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An Integrated Model for M-Banking Adoption in Saudi Arabia

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Abstract

Purpose – This study aims to identify and examine the most important factors that could predict the Saudi customer's continued intention towards adoption of mobile banking.

Design/methodology/approach – The proposed conceptual model was based on the Technology Acceptance Model (TAM) and Task-Technology Fit (TTF) model. This is also expanded by considering two additional factors: perceived privacy and perceived security. By using a self-administered questionnaire, the data was collected from a convenience sample of Saudi banking customers from different parts of Saudi Arabia.

Findings – The main results based on structural equation modelling analyses supported the impact of perceived privacy, perceived security, perceived usefulness, and task-technology fit on the customers' continued intention to use mobile banking.

Research limitations/implications – The moderation influence of the demographic factors (i.e. age, gender, income level, educational level) was not tested. The data was also collected using a self-report questionnaire; however, it would be more accurate to utilise more statistics from the bank database about the users of m-banking.

Originality/value – This study represents a worthy attempt to test such novel technology (m-banking) in the KSA where there is a scarcity of literature. A considerable theoretical contribution was also made by integrating the TTF model with the TAM in addition to consider privacy and security in one single model. Moreover, considering both perceived privacy and security in the current model creates an accurate picture about the adoption of m-banking especially as there are a limited number of m-banking studies that have considered privacy and security alongside the TTF model and TAM in the same model.

Keywords: Mobile banking, TTF, TAM, Saudi Arabia, Intention, Adoption

1. Introduction

Mobile banking (m-banking) addresses the essential restriction of e-banking as it decreases the user's requirement to merely a mobile phone rather than relying on a PC device with Internet connections (Adholiya et al., 2012; Alalwan et al., 2016; Al-Otaibi et al., 2018; Laukkanen and Pasanen, 2008; Mullan et al., 2017; Sharma and Al-Muharrami, 2018; Zhou, 2012; Zhou, 2011). For this reason, mobile devices have increasingly become instruments that consumers adopt for banking services such as making payments, checking balances and statements, viewing account details, viewing and cancelling Direct Debits, and easily identifying user transactions (Alalwan et al., 2017; Coetzee and Eksteen, 2011; Jeong and Yoon, 2013; Kim et al., 2009; Lee and Chung, 2009; Priya et al., 2018; Santander Bank, 2017; Singh and Srivastava, 2018; Slade et al., 2015a; Slade et al., 2015b).

According to the Board of Governors of the Federal Reserve System (2013), among mobile phone users, the rate of m-banking adoption increased from 21% to 28% between 2011 and 2012. Furthermore, among owners of smartphones, the rate of using m-banking went up from 42% to 48% between 2011 and 2012. Moreover, according to the British Bankers' Association (2015), there is a notable growth with m-banking as payment via apps, which ascended in 2015 by 54% with a value of £347m. Interestingly, China has witnessed a radical increase in the adoption of m-banking since 2015. As such, the gross transaction volume which was done through using m-banking soared from 65.5 trillion Yuan in 2015 to reach 179 trillion Yuan in 2017. In addition, the transaction volume is supposed to increase in 2018 to reach 244.9 trillion Yuan (Statista, 2017).

The steadily growing adoption of m-banking cannot merely be interpreted as being due to the ability of m-banking to provide accessibility to financial services remotely, but also as being due to the unique characteristics of mobiles used in m-banking which support the issue of personal security (Coetzee and Eksteen, 2011; Jahangir and Begum, 2008; Jeong and Yoon,

2013; Shareef et al., 2018). For instance, through using an iPhone, the user can upload a securely protected photo of his/her debit/credit card and use it in financial transactions and payments without the need to hold physical cards anymore (Cellan-Jones, 2016; Kaymaz, 2017; Santander Bank, 2017). Furthermore, with a passcode and finger ID check, there is no possibility of a third party stealing or penetrating the device (Apple Pay, 2017; Deloitte LLP UK member firm of DTT, 2016; Martin, 2016). These multiple shields of privacy and security have increased the reliance of users on their mobiles while doing m-banking and, hence, maximised their continued intention to use an m-banking service (Bannister, 2014; Barclays, 2017; Pay by Bank app, 2016; Rolfe, 2015).

M-banking technology comprises several kinds of benefits that really accelerate customers' continued intention to use such technology. For instance, using m-banking helps customers to access a wide range of banking transactions (i.e. balance enquiries, fund transfers, payment of bills) without time and place restrictions (Lee et al., 2015; Lin, 2011; Lin, 2013). This, in turn, reduces the associated cost and time of launching such banking services, and accordingly, maximises the level of perceived usefulness in using m-banking (Alalwan et al., 2016). Further, using m-banking could also help banks to reach customers who reside in a particular area that has a weak Internet infrastructure or difficulties in establishing bank branches (Cruz et al., 2010; Mishra and Bisht, 2013; Shareef et al., 2012; Shareef et al., 2014). By the same token, due to the growth of m-banking espousal at an international level, the literature of the information systems field has investigated the factors that increase the continued intention to use m-banking (Afshan and Sharif, 2016; Akturan and Tezcan; 2012; Alalwan et al., 2016; Isac, 2013).

On the other hand, there are a number of barriers that could hinder customers' intention or continued intention to use m-banking. For example, customers in developing countries such as Saudi Arabia display habitual behaviour in accessing banking transactions via traditional channels, and therefore, there is always difficulty in persuading such bank clients to use m-banking (Laukkanen et al., 2007; Laukkanen and Cruz, 2009). Customers are also concerned about security and privacy issues when they are in process of using m-banking. For instance, problems related to the initial cost of using m-banking or having Internet access are reported by Yang (2009), Yu (2012), and Hanafizadeh et al. (2014) to be the main barriers hindering the customer's willingness to use m-banking. Other m-banking researchers (i.e. Hanafizadeh et al., 2014; Jeong and Yoon, 2013) have reported the negative impact of perceived risk in

hindering the adoption of m-banking as well. Furthermore, customers usually do not have adequate information, observability, and technical support to successfully use m-banking. This is attributed to the weak role of banks in this regard (Cruz et al., 2010).

The m-banking service, as a ubiquitous phenomenon, has been extended to include users within the context of Saudi Arabia. According to AVAYA (2017) and SyndiGate (2017), 24% of Saudi mobile users expressed their intentions to contact their financial institutions via mobile apps. Furthermore, 40% of Saudi users prefer using their mobiles for all services including m-banking. Also, in case of lack of security and privacy, 52% of Saudi m-banking users would shift their m-banking use from one bank to another one. In addition, 43% of them prefer contacting Virtual Financial Advisors (VFAs) through using m-banking for renewing their card details. Moreover, through Vision 2030, the government of Saudi Arabia has embraced and asserted the importance of information systems, including m-banking, in easing the lives of Saudi people. Also, through the NEOM Project, with a budget of nearly half a trillion US dollars on an area of 23000 km^2, the Saudi government aims to create a smart city on the national borders between Saudi Arabia, Jordan, and Egypt to be an economic technological hub as enshrined by Crown Prince Mohammad Bin Salman. Thus, it can be deduced that the current and future political direction of Saudi decision makers is to increase the reliance of people on using information technology services including m-banking (CNBC, 2017; Elnakat, 2017; Vision 2030, 2017).

Hence, it is a scientific as well as practical and societal necessity to try to identify factors that influence the continued use of m-banking among users within the context of Saudi Arabia as duly mentioned by Al-Husein and Sadi (2015), Al-Jabri and Sohail (2012), Alkhaldi (2016), Al-Otaibi et al. (2018), Alsheikh and Bojei (2014) and Hidayat-ur-Rehman (2014), who have examined these factors.

