanding factors affecting trust in and satisfaction with mobile banking in Korea: A modified DeLone and McLean's model perspective. *Interacting with computers*, *21*(5), 385-392.

Lee, H. J. and Yang, K. (2013). Inter personal service quality, self-service technology (SST) service quality, and retail patronage. *Journal of Retailing and Consumer Services*, *20*(1), 51-57.

Lee, H. J., Fairhurst, A. E., and Lee, M. Y. (2009). The importance of self-service kiosks in developing consumers' retail patronage intentions. *Managing Service Quality, 19*(6), 687-701.

Lee, Y. H., Hsieh, Y. C., and Hsu, C. N. (2011). Adding innovation diffusion theory to the technology acceptance model: Supporting employees' intentions to use e-learning systems. *Educational Technology & Society*, *14*(4), 124-137.

Lee, Y., Kozar, K. A., and Larsen, K. (2003). The technology acceptance model: Past, present, and future. *Communications of the Association for Information Systems*, *12*(50), 752-780.

Lee, E., Kwon, K., and Schumann, D. (2005). Segmenting the non-adopter category in the diffusion of Internet banking. *International Journal of Bank Marketing*, *23*(5), 414-437.

Lee, K. S., Lee, H. S., and Kim, S. Y. (2007). Factors influencing the adoption behavior of mobile banking: A South Korean perspective. *Journal of Internet Banking and Commerce*, *12*(2), 1-9.

Lee, W. I., Chiu Y. T., Liu, C. C., and Chen, C. Y. (2011). Assessing the effects of consumer involvement and service quality in a self-service setting. *Human Factors and Ergonomics in Manufacturing & Service Industries, 21*(5), 504- 515.

Lee, H., Cho, H. J., Xu, W., and Fairhurst, A. (2010). The influence of consumer traits and demographics on intention to use retail self-service checkouts. *Marketing Intelligence & Planning, 28*(1), 46-58.

Lee, H., Harindranath, G., Oh, S., and Kim, D. J. (2014). Provision of Mobile banking services from an actor–network perspective: Implications for convergence and standardization. *Technological Forecasting and Social Change*. Doi:10.1016/j.techfore.2014.02.007.

Lee, M., McGoldrick, P. J., Keeling, K. A., and Doherty, J. (2003). Using ZMET to explore barriers to the adoption of 3G mobile banking services. *International Journal of Retail and Distribution Management*, *31*(6), 340-348.

Legris, P., Ingham, J., and Collerette, P. (2003). Why do people use information technology? A critical review of the technology acceptance model. *Information and Management*, *40*(3), 191-204.

Lenth, R. V. (2001). Some practical guidelines for effective sample size determination. *The American Statistician*, *55*(3), 187-193.

Leonard-Barton, D. (1985). Experts as negative opinion leaders in the diffusion of a technological innovation. *Journal of Consumer Research, 11*(4), 914-926.

Liao, S., Shao, Y., Wang, H., and Chen, A. (1999). The adoption of virtual banking: An empirical study. *International Journal of Information Management*, *19*(1), 63-74.

Lichtenstein, S. and Williamson, K. (2006). Understanding consumer adoption of Internet banking: An interpretive study in the Australian banking context. *Journal of Electronic Commerce Research, 7*(2), 50-66.

Liljander, V., Gillbergb, F., Gummerus, J., and Rield, A. (2006). Technology readiness and the evaluation and adoption of self-service technologies. *Journal of Retailing and Consumer Services*, *13*(3), 177-191.

Limayem, M., Hirt, S. G., and Cheung, C. M. K. (2007). How habit limits the predictive power of intentions: The case of IS continuance. *MIS Quarterly*, *31*(4), 705-737.

Lin, C. T. (2010). Examining e-travel sites: an empirical study in Taiwan. *Online Information Review*, *34*(2), 205-228.

Lin, H. F. (2011). An empirical investigation of mobile banking adoption: The effect of innovation attributes and knowledge-based trust. *International Journal of Information Management*, *31*(3), 252-260.

Lin, H. F. (2013). Determining the relative importance of mobile banking quality factors. *Computer Standards & Interfaces, 35*(2), 195-204.

Lin, T. T. (2006). An Internet banking system establishment with transaction rate uncertainty: A real options approach. *Journal of Information and Optimization Sciences, 27*(1), 1-15.

Lin, J. and Hsieh, P. (2006). The role of technology readiness in customers' perception and adoption of self-service technologies. *International Journal of Service Industry Management*, *17*(5), 497-517.

Lin, J. C. and Hsieh, P. L. (2007).The influence of technology readiness on satisfaction and behavioural intentions toward self-service technologies. *Computers in Human Behaviour*, *23*(3), 1597-1615.

Lin, J. S. H. and Hsieh, P. L. (2011). Assessing the self-service technology encounters: Development and validation of SSTQUAL scale. *Journal of Retailing*, *87*(2), 194-

206.

Lin, C. H., Shih, H. Y., and Sher, P. J. (2007). Integrating technology readiness into technology acceptance: The TRAM model. *Psychology & Marketing*, *24*(7), 641-657.

Lindell, M. K. and Whitney, D. J. (2001). Accounting for common method variance in cross sectional research designs. *Journal of Applied Psychology*, *86*(1), 114-121.

Liska, A. E. (1984). A critical examination of the causal structure of the Fishbein/ Ajzen attitude - behavior model. *Social Psychology Quarterly, 47*(1), 61-74.

Little, R. J. (1988). A test of missing completely at random for multivariate data with missing values. *Journal of the American Statistical Association*, *83*(404), 1198-1202.

Littler, D. and Melanthiou, D. (2006). Consumer perceptions of risk and uncertainty and the implications for behaviour towards innovative retail services: The case of Internet banking. *Journal of Retailing and Consumer Services*, *13*(6), 431-443.

Lockett, A. and Littler, D. (1997). The adoption of direct banking services. *Journal of Marketing Management, 13*(8), 791-811.

Lord, K. R., Putrevu, S., and Shi, Y. Z. (2008). Cultural influences on cross-border vacationing. *Journal of Business Research*, *61*(3), 183-190.

Lu, J. L., Choi, J. K., and Tseng, W. C. (2011). Determinants of passengers' choice of airline check-in services: A case study of American, Australian, Korean, and Taiwanese passengers. *Journal of Air Transport Managemen*t, *17*(4), 249-252.

Lu, J., Chou, H., and Ling, P. (2009). Investigating passengers' intentions to use technology-based self-check-in services. *Transportation Research Part E: Logistics and Transportation*, *45*(2), 345-356.

Luarn, P. and Lin, H. H. (2005). Toward an understanding of the behavioral intention to use Mobile banking. *Computers in Human Behavior, 21*(6), 873-891.

Lucas, H. C., Swanson, E. B., and Zmud, R. W. (2007). Implementation, innovation, and related themes over the years in information systems research. *Journal of the Association for Information Systems, 8*(4), 206-210.

Luck, J. D. and Rubin, S. R. (1987). *Marketing research.* (7th Ed.). Prentice Hall International.

Luo, X., Li, H., Zhang, J., and Shim, J. P. (2010). Examining multi-dimensional trust and multifaceted risk in initial acceptance of emerging technologies: An empirical study of Mobile banking services. *Decision Support Systems*, *49*(2), 222-234.

Luarn, P., & Lin, H. (2005). Toward an understanding of the behavioral intention to use mobile banking. *Computers In Human Behavior*, *21*(6), 873-891. http://dx.doi.org/10.1016/j.chb.2004.03.003

Makarem, S. C., Mudambi, S. M., and Podoshen, J. S. (2009) Satisfaction in technology-enabled service encounters, *Journal of Services Marketing*, *23*(3), 134-144.

Malhotra, N. (1999). *Marketing research: An applied orientation*. Englewood Cliffs, NJ: Prentice-Hall.

Malhotra, N. K. and Birks, D. F. (2003). *Marketing research: An applied approach*. Harlow: Prentice Hall.

Malhotra, N. K., Agarwal, J., and Peterson, M. (1996). Methodological issues in cross-cultural marketing research. *International Marketing Review*, *13*(5) 7-43.

Malhotra, Y. and Galletta, D. F. (1999). Extending the technology acceptance model to account for social influence: Theoretical bases and empirical validation. In *Proceedings of the 32nd Annual Hawaii International Conference on System Sciences HICSS-32*, 5th-8th January 1999, Maui, HI, USA. IEEE.

Malhotra, N. K., Kim, S. S., and Patil, A. (2006). Common method variance in IS research: A comparison of alternative approaches and a reanalysis of past research. *Management Science*, *52*(12), 1865-1883.

Mallat, N., Rossi, M., and Tuunainen, V. (2004). Mobile banking services. *Communications of the ACM*, *47*(5), 42-46.

Mallat, N., Rossi, M., and Tuunainen, V. (2008). An empirical investigation of Mobile ticketing service adoption in public transportation. *Pers Ubiquit Comput*, *12*(1), 57-65.

Mallinckrodt, B. and Wang, C. (2004). Quantitative methods for verifying semantic

equivalence of translated research instrument: A Chinese version of the experience in close relationships scale. *Journal of Counselling Psychology*, *51*(3), 368-379.

Mansumitrchai, S. and Al-Malkawi, H. A. N. (2011). Factors underlying the adoption of online banking by Mexican consumers. *International Journal of Business & Management*, *6*(9), 155-169.

Manzano, J. L., Navarre, C. I., Mafe, C. R., and Blas, S. S. (2009). The role of consumer innovativeness and perceived risk in online banking usage. *International Journal of Bank Marketing, 27*(1), 53-75.

Marler, J. H., Fisher, S. L., and Ke, W. (2009). Employee self-service technology acceptance: A comparison of pre-implementation and post-implementation relationships. *Personnel Psychology*, *62*(2), 327-358.

Martin, S. S. and Camarero, C. (2008). How perceived risk affects online buying. *Online Information Review*, *33*(4), 629-654.

Martins, G., Oliveira, T., and Popovic, A. (2014) Understanding the Internet banking adoption: A unified theory of acceptance and use of technology and perceived risk application. *International Journal of Information Management*, *34*(1), 1-13.

Market research and user experience research experts | GfK Global. (2014). Gfk.com. Retrieved 1 August 2015, from http://www.gfk.com/

Mathieson, K. (1991). Predicting user intentions: Comparing the technology acceptance model with the theory of planned behavior. *Information Systems Research*, *2*(3), 173-191.

Mattila, A. S., Cho, W., and Ro, H. C. (2011). The role of self-service technologies in restoring justice. *Journal of Business Research*, *64*(4), 348-355.

Mattila, M., Karjaluoto, H., and Pento, T. (2003). Internet banking adoption among mature customers: Early majority or laggards?. *Journal of Services Marketing*, *17*(5), 514-528.

MacCallum, R., Roznowski, M., and Necowitz, L.B. (1992). Model modifications in covariance structure analysis: The problem of capitalization on chance.

