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Author post-print (accepted) deposited by Coventry University's Repository

Original citation & hyperlink:

Ameen, N, Willis, R & Shah, M 2018, 'An examination of the gender gap in smartphone adoption and use in Arab countries: a cross-national study.' *Computers in Human Behavior*, vol. 89, pp. 148-162.

<https://dx.doi.org/10.1016/j.chb.2018.07.045>

DOI 10.1016/j.chb.2018.07.045

ISSN 0747-5632

Publisher: Elsevier

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An examination of the gender gap in smartphone adoption and use in Arab countries: a cross-national study

Abstract

This is the first research to study gender differences among consumers in a cross-national context in the Middle East: the United Arab Emirates (UAE) and Jordan. A conceptual framework was developed by extending the extended unified theory of acceptance and use of technology (UTAUT2) further. It was tested among individuals aged 18–29 years using multi-stage cluster sampling. A total sample of around 900 usable responses from both countries were included in the analysis. The factors national IT development, enjoyment, perceived relative advantage, price value and effort expectancy were found to be significant in the model among Arab women in the UAE and Jordan. The study has theoretical, social and policy relating contributions. The study shows how an extended UTAUT2 fits among both genders in a cross-national context. The study is helpful for policymakers who intend to reduce the gender gap in smartphone adoption and use. The advancement of national IT development and the presence of effective policies focusing on women were found important in both countries.

Keywords: Smartphone adoption, Emerging countries, Gender gap, Mobile communications, Arab countries

1. Introduction

The use of smartphones and their applications is growing rapidly. Therefore, mobile companies, policymakers and businesses are becoming more aware of the importance of smartphones and the advantages of using the applications accessed through them. Since the first smartphone was introduced in 2007, a substantial number of related services were added (Phan & Daim, 2011; Shah, 2014).

The existing literature is a rich source of technology acceptance theories; for example, Davis' (1989) technology acceptance model (TAM), Ajzen's (1985) theory of planned behaviour (TPB), Rogers' (2003) diffusion of innovation, Venkatesh, Morris, Davis, and Davis's (2003) unified theory of acceptance and use of technology (UTAUT), and Venkatesh, Thong, and Xu's (2012) extended unified theory of acceptance and use of technology (UTAUT2). However, only a few of these studies have tested how their model fits among different demographic profiles of consumers, as found in Venkatesh et al. (2003). Hence, Venkatesh et al. (2003) integrated four main moderators (including age, gender, experience and voluntariness) into the UTAUT. However, there is a lack of research extending the UTAUT theory and examining the effects of these moderators (Venkatesh, Thong, & Xu, 2016; Williams, Rana, & Dwivedi, 2015).

The importance of studying gender differences has been highlighted in recent studies (e.g., Anwar et al., 2017). The study conducted by Shaouf, Lü, and Li (2016) found significant differences between men and women in their adoption of technology. There is a gap in the literature on technology adoption in Arab countries in terms of examining the effects of moderating factors including gender on the relationships between the factors in the UTAUT and UTAUT2. The majority of previous research in Arab countries studied the direct effects in the UTAUT (e.g., Alalwan, Dwivedi, & Rana, 2017; Baabdullah, Dwivedi, & Williams, 2015; Tarhini, El-Masri, Ali, & Serrano, 2016). Also, there is a gap in the literature in studying gender differences in smartphone adoption in a cross-national context within the Arab region.

Technology has changed many aspects of people's life around the world. The role of information and communications technology (ICT) is significant in emerging markets (Luo & Bu, 2016), such as Jordan and the UAE. This is due to its power in connecting people and enabling individuals to access various services. In 2016, mobile technology and services generated 4.2% of GDP in Arab countries (Group Special Mobile Association [GSMA], 2017). The smartphone is the main platform for accessing mobile applications. The Middle East is an important market; and young people, who are usually the early adopters of technology (Rogers, 2003), form the largest segment of the population there (GSMA, 2015). However, a gender gap still exists in the region in terms of ICT adoption and use.