This study, however, is unique as it combines two models (i.e. the Technology Acceptance Model (TAM) of Davis (1989) and the Task-Technology Fit (TTF) model of Goodhue and Thompson (1995). In relation to the TAM, this study adopts two variables (i.e. perceived usefulness (USF) and perceived ease of use (EOU)). With regard to the TTF model, this study adopts three variables (i.e. task characteristics, technology characteristics, and TTF). In addition, the study includes two independent factors (i.e. perceived privacy and perceived security). This combination of the two theories and perceived security and perceived privacy

variables aims to increase the prediction power of the continued intention to use m-banking among Saudi users.

2. Literature Review

Identification of the factors which influence continuous intention to use m-banking has been conducted through reliance on a number of theories in the Information Technology and Information Systems field (Shaikh and Karjaluoto, 2015). For instance, Abbas et al. (2018), Al-Husein and Sadi (2015), Chaouali et al. (2017), Mostafa and Eneizan (2018), and Mutahar et al. (2018) implemented an extended TAM; Chawla and Joshi (2018) extended the TAM and Innovation Diffusion Theory (IDT); Lee (2009) integrated Theory of Planned Behaviour (TPB) and the TAM; Al-Jabri and Sohail (2012) and Kapoor et al. (2015) embraced IDT; Yu (2012) embraced the Unified Theory of Acceptance and Use of Technology (UTAUT); and Alalwan et al. (2017) adopted UTAUT2 with trust.

With regard to the TAM, there are extensive studies that used this model in order to examine the factors that influence the continued intention to use m-banking in an international context (e.g. Lee, 2009; Munoz-Leiva et al., 2018; Nasri and Charfeddine, 2012; Yeow et al., 2008). In their systemic review study of 55 articles examining the adoption of m-banking, Shaikh and Karjaluoto (2015) highlighted the fact that the TAM has been the most frequent model applied as theoretical foundation to predict the customers' intention to adopt m-banking. In detail, as stated by Shaikh and Karjaluoto (2015), about 23 studies have employed the TAM and its basic constructs: perceived usefulness and ease of use. Nevertheless, the TAM does not cover the most important aspects which could be considered by customers in forming their intention and decision to use m-banking (Shaikh and Karjaluoto, 2015). And therefore, there are several different factors (i.e. relative advantage, personal innovativeness, perceived risk, perceived cost of use, compatibility, awareness, lifestyle, and perceived security) that have been proposed alongside with TAM constructs (see Shaikh and Karjaluoto, 2015).

In relation to the TTF model, a considerable number of studies have affirmed the power of explanation the TTF model has on individual performance within the context of m-technologies in general (e.g. Junglas et al., 2008), mobile information system studies (e.g. Gebauer and Shaw, 2004; Junglas and Watson 2003; Malaquias et al., 2018; Mehrad and Mohammadi, 2017; Liang and Wei 2004), and m-banking in particular (Gebauer et al., 2005; Lee and Chung, 2009; Lin, 2012; Oliveira et al., 2014; Vatanasombut et al., 2008; Zhou et al.,

2010; Zhou et al., 2010). However, regarding the continued intention to use m-banking within the context of Saudi Arabia, up to date, the application of TTF on m-banking in Saudi Arabia has not been undertaken and, hence, using TTF as a predicting power for examining continued intention to use m-banking is tackled in this study. Moreover, the issue of perceived security as a key factor in influencing continued intention to use m-banking has been thoughtfully examined in the literature (i.e. Haider et al., 2018; Jahangir and Begum, 2008; Kim et al., 2009; Linck et al., 2006; Nie and Hu, 2008; Sharma and Sharma, 2019). Also, perceived privacy was indicated as an efficient predictive factor over continued intention to use m-banking (e.g. Casalo et al., 2007; Choudrie et al., 2018; Jahangir and Begum, 2008; Finn et al., 2013).

Furthermore, various studies tend to combine factors mentioned in two models or more in order to achieve maximum power of prediction of the user's continued intention to use m-banking (e.g. Oliveira et al., 2014; Zhou et al., 2010, Zhou, 2018; Zoghlami et al., 2018). As such, Zhou et al. (2010) combined UTAUT2 and TTF in order to examine m-banking. They found that performance expectancy, social influence, and facilitating conditions from UTAUT and TTF positively impact users' continued intention to use m-banking. Furthermore, Oliveira et al. (2014) combined three models (i.e. UTAUT, and TTF, and the initial trust model (ITM)). After analysing the data of 194 users of m-banking within the context of Portugal, they indicated that facilitating conditions and behavioural intention positively influenced the continuous usage of m-banking. Furthermore, Yuan et al. (2016) adopted a model that combined TTF, the TAM, and perceived risk into the expectance-confirmation model (ECM) in order to measure the continuous intention to use m-banking within the domain of China. After collecting and analysing the data from 434 m-banking users who already have prior experience, the findings suggest that perceived TTF, perceived usefulness, satisfaction, and perceived risk significantly influence users' continuous intention to use. Furthermore, they found that perceived USF is impacted by perceived EOU, confirmation, and perceived TTF. Nonetheless, they found that perceived EOU does not significantly influence users' continuous intention to use m-banking.

A recent study conducted by Munoz-Leiva et al. (2018) has supported the role of both perceived usefulness and perceived ease of use on customers' attitudes toward m-banking. However, Munoz-Leiva et al. (2018) stated that there was no impact of perceived usefulness on customers' intention to use m-banking. Another recent study by Chaouali et al. (2017)

asserted the positive role of customers' attitudes in predicting customers' willingness to adopt m-banking in Tunis. In their longitudinal study to test the adoption of m-banking in Brazil, Malaquias et al. (2018) empirically noticed that with the passage of time on the use of m-banking, there is an improvement in the level of consumer perception toward aspects pertaining to task characteristics, trust, ease of use, and social influence. More recently, three factors from the IS success model (information quality, system quality, and service quality) along with trust were proposed by Sharma and Sharma (2019) to predict the customer's intention to use m-banking. Sharma and Sharma (2019) found out that both customers' intention and satisfaction were largely predicted by the role of service quality, information quality, and trust. In their meta-analytic study, they supported the moderation role of power distance on the relationship between social influence and trust with customers' intention to use m-banking. According to the same study of Zhang et al. (2018), individualism has a significant role in moderating the relationship between factors such as performance expectancy, effort expectancy, and perceived risk with customers' intention.

Looking carefully at these studies leads the reader to notice the importance of the benefits perceived in using m-banking as well as the extent to which m-banking is easy to use by customers. In addition, according to the outcomes of these studies, it is important to consider the aspects pertaining to characteristics of the financial tasks performed by m-banking as well as characteristics of m-banking as a technology. Further, m-banking could expose banking customers to a number of issues related to their own information and money privacy and security. Such issues have been largely addressed either generally for online banking channels (i.e. Internet banking) or specifically for m-banking. Therefore, there is always a need to consider these aspects in one single model to see how the customer's attitude, intention, continued intention, or actual adoption could be shaped. More discussion in this regard will be provided in the conceptual model section.

It is also worth mentioning that even though there are a good number of studies that have tested the adoption of m-banking over developing countries (i.e. Malaysia, Singapore, Ghana, Zimbabwe, and India) (see Shaikh and Karjaluoto, 2015), there are few attempts over the Arab countries (i.e. Jordan and Saudi Arabia) (Alalwan et al., 2017; Baabdullah et al., 2019). More specifically, within the context of Saudi Arabia, a small number of studies have focused on the issue of online banking in general (e.g. Alabdan, 2017; Al-Ghaith et al., 2010; Al-Malkawi et al., 2016; Al-Somali et al., 2009; Awan et al., 2016) and m-banking in particular

(i.e. Al-Husein and Sadi, 2015; Al-Jabri and Sohail, 2012, Alkhaldi, 2016; Al-Otaibi et al., 2018; Alsheikh and Bojei, 2014; Hidayat-ur-Rehman, 2014).

