Factors affecting intention to use e-banking in Jordan

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Abstract

Purpose – Despite the wide availability of internet banking, levels of intention to use such facilities remain variable between countries. The purpose of this paper is to focus on e-banking in a country with low intention to use e-banking – Jordan – and to explain the slow uptake.

Design/methodology/approach – A quantitative method employing a cross-sectional survey was used as an appropriate way of meeting the research objectives. The survey was distributed to bank customers in Amman, Jordan, collecting a total of 328 completed questionnaires. SPSS and AMOS software were used, and multiple regression and artificial neural networks were applied to determine the relative impact and importance of e-banking predictors.

Findings – The statistical techniques revealed that several major factors, including perceived ease of use, perceived usefulness, security and reasonable price, stand out as the barriers to intention to use e-banking services in Jordan.

Originality/value – This study theorizes a series of implications on intention to use e-banking. It draws the attention of Jordanian banks to the full functionality of their e-banking systems, emphasizing positive safety features, which could contribute to changing negative customer perceptions. It also contributes to eliciting the theory of customer value among banks by focusing on how they should properly enhance their use of shared value. Moreover, it will present to managers how e-banking predictors can send meaningful and timely information to customers.

Keywords Internal marketing, Individual perception, Individual behaviour, Multiple regression analysis, Jordan

Paper type Research paper

Introduction

The pervasiveness of technology defining the twenty-first century is leading banks to adopt a new set of practices. Today, the best banks recognize the need to have more complete and up-to-date services that go beyond traditional offerings. The e-banking concept is based on the development, design, and implementation of financial services that take place on the internet. Simply, e-banking occurs when customers use the internet to access their bank accounts to carry out banking transactions (Sathye, 1999). Thus, offering multichannel banking has become a competitive necessity and a guarantee of the interaction between banks and their customers (Stoica *et al.*, 2015). Both banks and customers can benefit from e-banking services. Banks can create higher banking efficiency by enabling customers to open accounts, make deposits, transfer funds across accounts and make payments entirely online (Takieddine and Sun, 2016). Customers can undertake financial processes such as buying and fund transfer with speed and convenience (Ling *et al.*, 2016). In particular, e-banking services offer benefits to customers because they can perform their transactions and other financial activities from home.

Despite these e-banking services benefits and the huge investments made by banks into implementing internet banking technology, many customers are reluctant to use these

services (Chaouali *et al.*, 2016; Tarhini *et al.*, 2016). Indeed, its adoption by customers is reported to be very low and is not as expected (Shaikh and Karjaluoto, 2015; Shih *et al.*, 2010). Çelik (2008) and Yousafzai and Yani-De-Soriano (2012) found that Turkish and English banks have not succeeded in generating enthusiasm among their customers for adopting and accepting internet banking. This low uptake of e-banking is despite the widespread use of the internet as a whole. The number of internet users has reached 3.7bn, representing 49.7 percent of the total population (comScore report, 2017). This penetration has reached 56.7 percent in the Middle East, compared to 88.1 percent in North America and 77.4 percent in Europe. However, there is a huge disparity across Middle Eastern countries in the diffusion of internet banking services; it is 91.9 percent in the United Arab Emirates, Saudi Arabia (64.7 percent) and Jordan (45.7 percent). Such a low adoption rate is troublesome for banking institutions (Alalwan *et al.*, 2014) and leads to the question of why different countries exhibit different levels of internet banking adoption.

In Jordan, like in many other developing countries, the low penetration level of internet users has created opportunities for banks to expand to a broader customer base. However, many people prefer the traditional ways (personal contact) of attaining financial services when doing business, which could justify the low adoption rate of online banking. Thus, to increase the usage rate, banks need to manage the factors that affect consumer adoption of online banking better (Montazemi and Qahri-Saremi, 2015), as well as attracting new consumer (Calisir and Gumussoy, 2008; Kimball and Gregor, 1995; Thornton and White, 2001) by making the e-services more attractive, useful and easy to use. Without knowing the most influential factors, bank managers are likely to continue to flounder and waste time, money, and other resources. On the customers' part, they need to be made aware of e-banking services and feel secure and comfortable with using e-banking services as such services are radically new to them. Understanding consumers' decisions in adopting e-banking is important for both bankers and regulators in order to formulate appropriate strategies that will guarantee effective implementation and adoption of e-banking, and increase e-banking adoption rates (Liébana-Cabanillas *et al.*, 2017). Hence, it becomes imperative for bank managers to understand the factors that can hinder or facilitate the acceptance and usage of e-banking, enabling them to formulate strategies to improve the take up of online banking (Tarhini *et al.*, 2016).

As in most IT adoption studies, it is often difficult to predict the adoption behaviors of e-commerce consumers due to the complexity and uncertainty involved in the decision-making process (Chong, 2013). Several prior studies have proposed a variety of models to explain the factors affecting consumers' adoption of online banking. A recent descriptive literature review shows that interest in the topic of internet banking adoption grew significantly between 1999 and 2012, and it remains a popular topic of research (Hanafizadeh *et al.*, 2014). However, despite more than a decade of research, the extant online banking adoption literature remains somewhat fragmented (Montazemi and Qahri-Saremi, 2015). Therefore, this study proposes an integrated conceptual model to predict consumers' behavior and examine the main factors that influence the decision to use e-banking. This model includes not only the well-known positive predictors of technology adoption, such as perceived usefulness, perceived ease of use and trust, but also negative variables, such as awareness of e-banking services, price, resistance to change and the availability of personal computers (PCs). The influence of which on e-banking adoption has been examined in a very limited number of studies.

Furthermore, most previous studies have used regression-based statistical tests to predict consumers' behavior, but these tests tend to examine only linear relations among variables and they are incapable of modelling complex non-linear relationships, whereas the relationships between online predictors may be non-linear. In contrast, artificial neural network (ANN) analysis is capable of dealing with non-linear relationships. Thus, this study

adopted a sequential multi-method research design, as recommended by Scott and Walczak (2009), integrating both structural equation modeling (SEM) and ANN analysis. SEM is employed to verify the validity of causal relationships by examining the goodness of fit of the model. The supported relationships and the significant variables from the SEM analysis were then used as the inputs for the neural network structure to determine the relative importance of significant factors (Liébana-Cabanillas *et al.*, 2017). The use of the sequential multi-method predictive-analytic method (Scott and Walczak, 2009; Shmueli and Koppius, 2010) is deemed to be able to provide a richer and more holistic understanding of the phenomenon under study and thus may provide a significant methodological contribution from the statistical point of view (Leong *et al.*, 2015). Although the ANNs and other expert system techniques are used in previously published studies, to our knowledge, this is the first they are used in e-banking literature. Accordingly, the main aim of this study was not only to determine the most significant factors influencing e-banking adoption, but also the relative importance of each factors in terms of significance. This makes a new contribution to the existing literature in that expert system techniques were applied in a new context of information systems (IS) studies.

