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Examining Adoption of Mobile Internet in Saudi Arabia: Extending TAM with Perceived Enjoyment, Innovativeness and Trust

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Abstract

Mobile internet represents a breakthrough technology that has derived much attention from mobile organizations and services providers in the Kingdom of Saudi Arabia (KSA)¹. However, the level of acceptance of mobile internet in the KSA is still below the level of ambition. This is in addition to the fact that there is a considerable need to discover the main factors shaping Saudi customers' intention and adoption of such a mobile system. For this reason, this study is conducted in the hope of providing further understanding about the adoption of mobile internet in the KSA. The extension version of Technology Acceptance Model TAM² with perceived enjoyment was adopted as a theoretical foundation of the current study model. This was expanded by considering two additional factors: innovativeness and trust. The main empirical data collected through questionnaires was analysed using structural equation modelling (SEM)³. Perceived usefulness, perceived enjoyment, trust, and innovativeness are statistically supported to have a significant impact on the Saudi customer intention to adopt mobile internet. Further discussion regarding the main contribution as well as research limitations and future directions are presented at the end of this paper.

Keywords: Mobile internet, TAM, KSA, adoption.

1. Introduction

Worldwide, the number of mobile users is increasing tremendously. For instance, and according to Statista (2018c), the number of mobile phone subscribers reached 4.6 billion in 2016 and this number is expected to reach 5.07 billion by 2019. Accordingly, mobile and telecommunication organizations have been looking forward to expand their products and services provided by mobile phones (i.e. mobile internet, mobile payment, mobile social media, mobile government, mobile commerce, mobile shopping, and mobile learning) (Alalwan et al., 2016; Gerpott and Meinert, 2016; Laukkanen, 2016; Rana et al., 2016; Shareef et al., 2018; Xu et al., 2017). The evolution in mobile technology also represents more opportunities to be utilized by business and governmental organizations to introduce their products and services in a more effective and efficient manner (Mascheroni and Ólafsson, 2016; Tran and Corner, 2016). It is important to mention that this interest in accelerating mobile services has been with the intention of making people's life easier and

¹ the Kingdom of Saudi Arabia

² Technology Acceptance Model

³ structural equation modelling

enhancing the quality of services provided to them from both private and public organizations (Shareef et al., 2016). Accordingly, mobile technology applications have increasingly been playing an integral part in customers' daily lives; most people cannot leave their homes without carrying their phones (Dwivedi et al., 2016; Dwivedi et al., 2017a; Gallup, 2012; Shareef et al., 2012). One of these applications is mobile internet (M-Internet), which could be defined as the "access to the Internet with devices that offer wireless connectivity" (Fogelgren-Pedersen, 2005, p.2). Such novel technology (mobile internet) enjoys various attractive characteristics (i.e. mobility, stability, ubiquity, accessibility, and usefulness) (Kapoor et al., 2015). Thus, such technology has attracted considerable interest from customers worldwide. For example, in 2017, the penetration rate of mobile internet users reached 58.9% worldwide and this percentage is expected to rise to 63.4% by 2019 as stated by Statista (2018a).

Saudi Arabia has seriously started thinking about utilizing mobile technology and Internet applications to provide a wide range of services to Saudi customers over a large geographical area of 2,150,000 km² (Ipsos⁴, 2012). This comes especially in the light of Saudi government interest in technology and innovation diffusion as declared in both the Neom project to establish a big smart city and Saudi Arabia's Vision 2030 (vision2030, 2018). As an important part of this vision, organizations working in the mobile and telecommunication sector have been placing a considerable amount of investment and resources in improving all the aspects related to mobile technologies such as mobile internet. For instance, about \$2.14 billion have been invested in sectors like technology and innovation by the Saudi government as reported by Export.gov (2017). This reflects on the usage rate of telecommunication services in the KSA. In that regard, in 2017, there were about 4 million landline phones working and users of mobile phone reached 52.7 million (Export.gov, 2017). However, regardless of the efforts and investment spent by mobile services providers in planning and implementing mobile internet, the actual adoption rate has not been as planned and expected. A recent report from Statista (2018b) indicated that 22.85% of mobile phone users accessed Internet services via their mobile phone, which represents 44% of the total number of mobile phone subscribers (52.7 million). In detail, about 37% of Saudi mobile internet users did shopping via their mobile phone. In 2012, 15% of Saudi Arabian consumers were familiar with mobile payments at the point of sale and 24% were willing to try them (Statista, 2018d). Likewise, about 15% of customers in the KSA have awareness and understanding of mobile

⁴ is a global market research and a consulting firm with worldwide headquarters in Paris, France.

payment and about 24% of Saudi customers have an intention to actually use it (Statista, 2018e). The usage rate of mobile internet in the KSA seems to be low especially in comparison with other developed countries like the United States where there are about 237.2 actual mobile internet users with penetration rate of 89.3% from the total number of mobile phone subscribers (Statista, 2018f). In spring 2017, the number of cell phone users in the United States amounted to 237.72 million. This raises a question as to which kind of efforts should be made in order to increase the desired level of adoption of these services (Afshan and Sharif, 2016; Alalwan et al., 2016; Alalwan et al., 2017; Dwivedi et al., 2016). Even though the related issues of mobile internet represent worthy trends in the KSA to be considered by researchers, there is a dearth of literature which has focused on mobile internet in the KSA (i.e. Abanomy and Mayhew, 2005; Alhussain et al., 2010; Al-Khalifa, 2011; Alqahtani and Atkins, 2017; Almutairi, 2011; Alnahdi et al., 2017; Alsenaidy and Ahmad, 2012; Alwahaishi and Snášel, 2013a, b; Baabdullah, 2018; Baabdullah et al., 2016; Badwelan et al., 2016; Dwivedi et al., 2017a; Gerpott et al., 2017). This is in addition to the fact that it is important that more quantitative data are available to figure out and test the main factors predicting customer intention and adoption of mobile internet in the KSA.