In relation to the TAM, Al-Husein and Sadi (2015) adopted an extended TAM that includes self-efficacy, quality of Internet connection, resistance to change, and trust. Their findings show that behavioural intention significantly impacts the continued intention to use m-banking within Saudi Arabia. In addition, Alkhaldi (2016) asserted the importance of perceived security and perceived privacy factors as either deterrent factors that prevent continued intention to use m-banking among Saudi users in cases of perceiving low levels of security and privacy or attracting factors in cases of perceiving high levels of security and privacy. In addition, the findings of Al-Husein and Sadi (2015), which derived from the TAM, indicate that financial centres should emphasise their security features in order to increase the security perceptions of users. This would result in aggregating the level of continued intention to use m-banking within Saudi Arabia. Moreover, through relying on a modified TAM, Alabdan (2017) found that the continued intention to use m-banking among Saudi females is affected by a number of factors (i.e. trust, perceived security, user-friendly, comfortable, and availability). Among the aforementioned factors, Alabdan (2017) indicated that perceived security constitutes the most significant factor over continued intention to use m-banking in Saudi Arabia.

Thus, within the context of Saudi Arabia, there are a few studies that have adopted the TAM, perceived security, and perceived privacy; however, no study used TTF in order to predict continued intention to use m-banking. In the following conceptual model section, the TAM, TTF, perceived security, and perceived privacy will be discussed.

3. Conceptual Model

This study adopts a conceptual model that combines four distinctive factors (i.e. factors belonging to the TAM, factors belonging to the TTF model, perceived privacy, and perceived security) as seen in Figure 1.

<div align="center">**<Figure 1 about here>**</div>

With regard to TTF, strictly speaking, there are two theories in the literature. The theory of TTF was suggested by Goodhue and Thompson (1995) and argues that TTF is an essential idiom in explaining and evaluating information system success. This theory is concerned with

a person's adoption of information systems and established a predominantly positivistic approach pertinent to information systems in common. Another theory is that of Zigurs and Buckland (1998). It introduces a systematic profile for the combination of task technology between Group Tasks and Group Support Systems. This theory concentrates on the adoption of information systems by groups, rather than individuals, and develops a fit profile applicable particularly to Group Support Systems. This study will consider the theory of Goodhue and Thompson (1995) when examining the TTF model.

Indeed, the TAM considers only two main aspects regarding technology acceptance from the individual perspective: perceived ease of use and perceived usefulness. This, in turn, restricts the ability of the TAM to provide an accurate and comprehensive view about the main aspects predicting the individual's intention and actual adoption of new systems (Agrawal and Prasad, 1999). Accordingly, it has usually been noticed that the TAM is weakly able to predict adequate level of variance in both intention and actual adoption (see Legris et al., 2003; Venkatesh et al., 2003; Venkatesh and Davis, 2000). This could be due to the fact that the TAM model does not cover the impact of individuals' characteristics, technological characteristics, environmental impact, and the role of such factors (privacy and security) (Alalwan et al., 2016; Venkatesh and Davis, 2000; Venkatesh et al., 2003). The main aspects missing in the TAM has been covered in the TTF model, such as task characteristics and technology characteristics, while customers' belief toward aspects of ease of use and usefulness is not covered in the TTF model but addressed by the TAM (Dishaw and Strong, 1999). All things considered have motivated the current study to have an expanded and integrated model considering the TAM, the TTF model, and two other external factors: perceived privacy and perceived security.

Regarding the justification of the integration of the TTF model and the TAM, it can be indicated that this elaboration is provided by the arguments of Goodhue and Thompson (1995) as they made a link between their models and the technology usage model of Bagozzi (1982) (Dishaw and Strong, 1999). Bagozzi's model, which resembles the TAM, was constructed and developed based on attitude and behaviour models to interpret the utilisation of technology (Dishaw and Strong, 1999).

The common argument for putting the TTF model and the TAM into one model is that each one of these models captures two distinctive facets of consumers' selections to utilise information systems (Dishaw and Strong, 1999; Klopping and McKinney, 2004). As such,

the TAM presumes that attitudes and beliefs of the consumers regarding certain information technology extensively determined whether consumers show the behaviour of utilising the information technology (Goodhue, 1995; Shaikh et al., 2018). The TTF model, however, assumes that users tend to utilise information technology to get benefits such as enhancing their job performance (Lee et al., 2007).

That is to say, users tend repeatedly to adopt information technology when it boosts their work even if they do not like it or have negative attitudes towards it (Lee et al., 2007). From this comparison, it can be deduced that the TTF model adopts an approach that is decidedly rational (Goodhue, 1995). This approach is based on the utilisation of the information system to satisfy job performance rather than considering the attitudes of users towards the technological service (Klopping and McKinney, 2004). Accordingly, choices of the users to utilise an information technology service is impacted by two issues (i.e. their beliefs as duly mentioned by the TAM and their rationale as assumed by the TTF model).

Based on the above-mentioned argument, combining the TAM and TTF model is likely to give a robust explanation on the utilisation of information technology, and this explanation is higher in its accuracy when comparing it with the one that is based on either the TAM or TTF model (Klopping and McKinney, 2004). In addition, this study added perceived security and perceived privacy to the conceptual model due to their substantial roles in sensitive technological services that are related to financial dealings such as m-banking (e.g. Alabdan, 2017; Alkhaldi, 2016; Casalo et al., 2007; Finn et al., 2013; Khasawneh et al., 2018; Linck et al., 2006; Mashhour and Saleh, 2015).

3.1 Task Characteristics (Task.C) – Task-Technology Fit (TTF)

Task means "actions" fulfilled by persons in order to turn input into output. Task characteristics include "those [actions] that might move a user to rely more heavily on certain aspects of information technology" (Goodhue and Thompson, 1995, p. 216). There are two main constructs for identifying task characteristics (i.e. "task equivocality" and "task interdependence") (Goodhue and Thompson, 1995, p. 235). Task equivocality aims at dealing with ill-defined business difficulties, ad hoc non-routine business difficulties, and answering new queries in work, while task interdependence focuses on dealing with multi-function business problems (Goodhue and Thompson, 1995). In the model of Fit Focus, Goodhue and Thompson (1995) found that task characteristics positively impact TTF in the field of information technology. With regard to the context of mobile technology, Gebauer et al.

(2010) indicated that dependency on task characteristics is determined through three parameters (i.e. time, location, and identity). As such, in the context of m-banking when tasks are deeply time-critical, the fit focus of the users would be high when using their mobiles (Zhou et al., 2010). This means that users create a high level of TTF (Zhou et al., 2010). Furthermore, when the characteristic of the task requires a high level of mobility, using m-technologies would be optimal for doing such tasks as it increases focus on the task (Oliveira et al., 2014). Thus, there is a fit that exists between tasks that is required mobility and using mobiles. Accordingly, task characteristics do positively impact TTF (Gebauer, 2008). Also, in m-banking when the identity of the user does matter for fulfilling the task, the importance of mobile devices would increase as it plays a role in determining the user's identity (Afshan and Sharif, 2016; Oliveira et al., 2014). A prominent example is the recent production of facial recognition technology in iPhone 8 and 8 Plus which might be decisive in future dealing with transactions that are done via mobiles (Dormehl, 2017). Oliveira et al. (2014) and Zhou et al. (2010) asserted the positive role of task characteristics on TTF as it enables the users of an m-banking service to manage their accounts anytime, transfer anytime elsewhere, and have real time control over their accounts as their financial transactions are urgent. Hence, this study proposes that:

H1: Task characteristics have a positive influence on TTF when using m-banking among consumers within the context of Saudi Arabia.