This study identifies and empirically examines the main factors predicting the behavioral intention and adoption of e-banking on the part of Jordanian customers. Such a study can also make a significant contribution by highlighting the fundamental aspects taken into account by Jordanian banking clients in shaping their decision to adopt or reject e-banking. Thus, bank managers will be provided with indications as to how they should design and promote e-banking as a self-service technology.

The contributions of this study are twofold. First, it expands on those studies that have treated e-banking in Jordan by expanding to some extent the sample size and presenting a different set of variables than suggested by other researchers (e.g. Alalwan *et al.*, 2016), drawing on an integrated model of the various factors proposed by earlier studies in Jordan. Second, it positions itself in the e-banking literature, offering a new combination of variables to include both variables associated with e-service delivery and customers. In addition, it investigates the factors influencing internet banking adoption in less-developed regions, particularly in parts of Arabic countries. Indeed, there is lack of country-level studies investigating the factors that make a difference in the diffusion of internet banking across different countries. To fill this gap in the internet banking literature, this study examines internet banking diffusion at the country level (Takieddine and Sun, 2016).

The following sections are organized as follows: the second section comprises of a literature review. The third section presents the theoretical model and hypothesis development; the data analysis and discussion are provided in the fourth section; and, finally, the fifth section outlines the main conclusions, the implications of the results, the potential steps for further research and the main limitations.

Literature review

Explaining and predicting customer intentions and the adoption of internet banking have recently been the focus of many scholars worldwide and this issue has seen dramatic growth in the relevant literature related to online banking channels (Lin, 2011; Purwanegara *et al.*, 2014; Zhou, 2012). Over the last several years, numerous theories offering new insights have emerged (Oruç and Tatar, 2017), aiming to explain and predict the relationship between user beliefs, attitudes and behavioural intentions to use the technology. The technology acceptance model (TAM), theory of planned behavior (TPB), innovation diffusion theory and theory of reasoned action are examples of these theories.

The TAM has been proven to be a valid theory that predicts adoption behavior and behavioural intention, with an emphasis on perceived usefulness and perceived ease of use as the most salient drivers of the acceptance of new technology. Thus, this model has become one

of the most widely used model due to its simplicity, parsimony and robustness (Alalwan *et al.*, 2016; Chaouali *et al.*, 2016; Koo *et al.*, 2015; Mital *et al.*, 2018; Rawashdeh, 2015). It has also been shown to be superior to other prevalent competing models. Although the extensive replication, application and integration of the TAM have enabled many researchers to understand the adoption of technology, the TAM has its limitations (Benbasat and Barki, 2007; Venkatesh *et al.*, 2007) and there is still a need for systematic investigation and theorizing of the salient factors that apply to context-based consumer technology use. Moreover, researchers have found that studies based on this model provide insufficient guidance to e-banking providers in terms of the roles of network influence and securities. Therefore, there is a need to extend the TAM when studying the adoption of e-banking.

Researchers have attempted to extend the TAM by introducing new factors, exploring the underlying belief factors, and introducing antecedent, moderator and mediator variables into the TAM framework (Wixom and Todd, 2005). Several studies have considered usage/adoption as an important variable of study (Koo *et al.*, 2015; Saeed and Abdinnour, 2013). All such studies have focused on adding a few new variables based on context. The problem is that there are so many new variables in different contexts that are added to the original theory and thus the theory is no longer parsimonious, which is also a challenge for theory development. In the literature, various studies related to the adoption of internet banking have been conducted. These studies provide a further understanding of the main factors predicting customer intention and usage of e-banking; however, other important aspects have yet to be explained, including the role of self-efficacy. Table I summarizes the variables used by various researchers, which can influence the intention to use e-banking. The selection was based on a common ground; all of the studies mentioned in the table were undertaken in developing countries, of which Jordan is one.

Table I summarizes the previous literature examining the intention to use e-banking. Several issues are clear. First, the intention to use e-banking services is influenced by many factors, which have varying impacts on usage. Second, according to Shmueli and Koppius (2010), to advance current IS studies, there is a need to integrate predictive-analytic methods as a means of generating data predictions, as well as to adopt methods for assessing predictive power. By employing predictive-analytic techniques, researchers will not only create practically useful models, but also create ones that can help alongside explanatory modelling in theory building and theory testing. Third, when deciding the selection of variables which can affect the intention to use e-banking services, two dimensions should be taken into account: the researcher's recognition of the variables, which may affect the intention to use e-banking services, depending on experience in the environment; and the gaps in knowledge not addressed by previous studies. In this context, the literature on e-banking services is very limited in Jordan. Moreover, most of the studies that do exist tend to focus on comparative research between banks in Jordan and banks in developed countries, such as the work of Migdadi (2008), or the impact of e-banking services on the financial performance of individual banks, such as the research of Al-Smadi (2011). Therefore, it is important to investigate those factors that may affect the intention to use e-banking services in Jordan specifically. The next section discusses these factors based on the current literature.

Therefore, to fill this research gap and to provide a solid theoretical basis for examining the adoption of online banking services in Jordan, this study draws on two main schools of thought: TAM (Davis *et al.*, 1989) and TPB (Ajzen, 1991). As the TAM and TPB have been used in many studies to explain user perceptions of system use and the probability of adopting an online service (Hsu *et al.*, 2006), they are the most appropriate tools for understanding online banking adoption.

Theoretical model and hypothesis development
Over the past decade, the TAM and TPB have been widely applied to examine e-banking usage and acceptance (Davis, 1993; Hsu, 2004; Hsu *et al.*, 2006). However, neither the TAM

Table I.

Study	Country	Factors
Yaseen and El Qirem (2018)	Jordan	Modifies the unified theory of acceptance and use of the technology model (performance expectancy, effort expectancy, social influence, perceived e-banking services quality and hedonic motivation)
Sánchez-Torres et al. (2018)	Colombia	UTAUT2 model (performance expectancy, effort expectancy, government support and trust (quality of information, perceived security and perceived privacy)
Arora and Sandhu (2018)	India	Functionality, information, effort expectancy, credibility, performance, self-interest, social influence and service content
Marafon et al. (2018)	Brazil	Self-confidence and risk acceptance as a moderators of the relationship between perceived risk and intention to use internet banking
Szopiński (2016)	Poland	Use of the internet, taking advantage of other banking products as well as trust in commercial banks
Chaouali et al. (2016)	Tunis	Roles of counter-conformity motivation, social influence and trust in explaining customers' intention to adopt internet banking services
Ayo et al. (2016)	Nigeria	Perceived e-service quality, competence of e-service support staff, system availability, service portfolio, responsiveness and reliability were found to be most significant in rating e-service quality
Alalwan et al. (2016)	Jordan	Unified theory of acceptance and use of technology (UTAUT2) along with trust: behavioral intention, performance expectancy, effort expectancy, hedonic motivation, price value and trust
Rawashdeh (2015)	Jordan	Perceived usefulness, perceived ease of use, perceived web privacy, attitude and behavioral intention
Abu-Assi et al. (2014)	Jordan	Perceived ease of use, usefulness, compatibility, trialability and security
Abbad (2013)	Jordan	(Subjective norms, security and trust) forms: perceived usefulness. (Internet experience and enjoyment) forms: perceived ease of use
Chang and Rizal (2010)	Taiwan	Perceived ease of use, perceived usefulness, personal involvement
Amin (2009)	Malaysia	Perceived ease of use, perceived usefulness, perceived credibility, perceived enjoyment and social norm
Hua (2009)	China	Perceived ease of use, privacy, security
Celik (2008)	Turkey	Perceived risk, perceived playfulness, perceived usefulness and perceived ease of use
Sohail and Shaikh (2008)	KSA	Efficiency and security, fulfillment and responsiveness
Zolait and Sulaiman (2008)	Yemen	Relative advantage, compatibility and ease of use
Lallmahamood (2007)	Malaysia	Security and privacy
Guriting and Ndubisi (2006)	Malaysia	Perceived ease of use, perceived usefulness, computer self-efficacy, prior computing experience
Kassim and Abdullah (2006)	Qatar	Ease of use, trust, secure and private