Furthermore, closer reviewing of the current literature of the mobile internet highlights the need to explore the role of both intrinsic and extrinsic motivation on the customer's intention and adoption of mobile internet services. Accordingly, this study would like to discuss these dimensions further by firstly reviewing the relevant literature to identify the main factors covering intrinsic and extrinsic motivation in order to present them in the current study model. This is in addition to making clear the main antecedences of customers' intrinsic and extrinsic motivation so as to provide an accurate picture of the customer's intention and adoption of mobile internet in the KSA context.

This study hopefully will also satisfy the need of firms working in a Saudi ICT⁵ context to have more understanding regarding the main factors that shape Saudi customers' intention and behaviour toward such a novel system (mobile internet). Accordingly, ICT firms will be able to customize more applicable marketing strategies that would accelerate the adoption rate of these services to the acceptable level (Ethos Interactive, 2012). From a theoretical perspective, such a study could add more knowledge to the literature and for researchers who

⁵ Information and Communications Technology

are interested in the related area, especially in the light of the fact that mobile technologies are a new theme in the IS⁶ area requiring more investigation and analyses.

2. Literature Review

Mobile internet has been increasingly the focus of attention of many researchers worldwide (Callanan et al., 2016; Das, 2011; Dwivedi et al., 2017a and b; Gerpott and Meinert, 2016; Härtfelder and Winkelmann, 2016; Lu and Zhu, 2011; Lu et al., 2005; Mascheroni and Ólafsson, 2016; Mukherjee et al., 2017; Singh and Swait, 2017; Taipale, 2016; Vanden Abeele, 2016; Wang et al., 2018; Yang et al., 2012a; Xu et al., 2017). In fact, researchers have examined the related issues of mobile internet from different perspectives (business versus customers). The ability of organizations to provide more value and benefits in mobile internet services enhances the level of perceived usefulness which, in turn, is reflected in the customers' loyalty toward the brand of such organizations (see Cyr et al., 2006; Zhou and Lu, 2011). According to Zhou and Lu (2011), customers' satisfaction about the performance of mobile internet services will be directly reflected in the customers' loyalty toward the organization that provides him or her with innovative services. By the same token, Okazaki et al. (2007) demonstrated that commercial activities conducted via mobile internet largely help to contribute to the level of economic benefits attained by both customers in having more convenience and organizations in having better performance and efficiency.

As a new system, mobile internet characteristics have also been confirmed to have an impact on the customer's decision on and perception of mobile internet services. For instance, and as stated by Parveen and Sulaiman (2008) and Son et al. (2012), as long as customers perceive mobile internet as not complex, they will find it more useful and much easier as well, and accordingly be more motivated to adopt such technology. Another aspect of innovation, relative advantage, was proved by Hsu et al. (2007) to predict the behavioural intention for four groups of adopters: innovators, early adopters, early majority, and late majority. Other factors (i.e. credibility, voluntariness, and irritation) were also supported by Hsu et al. (2007) to have a significant and positive impact on the customers' attitudes toward the intention to use mobile internet services.

Among the barriers that could hinder the success of mobile internet adoption, perceived risk was reported by Yang et al. (2012b). In the same line, perceived financial risk was another

⁶ Information System

negative factor hindering the customers' inclination to use mobile internet as reported by Shin (2009). At this instance, people when they would like to use mobile internet, they cope with different kinds of risk (i.e. perceived risk might be a financial risk, product risk, time risk, delivery risk, and social risk) as argued by Becher et al. (2011), Lu et al. (2005), Siau and Shen (2003), and Tai and Ku (2013).

On the other hand, customer trust was highly supported to have a critical role in hindering fears related to using mobile internet services as well as motivating customers to adopt such systems (Hollingsworth and Dembla, 2013; Joubert and Van Belle, 2009; Sadi and Noordin, 2011). Other studies (i.e. Aloudat et al., 2014; Cho et al., 2007; Hollingsworth and Dembla, 2013; Zarpou et al., 2012; Zhang et al., 2010) were also able to support the role of trust in shaping a positive customer perception about the values and benefits of using mobile internet. The hedonic aspects that could result from using mobile internet were addressed under different names: enjoyment (i.e. Park et al., 2014; Yun et al., 2013); fun (i.e. Bruner II and Kumar 2005); entertainment (i.e. Zhang and Mao, 2008); and playfulness (i.e. Fang et al., 2006).

Customers' personality characteristics attracted some attention from mobile internet studies as well. For example, innovativeness was proved as having a positive significant role in enhancing the level of perceived usefulness and ease of use (i.e. Lee et al., 2002; Lu et al., 2005; Parveen and Sulaiman, 2008) as well as hindering the level of perceived risk associated with mobile internet usage (i.e. Cheng and Huang, 2013). Self-efficacy as personal trait was mentioned by a number of studies as a key predictor of the customer's perception and intention toward different kinds of mobile technology (Lee et al., 2002; Lin and Wang, 2005; Mishra, 2011; Rana et al., 2017; Sadi and Noordin, 2011). Customer awareness was another factor playing an important role in shaping customer intention and behaviour toward mobile technologies as reported by Alsheikh and Bojei (2014) and Safeena et al. (2011).

Noticeably the TAM has been adopted and expanded by including many factors in the area of mobile internet or similar mobile systems (i.e. mobile commerce, mobile payment, mobile shopping). For example, in their conference paper, Chen and Mei (2017) adopted TAM to test customers' inclination to accept mobile internet ads. According to data collected from sample of students, Chen and Mei (2017) empirically supported the role of intrinsic motivation (entertainment) and social influence, yet usefulness did not predict any significant impact on the students' intention to use mobile internet ads. Likewise, in order to validate the customers' adoption of mobile internet commerce in Bangladesh, Mizanur and Sloan (2017)

expanded TAM with other external factors: perceived risk, perceived cost, and personal awareness. Their statistical results largely approved the role of both perceived usefulness and ease of use in predicting customers' intention to adopt mobile internet commerce.