3.2 Technology Characteristics (Techno.C) – Task-Technology Fit (TTF)

Technology is defined as "tools" adopted by persons in carrying out their tasks (Goodhue and Thompson, 1995, p. 216). While Goodhue and Thompson (1995) indicated that technology referred to computers as their work is relatively old, Oliveira et al. (2014) and Zhou et al. (2010) indicated that it referred to mobiles. Technology characteristics refer to the traits of technological devices or services used by users in order to fulfil their tasks (Afshan and Sharif, 2016). According to Goodhue and Thompson (1995), technology characteristics significantly influence TTF in the Utilisation Focus Model, where utilisation is about the way in which the jobs are designed and not about the usefulness or quality of the adopted information system. There are a number of studies that investigated the effect of technology characteristics over TTF within the domain of m-banking (e.g. Oliveira et al., 2014; Tam and Oliveira, 2016; Yuan et al., 2016; Zhou et al., 2010). Tam and Oliveira (2016) analysed the data from 256 participants, and they found that technology characteristics affect TTF among the users of m-banking in Portugal. According to Zhou et al. (2010), Oliveira et al. (2014),

and Yuan et al. (2016), technology characteristics in m-banking impact the TTF, which results in the continued intention to use m-banking technology. Based on the aforementioned discussion, this study suggests that:

H2: Technology characteristics have a positive influence on TTF when using m-banking among consumers within the context of Saudi Arabia.

3.3 Technology Characteristics (Techno.C) – Perceived Ease of Use (EOU)

EOU is influenced by the technology characteristics, which include tool experience and tool functionality (Dishaw and Strong, 1999). In detail, increasing the level of functionality would result in making the service easier to use (Yuan et al., 2016). Also, as consumers gain greater experience from their use of the service, the technological service is likely to be easier to use (Dishaw and Strong, 1999). Furthermore, according to Pagani (2006), technology characteristics can positively impact EOU of users when using high-speed data services via mobiles. Within the context of m-banking, Zhou et al. (2010) found that technology characteristics affect consumer effort expectancy, which resembles EOU. Therefore, this study assumes that:

H3: Technology characteristics have a positive influence on users' EOU when using m-banking within the context of Saudi Arabia.

3.4 Task-Technology Fit (TTF) – Perceived Usefulness (USF)

If a technological service gives a high level of fit with the task, users would perceive that the adopted service is useful for fulfilling the proposed task (Goodhue and Thompson, 1995). Thus, the positive effect of TTF on USF is derived directly from the definitions of both concepts. A number of studies have found that TTF positively influences USF within the context of mobile technologies (e.g. Chang, 2008; Klopping and McKinney, 2004; Pagani, 2006). According to Yuan et al. (2016), TTF positively impacts perceived USF of Chinese users. Based on this analysis, this study suggests that:

H4: Task-Technology Fit (TTF) has a positive influence on users' USF when using m-banking within the context of Saudi Arabia.

3.5 Task-Technology Fit (TTF) – Continued Intention (CI)

The rationale behind using a technological service is that it helps users in performing their tasks well, and this in turn would motivate users to continue using it (e.g. Goodhue and

Thompson, 1995; Klopping and McKinney, 2004). Accordingly, a high level of TTF would sustain a higher level of continuous intention to use a technological service (e.g. Afshan and Sharif, 2016; Chang, 2008; Pagani, 2006). Within the context of m-banking, Zhou et al. (2010) indicated that TTF positively affects users' continuous intention to use m-banking. Furthermore, Tam and Oliveira (2016) analysed the data from 256 participants, and they found that TTF is an essential precedent that impacts on users' continued intention to use m-banking, particularly when the path of TTF-continued intention to use m-banking is moderated by age. Furthermore, Yuan et al. (2016) found that TTF positively and significantly impacts the continued intention to use m-banking in China. Based on this discussion, this study presumes that:

H5: Task-Technology Fit (TTF) has a positive influence on users' continuous intention when using m-banking within the context of Saudi Arabia.

3.6 Perceived Usefulness (USF) – Continued Intention (CI)

USF is defined as "the degree to which a person believes that using a particular system would enhance his or her job performance" (Davis, 1989, p. 320). Kim et al. (2009) suggested that a person often evaluates the consequences of their actions and then establishes a selection reliant on the favourability of perceived USF. Accordingly, USF would impact an individual's intention to use m-banking as a technological service (Dwivedi et al., 2017b; Gumussoy et al., 2018; Williams et al., 2015). Within the domain of m-banking, persons tend to adopt it when perceiving the usefulness of the service for their financial transactions as well as saving their time (Gu et al., 2009; Shaikh and Karjaluoto, 2015; Zhou, 2012). Moreover, banks tend to use m-banking as it would enable them to reduce their physical branches and staff workforce, which in turn reduces their costs (Jeong and Yoon, 2013; Mashhour and Saleh, 2015; Yuan et al., 2016). Within Saudi Arabia, a number of studies affirmed the positive effect of USF on intention to use m-banking among consumers (e.g. Al-Ghaith et al., 2010; Al-Jabri and Sohail, 2012). Accordingly, this study supposes that:

H6: Perceived usefulness has a positive influence on users' continuous intention when using m-banking within the context of Saudi Arabia.

3.7 Perceived Ease of Use (EOU) – Continued Intention (CI)

EOU is defined as "the degree to which a person believes that using a particular system would be free of effort" (Davis, 1989, p. 320). A considerable number of studies have

indicated that EOU positively impacts the user's continuous intention to use m-banking (e.g. Crabbe et al., 2009; Gu et al., 2009; Laforet and Li, 2005; Mashhour and Saleh, 2015; Priya et al., 2018; Richard and Mandari, 2018). According to Jeong and Yoon (2013), perceiving an m-banking service as easy to use indicates that users felt free from challenge and free from great effort when using it. In contrast, users would denounce continuing use of m-banking when finding that the updates or changes in the service make using it either difficult to learn and/or not easy to use (Hanafizadeh et al., 2014). Therefore, information about m-banking, such as its benefits and guidelines as well as service details, are required to be given in order to make it easier for the users to continue using it (Dwivedi et al., 2016; Dwivedi et al., 2017c; Kim et al., 2009; Rana et al., 2017; Shareef et al., 2012). Within the context of Saudi Arabia, a number of studies examined the positive role of EOU on continuous use of m-banking (e.g. Al-Somali et al., 2008; Sohail and Al-Jabri, 2014). Based on the aforementioned discussion, this study suggests:

H7: Perceived ease of use has a positive influence on intention to use m-banking among consumers within the context of Saudi Arabia.

3.8 Perceived Security (SR) – Continued Intention (CI)

Perceived security is defined as "the extent to which a consumer believes that making payments online is secure" (Vijayasarathy, 2004, p. 748). According to Casalo et al. (2007), perceived security is a two-dimensional construct. Firstly, it includes the perceptions of users about the ways of dealing with and protecting personal data in issues of financial services such as m-banking. Secondly, it includes the security of the information technology used in these financial services. With regard to mobile payments, Linck et al. (2006) delineated a division of the idiom of security into subjective and objective security. While objective security addresses the issues of authorisation, confidentiality, integrity, authentication, and non-repudiation, subjective security is perceived security, and it expresses the level to which a user believes that adopting a certain mobile payment method or using m-banking would be secure. Distinctive studies have affirmed the importance of the role of perceived security on continuous intention of customers to use m-banking (e.g. Gu et al., 2009; Laukkanen, 2007; Mashhour and Saleh, 2015). Moreover, studies by Al-Husein and Sadi (2015) and Alkhaldi (2016) focused on the path of perceived security and the user's intention to use in Saudi Arabia. Hence, this study proposes that:

H8: Perceived security has a positive influence on intention to use m-banking among consumers within the context of Saudi Arabia.