Psychological Bulletin, 111(3), 490-504.

McCelland, S. (1994). Training needs assessment data-gathering methods: Part 4, survey questionnaire. *Journal of European Industrial Training, 18*(5), 22-26.

McDaniel, C. and Gates, R. (2006). *Marketing research: Essentials.* (5th Ed.). New York: John Wiley & Sons

Mendoza, J. L. and Stafford, K. L. (2001). Confidence intervals, power calculation, and sample size estimation for the squared multiple correlation coefficient under the fixed and random regression models: A computer program and useful standard tables. *Educational and Psychological Measurement*, *61*(4), 650-667.

Meuter, M. L. and Bitner, M. J. (1998). Self-service technologies: Extending service frameworks and identifying issues for research. In *Winter Educators' Conference Proceedings: Marketing Theory and Applications*, (*9*, 12-19). Chicago, USA. American Marketing Association,

Meuter, M. L., Bitner, M. J., Ostrom, A. L., and Brown, S. W. (2005). Choosing among alternative service delivery modes: An investigation of customer trial of self-service technologies. *Journal of Marketing, 69*(2), 61-83.

Meuter, M. L., Ostrom, A. L., Bitner, M. J., and Roundtree, R. (2003). The influence of technology anxiety on consumer use and experiences with self-service technologies. *Journal of Business Research*, *56*(11), 899-906.

Meuter, M. L., Ostrom, A. L., Roundtree, R., and Bitner, M. J. (2000). Self-service technologies: Understanding customer satisfaction with technology-based service encounters. *Journal of Marketing*, *64*(3), 50-64.

Migdadi, Y. K. A. (2012). The developing economies' banks branches operational strategy in the era of e-banking: The case of Jordan. *Journal of Emerging Technologies in Web Intelligence*, *4*(2), 189-197.

Miles, J. and Shevlin, M. (2007). A time and a place for incremental fit indices. *Personality and Individual Differences*, *42*(5), 869-874.

Miles, M. B. and Huberman, A. M. (1994). *Qualitative data analysis: An expanded sourcebook*. Thousand Oaks: Sage Publications Ltd.

Miller, R., Acton, C., Fullerton, D., and Maltby, J. (2002). *SPSS for social scientists: Cover versions 9, 10 and 11*. New York: Palgrave Macmillan.

Mingers, J. (2001). Combining IS research methods: Towards a pluralist   methodology. *Information Systems Research, 12*(3), 240-259.

Mingers, J. (2003). The paucity of multi-method research: A review of the information systems literature. *Information Systems Journal*, *13*, 233-249.

Mishra, V. and Bisht, S. (2013). Mobile banking in a developing economy: A customer-centric model for policy formulation. *Telecommunications Policy*, *37*(6), 503-514.

Mohd Suki, N., & Mohd Suki, N. (2017). Flight ticket booking app on mobile devices: Examining the determinants of individual intention to use. Journal Of Air Transport Management, 62, 146-154. http://dx.doi.org/10.1016/j.jairtraman.2017.04.003

Mols, N. P. (1998). The behavioral consequences of PC banking. *International Journal of Bank Marketing*, *16*(5), 195-201.

Mols, N. P. (2000). The Internet and services marketing - the case of Danish retail banking. *Internet Research*, *10*(1), 7-18.

Mols, N. P., Bukh, P. N., and Nielsen, J. F. (1999). Distribution channel strategies in Danish retail banking. *International Journal of Retail and Distribution Management*, *27*(1), 37-47.

Moon, J. W. and Kim, Y. G. (2001). Extending the TAM for a World-Wide-Web context. *Information & Management*, *38*(4), 217-230.

Moore, G. C. and Benbasat, I. (1991). Development of an instrument to measure the perceptions of adopting an information technology innovation. *Information Systems Research*, *2*(3), 192-222.

Morris Jr, R. F., Jones-Farmer, L. A., and Rainer Jr, R. K. (2009). An assessment of the mathematics information processing scale: A potential instrument for extending technology education research. In *Proceedings of the Southern Association for Information Systems Conference.* 12th-14th March, Charleston, South Carolina, USA. Sage Publication Ltd.

Morris, M. G., Venkatesh, V., and Ackerman, P. L. (2005). Gender and age differences in employee decisions about new technology: An extension to the theory of planned behavior. *IEEE Transactions on Engineering Management*, *52*(1), 69- 84.

Mouawad, M. and Kleiner, B. (1996). New developments in customer service   training. *Managing Service Quality*, *6*(2), 49-56.

Moutinho, L. and Smith, A. (2000). Modelling bank customers' satisfaction through mediation of attitudes towards human and automated banking. *International Journal of Bank Marketing*, *18*(3), 124-134.

Muñoz-Leiva, F., Climent-Climent, S., & Liébana-Cabanillas, F. (2017). Determinants of intention to use the mobile banking apps: An extension of the classic TAM model. Spanish Journal Of Marketing - ESIC, 21(1), 25-38. http://dx.doi.org/10.1016/j.sjme.2016.12.001

Muthén, B. and Asparouhov, T. (2002). Latent variable analysis with categorical outcomes: Multiple-group and growth modeling in Mplus. *Mplus Web Notes*, *4*(5), 1-22.

Myers, M. D. (1997). Qualitative research in information systems. *Management Information Systems Quarterly*, *21*(2), 241-242.

Myers, M. D. and Avison, D. (2002). *An introduction to qualitative research in information systems.* California, USA: Sage Publications Ltd.

Nasirin, S. and Papazafeiropoulou, A. (2009). E-Government initiatives in the developing world: Challenges and opportunities. *Information Technology for Development 15*(3), 149-150.

Natarajan, T., Balasubramanian, S., & Kasilingam, D. (2018). The moderating role of device type and age of users on the intention to use mobile shopping applications. Technology In Society. http://dx.doi.org/10.1016/j.techsoc.2018.01.003

Ndubisi, N. O. and Sinti, Q. (2006). Consumer attitudes, system's characteristics and Internet banking adoption in Malaysia. *Management Research News*. *29*(1/2), 16-27.

Neuman, W. L. (1997). *Social research methods: Qualitative and quantitative approaches*. Boston, MA: Allyn and Bacon.

Nilsson, D. (2007). A cross-cultural comparison of self-service technology use. *European Journal of Marketing*, *41*(3/4), 367-381.

Nor, K. M. and Pearson, J. M. (2008). An exploratory study into the adoption of internet banking in a developing country: Malaysia. *Journal of Internet Commerce*, *7*(1),

29-73.

Nor, K., Shanab, E., and Pearson, J. (2008). Internet banking acceptance in Malaysia based on the theory of reasoned action. *Journal of Information Systems and Technology Management*, *5*(1), 03-14.

Nunnally, J. C. (1978). *Psychometric theory*. New York, NY: McGraw-Hill.

Oliver, R. L., and Bearden, W. O. (1985). Crossover effects in the theory of reasoned action: A moderating influence attempt. *Journal of Consumer Research*, *12*(3), 324-340.

Oni, O. and Papazafeiropoulou, A. (2012). Diverse views on IT innovation diffusion among SMEs: Influencing factors of broadband adoption. *Information Systems Frontiers*, *16*(4), 729-747.

Oppenheim, A. N. (1992). *Questionnaire design, interviewing and attitude measurement*. London: Pinter Publishers.

Orlikowski, W. and Baroudi, J. J. (1991). Studying information technology in organizations: research approaches and assumptions. *Information Systems Research*, *2*(1), 1-28.

Oyedele, A. and Simpson, P. M. (2007). An empirical investigation of consumer control factors on intention to use self-service technologies. *International Journal of Service Industry Management*, *18*(3), 287-306.

Pantano, E. and Viassone, M. (2014). Demand pull and technology push perspective in technology-based innovations for the points of sale: The retailers' evaluation. *Journal of Retailing and Consumer Services, 21*(1), 43-47.

Papazafeiropoulou, A. and Pouloudi, A. (2000). The Government's role in improving electronic commerce adoption. In *Proceedings of 8th European Conference on Information Systems ECIS*, 3rd-5th July 2000, Vienna, Austria.

Papazafeiropoulou, A., Pouloudi, A., and Poulymenakou, A. (2002). Electronic commerce competitiveness in the public sector: The importance of stakeholder involvement. *International Journal of Services Technology and Management*, *3*(1), 82-95.

Parasuraman, A. (2000). Technology Readiness Index (TRI): A multiple-item scale to measure readiness to embrace new technologies. *Journal of Service Research*, *2*(4), 307-320.

Paris, C. M., Lee, W., and Seery, P. (2010). The role of social media in promoting special events: Acceptance of Facebook events. *Information and Communication Technologies in Tourism, 14*, 531-541.

Park, J., Yang, S., and Lehto, X. (2007). Adoption of mobile technologies for Chinese consumers. *Journal of Electronic Commerce Research*, *8*(3), 196-206.

Pavlou, P. A. (2001). Integrating trust in electronic commerce with the technology acceptance model: Model development and validation. In J. DeGross (Ed.), *Proceedings of the Seventh Americas Conference in Information Systems,* (pp. 816-822). New York: ACM.

Pavlou, P. A. (2006). Consumer acceptance of electronic commerce: Integrating trust and risk with the technology acceptance model. *International Journal of Electronic Commerce*, *7*(3), 101-134.

Pew Research 2013. (2013). *Pew Research Centre: Internet, Science & Tech*. Retrieved 1 October 2017, from http://www.pewinternet.org/2013/09/16/cell-internet-use-2013/

Phillips, E. M. & Pugh, D. S. (2000) How to get a PhD: a handbook for students and their supervisors, Open University Press, 325 Chestnut Street, Philadelphia, PA 19106.

Pikkarainen, T., Pikkarainen, K., and Karjaluoto, H. (2004). Customer acceptance of online banking: an extension of the technology acceptance model. *Internet Research*, *14*(3), 224-235.

Plouffe, C. R., Hulland, J. S., and Vandenbosch, M. (2001). Research report: Richness versus parsimony in modelling technology adoption decisions - understanding merchant adoption of a smart card-based payment system. *Information Systems Research, 12*(2), 208-222.

Podsakoff, P. M., MacKenzie, S. B., Lee, J. Y., and Podsakoff, N. P. (2003). Common method biases in behavioral research: A critical review of the literature and recommended remedies. *Journal of Applied Psychology*, *88*(5), 879.

Polonsky, M. J. and Waller, D. S. (2005). *Designing and managing a research project: A business student's guide*. Thousand Oaks, CA: Sage Publications Ltd.

Poon, W. C. (2008). Users' adoption of e-banking services: The Malaysian perspective. *Journal of Business & Industrial Marketing*, 23(1), 59-69.

Porter, C. E. and Donthu, N. (2006). Using the technology acceptance model to explain how attitudes determine Internet usage: The role of perceived access barriers and demographics. *Journal of Business Research*, *59*(9), 999-1007.