Recent statistics showed that women are still behind men in their use of technology and the Internet (GSMA, 2016, 2017; International Telecommunication Union [ITU], 2013). Forty-eight percent of women in the Arab world do not own a mobile phone (World Bank, 2015). In Arab countries in general, there is a large gender gap in smartphone adoption (ITU, 2013). The statistics show that the gender gap is largely irrespective of whether the country is more technologically advanced (e.g., the UAE, Saudi Arabia and Kuwait) or less technologically advanced (e.g., Lebanon, Jordan and Egypt) than others in the Arab region (GSMA, 2016; ITU, 2013). The gender gap is not limited to ownership of a smartphone; it also applies to use (GSMA, 2015).

Achieving gender equality in smartphone adoption would benefit women, their families and mobile companies. It would help in increasing women's engagement with technology could lead to a significant increase in GDP in these countries (GSMA, 2015, 2017; ITU, 2013). Smartphone users can access various mobile applications, including m-learning, m-commerce, m-banking, m-government, m-social media and m-email. Women can use these applications in the fields of education, communication, employability skills and entrepreneurship. Therefore, understanding women's behaviour in smartphone adoption and use is imperative.

This research aims to examine gender differences in smartphone adoption and use in Arab countries and support the development of powerful marketing techniques to target Arab women. To achieve this, the factors that may affect smartphone adoption and use among men and women were tested in Jordan and the United Arab Emirates (UAE). These two countries differ in terms of economic and technological advancement but have a similarly large gender gap in smartphone adoption and use.

This study advances knowledge in three main ways. First, this is the first research to study gender differences in smartphone adoption and use in a cross-national context in the Middle East. Second, this research shows how an extended UTAUT2 fits among both genders in a cross-national context in Jordan and the UAE. Third, it focuses on gender differences in the adoption of smartphones, including making calls and other mobile applications as part of the user's experience.

In terms of practical contributions, the research provides important insights to help to reduce the large gender gap in smartphone adoption and use in the region and empower Arab women to use different mobile applications and services.

The rest of this paper is organised as follows. A review of the literature is provided in the next section. The theoretical model is proposed in the following section. The methodology adopted in this research is explained in the fourth section, and the results are presented in the fifth section. This is followed by a discussion of the results. Finally, the research limitations, future directions and conclusion are provided.

2. Literature review

2.1 Smartphone adoption and use in Jordan and UAE

Jordan is one of the Levant countries in the Middle East. The percentage of women in the population is 47% (United Nations International Children's Emergency Fund [UNICEF], 2015). It is ranked high for the level of penetration and adoption of mobile phones, although the average income level is low to middle (GSMA, 2015). Smartphones account for nearly one-third of all mobile connections in Jordan (GSMA, 2015). The country is considered to be less technologically advanced than other countries in the Arab Gulf. According to the latest ITU (2013) report, 69% of males are smartphone users while only 31% of females are smartphone users. These characteristics made the inclusion of Jordan appropriate for this research.

The UAE is the most advanced country in the Arab world in smartphone adoption and ICT infrastructure (GSMA, 2015). In fact, it has the highest level of smartphone penetration (83%) in the world (GSMA, 2016). However, 75% of males are smartphone users and only 25% of females are smartphone users (ITU, 2013). In addition, the country has a high GDP per capita, which, as suggested in the literature, increases mobile phone adoption rates (GSMA, 2016). A unique characteristic of the UAE is its demography, as the country has many non-citizens living in it and young people form a large segment of the population (Trading Economics, 2016). The percentage of women in the population is 27% (Trading Economics, 2016). Including the UAE in this study helped to highlight differences between less advanced and more advanced countries with regard to the effect of gender on the adoption and use of smartphones. Table 1 shows the differences between the two countries included in the study.

Table 1

Comparison of the countries included in the study.