3.9 Perceived Privacy (PV) – Continued Intention (CI)

Perceived privacy is defined as the "user's perceptions about the protection of all the data that is collected (with or without users being aware of it) during users' interactions with an Internet banking system" (Wang et al. 2003, p. 503). It explains the view of users about the facet of an information system that focuses on the capacity an individual possesses to determine the type of electronic data that can be shared with third parties (Dwivedi et al., 2017a; Luarn and Lin, 2005). Perceived privacy affects the process of processing, storing, and distributing the electronic information, and this in turn impacts on the intention of users to adopt m-banking privacy (Finn et al., 2013). Indeed, when it comes to financial transactions, privacy becomes of utmost importance in affecting the continuous behaviour of persons as it affects the privacy of the person, the behaviour and action, communication, data and image, thoughts and feelings, location and space, and association (Finn et al., 2013). That is to say, a low level of privacy enables a third party to know the ways in which the m-banking user spends his/her money, his/her debit and credit. Hence, a low level of privacy would deter the continuous use of m-banking as duly mentioned by Akturan and Tezcan (2012). Various studies have highlighted the role of privacy over continuous intention to use m-banking (e.g. Laukkanen, 2007). Within the context of Saudi Arabia, Alsheikh and Bojei (2014) examined the significant role of privacy on users' intention to use m-banking. Based on the previous discussion, this study suggests that:

H9: Perceived privacy has a positive influence on intention to use m-banking among consumers within the context of Saudi Arabia.

4. Research Methodology

A field survey using a self-administered questionnaire as a data collection instrument was adopted to collect the required data from a convenience sample of Saudi banking customers from four main cities of the KSA (Riyadh, Jeddah, Mecca, and Medina). In spite of the fact that using the probability sampling technique could avoid a number of problems in terms of sampling bias and results generalisability (Bhattacherjee, 2012), using this kind of probability samples was restricted and difficult in the current study. For instance, it was difficult to capture an inclusive and recent list of all the users of m-banking technology in the KSA. This

is one of the most fundamental elements required in the sample frame to use the probability sampling technique (Bhattacherjee, 2012; Dwivedi et al., 2006). Banks in Saudi Arabia never allow information (i.e. contact numbers, addresses, emails) to be given regarding their customers. All things considered, the convenience sampling technique was selected as a more appropriate technique for the current study population (Castillo, 2009; Dwivedi et al., 2006). As for the four cities considered in the current study, Riyadh, Jeddah, Mecca, and Medina are the largest cities in the KSA respectively. The actual population size of these cities are as follows: Riyadh: 6,506,700; Jeddah: 3,976,400; Mecca: 1,919,900; and Medina: 1,271,800 (Worldatlas, 2018). Further, these cities geographically represent all parts of the KSA. Riyadh is the political capital in the south; Jeddah is in the east of the KSA; Mecca is the capital city of the Hejaz province in the KSA; and Madina is the fourth largest city in the KSA (Worldatlas, 2018).

This study was conducted over the period from December 2017 till the end of February 2018. As the study aims to test customers' continued intention to use m-banking, it targeted the actual users of m-banking who have used such a system. Importantly, it also considered the m-banking services delivered using specific kinds of mobile applications provided by banks. Five hundred banking customers who have used m-banking were allocated questionnaires using several techniques. A large number of those participants were approached by their banks while others were accessed at their work places (Dwivedi et al., 2006).

The questionnaire consists of three parts (i.e. cover page (research's aim and researchers' information), participant's demographic profile (age, gender, occupation and income) and constructs' items derived from the relevant literature (30 scale items) - See Appendix. For example, both perceived USF and EOU were measured using items extracted from Davis et al. (1989). Items of the TTF model constructs were adopted from Zhou et al. (2010) and Lin and Huang (2008). The main items of privacy and security were derived from Vijayasarathy (2004) and Casalo et al. (2007). As Arabic is the main language in the KSA, the questionnaire was translated from English to Arabic using the back-translation method suggested by Brislin (1976). Then, the Arabic version of the questionnaire was judged by a panel of experts at the department of Management Information System (MIS) and marketing in the King Abdulaziz University who are fluent in both Arabic and English (Dwivedi et al., 2006). After that, a pilot study with 30 master students at the Business School in the King Abdulaziz University was conducted to see if there was any problem regarding the language used as well as to test the factors reliability (Dwivedi et al., 2006). Most participants

mentioned that the language used was clear and there were no vague sentences. Factors reliability was tested using Cronbach's alpha as suggested by Nunnally (1978), and all values were found to be higher than 0.70 (Nunnally, 1978).

4.1 Treatment of Missing Data

As recommended by Churchill (1995), the amount of missing data was examined in addition to their distribution pattern. The yielded results showed that the percentage of the missing values for each construct was within the recommended level (<5%). Furthermore, the p value (p = .785) of missing completely at random (MCAR) was non-significant (Churchill, 1995). This ensures the random pattern of the missing data values (non-systematically distributed) (Little, 1988). Accordingly, all the missing data values were filled by the mean value of each variable (Hair et al., 2010; Tabachnick and Fidell, 2007).

5. Results

5.1 Response Rate and Participants' Characteristics

Out of the 500 questionnaires that were allocated, 352 were returned. Out of these, 320 questionnaires were found to be completed and valid, and accordingly these 320 that were subjected to further analyses. As seen in Table 1, among the 320 participants, 189 of them are male (59.1%) while 131 are female (40.9%). The largest number of participants (215; 67.2%) is noted to be within the age group of 21-29 followed by the age group 30-39 (44; 13.8%). About 178 (55.6%) of the respondents are public sector employees while 60 (18.8%) are private sector employees. One hundred and forty (43.8%) have monthly income ranging between 8001 and 14000 Saudi Riyals followed by those who have monthly income between 4001 and 8000 Saudi Riyals.

<Table 1 about here>

5.2 Structural Equation Modelling

Two stages of structural equation modelling (SEM) were applied using AMOS 22. In the first stage, measurement model, confirmatory factor analyses (CFA) were tested to ensure adequate level of model fitness as well as to attain construct reliability and validity. Then, the proposed model and research hypotheses were targeted in the second stage: structural model analyses.

The CFA was tested firstly, and the initial fit indices of the measurement model (i.e. CMIN/DF was 3.214, GFI= 0.851, AGFI= 0.751, NFI= 0.894, CFI= 0.905, and RMSEA=

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0.085) indicated that the model has poor fit (see Table 2). Therefore, the main problematic items were removed from the revised version of the measurement model (see Table 3). These problematic items were found to be as follows: one item from SR and two items from PV. All of these items were found to have a factor loading less than 0.50 and accordingly were dropped from the revised version of the measurement model. The fit indices of the revised measurement model were found to be as follows: CMIN/DF= 2.365, GFI= 0.912, AGFI= 0.861, NFI= 0.947, CFI= 0.974, and RMSEA= 0.064. This proved the goodness of fit of the measurement model at this time (Anderson and Gerbing, 1988; Hair et al., 2010).

<Table 2 about here>

As seen in Table 4, all constructs were found to have composite reliability (CR) value higher than 0.70 as suggested by Hair et al. (2010). The highest value of CR (0.985) was recorded for Techno.C whereas the lowest one (0.821) was for Task.C. As for the average variance extracted (AVE), all constructs have also been recorded as having an acceptable value higher than 0.50 as suggested by Hair et al. (2010). The AVE values range from 0.606 for Task.C to 0.956 for Techno.C. Finally, the discriminant validity was ensured in the current study as all inter-correlation values between constructs are less than the squared root of AVE value of the targeted construct (Kline, 2011).