Preston, C. C. and Colman, A. M. (2000). Optimal number of response categories in rating scales: Reliability, validity, discriminating power, and respondent preferences. *Acta Psychologica*, *104*(1), 1-15.

Proença, J. and Rodrigues, M. A. (2011). A comparison of users and non-users of banking self-service technology in Portugal. *Managing Service Quality, 21*(2), 192-210.

Proença, J. F. and Silva, M. (2007). Banking relationships and Internet banking. *International Journal on WWW/Internet*, *5*(2), 181-192.

Pujari, D. (2004). Self-service with a smile? Self-service technology (SST) encounters among Canadian business-to-business. *International Journal of Service Industry Management*, *15*(2), 200-219.

Purwanegara, M., Apriningsih, A., and Andika, F. (2014). Snapshot on Indonesia regulations in Mobile Internet banking users' attitudes. *Procedia-Social and Behavioral Sciences*, *115*, 147-155.

Püschel, J., Mazzon, J. A., and Hernandez, J. M. C. (2010). Mobile banking: Proposition of an integrated adoption intention framework. *International Journal of Bank Marketing*, *28*(5), 389-409.

Ram, S. (1987). A model of innovation resistance. *Advances in Consumer Research*, *14*(1), 208-212.

Ramayah, T. and Ling, K. P. (2002). An exploratory study of Internet banking in Malaysia. In *The Proceedings of the Third International Conference on Management of Innovation and Technology,* 25th-27th October, Hangzhou City, China.

Ramsay, J. and Smith, M. (1999). Managing customer channel usage in the Australian banking sector. *International Journal of Bank Marketing*, *14*(7), 329-338.

Rana, N. P., Dwivedi, Y. K., and Williams, M. D. (2013). Evaluating alternative theoretical models for examining citizen centric adoption of e-government. *Transforming Government: People, Process and Policy*, *7*(1), 27-49.

Rana, N. P., Williams, M. D., and Dwivedi, Y. K. (2012). Evaluating suitability of alternative theoretical paradigm for examining citizen adoption of e-government. In *Proceedings of tGov Workshop*, 8th-9th May, Brunel University, London, United Kingdom.

Reinders, M. J., Dabholkar, P. A., and Frambach, R. T. (2008). Consequences of forcing consumers to use technology-based self-service. *Journal of Service Research*, *11*(2), 107-123.

Rehman, M., Esichaikul, V., & Kamal, M. (2012). Factors influencing e-government adoption in Pakistan. *Transforming Government: People, Process And Policy*, *6*(3), 258-282. http://dx.doi.org/10.1108/17506161211251263

Remenyi, D., Williams, B., Money, A., and Swartz, E. (1998). *Doing research in business and management: An introduction to process and method*. London: Sage Publications Ltd.

Rexha, N., John, R. P., and Shang, A. S. (2003). The impact of the relational plan on adoption of electric banking. *Journal of Services Marketing*, *17*(1), 53-67.

Reynolds, N. and Diamantopoulos, A. (1998). The effect of pretest method on error detection rates. *European Journal of Marketing, 32*(5/6), 480-498.

Ribbink, D., Van Riel, A. C., Liljander, V., and Streukens, S. (2004). Comfort your online customer: Quality, trust and loyalty on the Internet. *Managing Service Quality*, *14*(6), 446-456.

Riffai, M. M. M. A., Grant, K., and Edgar, D. (2012). Big TAM in Oman: Exploring the promise of on-line banking, its adoption by customers and the challenges of banking in Oman. *International Journal of Information Management*, *32*(3), 239-250.

Riivari, J. (2005). Mobile banking: A powerful new marketing and CRM tool for financial service companies all over Europe. *Journal of Financial Services Marketing*, *10*(1), 11-20.

Riquelme, H. E. and Rios, R. E. (2010). The moderating effect of gender in the adoption of Mobile banking. *International Journal of Bank Marketing*, *28*(5), 328-341.

Robertson, N. (2012). Self-service technology complaint channel choice: Exploring consumers' motives. *Managing Service Quality*, *22*(2), 145-164.

Robertson, N., McQuilken, L., and Kandampully, J. (2012). Consumer complaints and recovery through guaranteeing self-service technology. *Journal of Consumer Behavior*, *11*(1), 21-30.

Robson, C. (2002). *Real World Research*. (2nd Ed.). Oxford, UK: Blackwell.

Rod, M., Ashill, N. J., Shao, J., and Carruthers, J. (2009). An examination of the relationship between service quality dimensions, overall internet banking service quality and customer satisfaction: A New Zealand study. *Marketing Intelligence & Planning*, *27*(1), 103-126.

Rogers, E. M. (1976). New product adoption and diffusion. *Journal of Consumer Research*, *2*(4), 290-301.

Rogers, E. M. (1983). *Diffusion of innovations* (3rd Ed.). New York, NY: Free Press.

Rogers, E. M. (2003). *Diffusion of innovations* (5th Ed.). New York, NY: Free Press.

Roggeveen, A. L., Tsiros, M., and Grewal, D. (2012). Understanding the co-creation effect: When does collaborating with customers provide a lift to service recovery?. *Journal of Academy of Marketing Science, 40*(6), 771-790.

Rotchanakitumnuai, S. and Speece, M. (2003). Barriers to internet banking adoption: A qualitative study among corporate customers in Thailand. *International Journal of Bank Marketing*, *21*(6/7), 312-323.

Rudestam, K. E., &Newton, R. R. (2001). *Surviving your dissertation: A comprehensive guide to content and process*. (2nd Ed.). Thousand Oaks, Calefornia: sage.

Rowley, J. (2003). Using case studies in research. *Management Research News*, *25*(1).

Salhieh, L., Abu-Doleh, J., and Hijazi, N. (2011). The assessment of e-banking readiness in Jordan. *International Journal of Islamic and Middle Eastern Finance and Management*, *4*(4), 325-342.

Salomann, H., Kolbe, L., and Brenner, W. (2006). Self-services in customer relationships: Balancing high-tech and high-touch today and tomorrow. *E- Service Journal*, *4*(2), 65-84.

San Martín, S. and Camarero, C. (2009). How perceived risk affects online buying. *Online Information Review*, *33*(4), 629-654.

Santos, J. (2003). E-service quality: A model of virtual service quality dimensions. *Managing Service Quality*, *13*(3), 233-246.

SarayNews (2011). *1103 electronic crimes have occurred in Jordan during 11   months.* Available from: http://www.saraynews.com/index. Accessed: 14.12.12.

Sarrab, M., Elbasir, M., & Alnaeli, S. (2016). Towards a quality model of technical aspects for mobile learning services: An empirical investigation. Computers In Human Behavior, 55, 100-112. http://dx.doi.org/10.1016/j.chb.2015.09.003

Sathye, M. (1999). Adoption of Internet banking by Australian consumers: an empirical investigation. *International Journal of Bank Marketing*, *17*(7), 324-334.

Saunders, M., Lewis, P., and Thornhill, A. (2003). *Research methods for business students*. (3rd Ed.). Harlow: Prentice Hall.

Safeena, R., Date, H., Kammani, A., & Hundewale, N. (2012). Technology Adoption and Indian Consumers: Study on Mobile Banking. *International Journal of Computer Theory And Engineering*, 1020-1024. http://dx.doi.org/10.7763/ijcte.2012.v4.630

Saunders, M., Lewis, P., &Thornhill, A. (2009). Understanding research philosophies and approaches. In *Research methods for business students.* (5th Ed.). (pp. 106-136). Edinburgh, UK: Pearson Education Limited.

Schaupp, L. C., Carter, L., and McBride, M. E. (2010). E-file adoption: A study of US taxpayers' intentions. *Computers in Human Behavior*, *26*(4), 636-644.

Schepers, J. and Wetzels, M. (2007). A meta-analysis of the technology acceptance model: Investigating subjective norm and moderation effects. *Information & Management*, *44*(1), 90-103.

Schultze, U. (2003). Complementing self-serve technology with service relationships: The customer perspective. *E-service Journal*, *3*(1), 7-31.

Schwarz, A. and Chin, W. (2007). Looking forward: Toward an understanding of the nature and definition of IT acceptance. *Journal of the Association for Information Systems*, *8*(4), 230-243.

Segun J., Teresa G. Rivas M. (2011) mobile banking in economic experiments. *Behavioral and Experimental Economics*. Vol. 70, extra 1, 99-111. ISSN: 0034-9712; eISSN: 1988-429X. DOI 10.3989/ris.2011.04.19

Sekaran, U. (2010) *Research methods for business, A skill-building approach*. (5th Ed.). York: John Wiley & Sons.

Sekaran, U. (2003). *Research methods for business: A skill-building approach*. 4th Ed.). John Wiley & Sons.

Selnes, F. and Hansen, H. (2001). The potential hazard of self-service in developing customer loyalty. *Journal of Service Research*, *4*(2), 79-90.

Shamdasani, P., Mukherjee, A., and Malhotra, N. (2008). Antecedents and consequences of service quality in consumer evaluation of self-service internet technologies. *The Service Industries Journal*, *28*(1), 117-138.

Shammot, M. M. and Al-Shaikh, M. S. (2008). Adoption of mobile banking services in Jordan. *Humanities and Management Sciences*. *9*(2), 253-267.

Shareef, M. A., Archer, N., and Dwivedi, Y. K. (2012). Examining adoption behavior of Mobile Government. *Journal of Computer Information Systems*, *53*(2), 39-49.

Shareef, M. A., Dwivedi, Y. K. Stamati, T., and Williams, M. D. (2014). SQ mGov: A comprehensive service-quality paradigm for Mobile government. *Information Systems Management*, *31*(2), 126-142.

Shareef, M. A., Kumar, V. Kumar, U., and Dwivedi, Y. K. (2011). E-Government adoption model (GAM): Differing service maturity levels. *Government Information Quarterly*, *28*(1), 17-35.

Shaikh, A., & Karjaluoto, H. (2015). Mobile banking adoption: A literature review. *Telematics And Informatics*, *32*(1), 129-142. http://dx.doi.org/10.1016/j.tele.2014.05.003

Sheng, M. L., Hsu, C. L., and Wu, C. C. (2011). The asymmetric effect of online social networking attribute-level performance. *Industrial Management & Data Systems*, *111*(7), 1065-1086.

Sheppard, B. H., Hartwick, J., and Warshaw, P. R. (1988). The theory of reasoned action: A meta-analysis of past research with recommendations for modifications and future research. *Journal of Consumer Research*, *15*(3), 325- 343.

Sheth, J. N. (1981). Psychology of innovation resistance: The less developed concept (LDC) in diffusion research. *Research in Marketing, 4*(3), 273-282.

Sheth, J. N., Newman, B. I., and Gross, B. L. (1991). Why we buy what we buy: A theory of consumption values. *Journal of Business Research*, *22*(2), 159-170.