Another study conducted by Tsai et al. (2017) also adopted TAM to test the customers' intention toward location-based mobile commerce in the internet of things. In detail, convenience incentive, promotion incentive, information incentive, entertainment, and interactive incentive are all proposed by Tsai et al. (2017) as key determinants of both perceived usefulness and ease of use which in turn predict the behavioural intention. Perceived usefulness was noticed by Tsai et al. (2017) to be predicted by convenience incentive, information incentive, entertainment, and interactive incentive. A strong relationship was observed between perceived usefulness and behavioural intention as well (Tsai et al., 2017). However, perceived ease of use did not have any significant impact on behavioural intention as stated by Tsai et al. (2017).

An extended model based on TAM along with social influence, variety of services, perceived cost, and trust was proposed by Yadav et al. (2016) to test the customers' adoption of mobile internet commerce. Their findings confirmed the significant influence of all factors proposed excluding perceived ease of use. Deng (2017) considered Chinese mobile internet users in his study to see how factors like perceived ease of use, perceived usefulness, and interactivity could shape those users' intention to continue as members in the community of mobile internet. Deng (2017) statistically validated the role of perceived ease of use on the customers' perception toward usefulness and interactivity, which in turn reflects on customers' satisfaction related to online brand community. Users' continuance intention toward mobile internet community was also noticed by Deng (2017) to be largely predicted by satisfaction.

In the area of online mobile shopping, Sohn (2017) validated the impact of mobile online store quality as antecedences of the user's perceived usefulness of mobile online stores for information search and online purchasing. Sohn (2017) successfully provided statistical evidences confirming the impact of security quality, information quality, and aesthetic quality on the perceived usefulness toward both mobile online store for information search and purchasing. Perceived risk and perceived trust were identified by Hampshire (2017) as key predictors of perceived usefulness toward mobile payment systems. Based on data collected from UK customers, Hampshire (2017) was able to argue that while trust positively

correlated with usefulness, perceived risk hinders the level of usefulness perceived in using mobile payment.

Even though mobile technology applications have been largely examined worldwide, few studies address such issues in the context of Saudi Arabia (i.e. Alwahaishi and Snášel, 2013a, b). In their first study, Alwahaishi and Snášel (2013a) provided statistical evidence supporting the role of performance expectancy, facilitating conditions, social influences, and perceived playfulness on the Saudi customers' intention to adopt mobile internet services. The second study by Alwahaishi and Snášel (2013b) proved that Saudi customers' intention was mostly predicted by the role of performance expectancy followed by perceived playfulness while facilitating conditions did not have any impact on the actual use behaviour with regard to mobile internet in the KSA. In spite of the fact that Alwahaishi and Snášel's (2013a, b) studies do contribute to the current understanding of mobile internet adoption, there is still a need to conduct more studies to cover important aspects related to customers' trust and awareness and to see how these dimensions could shape Saudi customers' intention and adoption of mobile internet. This is in addition to the importance of clarifying the role of intrinsic and extrinsic motivation. Therefore, filling this gap will be the main focus for the current study as presented in the following sections.

3. Conceptual Model

As stated in the introduction sections, this study attempts to have a parsimonious model providing an accurate picture about the most important aspects that shape the adoption of mobile internet in the KSA. Therefore, and after reviewing the most well-known theories and models in the area of technology adoption, the extended version of the Technology Acceptance Model (TAM) proposed by Davis et al. (1992) was adopted as a theoretical foundation for the current study model. Accurately, in line with Davis et al. (1992), perceived enjoyment was included in the current model alongside both perceived ease of use and perceived usefulness as key predictors of the customer's intention to adopt mobile services (see Figure 1). In doing this, both intrinsic utilities and extrinsic utilities were considered in the conceptual model. Also, as proposed by Gefen et al. (2003), trust is a very critical factor and should be included beside TAM factors. Indeed, trust has been largely cited as a critical factor in the area of mobile technology adoption (see Alalwan et al., 2017; Hanafizadeh et al., 2014; Kim et al., 2009; Lin, 2011; Luo et al., 2010; Rana et al., 2017; Zhou, 2011). Innovativeness was another factor included in the current study model as a predictor of both

perceived enjoyment as behavioural intention (see Figure 1). Further discussion on the main factors and the research hypothesis will be presented in the forthcoming subsections.