Table I.
Variables affecting the intention to use e-banking

nor TPB have been found to provide consistently superior explanations or behavioural predictions (Chen et al., 2007). Recently, a growing body of research has focused on integrating the two models to examine information technology usage and e-service acceptance because they are complementary; the results of such research have shown that the integrated model has better exploratory power than the individual use of the TAM or TPB (Bosnjak et al., 2006; Chen et al., 2007). The strengths of the TPB have been explored to enrich the TAM by adding usage and placing premiums on specific settings and external variables that influence a technology adoption process (Awa et al., 2015).

As the focus of this study is online banking service adoption, which is an instance of the acceptance of innovative technology intertwined with social systems and personal characteristics, the integration of the TAM and TPB for our research framework should be comprehensive in order to examine the consumers' intentions and acceptance concerning online banking. Hence, the suggested model is on lines with previous studies

who stressing the need to adjust and extend acceptability models to suit the relevant technology (Chen, 2016; Dishaw and Strong, 1999; Kim *et al.*, 2010; Lancelot Miltgen *et al.*, 2013; Moták *et al.*, 2017; Venkatesh *et al.*, 2003; Yousafzai *et al.*, 2010). This adjustment and extension is proposed to identify as broadly as possible – but still on a sound theoretical basis – the factors capable of predicting the acceptability of new technology, in particular an e-banking. Furthermore, Dahlberg *et al.* (2015) suggested integrating theories other than the TAM to gain a deeper understanding of the factors that affect consumer acceptance.

Figure 1 shows a set of factors that affect the intention to use e-banking services. Intention to use can be described as acceptance and continued use of a product (Sathye, 1999). Hence, when considering the process of intention to use related to e-banking, it is necessary to provide sufficient information so that people are aware of the service and to explain the added value of this service.

Factors influencing adoption are a complex set of different aspects including access technology and infrastructure related factors, sector-specific internet banking factors and other socioeconomic factors. Indeed, the analysis by Centeno (2003) conducted in European Union countries shows that development of a service by the banks is not sufficient, on its own, to ensure adoption. Access infrastructure to the service is a prerequisite and access at home may be a relevant factor. Time and trust are needed to convert consumers of banking services to the use of e-delivery channels, including the internet.

Perceived ease of use and perceived usefulness are the main factors which influence the intention to use of e-banking. Davis *et al.* (1989) argue that perceived ease of use and perceived usefulness are crucial determinants of system use in an organization. Cooper (1997) argues that ease of use is an important factor when adopting e-banking services. E-banking services should be easy to use in order to ensure customer use. One of the reasons for the failure of e-banking in the USA is the difficulty of use regarding the technological innovation of e-banking services (Dover, 1988). If Jordanian customers are not adopting e-banking, it could be because the online banking services are not easy to use. This can be hypothesized as:

H1. Ease of use positively affects Jordanian consumers' attitude to use e-banking.

Usefulness refers to the improvement of job performance resulting from the use of a particular system (Davis *et al.*, 1989). Literature on e-banking concludes that there is a positive relationship between perceived usefulness and the intention to use of e-banking
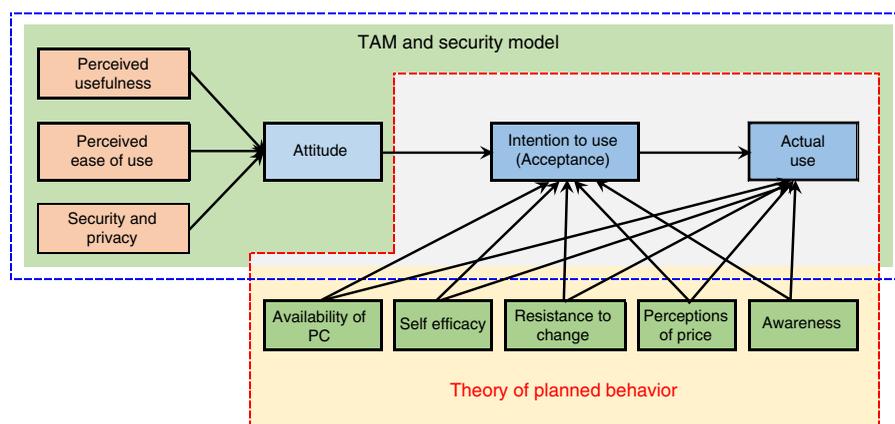

Figure 1.
Proposed theoretical
model

service (Pikkarainen *et al.*, 2004; Eriksson *et al.*, 2005; Gounaris and Koritos, 2008; Ozdemir *et al.*, 2008). Hence, this study hypothesizes this relationship as follows:

H2. Usefulness positively affects Jordanian consumers' attitude to use e-banking.

A feeling of security when performing transactions on the internet is considered a key factor that removes customer concerns regarding online purchases (Salisbury *et al.*, 2001). Customers tend to increase usage of e-service only if they feel that their transactions are safe (Cheng *et al.*, 2006). It is clear that security influences the use of e-banking services, where high security leads to increasing usage of e-banking services. Hence, there is both theoretical and empirical evidence of a significant association between trust and intention to use e-banking. For example, Doney and Cannon (1997) found that consumer trust is related to intention to use the vendor in the future, whereas Gefen (2000) found trust had a significant effect on purchase intentions and suggested that trust in the e-commerce vendor increases the individual's intention to use the vendor's website. Moreover, prior research has also recognized a significant association between trust and PU (Chircu *et al.*, 2000, Gefen *et al.*, 2003; Stewart, 2003). In this vein, Daniel (1999) argued that security is one of the most important factors that influences customer acceptance. It can be concluded that e-banking services will not be adopted unless customers regard them as secure. Such arguments can generate the following hypothesis:

H3. Security positively affects Jordanian consumers' attitude to use e-banking.