Shih, D. H., Chen, I. C., and Hu, S. C. (2009). A study of the adoption of self-service technologies by consumers in convenience stores. In *Proceedings of the 11th International Conference on Advanced Communication Technology, ICACT,* 15th -18th February 2009, Phoenix Park, Dublin, Ireland. IEEE.

Shih, Y. and Fang, K. (2004). The use of a decomposed theory of planned behaviour to study internet banking in Taiwan. *Internet Research*, *14*(3), 213-223.

Shih, Y. and Fang, K. (2006). Effects of network quality attributes on customer adoption intentions of internet banking. *Total Quality Management*, *17*(1), 61- 77.

Simintiras, A. C., Dwivedi, Y. K., and Rana, N. P. (2014). Can marketing strategies enhance the adoption of electronic government initiatives?. *International Journal of Electronic Government Research (IJEGR)*, *10*(2), 1-7.

Simon, F. and Usunier, J. C. (2007). Cognitive, demographic and situational determinants of service customer preference for personnel in-contact over self- service technology. *International Journal of Research in Marketing*, *24*(2), 163- 173.

Singh, A. B. (2012). Mobile banking based money order for India Post: Feasible m o d e l and assessing demand potential. *Procedia-Social and Behavioral Sciences*, *37*, 466-481

Slade, E., Williams, M. D. Dwivedi, Y. and Piercy, N. (2014). Exploring consumer adoption of proximity mobile payments. Forthcoming in *Journal of Strategic Marketing*. Doi:10.1080/0965254X.2014.914075.

Sparks, P. and Shepherd, R. (1992). Self-identify and the theory of planned behaviour: Assessing the role of identification with 'green consumerism'. *Social Psychology Quarterly*, *55*(4), 388-399.

Sparks, P., Shepherd, R., and Frewer, L. J. (1995). Assessing and structuring attitudes toward the use of gene technology in food production: The role of perceived ethical obligation. *Basic and Applied Social Psychology*, *16*(3), 267-285.

Srijumpa, R., Speece, M., and Paul, H. (2002). Satisfaction drivers for internet service technology among stock brokerage customers in Thailand. *Journal of Financial Services Marketing*, *6*(3), 240-253.

Standard Chartered Jordan. (2014). *Phone banking*. Available from: https://www.sc.com/ jo/personal-banking/services/phone-banking/en/. Accessed: 15.04.14.

Stockdale, R. (2007). Managing customer relationships in the self-service environment of e-tourism. *Journal of Vacation Marketing*, *13*(3), 205-219.

Stone, E. F. (1978). *Research methods in organizational behavior*. Goodyear, Santa Monica, CA: Goodyear.

Straub, D. W. (1989). Validating instruments in MIS research. *MIS Quarterly*, *13*(2), 147-169.

Straub, D. W., Gefen, D., and Boudreau, M-C. (2005). *Quantitative research. Research in information systems: A handbook for research supervisors and their students, 1*. Amsterdam: Elsevier.

Straub, D., Boudreau, M. C., and Gefen, D. (2004). Validation guidelines for IS positivist research. *The Communications of the Association for Information Systems*, *13*(1), 63.

Suh, B. and Han, I. (2002). Effect of trust on customer acceptance of Internet banking. *Electronic Commerce Research and Applications*, *1*(3/4), 247-263.

Sun, H. and Zhang, P. (2006). The role of moderating factors in user technology acceptance. *International Journal of Human-Computer Studies*, *64*(2), 53-78.

Sundarraj, R. P. and Wu, J. (2005). Using information-systems constructs to study online- and telephone-banking technologies. *Electronic Commerce Research and Applications*, *4*(4), 427-443.

Suoranta, M. and Mattila, M. (2004). Mobile banking and consumer behaviour: New insights into the diffusion pattern. *Journal of Financial Services Marketing, 8*(4), 354-366.

Surjadjaja, H., Ghosh, S., and Antony, J. (2003). Determining and assessing the determinants of e-service operations. *Managing Service Quality*, *13*(1), 39-53.

Surprenant, C. F. and Solomon, M. R. (1987). Predictability and personalization in the service encounter. *Journal of Marketing, 51*(2), 86-96.

Susanto, A., Lee, H., Zo, H., and Ciganek, A. P. (2013). User acceptance of Internet banking in Indonesia: Initial trust formation. *Information Development*, *29*(4), 309-322.

Svensson, G. (2006). New aspects of research into service encounters and service quality. *International Journal of Service Industry Management*, *17*(3), 245-257.

Sweeney, J. C. and Soutar, G. N. (2001). Consumer perceived value: The development of a multiple item scale. *Journal of Retailing*, *77*(2), 203-220.

Sweeney, J. C., Soutar, G. N., and Johnson, L. W. (1999). The role of perceived risk in the quality-value relationship: A study in an environment. *Journal of Services Retailing*, *75*(1), 77-105.

Tabachnick, B. G. and Fidell, L. S. (2001). *Using multivariate statistics*. (4th Ed.). Needham Heights, MA: Allyn and Bacon.

Tabachnick, B. G. and Fidell, L. S. (2007) *Using multivariate statistics*. (5th Ed.). Boston: Pearson Education.

Tabachnick, B., & Fidell, L. (2013). *Using multivariate statistics* (6th Ed.). California: Pearson.

Tan, M. and Teo, T. S. (2000). Factors influencing the adoption of Internet banking. *Journal of the Association for Information Systems*, *1*(5), 1-42.

Tan, S. J. (1999). Strategies for reducing consumers' risk aversion in Internet shopping. *Journal of Consumer Marketing, 16*(2), 163-180.

Tan, W. K. and Chen, S. K. (2008). Using self-service technologies (SST) in a retail setting: A study in Taiwan's convenience store context. In *Proceedings of IADIS multi- conference on computer science and information system,* 25th-27th July 2008, Amsterdam, Netherlands.

Taylor, D. G. and Strutton, D. (2010). Has e-marketing come of age? Modeling historical influences on post-adoption era internet consumer behaviors. *Journal of Business Research*, *63*(9), 950-956.

Taylor, S. and Todd, P. A. (1995a). Decomposition and crossover effects in the theory of planned behavior: A study of consumer adoption intentions. *International Journal of Research in Marketing*, *12*(2), 137-155.

Taylor, S. and Todd, P. A. (1995b). Understanding information technology usage: A test of competing models. *Information Systems Research*, *6*(2), 144-176.

Taylor, S. and Todd, P. A. (1995c). Assessing IT usage: The role of prior experience. *MIS Quarterly*, *19*, 561-570.

Teas, R. K. and Agarwal, S. (2000). The effects of extrinsic product cues on consumers' perceptions of quality, sacrifice, and value. *Journal of the Academy of Marketing Science*, *28*(2), 278-290.

Teo, T. S., Lim, V. K., and Lai, R. Y. (1999). Intrinsic and extrinsic motivation in internet usage. *Omega*, *27*(1), 25-37.

The Gulf Today. (2012). *Jordan's Internet users stand at 3.535 million: August 19, 2012.* Available from: http://gulftoday.ae/portal/cf77a112-4874-4abe-bba8-4265dc1aa8c9. aspx. Accessed: 08.01.14.

The Jordan Times. (2013). Mobile phone penetration projected to reach 200%. Available from: http://jordantimes.com/mobile-phone-penetration-projected-to- reach-200. Accessed: 25.12.13.

The Jordan Times. (2014). Cybercrime a growing threat to internet users in Jordan. Available from: http://jordantimes.com/cyber-crime-a-growing-threat-to- internet-users-in-jordan. Accessed: 16.06.14.

The World Bank. (2013). Literacy rate, adult total (% of people ages 15 and above). Available at: http://data.worldbank.org/indicator/SE.ADT.LITR.ZS. Accessed: 17.04.13.

The Gulf Today. (2012). *Mideast*. Retrieved 1 November 2015, from http://gulftoday.ae/portal/B6EF085D-6629-4C22-BDBD-A19A187413B5.aspx

Thompson, R., Compeau, D., and Higgins, C. (2006). Intentions to use information technologies: An integrative model. *Journal of Organizational and End User Computing*, *18*(3), 25-46.

Thompson, R., Higgins, C., and Howell, J. (1991). Personal computing: Toward a conceptual model of utilization. *MIS Quarterly*, *15*(1), 125-143.

Thompson, R., Higgins, C., and Howell, J. (1994). Influence of experience on personal computer utilization: Testing a conceptual model. *Journal of Management Information Systems*, *11*(1), 167-187.

Thornton, J. and White, L. (2001). Customer orientation and usage of financial distribution channels. *Journal of Services Marketing*, *15*(3), 168-185.

Tiwari, R, & Buse, S, 2007, "The mobile commerce prospects A strategic Analysis of opportunities in the Banking sector", *Institute of Technology & Innovation Management* Hamburg, Germany

Titah, R. and Barki, H. (2009). Nonlinearities between attitude and subjective norms in information technology acceptance: A negative synergy?. *Management Information Systems Quarterly*, *33*(4), 13.

Tornatzky, L. G. and Klein, K. J. (1982). Innovation characteristics and innovation adoption implementation: A meta-analysis of findings. *IEEE Transactions on Engineering Management*, *29*(1), 28-43.

Trc.gov.jo. (2015). The Telecommunications Regulatory Commission (TRC). [Online] Available at: http://www.trc.gov.jo [Accessed 9 Sep. 2015].

Triandis, H. C. (1977). *Interpersonal Behavior.* Monterey, CA: Brooks/Cole Publishing Company (p.329).

Triandis, H. C. (1980). Values, attitudes, and interpersonal behaviour. In H. E. Howeand M. M. Page (Eds.). *Nebraska Symposium on Motivation, 1979, 195-259.* Lincoln: University of Nebraska Press.

Tung, L. L. and Rieck, O. (2005). Adoption of electronic government services among business organizations in Singapore. *The Journal of Strategic Information Systems*, *14*(4), 417-440.

Turban, E., King, D., Viehland, D., and Lee, J. (2006). *Electronic commerce 2006: A management perspective*. New Jersey: Pearson Education.

Upadhyaya, S. (2002). Mobile computing. 1st ed. Boston: Kluwer Academic Publishers.

Vallerand, R. J. (1997). Toward a hierarchical model of intrinsic and extrinsic motivation. *Advances in Experimental Social Psychology*, *29*, 271-360.

Vallerand, R. J. (2000). Deci and Ryan's self-determination theory: A view from the hierarchical model of intrinsic and extrinsic motivation. *Psychological Inquiry*, *11*(4), 312-318.

Van der Heijden, H. (2004). User acceptance of hedonic information systems. *MIS Quarterly*, *28*(4), 695-704.

Van Raaij, E. M. and Schepers, J. J. (2008). The acceptance and use of a virtual learning environment in China. *Computersand Education*, *50*(3), 838-852.

Venkatesh, V. (1999). Creation of favorable user perceptions: Exploring the role of intrinsic motivation. *MIS Quarterly*, *23*(3), 239-260.