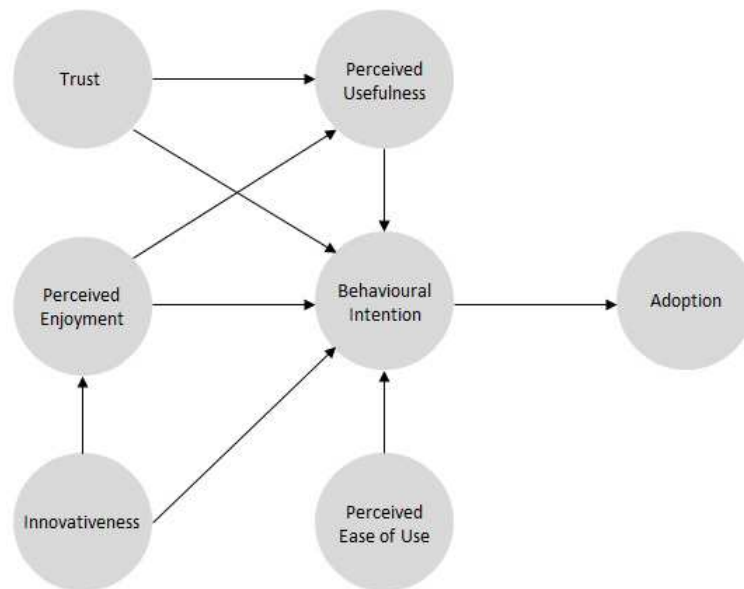


Figure 1: Conceptual Model

3.1. Perceived Usefulness (USF⁷)

Perceived usefulness could be addressed as functional and extrinsic benefits that are realized by using technologies (Davis et al., 1989). According to Davis et al. (1992, p.112), “*extrinsic motivation refers to the performance of an activity because it is perceived to be instrumental in achieving valued outcomes that are distinct from the activity itself, such as improved job performance, pay, or promotions*”. Such benefits could be related to the extent to which customers perceive using mobile internet as being a more productive way of doing things, saving their time and effort in using services rather than employing traditional tools to access the same kind of services (Dwivedi et al., 2017b; Liébana-Cabanillas et al., 2013; Lim et al., 2011; Lin and Wang, 2005; López-Nicolás et al., 2008; Rana et al., 2016). Mobile technology is characterized by a higher degree of mobility which lets customers use Mobile internet services at any time and in any place without any restrictions (Wong et al., 2013). This accordingly makes customers more motivated to perceive using mobile internet as more useful in their daily lives (Pousttchi and Goeke, 2011). Many mobile technology studies have

⁷ Perceived Usefulness

argued that as long as customers perceive using mobile technologies as being more useful and productive, they will be motivated to adopt such systems (Cheng and Huang, 2013; Dyna and Purwo Adi, 2012; Fang et al., 2006; Hollingsworth and Dembla, 2013; Park et al., 2014; Zarpou et al., 2012). Consequently, perceived usefulness could have a direct impact on the Saudi customers' intention to adopt mobile internet. The following hypothesis is proposed:

H1: Perceived usefulness will positively influence Saudi customers' intention to adopt mobile internet.

3.2. Perceived Ease of Use (POU⁸)

The extent to which customers perceive using a new system as being simple and not requiring too much effort usually shapes their willingness to adopt such a system (Davis et al., 1989). Indeed, mobile internet could be considered as a new technology that will require that customers have a certain level of experience and knowledge to use it both safely and efficiently. In the prior literature of mobile technology, there are a good number of studies that have approved the impact of the role of perceived ease of use on the customer intention to adopt such technology (Luarn and Lin, 2005). In Brazil, Püschel et al. (2010) supported a significant relationship between perceived ease of use and customers' attitudes toward mobile banking. By the same token, Hanafizadeh et al. (2014) statistically confirmed the statistical impact of customers' intention to adopt mobile banking as well. Later, in 2016, Arpaci (2016) argued the crucial impact of perceived ease of use on customers' perception and intention to use mobile cloud services. All things considered, the current study proposes that Saudi customers' willingness could be contributed by the role of perceived ease of use. Thus, the following hypothesis is:

H2: Perceived ease of use will positively influence Saudi customers' intention to adopt mobile internet.

3.3. Perceived Enjoyment (ENJ⁹)

In the prior IS and technology acceptance literature, it has been largely argued that intrinsic motivation (i.e. enjoyment, fun, entertainment, and playfulness) has importance with regard to customer intention to use new systems and applications (i.e. Davis et al., 1992; Van der Heijden, 2004; Venkatesh, 2000; Venkatesh et al., 2012). According to Davis et al. (1992,

⁸ Perceived Ease of Use

⁹ Perceived Enjoyment

p.112), “*intrinsic motivation refers to the performance of an activity for no apparent reinforcement*”. Mobile internet is also considered as a new and novel technology that could provide customers with a degree of fun and enjoyment when using it (Alalwan et al., 2017; Chong, 2013; Dai and Palvi, 2009). In a study testing the adoption of mobile social network games, Park et al. (2014) statistically proved the significant influence of perceived enjoyment on customer intention to adopt such mobile internet applications. Likewise, a similar factor to enjoyment, entertainment, was supported by Tsang et al. (2004) as a factor predicting customer’s attitudes toward mobile advertising. Another study examining customers’ intention to purchase a mobile newspaper noticed the strong impact of perceived enjoyment. It is also worth discussing that an increasing at the level of customers’ intrinsic utilities will lead customers to perceive using the targeted system as more useful and productive as discussed by Agarwal and Karahanna (2000) and Van der Heijden (2004). Thus, the following hypotheses are:

H3: Perceived enjoyment will positively influence Saudi customers’ intention to adopt mobile internet.

H4: Perceived enjoyment will positively influence perceived usefulness related to the adoption of mobile internet.

3.4. Trust (TR¹⁰)

Using mobile internet usually requires that customers provide more personal and financial information. Thus, customers could really have a concern about the level of security and privacy in using such applications. Also, using mobile internet represents an interaction with a mobile screen rather than face-to-face interaction. This, in turn, makes customers depend more on trust mechanisms to mitigate the level of risk and support their decision to use new systems such as mobile internet. Conceptually, trust was defined by Gefen et al. (2003) as the individual’s belief in three main aspects, which are ability, integrity, and benevolence, which, in turn, makes customers feel the targeted technology is more dependable and trustworthy to use. In the prior literature examining different types of mobile internet applications, there are many studies that have supported the role of trust (Alalwan et al., 2017; Gao and Waechter, 2017; Khalilzadeh et al., 2017; Malaquias and Hwang, 2016). For instance, both Alalwan et al. (2017) in Jordan and Malaquias and Hwang (2016) in Brazil supported the role of trust in the customers’ intention to adopt mobile banking. Another study testing mobile booking also

¹⁰ Trust

confirmed the role of trust in the customers' intention (see Khalilzadeh et al., 2017). In their study, Gao and Waechter (2017) provided further statistical evidence proving the role of trust in the adoption of mobile payment as well. Further, Gefen et al. (2003) discussed and supported the role of trust in shaping customers' perceived usefulness. To put it differently, customers' beliefs in the ability and integrity of the targeted system will largely be reflected in the degree of perceived usefulness. Such a relationship has been noticed by different studies in the prior literature of IS and mobile technology as well (see Alalwan et al., 2017; Aloudat et al., 2014; Cho et al., 2007; Gefen et al., 2003; Hollingsworth and Dembla, 2013; Zarm pou et al., 2012; Zhang et al., 2010). Accordingly, this study proposes the following hypotheses:

H5: Trust will positively influence Saudi customers' intention to adopt mobile internet.