Criteria	Jordan	UAE
Population	9.5million	9.3million
Proportion of women in the population	47%	27%
Gender gap in smartphone use	69% of males are smartphone users while only 31% of females are smartphone users	75% of males are smartphone users and only 25% of females are smartphone users
Women's participation in the labour force	Only 16% of women participated in the labour force in 2016	Only 42% of women participated in the labour force in 2016
GDP	38.65 (USD billion)	348.74 (USD billion)
Ranking in the emerging markets index	33	2
Number of mobile cellular subscriptions	196 per 100 people	204 per 100 people
Smartphone adoption	30%	83%
ICT infrastructure	4G – advanced	4G – advanced
Type of user	Integrated	Consumer
Competition level	Competition	Duopoly

ICT policies	One of the most liberal ICT markets compared with other Arab countries. However, there are gaps and major issues in taxation of mobile phones and mobile Internet.	The country is still behind in terms of creating and implementing effective ICT policies. There are issues relating to freedom of information and restrictions on voice over internet protocol (VoIP) services.
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Note. Information was collected from the following sources: Alfaki and Ahmed (2013); Brach (2010); Freedomhouse (2013, 2015); GSMA (2015, 2017); ITU (2013); UNICEF (2015); Trading Economics (2016); Transport Intelligence (2017); World Bank (2016a, 2017a, 2017b).

2.2 Examining the role of gender in technology adoption literature

Outside the context of the Middle East, studies have found that the behaviour of individuals in relation to smartphones varies by gender and age (Anshari, Alas, Hardaker, Jaidin, Smith, & Ahad, 2016). In a recent review (Venkatesh et al., 2016) of the literature on the UTAUT (Venkatesh et al., 2003) and the UTAUT2 (Venkatesh et al., 2012), the authors evaluated how the theory was extended in studies conducted between September 2003 and December 2014. This review identified a gap in the literature in terms of research examining the effects of moderating factors, including gender (Venkatesh et al., 2016). This was also found by a more recent study (Dwivedi, Rana, Jeyaraj, Clement, & Williams, 2017).

The role of gender cannot be neglected when studying technology adoption (Venkatesh et al., 2003; Venkatesh, Sykes, & Zhang, in press). It can be argued that studying gender differences in mobile adoption and use is crucial for the case of developing countries in general and for Arab countries in particular. Sociodemographic factors (such as financial autonomy and educational level) and cultural factors play an important role in this (Ameen & Willis, 2016; GSMA, 2018). Mobile phone use is considered to support Arab women to stay independent (Ameen & Willis, 2016; United Nations Development Programme [UNDP], 2013). In many Arab countries, women have fewer rights than men in many aspects of life; for example, job retention and social activities (World Bank, 2016b). The fact that women in the region have significantly fewer chances than men of obtaining a job has led women who are unemployed to use mobile devices for social purposes. Indeed, it has been found that mobile phones are empowering for Arab women, as they enable women to access different mobile services, including those for managing a business (Ameen & Willis, 2016; GSMA, 2013; Kamel & Farid, 2007). Table 2 provides examples of recent studies that tested or extended the UTAUT2 in Arab countries, in addition to a summary of the methods used in these studies and their results.

Table 2

Examples of previous studies testing the UTAUT2 in Arab countries.

Author	Country	System/context	Participants	Findings related to this study
Alalwan, Dwivedi, & Williams (2014)	Jordan	Internet banking	Questionnaires were collected from Jordanian banking customers. 348 were included in the analysis.	Performance expectancy, hedonic motivation, facilitating conditions, trust and perceived risk had significant effects on behavioural intention. Facilitating conditions and trust had significant effects on performance