Venkatesh, V. (2000). Determinants of perceived ease of use: Integrating perceived behavioral control, computer anxiety and enjoyment into the technology acceptance model. *Information Systems Research, 11*(4), 342-365.

Venkatesh, V. and Davis, F. D. (2000). A theoretical extension of the technology acceptance model: Four longitudinal field studies. *Management Science*, *46*(2), 186-204.

Venkatesh, V. and Morris, M. G. (2000). Why don't men ever stop to ask for directions? Gender, social influence, and their role in technology acceptance and usage behaviour. *MIS Quarterly*, *24*(1), 115-140.

Venkatesh, V. and Speier, C. (1999). Computer technology training in the workplace: A longitudinal investigation of the effect of mood. *Organizational behavior and human decision processes*, *79*(1), 1-28.

Venkatesh, V., Davis, F., and Morris, M. (2007). Dead or alive? The development, trajectory and future of technology adoption research. *Journal of the Association for Information Systems, 8*(4), 267-286.

Venkatesh, V., Morris, M., Davis, G., and Davis, F. (2003). User acceptance of information technology: Toward a unified view. *MIS Quarterly*, *27*(3), 425-478.

Venkatesh, V., Thong, J. Y. L., and Xu, X. (2012). Consumer acceptance and use of information technology: Extending the unified theory of acceptance and use of technology. *MIS Quarterly*, *36*(1), 157-178.

Veríssimo, J. (2016). Enablers and restrictors of mobile banking app use: A fuzzy set qualitative comparative analysis (fsqca). *Journal of Business Research*, 69(11), 5456-5460. http://dx.doi.org/10.1016/j.jbusres.2016.04.155

Vishwanath, A. and Goldhaber, G. M. (2003). An examination of the factors contributing to adoption decisions among late-diffused technology products. *New Media & Society*, *5*(4), 547-572.

Walker, R. and Johnson, L. (2006). Why consumers use and do not use technology-enabled services. *Journal of Services Marketing*, *20*(2), 125-135.

Walker, R. H., Craig-Lees, M., Hecker, R., and Francis, H. (2002). Technology-enabled service delivery: an investigation of reasons affecting customer adoption and rejection. *International Journal of Service Industry Management*, *13*(1), 91-106.

Walsham, G. (1993). *Interpreting information systems in Organisations.* Chichester: Wiley.

Walsham, G. (1995). The emergence of interpretivism in IS research. *Information Systems Research*, *6*(4), 376-394.

Wan, G. H. and Che, P. (2004). Chinese air travelers' acceptance towards electronic ticketing. In *Proceedings of Engineering Management Conference,* (*1*, pp. 269-275), 18th-21st October 2004. IEEE.

Wan, W. W., Luk, C. L., and Chow, C. W. (2005). Customers' adoption of banking channels in Hong Kong. *International Journal of Bank Marketing*, *23*(3), 255-272.

Wang, M. C. H. (2012). Determinants and consequences of consumer satisfaction with self-service technology in a retail setting. *Managing Service Quality*, *22*(2), 128- 144.

Wang, Y. S. and Shih, Y. W. (2009). Why do people use information kiosks? A validation of the unified theory of acceptance and use of technology. *Government Information Quarterly, 26*, 158-165.

Wang, Y. S., Lin, H. H., and Luarn, P. (2006). Predicting consumer intention to use mobile service. *Information Systems Journal, 16*(2), 157-179.

Wang, Y. S., Wang, Y. M., Lin, H. H., and Tang, T. I. (2003). Determinants of user acceptance of internet banking: An empirical study. *International Journal of Service Industry Management*, *14*(5), 501-519.

Wang, Y., Lo, H. P., and Yang, Y. (2004). An integrated framework for service quality, customer value, satisfaction: Evidence from China's telecommunication industry. *Information Systems Frontiers*, *6*(4), 325-340.

Weijters, B., Rangarajan, D., Falk, T., and Schillewaert, N. (2007). Determinants and outcomes of customer's use of self-service technology in a retail setting. *Journal of Service Research*, *10*(1), 3-21.

Wessels, L. and Drennan, J. (2010). An investigation of consumer acceptance of M-banking. *International Journal of Bank Marketing, 28*(7), 547-568.

Wheaton, B., Muthen, B., Alwin, D., and Summers, G. F. (1977). Assessing reliability and stability in panel models. In D. Heise (Ed.), *Sociological methodology*. San Francisco, CA: Josey-Bass.

Williams, M. D. and Williams, J. (2007). A change management approach to evaluating ICT investment initiatives. *Journal of Enterprise Information Management, 20*(1), 32-50.

Williams, M. D., Slade, E., and Dwivedi, Y. K. (2014). Consumers' intentions to use e- readers. *Journal of Computer Information Systems, 54*(2), 66-76.

Williams, M. D., Dwivedi, Y. K., Lal, B., and Schwarz, A. (2009). Contemporary trends and issues in IT adoption and diffusion research. *Journal of Information Technology*, *24*(1), 1-10.

Wilson, A. (2006). *Marketing research: An integrated approach.* (2nd Ed.). Harlow, England: Pearson Education Ltd.

Wolfe, B. (1994). Organisational innovation: Review, critique and suggested research directions. *Journal of Management Studies*, *31*(3), 405-431.

Wong, K. T., Russo, S., and McDowall, J. (2013). Understanding early childhood student teachers' acceptance and use of interactive whiteboard. *Campus-Wide Information Systems*, *30*(1), 4-16.

Wu, J. H. and Wang, S. C. (2005). What drives Mobile commerce? An empirical evaluation of the revised technology acceptance model. *Information & Management*, *42*(5), 719-729.

Xu, D. J., Benbasat, I., Cenfetelli, R. T., and Vancouver, B. C. (2009). The effect of perceived service quality, perceived sacrifice and perceived service outcome on online customer loyalty. In *Proceedings of the Thirteenth European Conference on Information Systems,* 2009 Phoenix, Arizona, USA, AIS Electronic Library, Paper 175.

Xue, M., Hitt, L. M., and Chen, P. Y. (2011). Determinants and outcomes of Internet banking adoption. *Management Science*, *57*(2), 291-307.

Xue, M., Hitt, L. M., and Harker, P. T. (2007). Customer efficiency, channel use and firm performance in retail banking. *Manufacturing & Service Operations Management*, *9*(4) 535-558.

Yang, A, S. (2009). Exploring adoption difficulties in mobile banking services. *Canadian Journal of Administrative Sciences, 26*(2), 136-149.

Yang, J. and Klassen, K. J. (2008). How financial markets reflect the benefits of self-service technologies. *Journal of Enterprise Information Management*, *21*(5), 448-467.

Yang, K. (2010). Determinants of US consumer Mobile shopping services adoption: Implications for designing mobile shopping services. *Journal of Consumer Marketing*, *27*(3), 262-270.

Yen, R. and Gwinner, K. P. (2003). Internet retail customer loyalty: The mediating role of relational benefits. *International Journal of Service Industry Management*, *14*(5), 483-500.

YenYuen, Y. and Yeow, P. H. (2009). User acceptance of internet banking service in Malaysia. In *Web information systems and technologies* (pp.295-306). Berlin & Heidelberg: Springer.

Yeow, P. H., Yuen, Y. Y., Tong, D. Y. K., and Lim, N. (2008). User acceptance of online banking service in Australia. *Communications of the IBIMA*, *1*(22), 191-197.

Yin, R. (2009). *Case study research: Design and methods*. (4th Ed.). London: Sage Publications Ltd.

Yiu, C. S., Grant, K., and Edgar, D. (2007). Factors affecting the adoption of Internet banking in Hong Kong - implications for the banking sector. *International Journal of Information Management*, *27*(5), 336-351.

Yoon, C. (2010). Antecedents of customer satisfaction with online banking in China: The effects of experience. *Computers in Human Behavior, 26*(6), 1296-1304.

Yousafzai, S. Y., Foxall, G., and Pallister, J. G. (2010). Explaining Internet banking behavior: Theory of reasoned action, theory of planned behavior, or technology acceptance model. *Journal of Applied Social Psychology*, *40*(5), 1172-1202.

Yousafzai, S. Y., Pallister, J. G., and Foxall, G. R. (2005). Strategies for building and communicating trust in electronic banking: A field experiment. *Psychology and Marketing*, *22*(2), 181-201.

Yousafzai, S. Y., Pallister, J. G., and Foxall, G. R. (2009). Multi-dimensional role of trust in Internet banking adoption. *The Service Industries Journal*, *29*(5/6), 591-605.

Yu, C. S. (2012). Factors affecting individuals to adopt Mobile banking: Empirical evidence from the UTAUT model. *Journal of Electronic Commerce Research*, *13*(2), 104-121.

Yuan, S., Liu, Y., Yao, R., and Liu, J. (2014). An investigation of users' continuance intention towards Mobile banking in China. *Information Development*. *1-5*. Doi:10.1177/ 0266666914522140.

Zeithaml, V. A., Bitner, M. J., and Gremler, D. D. (2009). *Services marketing: Integrating customer focus across the firm.* (5th Ed.). New York, NY: McGraw- Hill.

Zeithaml, V. A., Parasuraman, A., and Malhotra, A. (2002). Service quality delivery through websites: A critical review of extant knowledge. *Journal of the Academy of Marketing Science*, *30*(4), 362-376.

Zeithaml, V. and Bitner, M. (2000). *Services marketing: Integrating customer focus across the firm.* (2nd Ed.). New York, NY: McGraw-Hill.

Zhao, X., Mattila, M., and Tao. L. (2008). The role of post-training self-efficacy in customers' use of self-service technologies. *International Journal of Service Industry Management*, *19*(4), 492-505.

Zhou, T. (2011). An empirical examination of initial trust in Mobile banking. *Internet Research*, *21*(5), 527-540.

Zhou, T. (2012). Understanding users' initial trust in Mobile banking: An elaboration likelihood perspective. *Computers in Human Behavior*, *28*(4), 1518-1525.

Zhou, T., Lu, Y., and Wang, B. (2010). Integrating TTF and UTAUT to explain Mobile banking user adoption. *Computers in Human Behavior*, *26*(4), 760-767.

Zhu, F. X., Wymer Jr., W., and Chen, I. (2002). IT-based services and service quality in consumer banking. *International Journal of Service Industry Management*, *13*(1), 69-90.

Zhu, Y. Q. and Chen, H. G. (2012). Service fairness and customer satisfaction in Internet banking: Exploring the mediating effects of trust and customer value. *Internet Research, 22*(4), 482-498.

Zhu, Z., Nakata, C., Sivakumar, K., and Grewal, P. (2013). Fix it or leave it? Customer recovery from self-service technology failure. *Journal of Retailing*, *89*(1), 15-29.

Zhu, Z., Nakata. C., Sivakumar, K., and Grewal, D. (2007). Self-service technology effectiveness: The role of design features and individual traits. *Journal of the Academy of Marketing Science*, *35*(4), 492-506.