H6: Trust will positively influence perceived usefulness related to the adoption of mobile internet by Saudi customers.

3.5. Innovativeness (INN¹¹)

According to Midgley and Dowling (1978), innovativeness could be classified under the personality factors that shape the extent as to how much anyone can accept and adopt new ideas, products, and systems. Additionally, innovativeness is discussed by Rogers et al. (2005): people could be innovative if they are approximately engaged with a process of adoption and using new products and systems compared to other people of the same social system. Indeed, Mobile internet could be considered as a novel and new system in their early introduction stage. Thus, in order to really be motivated to adopt this system, customers should have an extent level of innovativeness. In the line with this argument, Aldás-Manzano et al. (2009) statistically confirmed the role of innovativeness not only in terms of accelerating the adoption of technology but also in mitigating the level of risk associated with use of this technology. In the mobile technology literature, Das (2011) was successfully able to support the role of innovativeness in the customers' intention to adopt mobile internet. It is also worth indicating that as long as a new system is more innovative and novel, customers could have more intrinsic utilities by using such systems (Venkatesh et al., 2012). Therefore, by increasing the level of innovativeness, customers will not only be motivated to use this system but also perceive more hedonic benefits in using it. Thus, the following hypotheses are proposed:

¹¹ Innovativeness

H7: Innovativeness will positively influence Saudi customers' intention to adopt mobile internet.

H8: Innovativeness will positively influence perceived enjoyment related to the adoption of mobile internet by Saudi customers.

3.6. Behavioural Intention (BI¹²)

Customer intention and willingness has been always identified as a basic requirement of the individuals' actual behaviour in adopting a new system and technology (see Ajzen, 1991; Alalwan et al., 2017; Venkatesh et al., 2003). In the prior literature of mobile technologies, there are a large number of studies that have supported the role of behavioural intention on the actual use behaviour (see Alkhunaizan and Love, 2013; Gao and Deng, 2012; Lim et al., 2011; McKenna et al., 2011; Venkatesh et al., 2012; Wiratmadja et al., 2012; Yun et al., 2013; Zheng et al., 2012). Therefore, the following hypothesis is:

H9: Behavioural intention will positively influence Saudi customers' adoption of mobile internet.

4. Research Methodology

A self-administered questionnaire was adopted in the current study to collect the required data (Dwivedi and Irani, 2009). Actually, a convenience sample size of 700 participants was applied by researchers to collect the required data from different parts of the KSA; however, about 357 completed the survey. In detail, respondents were targeted from the six biggest cities in the KSA: Riyadh, Jeddah, Makkah, Al-Madina, Ta'if, and Tabuk. Indeed, these cities were targeted not only because of their population size but also due to the fact that they are located in the east, west, south, and north of the KSA. This was with the intention of covering all parts of the KSA. Researchers used different approaches to reach the targeted participants. Mainly, questionnaires were allocated to mobile internet customers via the main branches of mobile service providers in these cities. So as to increase the response rate, there was a need to visit participants at their own places (i.e. staff and students at universities, employees in their public and private organizations). As this study aims to examine the actual adoption of mobile internet, the actual users of mobile internet are targeted in the current study sample.

¹² Behavioural Intention

As mentioned above, about 357 completed the survey; 206 (75.7%) of those participants were male and 151 (42.3%) were female. Most of those participants (207; 58%) were noticed to be within the age group of 21-29 followed by the age group 30-39 (58; 16.2%). Regarding the educational level, Bachelor degree holders (162; 45.4%) capture the largest part in the current study sample followed by those who have a Diploma (65; 18.2%) and High school education (64; 17.9%). As for participants' occupations, about 187 (52.4%) were noticed to be staff in the public sector; 87 (24.4%) were staff at private sector followed by self-employed (43; 12%) while students were the smallest part of the current sample, about 40 (11.2%). The vast majority of respondents (166; 46.5%) were observed to have a monthly income of SR8001-14000.

The main constructs, which were behavioural intention, perceived usefulness, perceived ease of use, and enjoyment, were measured using items extracted from Davis et al. (1989) and Davis et al. (1992). Gefen et al.'s (2003) scale was applied to measure trust. Innovativeness was measured using items proposed by Agarwal and Prasad (1998), Aldás-Manzano et al. (2009), and Karaiskos et al. (2009). To evaluate all constructs' items, researchers employed a seven-point Likert scale ranging from extremely disagree to extremely agree. Items of actual adoption were derived from Venkatesh et al. (2012). The back-translation method was used to convert the English version of the questionnaire to the Arabic one as Arabic is the main language in the KSA. Also, the translated version was judged by experts in the King Abdulaziz University who are fluent in English and Arabic. Then, a pilot study was conducted by allocating 40 questionnaires to Master of Business Administration students in the King Abdulaziz University. Most of those students assured the researchers that the language used was clear and understandable. Further, Cronbach's alpha was tested for all items in the questionnaire, and the yielded values were found to be above 0.70 as recommended by Nunnally (1978).

5. Results

Structural equation modelling was adopted in the current study to test both the measurement model (confirmatory factor analyses) and the structural model. In the measurement model analyses, the model goodness of fit was tested based on the number of fit indices (GFI¹³;

¹³ Goodness-of-Fit Index

AGFI¹⁴; CFI¹⁵; CMIN/DF¹⁶; NFI¹⁷; and RMSEA¹⁸). The main results largely supported that the measurement model has adequate fit to the observed data as all of the fit indices mentioned above were found to be within their recommended level as follows: GFI=0.91; AGFI=0.851; NFI=0.941; CFI=0.971; and RMSEA=0.0651 (Hair et al., 2010; Tabachnick and Fidell, 2007).