				expectancy. Trust had a significant effect on hedonic motivation.
Baabdullah et al. (2015)	Saudi Arabia	Mobile government	Questionnaires were distributed in three cities in Saudi Arabia. 418 usable responses were included in the analysis.	Performance expectancy, effort expectancy, social influence, facilitating conditions, hedonic motivation, price value, innovativeness and behavioural intention were found to be significant in the model.
Al-Sahouly (2015)	Egypt	E-commerce	Egyptian respondents participated in the study. 600 usable responses were included in the analysis.	Effort expectancy, hedonic motivation, facilitating conditions, social influence, online trust, online satisfaction and online interactivity had significant effects on behavioural intention. Age, gender and experience did not have any moderating effects in the model.
Alalwan et al. (2017)	Jordan	Mobile banking	Data was collected by conducting a field survey questionnaire completed by participants. 343 usable responses were used in the analysis.	Behavioural intention was significantly and positively influenced by performance expectancy, effort expectancy, hedonic motivation, price value and trust.
Bendary & Al-Sahouly (2017)	Egypt	Mobile commerce	Data was collected by conducting a field survey questionnaire completed by participants. 200 usable responses were used in the analysis.	Behavioural intention was significantly influenced by perceived usefulness, perceived ease of use, social influence, hedonic motivation and convenience.
Alalwan, Dwivedi, Rana, & Algharabat (2018)	Jordan	Internet banking	Questionnaires completed by Jordanian customers were used in the study. 348 usable responses were used in the analysis,	Behavioural intention was significantly influenced by performance expectancy, effort expectancy, hedonic motivation, price value and perceived risk. However, social influence did not have a significant impact on behavioural intention.
Baabdullah (2018)	Saudi Arabia	Mobile social network games	386 questionnaires were used in the analysis.	Performance expectancy, effort expectancy, social influence, trust, hedonic motivation and price value had significant effects on behavioural intention. Social influence and hedonic motivation had significant effects on trust.
Yaseen & El Qirem (2018)	Jordan	E-banking services	348 questionnaires were collected via a survey.	Effort expectancy, social influence and perceived quality of e-banking services had significant effects on behavioural intention. Performance expectancy and hedonic motivation were not significant predictors in the model.
Tarhini, Alalwan & Algharabat (in press)	Lebanon	Online shopping	342 usable questionnaires were included in the analysis. Data was	Performance expectancy was the strongest antecedent of behavioural intention. However, the relationship between effort expectancy, social

Based on the results in Table 2, a few observations have been made with regard to studying gender differences in smartphone adoption in Arab countries. First, within the context of Arab countries, the UTAUT2 has been examined and extended mainly using direct relationships. Fewer studies have examined the effect of gender and other moderating factors when studying the adoption and use of different technologies. Second, none of the studies included in Table 2 examined the adoption and use of the smartphone and its related mobile applications as a whole in order to fully understand this phenomenon from a gender perspective. Instead, they focused on a single application or service. There is a lack of cross-national studies with the primary aim of examining the differences between men and women and the influence of gender as an important moderator. Only one study (Al-Qeisi, Dennis, Hegazy, & Abbad, 2015) examined women's online behaviour in the context of Internet banking adoption in three Arab countries (Jordan, Egypt and Saudi Arabia). However, the study used the original UTAUT theory instead of the UTAUT2. The sample size from each country was small, so the samples were combined; studying a sample from each country separately would have led to more accurate results. Therefore, the framework proposed in this research aims to fill this gap by examining gender differences in smartphone adoption and use. Including the moderator (gender) helps to identify the context within which the relationship between two factors becomes significant.

3. Proposed model and development of hypotheses

The model proposed in this research is an extension of the UTAUT2 developed by Venkatesh et al. (2012) to fit the context of smartphone adoption in Arab countries. The first version of the UTAUT was developed by Venkatesh et al. (2003). It was developed from an organisational perspective using organisational settings. The eight main models related to the use of technology were gathered and tested: the TRA (Ajzen & Fishbein, 1980), the TAM (Davis, 1989), the motivational model (Davis, Bagozzi, & Warshaw, 1992), the TPB (Ajzen, 1991), the combined TAM and TPB, known as the A-TAM (Taylor & Todd, 1995a), the model of PC utilisation (Thompson, Higgins, & Howell, 1994), the diffusion of innovation theory (Rogers, 2003), and the social cognitive theory (Bandura, 1986). Later, Venkatesh et al. (2012) extended their theory (UTAUT2) for use in the context of consumers. The main constructs included performance expectancy, effort expectancy, social influence, facilitating conditions, hedonic motivation, price value and habit. The moderators were age, gender, and experience. Voluntariness was eliminated as it is not related to the individual consumer's case (Venkatesh et al., 2012). Table 3 shows a summary of the main factors found in the main technology acceptance theories and the presence of gender as a moderator in these theories. Based on the results in Table 3, it can be concluded that the UTAUT2 model is appropriate to form the basis of the model proposed in this research. There are many reasons for choosing UTAUT2 to form the basis of the conceptual framework in this research. First, it was originally UTAUT (Venkatesh et al., 2003) which was based on comparing, combining and analysing eight widely acknowledged technology acceptance theories in the existing body of literature and their extensions. The model combines the concepts from these theories, which may have used different labels, but thematically overlapped. Second, the model provides a more in-depth understanding of the needs of individual consumers, as it includes the moderating factors: age, experience and more importantly gender, which allow the acknowledgement and identification of differences between individual users. Third, the framework created by Venkatesh et al. (2012) was tested using mobile Internet, which is not completely different from the context of smartphone technology adoption and was tested using actual users (customers' perspective).