Zikmund, W. G. (2000). *Business research methods*. (6th Ed.). Chicago, IL: The Dryden Press.

Zikmund, W. G. (2003). *Exploring marketing research*. Cincinnati, Ohio: Thomson/South-Western.

Zurek B., Chatham, B., Porth, M., Child, M., and Nakashima, T. (2001). *Making self-service pay off*. Cambridge, MA: Forrester Research Report.

Zhang, J., Zhang, H., Ordóñez de Pablos, P., & Sun, Y. (2014). Challenges and Foresights of Global Virtual Worlds Markets. *Journal of Global Information Technology Management*, 17(2), 69-73. http://dx.doi.org/10.1080/1097198x.2014.928559

Zhou, T., Lu, Y., and Wang, B. (2010). Integrating TTF and UTAUT to explain Mobile banking user adoption. *Computers in Human Behavior*, 26(4), 760-767.

Zhou, T. (2012). Understanding users' initial trust in mobile banking: An elaboration likelihood perspective. *Computers In Human Behavior*, *28*(4), 1518-1525. http://dx.doi.org/10.1016/j.chb.2012.03.021

Appendices

Appendix A.1: Mobile banking electronic questionnaire (English version)

E-Survey: Mobile banking apps in Jordan (2016)

Page 1: Page1

Dear all, your corporation is highly appreciated and will contribute to the success of this study. The questionnaire will only take 10-15 minutes of your time to fill out, please if you have any questions or concerns contact me: jawdat00962@yahoo.com

Please note: Participation in this survey is entirely anonymous and voluntary. No personal information is required and your privacy is completely protected, thank you.

Do you use the mobile app for banking?? If your answer is NO, thank you for your time, you can stop now. If your answer is YES, please proceed to the second question.

○ Yes

○ No

Part A: DEMOGRAPHIC INFORMATION Please answer the following questions by selecting the appropriate answer from the options provided.

Gender:

- ○ Male

- ○ Female

Age:

- ○ 18-24
- ○ 25-34
- ○ 35-44
- ○ 45-54
- ○ 55-64
- ○ 65 or older

Marital status:

- ○ Single
- ○ Married
- ○ In relationship
- ○ divorced

Education level:

- ○ No schooling completed
- ○ Primary school
- ○ Secondary school
- ○ Undergraduate
- ○ Postgraduate
- ○ Doctorate

Ocupation:

- ○ A student
- ○ Employed
- ○ Unemployed
- ○ Retired
- ○ Self-employed

Part B: Actual use of mobile Banking

Which mobile device do you use to access mobile banking app?

- ○ Smartphone
- ○ tablet

How frequent is your use of mobile banking?

- ○ Never
- ○ Not very frequent
- ○ Slightly frequent
- ○ Frequent
- ○ Very frequent

How often do you use mobile banking?

- ○ Never
- ○ Rarely
- ○ Monthly
- ○ Weekly
- ○ Daily

How many times do you use mobile banking in a week?

- ○ Not at all
- ○ once a week
- ○ 2-3 times
- ○ More than 3 times

What is the size of the screen of your mobile device?

○ Large

○ small

Part C: In this Part, your views on mobile banking are required. Please use the number ranking in the table below to provide your feedback on the statements thereafter

Using a rating scale of 1 to 5, please tick the option that indicates your level of disagreement/agreement with the following statements:

Please don't select more than 1 answer(s) per row.

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
I think using M-banking app saves me time.	☐	☐	☐	☐	☐
I think M-banking app is useful.	☐	☐	☐	☐	☐
M-banking app enables me to easily obtain the information I need.	☐	☐	☐	☐	☐
M-banking app enhances the way I conduct my financial transactions.	☐	☐	☐	☐	☐
I will improve monitoring of my savings using M-banking app.	☐	☐	☐	☐	☐

M- Banking app enables me to easily obtain any information I need about my bank account.	☐	☐	☐	☐	☐
I think learning to use M-banking app is easy.	☐	☐	☐	☐	☐
I think interaction with M-banking app does not require a lot of mental effort.	☐	☐	☐	☐	☐
I find M-banking app easy to use.	☐	☐	☐	☐	☐
I think it is easy for me to be skilled person at using M-banking app.	☐	☐	☐	☐	☐
People who have influence on my behaviour think that I should use the M-banking app.	☐	☐	☐	☐	☐
I use M-banking app because people who are important to me already used it.	☐	☐	☐	☐	☐

My friends and family value the use of M-banking app.	☐	☐	☐	☐	☐
I find using of M-banking app fashionable.	☐	☐	☐	☐	☐
I think the use of M-banking app gives me distinct status.	☐	☐	☐	☐	☐
A disruption of the usage of the mobile data probably happens at any time.	☐	☐	☐	☐	☐
The use of mobile data packets is costly.	☐	☐	☐	☐	☐
The mobiles' battery life is too short.	☐	☐	☐	☐	☐
The mobile storage capacity is small.	☐	☐	☐	☐	☐
The mobile device may contain private and personal data.	☐	☐	☐	☐	☐
The mobile device maybe exposure to lose or theft.	☐	☐	☐	☐	☐

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I find the process of completion of the task on M- banking app needs a few clicks (screen touches).	☐	☐	☐	☐	☐
The app of M-banking suffers from unexpected shutdown problems.	☐	☐	☐	☐	☐
I think the availability of the access to M-banking app is 24/7.	☐	☐	☐	☐	☐
M-banking app looks simple to navigate.	☐	☐	☐	☐	☐
M-banking app loads quickly.	☐	☐	☐	☐	☐
The content of the M-banking app is useful.	☐	☐	☐	☐	☐
The content of the M-banking app is clear.	☐	☐	☐	☐	☐
M-banking app updates regularly.	☐	☐	☐	☐	☐
The M-banking app looks attractive.	☐	☐	☐	☐	☐

The M-banking app looks organized.	☐	☐	☐	☐	☐
The M-banking app adapts automatically with the screen size of the mobile.	☐	☐	☐	☐	☐
The M-banking app uses suitable colours.	☐	☐	☐	☐	☐
On the M-banking app, I can find guidelines about customer policies such as privacy and disputes.	☐	☐	☐	☐	☐
I think that M-banking app has sufficient security features.	☐	☐	☐	☐	☐
I would not feel secure by passing my sensitive information via the app of M-banking.	☐	☐	☐	☐	☐
I believe my bank information is well secured by the provider of M-banking app.	☐	☐	☐	☐	☐

I think M-banking provider checks all Communications between the app and me for protection from hacking or eavesdropping.	☐	☐	☐	☐	☐
Only authorized users are able to access to secret information on M-banking app.	☐	☐	☐	☐	☐
M-banking app ascertains the identity of user every single login.	☐	☐	☐	☐	☐
The reports and news about M-banking fraud worry me about the security of M-banking.	☐	☐	☐	☐	☐
I am unsure that transactions on M-banking app will take place as I expect.	☐	☐	☐	☐	☐
I fear that apps of M-banking technology are not reliable.	☐	☐	☐	☐	☐

I am worried the M-banking app cannot verify the actual completion of the transaction.	☐	☐	☐	☐	☐
find it risky to do large amount of money transactions on M-banking app.	☐	☐	☐	☐	☐
I prefer to use M-banking app only for non- transactional tasks (ie. Only for viewing balance, transactions, etc.)	☐	☐	☐	☐	☐
I think M-banking app will not deny the transaction that occurred by me.	☐	☐	☐	☐	☐
Internet providers usually makesure that transactional information is protected from accidentally changed orlost.	☐	☐	☐	☐	☐

M-banking app requires one- time- passcode (OTP) to perform every transaction.	☐	☐	☐	☐	☐

Many thanks for completion this survey.

Jawdat Al-Tarawneh.

Appendix A.2: Mobile banking electronic questionnaire

(Arabic version)

اعزائي جميعا، مساعدتكم لي هو محل تقدير كبير وسوف يسهم في نجاح هذه الدراسة. الاستبيان سوف لن يستغرق سوى 15-10 دقيقة من وقتك لأتمامه، إذا كان لديك أي أسئلة أو استفسارات يرجى الاتصال بي على الايميل التالي jawdat00962@yahoo.com يرجى ملاحظة ما يلي: المشاركة في هذا الاستطلاع سرية تماما وطوعية. المعلومات الشخصية غير مطلوبة ابدا وخصوصيتك محمية تماما، شكرا لك

1. هل تستخدم تطبيقات المحمول المصرفية؟ إذا كان الجواب لا، شكرا لوقتك، يمكنك التوقف الآن ذا كان الجواب نعم، يرجى المتابعة إلى السؤال الثاني.

☐ نعم

☐ لا

الجزء أ: المعلومات الديموغرافية يرجى الإجابة على ما يلي من الأسئلة عن طريق تحديد الإجابة المناسبة من الخيارات المقدمة:

.الجنس:

☐ ذكر

☐ أنثى

العمر:

☐ 18-24

☐ 25-34

☐ 35-44

☐ 45-54

☐ 55-64

☐ 65 أو أكثر

.الحالة الاجتماعية:

☐ غير مرتبط

☐ متزوج-متزوجة

☐ في علاقة

☐ مطلق-مطلقة

.مستوى التعليم:

كم عدد المرات التي تستخدم فيها الخدمات المصرفية عبر الهاتف المحمول؟

☐ لم يتم اتمام الدراسة

☐ ابتدائي

☐ ثانوي

☐ جامعي

☐ دراسات عليا

☐ دكتوراه

. المهنة

☐ طالب

☐ غير موظف

☐ عمل حر

☐ موظف

☐ متقاعد

. ما الجهاز المحمول الذي تستخدمه للوصول إلى التطبيق المصرفي ؟

☐ هاتف ذكي

☐ جهاز لوحي

. ما مدى تكرار استخدامك للخدمات المصرفية عبر الهاتف المحمول؟

☐ أبدا

☐ ليست متكررة جدا

☐ متكررة قليلا

☐ متكرر

☐ متكررة جدا

. كم عدد المرات التي تستخدم فيها الخدمات المصرفية عبر الهاتف المحمول؟

☐ ابدا

☐ نادرا

☐ شهريا

☐ اسبوعيا

☐ يوميا

. كم عدد المرات التي تستخدم فيها الخدمات المصرفية عبر الهاتف المحمول في الاسبوع؟

☐ ليس على الاطلاق

☐ مرة في الأسبوع

☐ 2-3 مرات

☐ أكثر من 3 مرات

. ما هو حجم شاشة الجهاز المحمول الخاص بك؟

☐ كبير

☐ صغير

الجزء ب: في هذا الجزء، مطلوب وجهة نظركم عن الخدمات المصرفية عبر الهاتف المحمول.

. يرجى استخدام ترتيب الأرقام في الجدول أدناه لتوفير الاجوبة على البيانات بعد ذلك. الرجاء عدم تحديد أكثر من إجابة واحدة لكل صف.