Table 1: Standardized Regression Weights (Factor Loading)

Item	Estimate	Item	Estimate
POU1	.889	INN6	.787
POU2	.897	TR1	.861
POU3	.938	TR2	.940
POU4	.892	TR3	.941
USF1	.971	TR4	.618
USF2	.989	TR5	.576
USF3	.950	TR6	.556
USF4	.997	B11	.981
ENJ1	.950	B12	.991
ENJ2	.943	B13	.881
ENJ3	.991	Adoption1	.501
INN1	.762	Adoption2	.523
INN2	.633	Adoption3	.963
INN3	.916	Adoption4	.967
INN4	.859	Adoption5	.904
INN5	.746		

According to Table 1, all constructs are able to capture an adequate level of convergent validity as all items have factor loading higher than 0.50 (excluding one item from trust which has a factor loading less than 0.50) (Hair et al., 2010). As for the constructs' reliability and validity, all constructs were found to have a value of composite reliability (CR¹⁹) higher than 0.70 (see Table 2) (Fornell and Larcker, 1981). Also, the average variance extracted for all constructs was noticed to have a value higher than 0.50 as seen in Table 2 (Fornell and Larcker, 1981; Hair et al., 2010). It is also worth indicating that all constructs' items have factor loadings higher than 0.50 (see Figure 1), which is acceptable as suggested by Bagozzi and Yi (1988) and Byrne (2010). Furthermore, the squared root of AVE²⁰ displayed for each construct was higher than the inter-correlation estimates with other corresponding constructs

¹⁴ Adjusted Goodness-of-Fit Index

¹⁵ Comparative Fit Index

¹⁶ Normed Chi-Square/ Degree of freedom

¹⁷ Normed-Fit Index

¹⁸ Root Mean Square Error of Approximation

¹⁹ Composite Reliability

²⁰ Average Variance Extracted

(Fornell and Larcker, 1981). This, in turn, supports the discriminant validity of the main constructs in the current study model.

Table 2: Construct Reliability and Validity

	CR	AVE	ENJ	POU	INN	TR	USF	BI	Adoption
ENJ	0.974	0.925	0.962						
POU	0.947	0.817	0.388	0.904					
INN	0.907	0.622	0.394	0.569	0.789				
TR	0.878	0.526	0.270	0.398	0.463	0.725			
USF	0.988	0.955	0.487	0.690	0.632	0.425	0.977		
BI	0.969	0.912	0.542	0.539	0.600	0.470	0.633	0.955	
Adoption	0.875	0.611	0.145	0.075	0.038	0.014	0.145	0.297	0.782

At the second stage of SEM, the model was targeted to the structural model analyses to validate the proposed model and test the research hypotheses. The main fit indices of the structural model were found to be within their recommended level as follows: GFI=0.901; AGFI=0.821; NFI=0.933; CFI=0.962; and RMSEA=0.0682 (Hair et al., 2010; Tabachnick and Fidell, 2007;). The model also was able to predict about 51% of variance in the customers' intention and 29% of variance in the actual adoption behaviour. This supports the predictive validity of the conceptual model proposed. As for the path coefficient analyses, ENJ ($\gamma = .268$, $P = ***$), USF ($\gamma = .251$, $P = ***$), TR ($\gamma = .167$, $P = ***$), and INN ($\gamma = .229$, $P = ***$) were found to have a significant regression weight with BI. Yet, POU was not able to predict any significant variance in the BI ($\gamma = .075$, $P = .178$). INN was proved to have a significant impact on the ENJ ($\gamma = .408$, $P = ***$). Likewise, both ENJ ($\gamma = .404$, $P = ***$) and TR ($\gamma = .334$, $P = ***$) were able to have significant regression weight with USF. The regression weight between BI and actual adoption was also found to have a significant coefficient value ($\gamma = .289$, $P = ***$). Accordingly, except for H2, all hypotheses, H1, H3, H4, H5, H9, H6, H7, H8, and H9, are supported.

Table 3: Research Hypotheses Testing

Path	Standardized Estimate	Critical Ratio	P-value	Significance
USF→BI	.251	4.428	***	Significant
POU→BI	.075	1.346	.178	Non-Significant
ENJ→BI	.268	6.063	***	Significant
TR→BI	.167	3.324	***	Significant
INN→BI	.229	4.038	***	Significant
ENJ→USF	.404	8.749	***	Significant
INN→ENJ	.408	7.626	***	Significant
TR→USF	.334	5.352	***	Significant

BI→Adoption	.289	4.860	***	Significant
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6. Discussion

As discussed in the introduction section, this study meets the need to provide better understanding of the main factors shaping Saudi customers' intention and adoption of mobile internet services. Accordingly, the proposed model was based on what was theorized by Davis et al. (1992) along with trust and innovativeness. The main empirical results largely support the goodness of fit and predictive validity of the proposed model (about 51% of variance predicted in BI and 29% of variance in adoption). Furthermore, most causal paths proposed in the conceptual model were also proved to have a significant value. Thus, the results of the current study are in line with what was proposed in the conceptual model as well as what was argued in the prior literature.

As expected, perceived usefulness was found to have a significant impact on the Saudi customers' intention to adopt mobile internet services. This could be returned to many benefits and utilities that customers have by using internet services (Laukkanen, 2007; Lin, 2013). Indeed, mobile technologies and systems enjoy a high degree of mobility and convenience, and accordingly, customers can access many important services at any time and in any place they want (Lim et al., 2011; Lin and Wang, 2005). Also, customers feel more productive and efficient in attaining and producing mobile internet services in comparison with traditional tools to have the same kind of these services (Liébana-Cabanillas et al., 2013; López-Nicolás et al., 2008). Such results are in the line with what has been reached by Akturan and Tezcan (2012), Gu et al. (2009), Hanafizadeh et al. (2014), and Wessels and Drennan (2010).