Within the lead user theory, consumer knowledge has often been used to characterize and identify lead user status, mostly measured based on subjective self-assessment (Park *et al.*, 1994). Within IT literature on adoption, this knowledge has been linked to the actual level of digital skills of users (Sadowski, 2017). Howard and Moore (1982) emphasize that consumers have to become aware of the new product before intention to use. Creating awareness among consumers about a service or product is significant for any intention to use to occur (Alnsour, 2013; Alnsour and Al-Hyari, 2011; Sathye, 1999). Hence, if Jordanian consumers are not adopting e-banking, it may be because they are neither aware that such a service is available, nor of the benefits that it provides. This can be hypothesized as:

H4. Awareness positively affects Jordanian consumers' attitude to use e-banking.

The fifth factor, which influences consumer intention to use of e-banking services, is the overall price and cost. Cost includes both the normal costs associated with internet use and the cost of bank fees and charges. Ciciretti *et al.* (2009) emphasize the importance of price and cost factors in the intention to use of e-banking services. Furthermore, price tends to be a primary characteristic in brand switching (Gupta, 1988). Rayport and Sviokla (1994) confirmed the importance of price in terms of electronic distribution of services. This demonstrates that the intention to use of new technology is related to a reasonable price, where lower prices can attract customers to use such a service. Hence, the following hypothesis can be proposed:

H5. Perceptions of price or cost positively affect Jordanian consumers' attitude to use e-banking.

Another important factor that affects intention to use of e-banking service is that the existing mode of service delivery achieves the customers' needs sufficiently (Sathye, 1999). For human resources in banks, to change the current ways of operating and adopt a new technology, it should change their ideas in order to be a competitor (Salisbury *et al.*, 2001). For people, they most likely prefer depending on their knowledge and experience in dealing with banks. This requires fulfilling a certain need to change present ways of operating and intention to use

new technology. Unless such a need is encountered, consumers may not be changed their current ways in dealing with banks. Hence, the following hypothesis is proposed:

H6. Resistance to change positively affects Jordanian consumers' attitude to use e-banking.

The seventh factor that impacts the use of e-banking services is the availability of access, not only to a computer, but also to the internet, which, *per se*, is a prerequisite for using e-banking. Ho and Wu (2009) stated that the lack of access to either computers or the internet is one of the possible reasons for the slow growth of e-banking. Daniel (1999) found that low usage of electronic banking in the UK and Ireland is related to a lack of customer access to suitable computers. If the internet is easily accessible, customers will complete their financial transactions (The Australian Government the Treasury, 1997). It can be concluded that the failure to adopt e-banking in Jordan is probably related to a lack of access to computers, the internet or both. Hence, the following hypothesis is proposed:

H7. Availability of PC/internet positively affects Jordanian consumers' attitude to use e-banking.

Computer self-efficacy is one of the most important factors that contribute to create a positive performance and, in turn, positive outputs for e-banking services. Self-efficacy is comprised of three dimensions: generalizability, magnitude and strength (Bandura, 1997). Generalizability is the extent to which individual beliefs are limited to a specific domain of activity. This suggests that the use of different types of technology requires individuals to have high generalizability. Magnitude refers to the capability of individuals to accomplish difficult tasks; individuals with high capabilities of self-efficacy are expected to need minimum assistance, whilst individuals with low capabilities of self-efficacy are expected to need maximum support (Lussier and Hendon, 2012). Strength refers to the trust of individuals in their ability to use services (Lussier and Hendon, 2012). It will be interesting to observe how self-efficacy influences the intention to use of e-banking services. Compeau and Higgins (1995) argued that computer self-efficacy is associated with the individual's attitude toward the adoption of new technologies. Previous studies (Igbaria *et al.*, 1995; Johnson, 2005; Mcilroy *et al.*, 2007) also emphasized the effect of computer self-efficacy on adopting new innovations. Chang and Tung (2008) also suggested that self-efficacy plays an important role in motivation and behavior intention. If individuals are pessimistic about their ability to use a new system, then it will not have any significant effect on behavior. Thus, computer self-efficacy may influence the relationship between attitude and behavior toward switching (Lee *et al.*, 2011). A high level of self-efficacy may lead to a high use of e-banking services and vice versa; thus, it can underpin the following hypothesis:

H8. Level of self-efficacy positively affects Jordanian consumers' attitude to use e-banking.

Finally to hypotheses were developed that link attitude, intention to use and actual use of e-banking:

H9. Jordanian consumers' attitude positively affects intention to use e-banking.

H10. Jordanian consumers' intention to use e-banking positively affects actual use of Internet banking.

Research methods
A quantitative methodology employing a cross-sectional survey was used to address the research objectives.

Sample and collection procedures
Initially, a pre-test was carried out in two ways: the first draft was sent to four professors in IT and a marketing service to ascertain the face and content validity of the questionnaire;

and a pilot study was conducted with 32 e-banking service users to evaluate the questionnaire in terms of wording, clarity, relevance and time spent on completion. Finally, only respondents who identified themselves as users of e-banking were included for completion of the questionnaire. According to the Central Bank of Jordan (2015), there are 23 banks, most of which are commercial banks.

The researchers distributed the questionnaire randomly to customers. Completed questionnaires were collected during July and September 2016. Of the 1,500 questionnaires distributed, only 480 were deemed usable, yielding a response rate of 32 percent. Regarding the characteristics of respondents, the empirical findings indicate clear variation in their characteristics. Table II illustrates that the sample comprised 49 percent male respondents, and around 64 percent were aged between 30 and 50 years old, whereas only 19 percent were under 30, and the rest were older than 50. Around 68 percent held a Bachelor degree and above, 13 percent held a Diploma, and 19 percent held a high secondary school certificate or below. In terms of usage, 65 percent reported using an online service for communication. Finally, 82 percent had experience of using the internet and only 9 percent had low computer skills. The majority of participants (58 percent) worked in the public sector.

Variable measurements
The 38 items employed to measure the independent variable (TAM and TPB dimensions) were adapted from past studies:

(1) scales for perceived usefulness and perceived ease of use were based on Cheng *et al.* (2006);

(2) scales for perceived web security were based on Salisbury *et al.* (2001);

(3) scales for awareness of e-banking services, reasonable price, resistance to change and availability of PC/internet were adopted from AL-Majali and Mat (2011), Abu-shanab *et al.* (2010), Sathye (1999) and Davis (1989); and

(4) value-for-money factors were operationalized in accordance with the works by Adapa and Roy (2017) and Thomas and Sullivan (2005), and were measured using an eight-item scale consisting of two sub-dimensions (perceived benefits and perceived costs).

Indicators	Category	Percentages
Gender	Male	49
	Female	51
Age	Less than 20 years	6
	20–30	13
	30–40	28
	40–50	36
	More than 50	17
Education level	High secondary school or less	19
	Diploma	13
	Undergraduate	40
	Postgraduate and professional degree	28
Occupational category	Public sector	58
	Private sector	42
Usage of online services	Have experience in using internet	82
	Have no experience in using internet	12
Computer skills	Excellent computer skills	74
	Good computer skills	17
	Low computer skills	9
Use of e-banking over the last four weeks		54

Table II.
Characteristics of respondents

Two dependent variables, namely, intention to use (four items) and actual usage (three items), were adapted from past studies. A seven-point Likert-type scale was employed to measure the level of agreement for every item, anchored at strongly disagree (1) and strongly agree (7).