<Table 3 about here>

<Table 4 about here>

At the second stage, the structural model was tested to see the fitness of the proposed model to the observed data and to verify the main causal relationships hypothesised. Statistically, the model seems to adequately fit the observed data as all fit indices were observed to be within their cut-off values (CMIN/DF= 2.932, GFI= 0.906, AGFI= 0.842, NFI= 0.934, CFI= 0.961, and RMSEA= 0.068). As seen in Figure 2, the R^2 values were found as such: .58 for continued intention, .48 for TTF, .31 for usefulness, and .35 for ease of use. This, in turn, supports the predictive validity of the current proposed model.

<Figure 2 about here>

The main results of path coefficient analyses are presented in Table 5. Accurately, USF (γ= 0.49, p<0.000), TTF (γ= 0.25, p<0.000), SR (γ= 0.21, p<0.000), and PV (γ= 0.15, p<0.000) significantly predict intention to continue to use m-banking. TTF was found to be strongly affected by Task.C (γ= 0.38, p<0.000) and Techno.C (γ= 0.12, p<0.028). TTF has a positive influence on USF (γ= 0.48, p<0.000). Techno.C also significantly predicts EOU (γ= 0.60,

p<0.000). However, EOU (γ= 0.10, p<0.135) was not able to have a significant impact on the intention to continue use. Accordingly, all research hypotheses, H1, H2, H3, H4, H5, H6, H8, and H9, are accepted while H7 alone was rejected.

<Table 5 about here>

6. Discussion

As presented in the prior section, 'Results', this study was able to empirically support what has been discussed and proposed in the conceptual model. Researchers were keen to clarify how Saudi bank customers are interested in continuing to use m-banking as well as discover the main factors that could shape the perception of Saudi bank customers toward such innovative technology. The statistical results largely supported the predictive validity of the current study model. For example, about .58, .48, .31, .35 of variance were accounted continued intention, TTF, USF, and EOU sequentially. Such values were found to be more than the .30 that was suggested by Arambewela and Hall (2009), Holmes-Smith et al. (2006), and Kline (2011), and also these values are very similar to other studies that have tested the adoption of m-banking such as Foon and Fah (2011), who accounted .56 of variance in behavioural intention to use m-banking and Zhou et al. (2010), whose model predicted about .57 of variance in the adoption behaviour.

Such results extracted in the current study largely support the selection of both the TTF model and the TAM to propose the current study model. This also gives clues that such integration between the TTF model and the TAM could provide an accurate picture regarding the continued intention to adopt m-banking in the KSA as a developing country. Furthermore, excluding the path between EOU and CI, all proposed paths discussed in the conceptual model and literature review have been supported. In the following paragraphs, the current study results regarding each hypothesis are discussed more in light of the current study data as well as what has been discussed over the literature review and proposed in the conceptual model.

According to path coefficient analyses, perceived USF was observed to be the strongest factor predicting Saudi customers' continued intention to use m-banking. This means that Saudi customers largely value m-banking as a more useful and productive technology making their interaction with their banks much easier and more efficient. One of the main reasons behind this is the nature of m-banking as movable technology enabling customers to access a wide range of banking services without any time and place restrictions. To put it differently,

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as a kind of mobile technology, m-banking is enjoyed with a high level of mobility and ubiquity in comparison with other online or traditional banking channels. This means that m-banking enhances customers' ability to access banking services whenever and wherever they need. Accordingly, by using m-banking, customers are more able to save their time and effort in comparison to the traditional way of accessing m-banking via human encounter. In fact, there are a wide range of financial services (i.e. balance enquiries and downloading bank statements, funds transfer, and paying bills) that customers can access 24/7 from anywhere. Further, as mentioned in the introduction section, the nature of m-banking, which supports the consumer in relying on himself/herself and without any human interaction, also supports the level of privacy and security. Such results of USF are very similar to those reached by prior m-banking studies (i.e. Hanafizadeh et al., 2014; Wessels and Drennan, 2010).

TTF was also the second largest significant factor predicting Saudi customers' continued intention to use m-banking. This is in addition to the significant impact of TTF on USF. As long as m-banking can provide the targeted users with an adequate and high-quality level of functions and tasks that match their requirements, they are more likely to perceive using such technology as more useful in their daily life and accordingly they will be more interested in using this technology in future (Dwivedi et al., 2015). Indeed, the statistical results of the current study indicate that Saudi customers see m-banking as having a higher level of TTF, which positively reflects on their perception and intention to use m-banking in future. Different studies have extracted similar results to these attained in the current study (i.e. Chang, 2008; Klopping and McKinney, 2004; Pagani, 2006; Zhou et al., 2010).

The task characteristics construct was shown to have a significant impact on the TTF as presented in the results section. The main dimensions of any functions that customers need to accomplish regarding banking transactions will directly reflect on the TTF of the technology that helps customers to perform these functions. In fact, with the pressure of time and responsibilities, people seem to be more engaged with their banking. More specifically, customers currently need to have an interactive and constant communication with their banks. And accordingly, they are demanding more facilities to access banking services. This is in addition to the sensitive necessity for financial transactions that customers need to conduct continuously. In this respect, and according to Tam and Oliveira (2016) and Zhou et al. (2010), customers' requirements to manage, control, and conduct banking services whenever and wherever they are largely shape their perception of TTF related to using m-banking technology.

Technology characteristics were found to be a very crucial factor in the conceptual model as both TTF and EOU are largely influenced by this construct. As discussed above, compared with other bank channels (human encounter, ATM, and Internet banking) (Hanafizadeh et al., 2014), m-banking has several features that make customers more attracted to such a system and more positively value it either in terms of EOU or of TTF. For instance, there is the ubiquitous nature of m-banking that enables customers to access a wide range of banking services, at the time needed, quickly and safely. This, in turn, positively reflects the quality of the functions performed using m-banking as well as the usefulness and ease of use perceived in such technology. Such results are consonant with these found by Oliveira et al. (2014), Tam and Oliveira (2016), Yuan et al. (2016), and Zhou et al. (2010).

Both privacy and security were observed to have a significant impact on Saudi customers' continued intention to use m-banking. To put it differently, banking customers in the KSA seem to be more concerned regarding their own privacy and the level of security when they are in the process of using m-banking applications. This could be attributed to the sensitive nature of financial transactions overall and especially those conducted via online applications such as m-banking (Alalwan et al., 2017; Dwivedi et al., 2017a). Therefore, customers will pay more attention to tools and mechanisms to securely undertake financial transactions using mobile technology (Casalo et al., 2007; Vijayasarathy, 2004). Some aspects, such as authorisation, confidentiality, integrity, authentication, and non-repudiation, are very important in m-banking applications to let customers perceive that using these systems is secure and safe enough (Gu et al., 2009; Laukkanen, 2007; Mashhour and Saleh, 2015). By the same token, in order to use m-banking, the customer is requested to disclose important and personal information. This, in turn, could raise the customer's concerns regarding their own privacy especially due to the fact that some data could be shared with third parties (Luarn and Lin, 2005). Theoretically, there are a good number of studies that have supported the role of both security and privacy in customers' continued intention to use m-banking (i.e. Akturan and Tezcan, 2012; Finn et al., 2013; Laukkanen, 2007; Luarn and Lin, 2005).