The role of intrinsic utilities (perceived enjoyment) was also proved to be the strongest predictor of customers' intention. Thus, this confirmed the proposition of the current study to consider the role of intrinsic motivation. Such a role could be attributed to the nature of mobile internet as a more modern and unique platform to attain many services, which in turn, maximizes the customers' feeling of pleasure and enjoyment in using such systems. In addition, mobile internet and the attached services seem to be more joyful and entertained in their nature. Such results are consistent with prior studies regarding the role of intrinsic motivation (i.e. Alalwan et al., 2017; Chong, 2013; Dai and Palvi, 2009; Davis et al., 1992; Van der Heijden, 2004; Venkatesh, 2000; Venkatesh et al., 2012). Perceived enjoyment was also noticed to have a crucial impact on Saudi customers' perception of usefulness as

proposed in the conceptual model. That means that as long as customers feel that using mobile internet is enjoyable, they will positively perceive mobile internet as more productive and beneficial (Agarwal and Karahanna, 2000; Van der Heijden, 2004).

Statistical results provide strong evidence about the role of trust in shaping customers' intention and perception of usefulness toward mobile internet. To put it differently, customers are more likely to form a positive intention and perception about mobile internet if they perceive more integrity, benevolence, and ability in such technology. This could be returned to the sensitive nature of using mobile internet as customers are requested to provide more personal and financial information about themselves. This is in addition to the absence of human interaction when using mobile internet, which could add further fears and concerns on the customer's side (Alalwan et al., 2017; Gao and Waechter, 2017; Malaquias and Hwang, 2016; Ozturk et al., 2017). Indeed, the role of trust as approved in the current study has been largely validated and confirmed by too many studies either in the area of IS (i.e. Gefen et al., 2003; Johnson et al., 2008; Kim et al., 2011) in general or mobile technology in particular (i.e. Kim et al., 2009; Lee and Chung, 2009; Lin, 2011; Luo et al., 2010; Zhou, 2011).

Noticeably, innovativeness was found to be the most significant factor predicting customers' intention to adopt mobile internet. Such results could be attributed to the current IS and mobile technology revolution which means that customers have more opportunities to try a new and very innovative system such as mobile internet services. Further, most participants in the current study sample seem to be younger, have a higher degree of education, and adequate and good income level. This, in turn, is reflected in the tendency and readiness of those customers to adopt and experience such innovative systems (Aharony, 2013; Cheng and Huang, 2013; Yang et al., 2012a; Zarpou et al., 2012). Moreover, and as proposed in the conceptual model, innovativeness has a very strong impact in contributing to customers' perceived enjoyment related to using mobile internet. This is in line with what has been argued by other studies such as Qi et al. (2009), Tillema et al. (2009), Venkatesh et al. (2012), and Xiang et al. (2008).

6.1. Theoretical and Practical Implications

This study was successfully able to provide further understanding regarding this important problem related to the adoption of novel technology (mobile internet). According to what has been discussed in the introduction section and literature review section, this kind of mobile technology is in its early stage of introduction, and accordingly, there is always a need for

further examination of the main aspects that could shape customers' intention and adoption of mobile internet. Further, this study has addressed the adoption of mobile internet across the KSA as a developing country where very few attempts studying this system in the KSA. Therefore, this study has a considerable contribution to make to both researchers and practitioners when they are in the process of testing or implementing these new kinds of systems. The researchers have successfully introduced and proved a new causal relationship between the impact of innovativeness and perceived enjoyment. This really expands the theoretical horizon of TAM by firstly considering the role of innovativeness and secondly examining the impact of innovativeness on perceived enjoyment.

From the practical perspective, this study provides empirical evidence about the key dimensions that have to be taken into account by designers and marketers of mobile internet services. For instance, it shows clearly that innovativeness is one of the strongest factors predicting customers' intention to adopt mobile internet. Therefore, further marketing efforts should promote mobile internet as a pioneering and emerging system adding value to the new lifestyle of people in the KSA. This could be done by focusing on the unique features of mobile internet as well as by using very modern channels such as social media platforms to convince the targeted customers.

The current study results assure the importance of perceived enjoyment from the Saudi customer perspective. Indeed, increasing the level of perceived enjoyment will not only enhance the level of customers' willingness to adopt mobile internet but also contribute to its perceived usefulness according to the customer. Therefore, hedonic aspects should be the focus of attention for those who are interested in providing their services via a mobile internet platform. As discussed for the role of innovativeness, increasing the level of novelty and innovativeness perceived in using mobile internet will directly lead to enhancing the level of intrinsic utilities perceived in using such system. Also, designers should focus not only on functional services but also on hedonic and entertained services that could give more pleasure and fun for targeted customers when using mobile internet.

This study gives clues regarding the important role of perceived usefulness, and accordingly, more interest should be shown in enhancing the customer's perception of usefulness in the customer's mind (Dwivedi and Irani, 2009). In this instance, some promotional and marketing efforts should be made to cognitively position mobile internet in the customer's mind as more useful productive technology to save time and effort. In parallel with these efforts, practitioners should expand the level of services provided by mobile internet as well

as assuring the level of quality, reliability, and sustainability of performance of these services, thus enhancing the level of customers' perceived usefulness relating to Mobile internet (Ahmad et al., 2014; Alalwan et al., 2017; Alhussain et al., 2010; Al-Khalifa, 2011 Dwivedi et al., 2017a; Dwivedi et al., 2017b).

Customer trust has derived an interest by Saudi customers either in terms of their own perception toward usefulness or in forming their inclination to adopt mobile internet. Therefore, the main dimensions of customer trust, which are integrity, benevolence, and ability, should be empowered so as to enhance this trust. For instance, mobile internet service should be well designed in order to provide more reliable and high-quality services. Also, these applications should be well protected and secured to maintain the user's privacy and information. Organizations also should be careful regarding all promises given to their customers about their services introduced by mobile internet. This will differently let customers respect in the integrity of these organizations and accordingly have more trust in their mobile internet channels. Moreover, these organizations have to assure their customers that all provided information and their own privacy are well respected and will not be disclosed to any other parties. This, in turn, enhances the customer's perception of benevolence and accordingly the level of customer trust.