SEM–ANN approach
To analyze the data fully and provide bank managers with useful information, this study integrated both SEM and ANN techniques. This integration aimed to overcome the shortcomings of the two techniques implemented individually (Hew *et al.*, 2016). The covariance-based SEM is capable of detecting linear relationships, which leads to the possibilities of oversimplification of the complexities of the decision to adopt e-banking. ANN is able to detect both linear and non-linear relationships, but is not suitable for theory testing, as it is a "black-box" operation. Hence, ANN as a non-compensatory analysis is able to complement the weaknesses of the compensatory and linear SEM analysis. In addition, ANN is able to "learn" through training processes and tolerate noisy samples; it is thus superior to the partial least square (PLS) method. SEM–ANN analysis provides a more holistic understanding and thus provides significant methodological contributions from the statistical point of view. However, ANN cannot be used alone as it is not suitable for hypothesis testing and does not have the capability of producing path coefficients and p-values, unlike the SEM approach. Therefore, to take advantages of both the SEM and ANN techniques, we engaged an integrated approach by first validating the proposed model followed by the examination of the normalized importance of the significant determinants derived from the SEM analysis.

In general, most previous studies have employed only SEM or PLS techniques to verify hypothesized causal relationships and have rarely combined these techniques with other expert systems or artificial intelligence techniques (Chong, 2013; Leong *et al.*, 2015; Wong *et al.*, 2011). Therefore, the outcomes from this study may provide a better theoretical foundation and understanding of the determinants of use behavior from the viewpoint of customers.

To test the proposed model and the suggested causal relationship between the constructs, SEM with maximum likelihood estimation was computed and analyzed in AMOS 21. Following the recommendations of Hair *et al.* (2010), Leong *et al.* (2013) and Wang *et al.* (2014), a two-stage procedure was applied in the measurement model and the structural model. In the first stage, exploratory factor analysis (EFA) was used to identify the underlying constructs involved, followed by a second stage of confirmatory factor analysis (CFA) to ascertain the causal relationships between these constructs via path analysis (Kaplanidou and Vogt, 2006; Liu *et al.*, 2014; Leong *et al.*, 2015; Zopiatis *et al.*, 2014).

Testing the assumptions of multivariate analysis
Before analyzing the data collected, several tests were undertaken for multivariate assumptions, namely normality, multicollinearity and linearity. Construct reliability, validity, and convergent and discriminate validity were also tested.

The descriptive statistics suggest that non-normality was not excessive. Table III illustrates the results of the normality testing in terms of standard deviation, skewness and kurtosis. The maximum absolute values of skewness and kurtosis are 0.73 ($< \pm 1$) and 1.00 ($< \pm 2$) respectively (Tan *et al.*, 2015). Furthermore, the histogram, and the normal P–P and Q–Q plots verify the existence of normality, while the scatter plots verify linearity (Tan *et al.*, 2014). Common method bias was tested using Harman's one-factor test, loading all indicators of the study constructs into EFA (McFarlin and Sweeney, 1992). The results indicate that common method bias is not a serious concern in this study as the single-factor model exhibited a significantly worse fit. Moreover, the common latent factor in AMOS 25 revealed a shared variance of 13.74 percent, implying the non-existence of common method variance and the Mahalanobis d^2/independent variables < 3 indicate the

Variable	Mean	SD	Skewness	Kurtosis
Perceived ease of use	5.14	1.46	(0.71)	0.09
Perceived usefulness	5.14	1.46	(0.70)	0.08
Security	4.79	1.51	(0.49)	(0.07)
Attitude	4.31	1.77	(0.13)	(1.00)
Intention	4.96	1.50	(0.62)	(0.06)
Self-efficacy	5.03	1.52	(0.72)	0.05
Awareness	5.07	1.43	(0.61)	0.07
Resistant to technology	5.20	1.41	(0.73)	0.32
PC availability	4.97	1.48	(0.56)	(0.06)
Perception of price	4.37	1.55	(0.34)	(0.57)
Actual usage	5.19	1.46	(0.72)	0.19

Table III.
Descriptive statistics
for research variables

non-existence of multivariate outliers (Lee *et al.*, 2011). The multicollinearity of all scale items was tested using the variance inflation factor (VIF) to establish how much of the variance of the estimated coefficient was inflated by multicollinearity (e.g. a VIF of 9 means that the standard error is three times greater than if the VIF is 1). The VIF was 9.79 and the smallest tolerance was 2.29, much less than the common cut-off threshold of 10[1] (Kleinbaum *et al.*, 1988; Teo *et al.*, 2015). Finally, the sample size was 480, which is adequate for SEM (Hair *et al.*, 2010).

Construct validity and reliability
To measure the validity and reliability of the constructs several tests were used. Unidimensionality was measured using a goodness-of-fit index (GFI) for each construct. A value greater than the 0.90 threshold indicates good unidimensionality among the constructs (Prajogo and Hong, 2008). In addition, construct reliability was measured using Cronbach's alpha (α), with a recommended threshold of 0.70 (Nunnally and Bernstein, 1994). Moreover, to establish discriminant validity, the average variance extracted (AVE), maximum-shared squared variance (MSV) and average shared squared variance (ASV) were calculated. For discriminant validity, both the MSV and ASV should be less than the AVE (Hair *et al.*, 2010; Fornell and Larcker, 1981). Composite reliability (CR), which uses the actual factor loadings instead of the equal weight for all the constructs, was also calculated. Table IV illustrates the results of these tests.

Table IV shows that the AVE of all constructs exceeded the value of 0.50, and both MSV and MaxR (H) were less than the AVE. The CR values ranged from 0.71 to 0.927, with all the

	CR	AVE	MSV	MaxR (H)	POPR	PUSE	PEOU	PSEC	RTCH	PCAV	SELF	AWAR
POPR	0.927	0.680	0.663	0.640	*0.824*							
PUSE	0.819	0.536	0.429	0.478	0.446	*0.732*						
PEOU	0.869	0.588	0.487	0.385	0.730	0.655	*0.767*					
PSEC	0.836	0.528	0.203	0.510	0.450	0.392	0.320	*0.727*				
RTCH	0.836	0.564	0.501	0.153	0.543	0.381	0.436	0.264	*0.751*			
PCAV	0.710	0.564	0.487	0.437	0.814	0.450	0.400	0.389	0.465	*0.751*		
SELF	0.772	0.562	0.165	0.350	0.406	0.406	0.263	0.373	0.137	0.394	*0.679*	
AWAR	0.781	0.591	0.501	0.207	0.525	0.623	0.661	0.400	0.708	0.683	0.205	*0.769*

Notes: $CR = ((\Sigma(\lambda i)^2)/(\Sigma(\lambda i)^2 + \Sigma\delta_i))$, ($\lambda_i$ = standardized factor loadings, i = observed variables, δ_i = error variance); $AVE = ((\Sigma(\lambda i)^2)/(n))$, ($i = 1, \ldots, n, \lambda i$ = standardized factor loadings, i = observed variables); MSV, maximum-shared squared variance. [a]These measures were calculated based on Gaskin (2016) Excel StatTools Package (http://statwiki.kolobkreations.com)

Table IV.
Construct
unidimensionality,
reliability and
convergent validity[a]

construct loadings significant at $p < 0.001$. This means the all of the constructs in the scale fulfilled the requirements of convergent and discriminant validity; hence, for the measurement model both the reliability and validity of the constructs were successfully verified. Cronbach's α exceeded the value of 0.50.