In contrast with what has been proposed regarding the role of ease of use, Saudi customers seem to be not concerned about the level of easiness or difficulty in using m-banking. This could simply be due to the fact that m-banking has been increasingly becoming more adopted and technologies have been becoming better known as well as customers being more experienced in interacting with m-banking. This is in addition to the fact that the current study participants are actual users of m-banking and enjoy a certain level of experience in

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using it. Thus, they are less concerned regarding any difficulties that could be found in using m-banking. Moreover, even if there are some difficulties in using it, customers are more interested in using such systems as long as they highly value m-banking in terms of usefulness and TTF as for participants of the current study sample (Castañeda et al., 2007; Davis et al., 1989; Venkatesh et al., 2003; Venkatesh et al., 2012; Wang et al., 2006; Wessels and Drennan, 2010). Over the prior literature, there are a number of studies that have disproved the role of ease of use or similar factors such as effort expectancy, for example Brown et al. (2003), Wessels and Drennan (2010), Wu and Wang (2005), Yu (2012), and Zhou et al. (2010).

6.1 Theoretical and Practical Implications

This study early noted the importance of discovering and testing the main dimensions that could shape customers' perception and continued intention to use m-banking in the KSA. As discussed in the introduction section, the related issues of m-banking have received less attention by researchers over the developing countries especially in the KSA. Thus, this study represents a worthy attempt to test such technology (m-banking) in the KSA where there is a scarcity of literature. In fact, most studies that have tested the related issues of m-banking adoption simply considered the potential adopters and their intention toward such adoption. Other studies have considered the current usage behaviour. However, customers' continued intention has rarely been tested using a solid theoretical foundation considering models such as the TTF model and the TAM. Therefore, a considerable theoretical contribution was made by integrating the TTF model with the TAM in addition to considering privacy and security in one single model. In detail, careful reviewing of the current literature of m-banking leads to noticing a need to discover what the key mechanisms that could shape the customer's perception toward the functionality and fitness of the technology. This has been covered in the current study by testing the impact of task characteristics and technology characteristics on the TTF.

Furthermore, the current literature of m-banking does not cover well the role of TTF in shaping the customers' perceived usefulness. This study accordingly comprises another contribution by proposing and empirically validating such relationship between TTF and USF. Further, this study proposes a new relationship between technology characteristics and perceived EOU. This relationship has been less examined in the prior studies, which, in turn, comprises another contribution made by the current study. Moreover, considering both perceived privacy and security in the current model creates an accurate picture about the

adoption of m-banking especially as there are a limited number of m-banking studies that have considered privacy and security alongside the TTF model and the TAM in the same model.

Practically, this study could offer marketers and service providers clues that could help them to improve the key aspects that are considered by Saudi customers with respect to m-banking. For instance, the study supports that role of privacy and security, and accordingly, marketers and m-banking service providers have to focus more on enhancing the customer's perception that using m-banking is a safe channel to access banking services. In this regard, different mechanisms (biometric technology, authentication, and encryption) could be used by banks to ensure the level of security in any banking transaction conducted using m-banking. As well as this, banks should ensure the level of privacy related to any information provided by customers in order to use m-banking. Therefore, banks have to express their concern regarding the privacy of information provided by customers. In this respect, banks also have to ensure their moral and legal system is protecting the customer's personal information. Indeed, banks' attitude to the importance of privacy and security in m-banking services will also contribute to the customer's perception for the related issues of TTF.

Results of the current study also show the importance of technology characteristics in shaping the customer's perception toward ease of use and TTF. Thus, marketers and m-banking designers have to pay more attention to the main aspects of mobile technology. For example, the ubiquitous nature of mobile technology should be more accelerated to guarantee that customers can access m-banking services from wherever they are. This could call banks to collaborate more with mobile service providers to maintain their networks and geographical coverage. Banks also should ensure the quality and reliability of m-banking services as well as fix any problem that could hinder accessibility to such services. A m-banking platform with a friendly and simple design could also help with quick and easy use of m-banking services. Task characteristics were also the focus of attention of customers. Marketing campaigns should accelerate the customer perception that m-banking is a more flexible and adaptable channel to access banking services in comparison with traditional banking channels. Further, customers could have more controllability via using m-banking. It could be important to ensure the fit of m-banking services to the customer's requirements and needs. This could be enhanced by providing a wide range of banking services through m-banking as well as by ensuring its appropriateness to the new customer's lifestyle and work needs.

7. Conclusion

The related issues of m-banking have received little attention by researchers in the KSA. Therefore, this study was conducted to fill this gap and to provide researchers and practitioners with clues about the main dimensions that have to be considered to guarantee a better understanding about factors predicting the customer's intention and adoption of m-banking, and accordingly, having a successful implementation for such technology. Therefore, based on a critical review of the main body of literature either in m-banking or in the IS area overall, the researchers have successfully proposed an integrated model from the TAM and TTF model which was also expanded by including privacy and security. This study examines customers' continued intention to use m-banking; therefore, the actual users of m-banking were targeted in the current study sample. Data was collected using a convenience sample of m-banking users from four main cities of the KSA (Riyadh, Jeddah, Mecca, and Medina). The data was then tested using SEM, and the main results largely support the predictive validity of the current study model. Accurately, TTF, USF, SR, and PV were able to predict about .58 of variance in the customers' continued intention to use m-banking. Based on the current results, this paper has discussed the main theoretical and practical implications as presented in the prior section.

8. Research Limitations and Future Directions

Even though this study represents a valuable attempt to address the adoption of m-banking over emerging countries, there are still a number of concerns that restrict it. For example, the moderation influence of the demographic factors (i.e. age, gender, income level, educational level) is not tested. Thus, it could be more useful to see how the current study model yields different indicators by considering the moderation influence of the demographic factors (Haider et al., 2018). The study also does not consider the impact of personal and psychological factors (i.e. innovativeness, self-efficacy, perceived behavioural control, need for interaction). Accordingly, future studies could add value by testing these aspects. As a consumer technology, the role of hedonic motivation and price value is very critical, yet it was not considered in the current study. It would be very important to consider these hedonic and monetary aspects in future studies. The data was collected using a self-report questionnaire; however, it would be more accurate to utilise more statistics from the bank database about the users of m-banking. Finally, this study just examined the customers' continued use of m-banking; however, the outcomes of using m-banking on the customers'

actual use behaviour and customers' satisfaction would provide a comprehensive picture about the successful implementation of m-banking technology in the KSA.

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Table 1: Participant Demographics

Participants' Characteristics		Frequency	Pe
Monthly income (Saudi Riyals)	1000-4000	24	7.5
	4001-8000	71	22.
	8001-14000	140	43.
	14001-20000	60	18.
	More than 20000	25	7.8
	Total	320	100
Occupation	Student	41	12.
	Government employee	178	55.
	Private sector employee	60	18.
	Self-employed	41	12.
	Total	320	100
Gender	Male	189	59.
	Female	131	40.
	Total	320	100
Age	>= 18-20	37	11.
	21-29	215	67.
	30-39	44	13.
	40-49	20	6.3
	50 and above	4	1.3
	Total	320	100

Table 2: Results of Measurement Model

Fit indices	Cut-off point	Initial measurement model	Modified measurement
CMIN/DF	≤ 3.000	3.214	2.365
GFI	≥ 0.90	0.851	0.912
AGFI	≥ 0.80	0.751	0.861
NFI	≥ 0.90	0.894	0.947
CFI	≥ 0.90	0.905	0.974
RMSEA	≤ 0.08	0.085	0.064

Table 3: Standardised Regression Weights

Construct	Measurement Items	Estimate	Construct	Measurement Items	Esti
USF	USF1	.902	PV	PV1	.887
	USF2	.835		PV2	.706
	USF3	.835		PV3	.848
	USF4	.789	Techno.C	Techno.C1	.983
SR	SR1	.994		Techno.C2	.971
	SR2	.853		Techno.C3	.979
	SR3	.594	EOU	EOU1	.870
Task.C	Task.C1	.823		EOU2	.870
	Task.C2	.687		EOU3	.885
	Task.C3	.817		EOU4	.908
TTF	TTF1	.955	CI	CI1	.919
	TTF2	.755		CI2	.907
	TTF3	.661		CI3	.904
	TTF4	.939			

Table 4: Construct Reliability and Validity

	CR	AVE	SR	Task.C	TTF	CI	PV	USF	Techno
SR	0.865	0.689	**0.830**						
Task.C	0.821	0.606	0.125	**0.778**					
TTF	0.901	0.700	0.165	0.280	**0.837**				
CI	0.935	0.828	0.448	0.407	0.559	**0.910**			
PV	0.857	0.668	0.163	0.129	0.164	0.321	**0.817**		
USF	0.906	0.708	0.220	0.264	0.548	0.701	0.207	**0.841**	
Techno.C	0.985	0.956	0.265	0.151	0.193	0.370	0.108	0.214	**0.978**
EOU	0.934	0.780	0.138	0.242	0.244	0.366	0.094	0.401	0.594

Note: Diagonal values are squared roots of AVE; off-diagonal values are the estimates of inter-corre
between the latent constructs.