Table 3

Summary of factors found in technology acceptance theories and models

Model	Author	Independent factors							Dependent factors			Moderator
		PE	EE	SI	FC	HT	HM	PV	BI	USE	ATU	Gender
TAM	Davis (1989)	Y	Y	N	N	N	N	N	Y	Y	Y	N
TRA	Ajzen & Fishbein (1980); Fishbein & Ajzen (1975)	N	N	Y	N	N	N	N	Y	Y	Y	N
TPB	Ajzen (1991)	N	N	Y	Y	N	N	N	Y	Y	Y	N
SCT	Bandura (1986); Compeau & Higgins (1995)	Y	PF	Y	PF	N	Y	N	N	Y	N	N
DTPB	Taylor & Todd (1995b)	Y	Y	Y	Y	N	N	N	Y	Y	Y	N
A-TAM	Taylor & Todd (1995c)	Y	Y	Y	Y	N	N	N	Y	Y	Y	N
TAM2	Venkatesh & Davis (2000)	Y	Y	Y	N	N	N	N	Y	Y	N	N
UTAUT	Venkatesh et al. (2003)	Y	Y	Y	Y	N	N	N	Y	Y	N	Y
DoI	Rogers (2003)	Y	Y	Y	Y	PF	N	N	N	N	N	N
MPCU	Thompson et al. (1994)	Y	Y	Y	Y	PF	N	N	N	Y	N	N
MM	Davis et al. (1992)	Y	N	N	N	N	Y	N	Y	Y	N	N
UTAUT2	Venkatesh et al. (2012)	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y

Note. Y – Yes/present; N – No/not present; PF – Partly found.

The model proposed in the present study comprises the main constructs of the UTAUT2: effort expectancy, habit, price value, perceived relative advantage and enjoyment. In addition, we included two new constructs: culture-specific beliefs and values, and national IT development to account for the environment surrounding the individual user in Arab countries. The role of the environment around the user cannot be neglected. Loch, Straub, & Kamel (2003) and Straub, Loch, & Hill (2001) contended that when studying technology adoption, the national characteristics of each country in terms of technology must be studied separately in order to provide accurate results. The effect of culture, regulation liberty and the infrastructure of the country were found to be significant factors for technology adoption in the Middle East countries (Baabdullah et al., 2013). Lee, Trimi, & Kim (2013) explained that the effect of culture cannot be neglected when studying technology adoption, including smartphones. The authors used Hofstede cultural dimensions (namely: individualism vs collectivism, weak vs strong uncertainty avoidance, and short-term vs long-term orientation) at a country level to measure the effects of culture on technology adoption. However, the authors explained that culture should be studied at the individual user's level rather than the country's cultural dimension level. Hence, it is important to explore other cultural factors that are specific to individuals in Arab countries and can be seen differently among men and women. Luo and Bu (2016) explained that the role of the country's development level and regulatory environment and their effects on technology adoption and diffusion should not be neglected. The authors also highlighted that this can vary among different emerging economies.