	غير موافق بشدة	غير موافق	محايد	موافق	موافق بشدة
أعتقد استخدام التطبيقات المصرفية عبر الهاتف المحمول يوفر لي الوقت.	☐	☐	☐	☐	☐
أعتقد استخدام التطبيقات المصرفية عبر الهاتف المحمول يوفر لي الوقت.	☐	☐	☐	☐	☐
أعتقد التطبيقات المصرفية عبر الهاتف المحمول مفيد.	☐	☐	☐	☐	☐
التطبيق المصرفي يتيح لي سهولة الحصول على المعلومات التي أحتاج إليها.	☐	☐	☐	☐	☐
التطبيق المصرفي يعزز و يسهل طريقة إجراء المعاملات المالية.	☐	☐	☐	☐	☐
التطبيق المصرفية يتيح لي الحصول بسهولة على أي معلومات أحتاجها عن حسابي المصرفي.	☐	☐	☐	☐	☐

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					أعتقد أن تعلم استخدام التطبيق المصرفي هو سهل.
☐	☐	☐	☐	☐	أعتقد أن التفاعل مع التطبيق المصرفي لا يتطلب الكثير من الجهد العقلي.
☐	☐	☐	☐	☐	أجد التطبيق المصرفي سهل الاستخدام.
☐	☐	☐	☐	☐	أعتقد أنه من السهل بالنسبة لي أن اكون شخص ماهر في استخدام التطبيق المصرفي.
☐	☐	☐	☐	☐	الناس الذين لديهم تأثير على يعتقدون انه يجب علي ان استخدم التطبيقات المصرفية.
☐	☐	☐	☐	☐	استخدم التطبيقات المصرفية لأن الاشخاص الذين يهمونني يستخدمونه ايضا.
☐	☐	☐	☐	☐	أصدقائي وعائلتي يعرفون قيمة استخدام التطبيق المصرفي.
☐	☐	☐	☐	☐	أجد استخدام التطبيق المصرفي مثل الموضة.
☐	☐	☐	☐	☐	أعتقد أن استخدام التطبيق المصرفي يعطيني وضع متميز.
☐	☐	☐	☐	☐	قد يحدث تعطيل في استخدام البيانات المتنقلة(انترنت الهاتف الذكي) في أي وقت.
☐	☐	☐	☐	☐	استخدام حزم البيانات المتنقلة مكلف.

مدة عمر بطارية الهاتف قصيرة.	☐	☐	☐	☐	☐
مساحة تخزين الهاتف الذكي صغيرة نوعا ما.	☐	☐	☐	☐	☐
قد يحتوي الجهاز الجوال على بيانات خاصة وشخصية.	☐	☐	☐	☐	☐
قد يتعرض الجهاز المحمول للفقدان أو السرقة.	☐	☐	☐	☐	☐
أجد عملية الانتهاء من المهمة على التطبيق المصرفي يحتاج إلى عدد قليل من النقرات (لمسات الشاشة).	☐	☐	☐	☐	☐
التطبيق المصرفي يعاني من مشاكل الاغلاق غير متوقعة.	☐	☐	☐	☐	☐
أعتقد أن توافر الوصول إلى التطبيق المصرفي هو 7/24.	☐	☐	☐	☐	☐
التطبيقات المصرفية تبدو بسيطة للتصفح.	☐	☐	☐	☐	☐
يتم تحميل او فتح التطبيق المصرفي بشكل سريع.	☐	☐	☐	☐	☐
محتويات التطبيق المصرفي مفيدة.	☐	☐	☐	☐	☐
محتويات التطبيق المصرفي واضحة.	☐	☐	☐	☐	☐
يتم تحديث التطبيقات المصرفية بشكل دوري.	☐	☐	☐	☐	☐
التطبيق المصرفي يبدو جذاباً.	☐	☐	☐	☐	☐
التطبيق المصرفي يبدو منظماً.	☐	☐	☐	☐	☐

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					التطبيق المصرفي يتكيف تلقائيا مع حجم شاشة الهاتف النقال.
	☐	☐	☐	☐	☐
	☐	☐	☐	☐	☐	التطبيق المصرفي يستخدم الألوان المناسبة.
	☐	☐	☐	☐	☐	في التطبيق المصرفي، يمكنني العثور على ارشادات حول سياسات العملاء مثل الخصوصية والنزاعات.
	☐	☐	☐	☐	☐	أعتقد أن التطبيق المصرفي لديه ميزات أمنية كافية.
	☐	☐	☐	☐	☐	لا أشعر بالأمان عن طريق تمرير المعلومات الحساسة الخاصة بي عن طريق التطبيق المصرفي.
	☐	☐	☐	☐	☐	أعتقد أن المعلومات المصرفية الخاصة في مضمونة بشكل جيد من قبل مزود التطبيق المصرفي.
	☐	☐	☐	☐	☐	أعتقد أن مزود الخدمات المصرفية يتحقق من جميع الاتصالات بيني وبين التطبيق للحماية من القرصنة أو التنصت.
	☐	☐	☐	☐	☐	فقط المستخدمين المصرح لهم قادرون على الوصول إلى معلومات سرية عن التطبيق المصرفي.
	☐	☐	☐	☐	☐	التطبيق المصرفية يكشف هوية المستخدم عند كل عملية تسجيل دخول.

					التقارير والأخبار حول الاحتيال المصرفي تقلقني حول أمن التطبيق المصرفي.
	□	□	□	□	□
	□	□	□	□	□	أنا غير متأكد من أن المعاملات على التطبيق المصرفي سوف تحدث كما أتوقع.
	□	□	□	□	□	أخشى أن تطبيقات التكنولوجيا المصرفية ليست موثوقة.
	□	□	□	□	□	أنا قلق من ان التطبيق المصرفي لا يمكنه التحقق من الانتهاء الفعلي للمعاملة.
	□	□	□	□	□	اجد أنه من المخاطرة للقيام بكمية كبيرة من المعاملات المالية على التطبيق المصرفي.
	□	□	□	□	□	أنا أفضل استخدام التطبيق المصرفي فقط للمهام غير المعاملات (أي فقط لعرض الرصيد والمعاملات، وما إلى ذلك)
	□	□	□	□	□	أعتقد أن التطبيق المصرفي لن ينكر المعاملة المصرفية التي حدثت من قبلي.
	□	□	□	□	□	مزودي الانترنت يتاكدون بالعادة من ان الحركات المصرفية محمية من التغيرات المفاجئة و الفقدان.
	□	□	□	□	□	يطلب التطبيق المصرفي في كل

معاملة رمز مرور مختلف.					

Appendix B.1: Analysis Output

Scree Plot
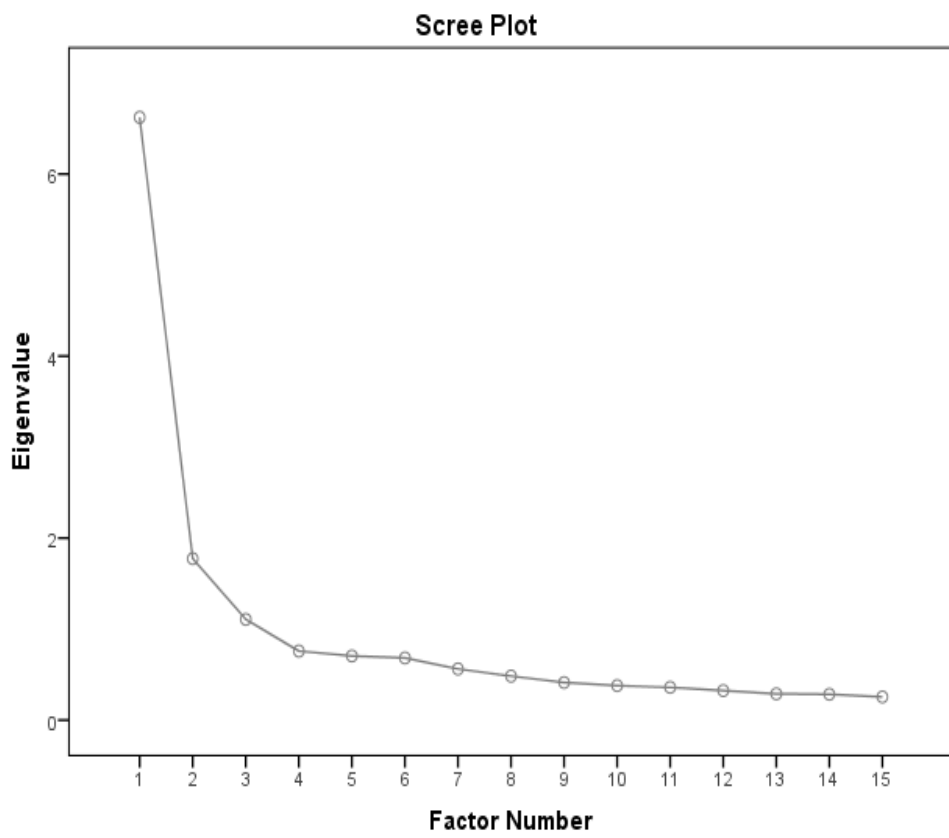
ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	210.536	8	26.317	27.905	.000[b]
	Residual	383.839	407	.943		
	Total	594.375	415			

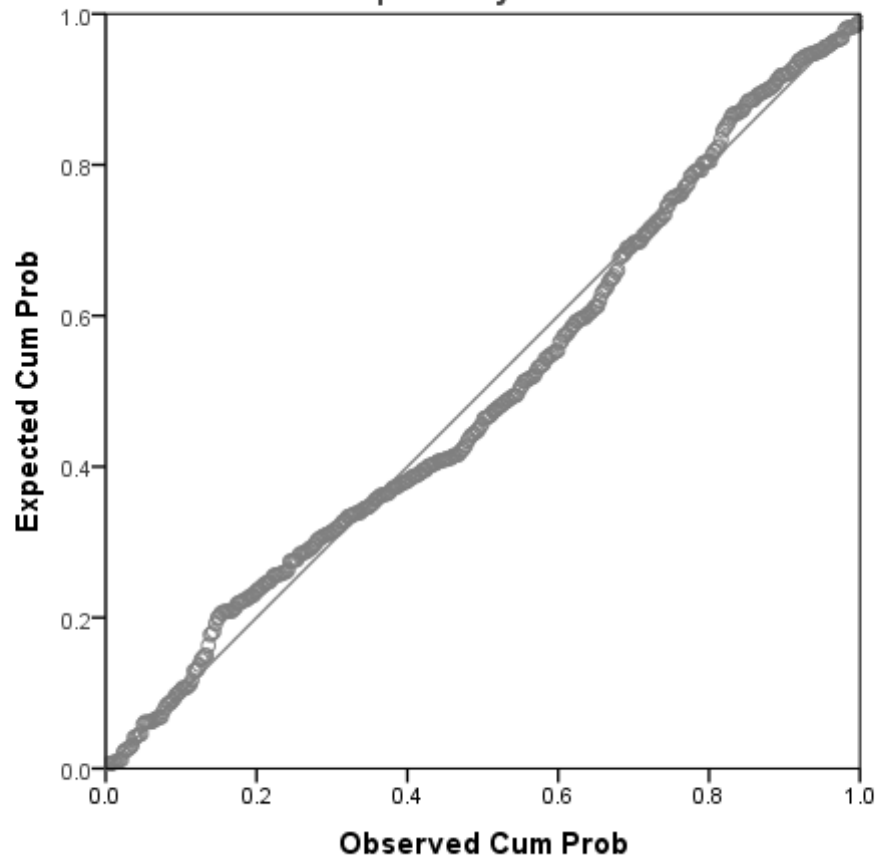a. Dependent Variable: Usg_1 How frequent is your use of mobile banking?