Measurement model – CFA
The next step after testing construct validity and reliability, a measurement model was developed based on the mean values of the indicators for each construct. The fit of the measurement model to the data was assessed using several goodness-of-fit measures, such as normed chi-square (χ^2/df), GFI, the standardized root mean residual (SRMR), the comparative fit index (CFI), the normed fit index (NFI), the incremental fit index (IFI), the Tucker–Lewis index (TLI) and the root mean square error of approximation (RMSEA). Table V illustrates the results of these measures.

As illustrated in Table V, all these measures (χ^2/df = 2.5, $p = 0.00$; GFI = 0.885; CFI = 0.96; NFI = 0.94; IFI = 0.96; TLI = 0.95; RMSEA = 0.055; SRMR = 0.034) exceeded the recommended thresholds (Hu and Bentler, 1999). This indicates that the measurement model presents a very good fit with the data.

Structural model
After establishing an acceptable measurement model, the study evaluated the structural model. Similar to the measurement model, nine GIF measures were used to gauge the fit of the structural model. As reported in Table V, all the measures (χ^2/df = 2.75, $p = 0.00$; GFI = 0.872; CFI = 0.956; NFI = 0.933; IFI = 0.956; TLI = 0.946; RMSEA = 0.061; SRMR = 0.07) exceeded the recommended thresholds. Therefore, the structural model managed to secure a very good fit with the data collected.

Hypothesis testing
To test the proposed hypotheses, path analysis was carried out employing the strength of the regression weights. The significance of a path is determined based on its p-value (Hair *et al.*, 2010). Table VI and Figure 2 present the results of hypothesis testing.

Table VI shows the results; the path significance is determined based on the p-value. Furthermore, Figure 2 illustrates the standardized path coefficient (β) with the p-value in parentheses together with the corresponding variance explained by the model (R^2). The results imply that 86 percent of the variance (squared multiple correlation) in customers' intention to use internet banking is explained by the relevant dimension, while the actual use of internet banking is able to explain 16 percent of the variance. In addition, Table VI shows, in *H1*, the relationship between PUSE for ATTD was proposed as positive and the results are admitting the validity of hypothesis. The value of path coefficient $\beta = 0.025$ at a significant $p < 0.01$. This implies that the results are strongly supporting the hypothesis. In *H2*, the relationship between PEOU for was proposed as positive and the results are admitting the validity of hypothesis. The value of path coefficient $\beta = 0.324$ at a significant $p < 0.01$. In *H3*, the relationship between PSEC for ATTD was proposed as positive and the results are admitting the validity of hypothesis. The value of path coefficient $\beta = 0.274$ at a significant $p < 0.01$. In *H4*, the relationship between ATTD for

Goodness-of-fit measures	χ^2/df (χ^2, df)	p-value	GFI	SRMR	CFI	NFI	IFI	TLI	RMSEA	
Recommended value	⩽3.00	⩾0.05	0.90	0.10	0.90	0.90	0.90	0.90	0.08	**Table V.**
Measurement model	2.5 (963.26, 394)	0.00	0.885	0.034	0.96	0.94	0.96	0.95	0.055	Measures of
Structural model	2.75 (1,256.43, 456)	0.00	0.872	0.07	0.956	0.933	0.956	0.946	0.061	the model fit

Hypothesis/path	Path coefficient	SE	Critical ratio	p-value	Results
PUSE→ATTD	0.025	0.047	3.638	***	Supported
PEOU→ATTD	0.324	0.053	6.933	***	Supported
PSEC→ATTD	0.274	0.049	5.849	***	Supported
ATTD→AINTN	0.324	0.087	3.406	***	Supported
SELF→AINTN	0.32	0.082	3.358	***	Supported
RTCH→AINTN	0.021	0.061	0.385	0.7	Not supported
PCAV→AINTN	0.022	0.077	0.274	0.784	Not supported
POPR→AINTN	0.928	0.099	11.195	***	Supported
AWAR→AINTN	0.001	0.065	4.02	***	Supported
AINTN→AUSE	0.411	0.047	9.259	***	Supported

Table VI.
Hypothesis
testing results

Notes: PEOU, perceived ease of use; PUSE, perceived usefulness; PSEC, security; ATTD, attitude; AINTN, intention; SELF, self-efficacy; PCAV, PC availability; POPR, perception of price; AUSE, actual usage; AWAR, awareness; RTCH, resistant to technology. ***Significant at $\alpha \leq 0.001$

Figure 2.
Schematic of a
neural network
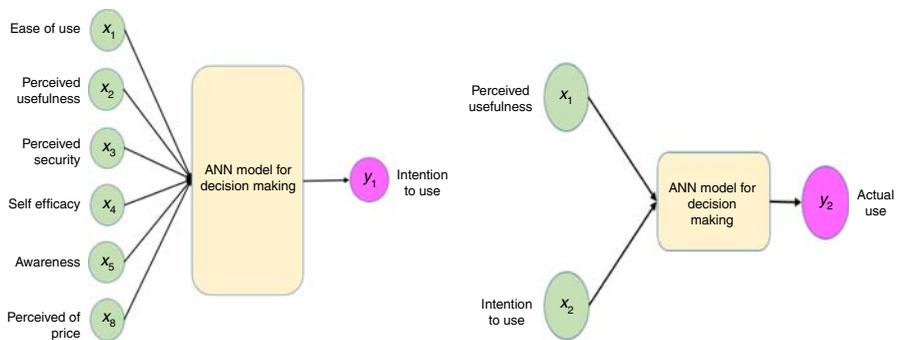
ATTD was proposed as positive and the results are admitting the validity of hypothesis. The value of path coefficient $\beta = 0.324$ at a significant $p < 0.01$. In *H5*, the relationship between SELF for ATTD was proposed as positive and the results are admitting the validity of hypothesis. The value of path coefficient $\beta = 0.32$ at a significant $p < 0.01$. In *H6*, the relationship between RTCH for ATTD was proposed as positive and the results are admitting the validity of hypothesis. The value of path coefficient $\beta = 0.021$ at a significant $p < 0.7$. In *H7*, the relationship between PCAV for ATTD was proposed as positive and the results are admitting the validity of hypothesis. The value of path coefficient $\beta = 0.784$ at a significant $p < 0.01$. In *H8*, the relationship between POPR for ATTD was proposed as positive and the results are admitting the validity of hypothesis. The value of path coefficient $\beta = 0.928$ at a significant $p < 0.01$. In *H9*, the relationship between AWAR for ATTD was proposed as positive and the results are admitting the validity of hypothesis. The value of path coefficient $\beta = 0.001$ at a significant $p < 0.01$. In *H10*, the relationship between AINTN for AUSE was proposed as positive and the results are admitting the validity of hypothesis. The value of path coefficient $\beta = 0.411$ at a significant $p < 0.01$. This implies that the results are strongly supporting *H1–H5* and *H8–H10*. However, resistance to technology (*H6*) and PC availability (*H7*) did not show significant impact on intention to use internet banking.