It could also be useful to adopt the Technology Roadmapping Technique suggested by Phaal et al. (2004), which could also help in future planning of mobile internet adoption. Practically, such a technique could help practitioners in their short- and long-term planning efforts, particularly in the developing countries, by providing them with methodologies, data, knowledge, and tools to accelerate the adoption of mobile internet systems (Phaal et al., 2004). In this instance, three kinds of process that have to be considered by practitioners are as follows: preliminary activities, the development of the roadmap, and the follow-up activities phase. During the preliminary activities, mobile internet service providers should figure out the current problem regarding the lower adoption rate of such systems by Saudi customers. For instance, what are the main aspects and conditions in mobile internet that are not covered and hinder the adoption rate? Such conditions could be related to those who are engaged in designing, implementing, and marketing mobile internet service such as technicians, marketers, and customers. As for the development stage, the main conditions and requirements should be clearly identified along with specifying which kind of customers will be targeted by mobile internet systems. Also, it is important to correlate the main customers' needs with the features of mobile internet systems, as well as specify the timeline detailing

how mobile internet could be effectively adopted by Saudi customers. At the final stage, there is the follow-up activity in which a continuous assessment and updated evaluation of the development and adoption of mobile internet will be required (Phaal et al., 2004).

7. Research Limitations and Future Directions

Even though conducting this study comprises a considerable contribution as presented in the prior section, there are a number of limitations that should be presented. Firstly, this study only considers one application of mobile technology (mobile internet) while there are many applications that also require more examination, such as mobile government, mobile healthcare applications, mobile learning, mobile commerce and mobile wallet. These applications should represent a focus of attention for future studies to discover the main dimensions that shape customers' perception and behaviour toward these applications. Especially, considering these mobile applications in the KSA would provide valuable contributions toward identifying the factors related to future technology acceptance, it would also help in future planning of technology deployments.

As discussed in the introduction section and literature review section, the gap that this study would like to cover is identifying the role of both intrinsic and extrinsic motivation which is formulated in terms of perceived usefulness and perceived enjoyment. It would also explore the most important factors that could predict the customer perception toward perceived usefulness and perceived enjoyment. Therefore, the current study model attempts to specifically discuss these aspects and their impact on customer intention and adoption of mobile internet in the KSA context. Accordingly, the current study model provides an accurate view of the main factors predicting customers' intention and adoption of mobile internet. Thus, future studies should pay more attention to the role of the social system. By the same token, this study ignores the impact of important facilities, support, and resources required to effectively use mobile internet. Accordingly, more interest has to be given to these aspects by future studies.

One of the most critical issues in the current study is considering the whole of Saudi Arabia as one homogenous market and analysing the current model for all participants in the six cities selected without taking into account the differences from city to another in the KSA. Thus, future studies could analyse sub-groups, which could in turn provide a more accurate picture. Finally, the impact of moderation factors such as age, gender, income level, and

educational level was not tested, and hence, future studies should explain more how these aspects will shape the Saudi customers' perception and reaction toward mobile internet.

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Appendix

Construct	Item	Source
Perceived usefulness	USF1: Mobile internet is useful in my daily life.	Davis et al. (1989)
	USF2: Using mobile internet helps me accomplish things more quickly.	
	USF3: Using mobile internet increases my productivity.	
	USF4: Using mobile internet increases my chances of achieving things that are important to me.	
Perceived ease of use	POU1: Learning how to use mobile internet is easy for me.	Davis et al. (1989)
	POU2: My interaction with mobile internet is clear and understandable.	
	POU3: Mobile internet is easy to use.	
	POU4: It is easy for me to become skilful at using mobile internet.	
Perceived enjoyment	ENJ1: Using mobile internet is fun.	Venkatesh et al. (2012)
	ENJ2: Using mobile internet is enjoyable.	
	ENJ3: Using mobile internet is very entertaining.	
Innovativeness	INN1: If I heard about mobile internet technology, I would look for ways to experiment with it.	Karaiskos et al. (2009)
	INN2: Among my peers, I am usually the first to explore new technology i.e. mobile internet.	
	INN3: I like to experiment with new technology, i.e. mobile internet.	
	INN4: In general, I am not hesitant to try out new information technologies.	Agarwal and Prasad (1998)
	INN5: Compared to my friends, I seek out a lot of information about mobile internet services.	Aldás-Manzano et al. (2009)
	INN6: I would try new mobile internet service even if in my circle of friends nobody has trialled it before.	
Trust	TR1: I believe that mobile internet is trustworthy.	Gefen et al. (2003)
	TR2: I trust in mobile internet.	
	TR3: I do not doubt the honesty of mobile internet.	
	TR4: I feel assured that legal and technological structures adequately protect me from problems on mobile internet.	
	TR5: Even if not monitored, I would trust mobile internet to do the job right.	
	TR6: Mobile internet has the ability to fulfil its task.	
	TR7: Promises made by mobile internet are likely to be reliable.	
Behavioural Intention	BI1: I will continue using mobile internet in the future.	Davis et al. (1989)
	BI2: I will always try to use mobile internet in my daily life.	
	BI3: I plan to continue using mobile internet frequently.	
Adoption	Adoption1: E-mail	Statista (2017)
	Adoption2: Online shopping	
	Adoption3: Watching Movies and online videos	
	Adoption4: Instant messaging and video calling	
	Adoption5: Using social media sites	

Examining Adoption of Mobile Internet in Saudi Arabia: Extending TAM with Perceived Enjoyment, Innovativeness and Trust

Highlights

- Mobile Internet has received less attention by researchers in Saudi Arabia
- This study provides the understanding on adoption of Mobile Internet in Saudi Arabia
- The study extended Technology acceptance model with trust, enjoyment and innovativeness
- The validated model predicted 51% of variance in behavioural intention
- Perceived ease of use was the only variable that was found non-significant on behavioural intention