b. Predictors: (Constant), ZtransacRisk Zscore: transactional risk, Zm.soc.influnece Zscore: Social Influence Mean, Ztech_related_anxiety Zscore: Worry from m-Banking Apps safet, Zm.EE Zscore: Effort Expectancy Mean, Z_security Zscore: trust/security with m-banking, Zmoble.perf.risks_mup2mean Zscore: Mobile usage perceived Usefulness, Zm.Pe Zscore: Performance Expectancy Mean, Zm.app_qual Zscore: M-banking app quality (AQ)

Histogram

Dependent Variable: How frequent is your use of mobile banking?
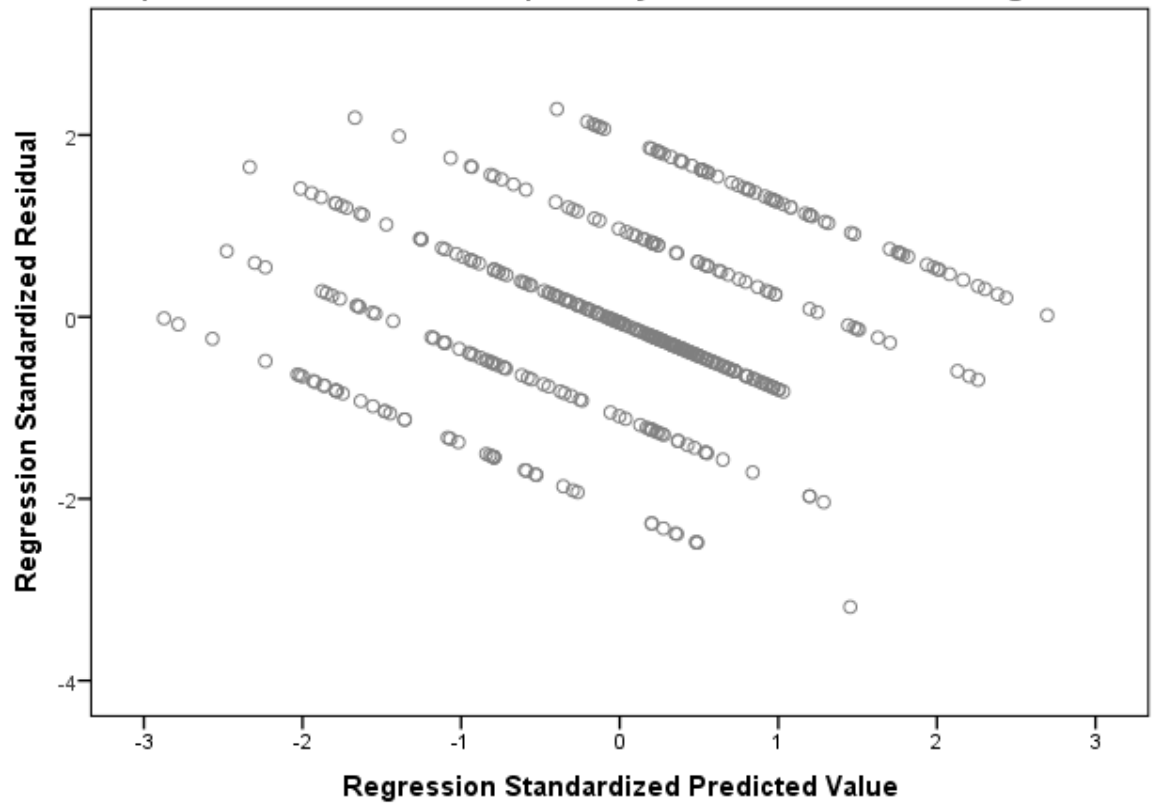

Mean = -1.64E-16
Std. Dev. = 0.990
N = 416
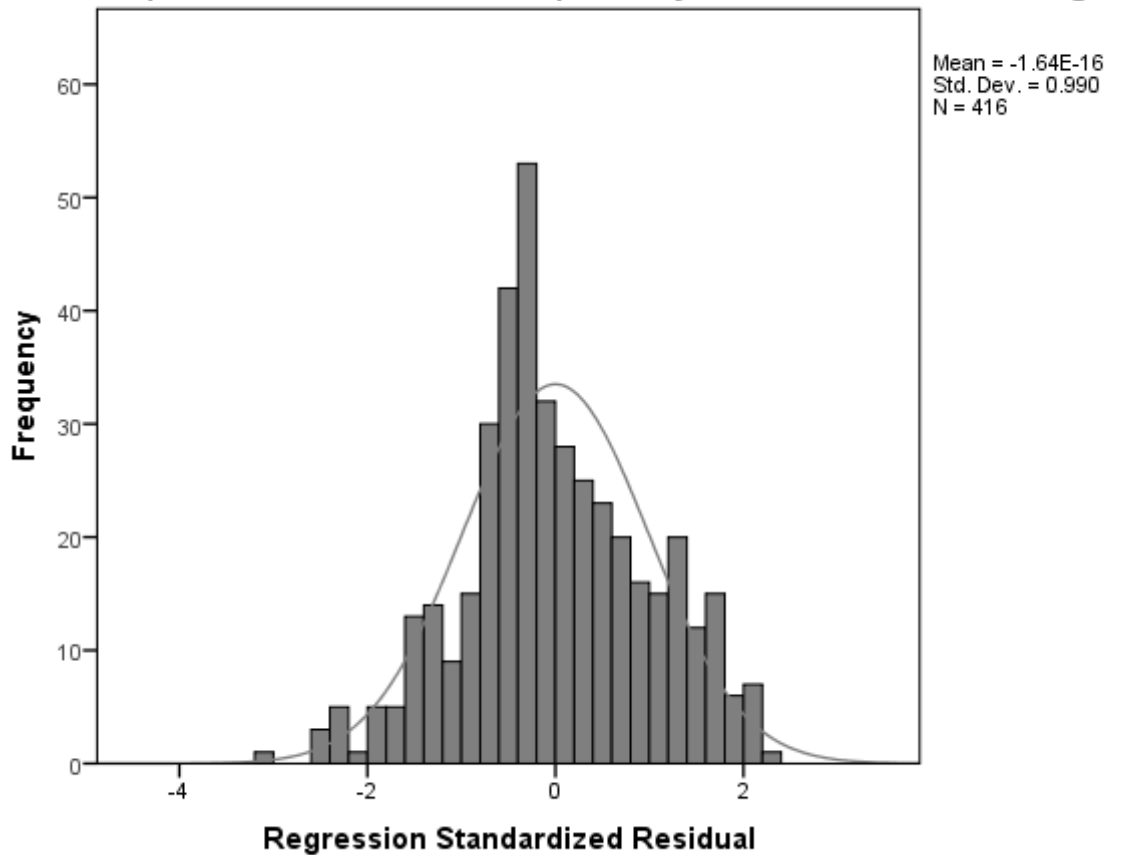
Normal P-P Plot of Regression Standardized Residual

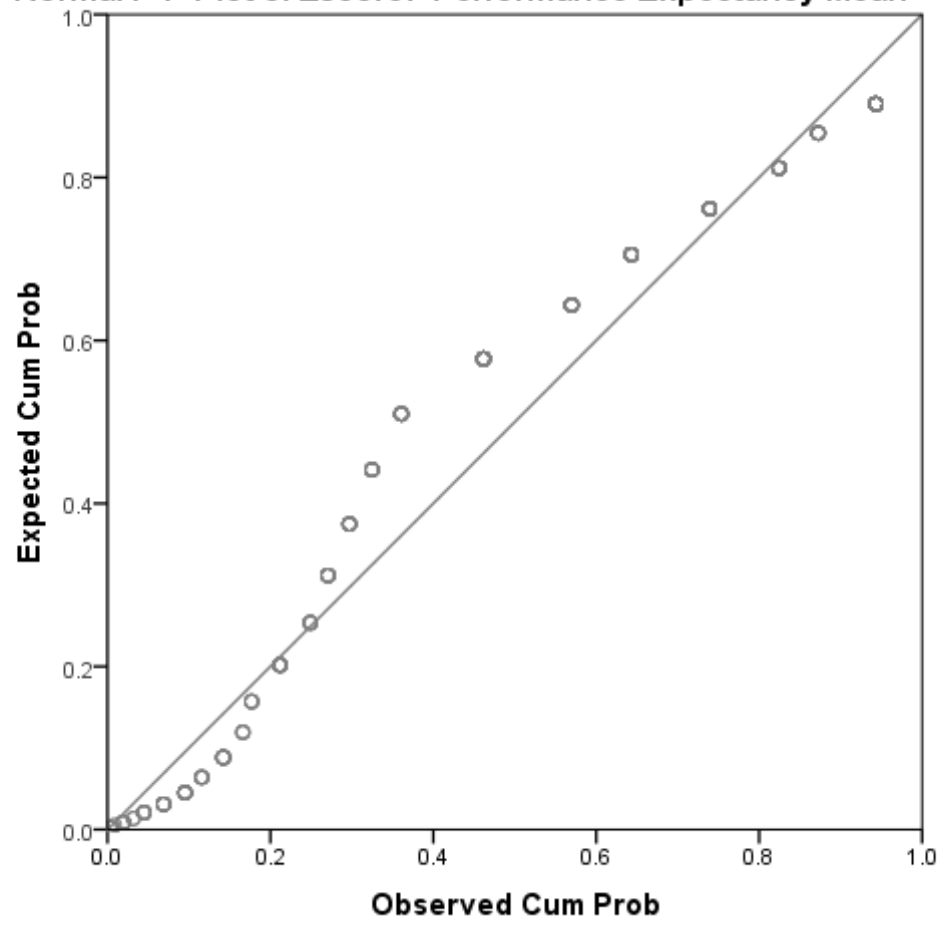### Dependent Variable: How frequent is your use of mobile banking?

Scatterplot

Dependent Variable: How frequent is your use of mobile banking?

Normal P-P Plot of Zscore: Performance Expectancy Mean

Normal P-P Plot of Zscore: How frequent is your use of mobile banking?