ANN analysis
The significant determinants from the SEM analysis were employed as the input variables for the ANN analysis using SPSS 23. A multi-layer perceptron (MLP) with a

feedforward-back propagation algorithm in which the input signals are fed in a forward direction while the error signals propagate in a backward direction were engaged. Based on the conceptual model presented in Figure 1, two different neural networks are presented. The first neural network captures the effect of the six input variables ease of use (x_1), perceived usefulness (x_2), perceived security (x_3), self-efficacy (x_4), awareness (x_5) and perceived price (x_8), and the output layer, consisting of one parameter, intention to use (y_1). The second neural network studies the effect of perceived usefulness and intention to use e-banking based on actual use of e-banking. Figure 2 presents a schematic structure of the neural network of perceptron optimization of the ANN obtained by studying the layout of the network and assessing the correlation between the experimental data obtained and the output of the neural network (predicted values). To avoid over-fitting, a tenfold cross validation with a data partition of 90:10 for training and testing was conducted. The number of hidden neurons was generated automatically and the sigmoid function was used for both output and hidden layers (Tan *et al.*, 2014).

The relevance of the predictor variables was validated based on the number of non-zero synaptic weights connected to the hidden layer. RMSEA was used to assess the accuracy of the ANN model, while the normalized importance of each predictor was calculated in the sensitivity analysis (Table VII). The mean RMSEA values ranged from 0.0755 to 0.0849, indicating high predictive accuracy.

For further analysis, Table VIII illustrates the overall independent importance of the variables in the data. The sensitivity analysis of variable importance of the first neural network shows that perceived usefulness was the most essential determinant of customer intention to use e-banking services, followed by self-efficacy and perceived price.

Neural network	Input neurons: EOU, PU, PS, SEF, AWR and POP, output nodes: INT		Input neurons: PU and INT, output nodes: ACU	
	Training	Testing	Training	Testing
1	0.0768	0.0655	0.0803	0.0972
2	0.0734	0.0738	0.0837	0.0887
3	0.0718	0.0721	0.0840	0.0870
4	0.0815	0.0791	0.0782	0.0772
5	0.0841	0.0876	0.0706	0.1052
6	0.0617	0.0736	0.0791	0.0734
7	0.0750	0.0937	0.0639	0.0775
8	0.0851	0.0914	0.0754	0.1050
9	0.0845	0.0943	0.0629	0.0655
10	0.0876	0.0897	0.0764	0.0720
Mean RMSE	0.0782	0.0821	0.0755	0.0849
SD	0.0080	0.0105	0.0075	0.0140

Table VII.
RMSEA values and sensitivity analysis

Independent variable	Importance	Normalized importance (%)	Independent variable	Importance	Normalized importance (%)
PU	0.239	100.0	PU	0.576	100.0
SEF	0.203	84.9	INT	0.424	73.8
POP	0.172	71.8			
PS	0.151	63.2			
AWR	0.118	49.2			
EOU	0.116	48.6			
Dependent variable: INT			Dependent variable: ACU		

Table VIII.
Overall independent variable importance

The second neural network shows that perceived usefulness was the most essential determinant of customers' actual use of e-banking services. This result highlights the importance of perceived usefulness as a main predictor of both intention and actual use of e-banking services.

Discussion

This study integrates SEM with ANN to overcome the shortcomings of both techniques by first validating the proposed model using SEM, followed by examining the normalized importance of the significant determinants derived from the SEM analysis. The descriptive statistics reveal that all respondents have heard of e-banking services but only 54 percent of them use such services. This demonstrates that marketing instruments for e-banking services within banks have not played a successful role in providing full awareness or the benefits of e-banking services to clients. It would seem that the problem of non-intention to use e-banking services is strongly related to the promotion of e-banking services by the banks.

The results imply that the relevant dimension explains 86 percent of the variance in customers' intention to use internet banking, while the actual use of internet banking is able to explain 16 percent of the variance. As Table VI shows, the findings reveal that ease of use, perceived usefulness, perceived security, self-efficacy, awareness and perceived price have significant and positive impacts on intention to use internet banking, supporting *H1–H5* and *H8–H10*, whereas resistance to technology and PC availability (*H6* and *H7*) show no significant impact on intention to use internet banking.

Perceived ease of use has a significant impact on the intention to use e-banking services and this plays an important role in intention to use on the part of customers. This result implies that banks need to make e-banking services easier to use. The research results reveal that issues with ease of use have a significant impact on the intention to use e-banking services; problems stem from the lack of smoothing instruments in banks to enable clients to feel comfortable with their use and adopt e-banking services. Complicated electronic procedures and the excessive time taken to execute financial processes are indicative of challenges in the use of e-banking services. The impact of perceived ease of use on the intention to use e-banking services has been put forward by numerous researchers (AL-Majali and Mat, 2011; Cheng *et al.*, 2006). In addition, this result is in line with those of Rawashdeh (2015) and, to some extent, with Rodrigues *et al.* (2017), which show that perceived ease of use, perceived usefulness, subjective norms, security and trust, internet experience and enjoyment are important factors that affect customers' adoption of e-banking in Jordan. However, this result is inconsistent with that of Adapa and Roy (2017), who show that technological factors, channel factors and value-for-money factors partially influence consumers' post-adoption behavior with regard to internet banking.

Table VI confirms that perceived usefulness has a significant positive impact on intention to use e-banking services. This finding suggests that the degree to which a respondent believes the use of e-banking services would improve his/her (job) performance is low. This result is consistent with the current literature (AL-Majali and Mat, 2011; Cheng *et al.*, 2006; Yiu *et al.*, 2007). Also, it reveals that internet security has a significant impact on the intention to use e-banking services. A high value for the standardized coefficient ($\beta = 0.415$) compared to other variables suggests its strong effect on the intention to use e-banking services. This result suggests that Jordanian customers are concerned about the safety of e-banking services. It appears that people do not trust the internet as a whole, which, in turn, provides a reason for non-intention to use e-banking services. Presumably, through observations, Jordanian people do not know who might be looking at their transactions. This behavior might be influenced by political tensions in the region and the censorship by government on the internet (see Warf, 2012). Security is a key factor because

it is influenced by other social-economic variables. For example, one instance of adverse media publicity can harm consumer trust in e-banking. An effective response to such publicity can assist in allaying customer concerns and restore their trust. Some banks provide such updates to their customers; however, others do not. This suggests there is a general need for banks to redevelop their strategies for presenting security information in a manner that is easy to understand, in order to enhance the perception of e-banking as a safe process for conduct banking business. Empirical findings (Guerrero, 2007) support this.