Table 5: Results of Standardised Estimates

Hypothesised path	Standardised estimate	P-value	Significance
USF→ CI	0.49	***	Sig
TTF→ CI	0.25	***	Sig
TTF→ USF	0.48	***	Sig
EOU→ CI	0.10	0.135	Non-Sig
PV→ CI	0.15	***	Sig
SR→ CI	0.21	***	Sig
Task.C→ TTF	0.38	***	Sig
Techno.C→ TTF	0.12	0.028	Sig
Techno.C → EOU	0.60	***	Sig

Construct		Items
Perceived Usefulness	PU1	I find mobile banking useful in my daily life.
	PU2	Using mobile banking increases my chances of achieving tasks that are important me.
	PU3	Using mobile banking helps me accomplish tasks more quickly.
	PU4	Using mobile banking increases my productivity.
Perceived Ease of Use	EOU1	Learning how to use mobile banking is easy for me.
	EOU2	My interaction with mobile banking is clear and understandable.
	EOU3	I find mobile banking easy to use.
	EOU4	It is easy for me to become skillful at using mobile banking.
Task Characteristics	Task.C1	I need to manage my account anytime anywhere.
	Task.C2	I need to transfer money anytime anywhere.
	Task.C3	I need to acquire account information in real time.
Technology Characteristics	Techno.C1	Mobile banking provides ubiquitous services.
	Techno.C2	Mobile banking provides real-time services.
	Techno.C3	Mobile banking provides secure services.
Technology Task Fit	TTF1	The functionalities of mobile banking are very adequate.
	TTF2	The functionalities of mobile banking are very appropriate.
	TTF3	The functionalities of mobile banking were very sufficient.
	TTF4	The functions of mobile banking fully meet my banking needs.
Perceived Privacy	PV1	I feel safe when I send personal information to mobile banking.
	PV2	I think mobile banking abides by personal data protection laws.
	PV3	I think mobile banking only collects user personal data that are necessary for its activity.
	PV4	I think mobile banking respects the user's rights when obtaining personal information.
	PV5	I think that mobile banking will not provide my personal information to other companies without my consent.
Perceived Security	SR1	I think mobile banking has mechanisms to ensure the safe transmission of its user information.
	SR2	I think mobile banking shows great concern for the security of any transactions.
	SR3	When I send data to mobile banking, I am sure that they will not be intercepted by unauthorised third parties.
	SR4	In general, making transactions on mobile banking is secure.

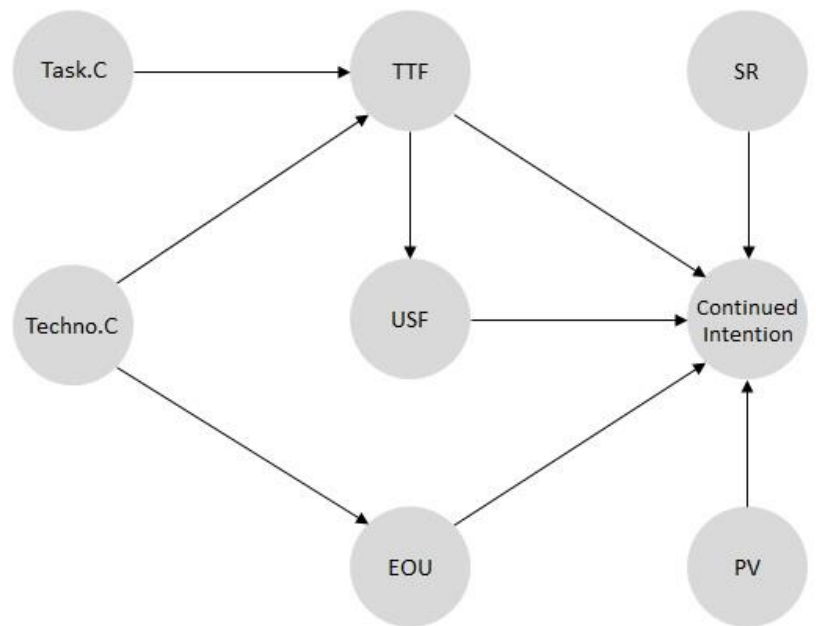| Continued Intention | CI1 | I intend to continue using mobile banking in the future. |
| | CI2 | I will always try to use mobile banking in my daily life. |
| | CI3 | I plan to continue to use mobile banking frequently. |

Figure 1: Conceptual Model – Adopted from Davis et al. (1989), Goodhue and Thompson (1995), Vijayasarathy
[Task.C: Task Characteristics, Techno.C: Technology Characteristics, TTF: Task-Technology Fit, USF: Perceived Usefulness, E(
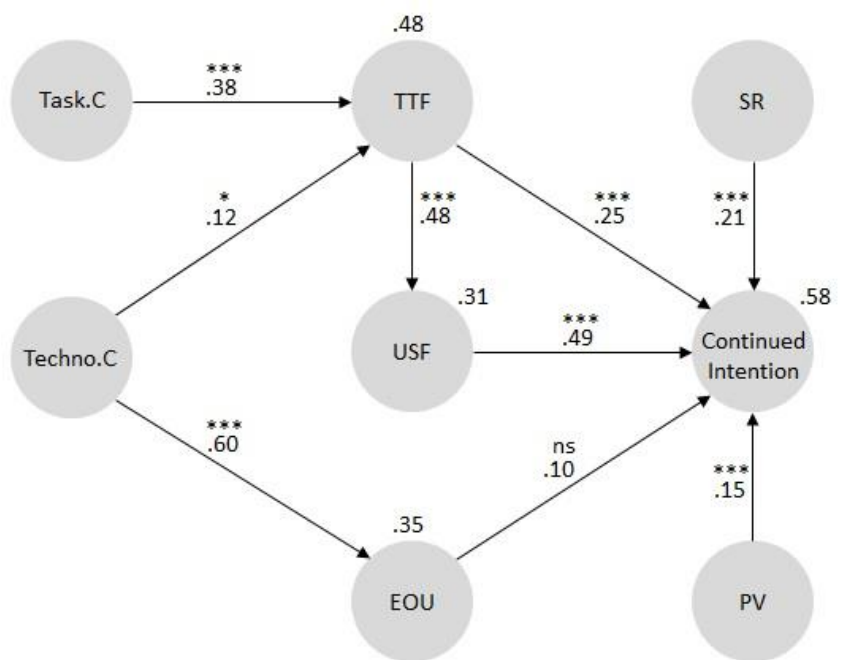Security, PV: Perceived Privacy, CI: Continued Intention]

Figure 2: Validation of the Conceptual Model
[ns: P > 0.05, *: P ≤ 0.05, **: P ≤ 0.01, ***: P ≤ 0.001]