The findings also reveal that a reasonable price has a significant impact on the intention to use e-banking services. The price/cost of the internet use in Jordan is relatively high due to taxes imposed by the government on communication companies, while the average income level is low. The lack of disposable income has made it difficult for the public to keep up with the rising cost of internet use. This result demonstrates that the price of the internet is not coherent with people's income, which then affects the cost of the use of e-banking services and intention to use such services. Banks could reduce operating costs for their customers, providing a low-cost service. According to Table VI, resistance to change has no significant impact on the intention to use e-banking services.

The ANN results show that the mean RMSEA values range from 0.0755 to 0.0849, indicating high predictive accuracy. The overall importance of the independent variable of the first neural network shows that perceived usefulness is the most essential determinant of customer intention to use e-banking services, followed by self-efficacy and perceived price. The second neural network shows that the perceived usefulness is the most essential determinant of customers' actual use of e-banking services, highlighting the importance of perceived usefulness as a main predictor of both intention and actual use.

Conclusion and recommendations
In this study, factors that contribute to enhancing the intention to use e-banking are presented in the context of the banking sector in Jordan by integrating the TAM and TPB models. The conjoined SEM–ANN analysis provides a more holistic understanding and thus may provide significant methodological contributions from the statistical point of view. Such research will help banks to formulate marketing strategies, which will lead to the creation of suitable products that attract customers to use e-banking and thus reduce their operating costs.

This study could be helpful to bankers in explaining the currently relatively low penetration rate of e-banking in formulating strategies to encourage the adoption and acceptance of e-banking by Jordanian customers, a country in which e-banking is still considered an innovation. It also contributes to the literature on technology adoption and acceptance, which many researchers have recommended be expanded to new contexts, specifically in terms of the generalizability and applicability of the TAM in a new context (online banking), with a new user group (consumers) and in new cultural setting (Jordan), a critical step in advancing a theory. The findings of this study provide support for the current literature on e-banking services. The results support the view that the intention to use e-banking services is influenced by several major factors, including perceived usefulness, perceived ease of use, security and reasonable price. However, these factors are notable as barriers to intention to use e-banking services in Jordan.

Managerial implications
Out of the eight dependent factors that introduced into the model, only the sub-dimension of relative advantage shows a significant relationship with consumers' continued use of e-banking behavior. This finding is particularly important for bank managers in formulating effective strategies for service delivery channel to retain and expand their existing customer base (Adapa and Roy, 2017). Bank managers need to focus more on using

marketing communications in order to widely publicize the advantages associated with the use of e-banking. Bankers can use advertising to influence consumers' attitudes toward the e-bank services, which, in turn, affect the intention to use e-banking (Page and Luding, 2003; Laskey *et al.*, 1992). Word-of-mouth (WOM) is another way to influence consumers' attitudes that can take place in a telephone conversation or within the context of a chat group on the internet (Kasper Helsdingen and Vries, 1999). Thus, both advertising and WOM process are offer special solutions to the problem of intangibility of services and they might help to overcome a service's problem of credibility (Bayus, 1985). Furthermore, personal selling is other way to increase the awareness between customers and influence their attitudes (Burnett and Moriarty, 1998; Kasper *et al.*, 1999).

Furthermore, bank managers need to improve the security features of their systems to assure their customers that e-banking services are safe. Emphasizing positive safety features could contribute to changing negative customer perceptions. Hence, banks should disseminate an effective message to users that current security is more than adequate, thereby enabling users to feel secure when using e-banking services. Bank managers should also enhance their use of shared value by collecting data regarding preferences and feedback from customers. This could be implemented through online surveys and/or a discussion forum. Such actions could improve the intention to use e-banking services.

Additional research could be conducted, as this study does not cover all the variables that affect intention to use e-banking services. Further research could focus on other variables, such as bank management, image or quality of online services. Moreover, examining other theories would greatly support decision makers and researchers in Jordan. Conducting comparative research in other countries with similar conditions would also extensively enrich and enhance current knowledge.

Summary statement of contribution
This study adopted a sequential predictive-analytic method by integrating both SEM and ANN. This helps in providing a more holistic understanding of the phenomenon under study and provides a significant methodological contribution from a statistical point of view.

It also makes significant practical contributions by highlighting the fundamental aspects taken into account by clients in shaping their decision to adopt e-banking, which helps in creating suitable products that attract them to use e-banking.

Note
1. Generally speaking, the more independent variables we have in the model, the more likely we experienced multicollinearity issues.

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Appendix

Construct	Indicator

Perceived ease of use (PEOU)
> Using the internet banking service is easy for me
> I find my interaction with the internet banking services clear and understandable
> It is easy for me to become skillful in the use of the internet banking services
> Overall, I find the use of the internet banking services easy

Perceived usefulness (PUSE)
> Using the internet banking would enable me to accomplish my tasks more quickly
> Using the internet banking would make it easier for me to carry out my tasks
> I would find the internet banking useful
> Overall, I would find using the internet banking to be advantageous

Perceived security (PSEC)
> I would feel secure sending sensitive information across the internet banking
> The internet banking is a secure means through which to send sensitive information
> I would feel totally safe providing sensitive information about myself over the internet banking
> Overall, the internet banking is a safe place to transmit sensitive information

Self-efficacy (SELF)
> I am confident of using internet banking if I have built-in online "help" function for assistance
> I am confident of using internet banking even if have only the online instructions for reference
> I am confident of using internet banking if I could call someone for help if I got stuck

Awareness of internet banking services (AWRN)
> I receive enough information about what internet banking services are out there
> I receive enough information about the benefits of internet banking
> I receive enough information of how to use internet banking
> I never received information about internet banking from the bank

PC availability/facilitating conditions (PCAV)
> I have the resources necessary to use internet banking transactions
> I have the knowledge necessary to use internet banking transactions
> internet banking is compatible with other systems I use

Resistant to technology (RETT)
> I am interested to hear about new technological developments
> Technological developments have enhanced our lives
> I feel comfortable in changing and using internet banking services for my financial activities
> I like to experiment with new technologies such as internet banking services

Perceived of price (POPR)
> You would be charged more to use internet banking transactions
> Network connection fees for internet banking transactions are expensive
> Extra services charged for internet banking transactions is expensive
> internet banking transactions expenses are burdens for you
> Total costs to perform internet banking transactions are more expensive than via other channels

Attitude (ATTD)
> I think that using internet banking is a good idea
> I think that using internet banking for financial transactions would be a wise idea
> I think that using internet banking is pleasant
> In my opinion, it is desirable to use internet banking

(*continued*)

Table AI.
Survey items

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Table AI.

Construct	Indicator
Intention (INTN)	
	I intend to continue using internet banking in the future
	I will recommend others to use internet banking
	I would always prefer e-banking
	I am satisfied with advantages that internet banking usage brings
Actual use of e-banking (AUSE)	
	I use internet banking often
	I use internet banking more frequently than classic banking
	I use internet banking as main way of using banking services

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