The proposed model includes two dependent factors: behavioural intention to use smartphones (BI) and actual use of smartphones (USE). We eliminated two factors: facilitating conditions and social influence. Facilitating conditions are defined as "consumers' perceptions of the resources and support available to perform a behaviour" (Venkatesh et al., 2012, p. 159). Social influence is "the extent to which consumers perceive that important others (e.g., family and friends) believe they should use a particular technology" (Venkatesh et al., 2012, p. 159). Previous studies that tested or extended the UTAUT model found that these two factors were insignificant in the context of technology adoption in the Middle East (Al-Gahtani, Hubona, & Wang, 2007; Al-Qeisi, Dennis, Alamanos, & Jayawardhena, 2014; Al-Qeisi et al., 2015). Venkatesh et al. (2003) explain that the effect of facilitating conditions can be overridden by the presence of effort expectancy in the model. In addition, the effect of social influence is generally stronger in a compulsory setting rather than a voluntary setting and when the technology is new (Davis, 1989; Venkatesh et al., 2003; Venkatesh et al., 2012), which is not the case in this research. Therefore, these two factors were excluded from the research model.

The constructs included in our model and our proposed hypotheses for their significance are discussed in the following sections.

3.1 Perceived relative advantage (PRA) – usefulness

Perceived relative advantage stems from perceived usefulness and performance expectancy, two important factors in previous theories of technology acceptance (e.g., Davis, 1989; Venkatesh et al., 2012). Rogers (2003, p. 229) defines relative advantage as "the degree to which an innovation is perceived as being better than the idea it supersedes". Previous studies have shown that perceived usefulness is a significant determinant of behavioural intention (Adams, Nelson, & Todd, 1992; Davis, 1989; Davis & Venkatesh, 1996; Terzis & Economides, 2011). Venkatesh et al. (2003) found that the effect of performance expectancy was influenced by gender and that its effect is stronger among men. Within the context of smartphone adoption in the UAE and Jordan, men are more exposed to technology and smartphones (GSMA, 2016;

ITU, 2013) so they are more likely to be aware of the benefits. Therefore, we anticipate that PRA is more significant among men. Thus, the following hypothesis was proposed:

Hypothesis 1. Gender will moderate the effect of perceived relative advantage on behavioural intention so that the effect is stronger among men.

3.2 Effort expectancy (EE)

Effort expectancy is defined as “the degree of ease associated with consumers’ use of technology” (Venkatesh et al., 2012, p. 159). This factor has been found to be significant in the UTAUT2 (Venkatesh et al., 2012) and many other studies (e.g., Davis, 1989; Davis et al., 1992; Taylor & Todd, 1995b, 1995c; Venkatesh & Davis, 2000). Venkatesh et al. (2003) found that gender moderates the relationship between effort expectancy and behavioural intention. Within the context of smartphone adoption and use, the low level of smartphone and application use among women (GSMA, 2016, 2017; ITU, 2013) means they are less experienced. Previous studies have shown that the lower the level of experience, the more important effort expectancy is (Tarhini et al., 2016). Therefore, more effort is required for Arab women to use smartphones. The following hypothesis was proposed:

Hypothesis 2. Gender will moderate the effect of effort expectancy on behavioural intention so that the effect is stronger among women.

3.3 Enjoyment (Enj)

The construct of enjoyment refers to the construct of hedonic motivation in the UTAUT2 (Venkatesh et al., 2012). Hedonic motivation is “the fun or pleasure derived from using a technology, and it has been shown to play an important role in determining technology acceptance and use” (Venkatesh et al., 2012, p. 161). Enjoyment was found to be important in recent studies (e.g., Akram & Mirsha, 2017). Women mainly use smartphones and social media apps for the purpose of social connectivity (Wajcman, Bittman, Jones, Johnstone, & Brown, 2007). One of the main applications used in Arab culture is WhatsApp, because it is easy, free and accessible for a wide range of ages. However, the app is not fully available in the UAE (Freedomhouse, 2013; Radcliffe & Lam, 2018). Venkatesh et al. (2012) found that the effect of enjoyment on behavioural intention is stronger among male smartphone consumers. Arab women are usually more restricted than Arab men. These restrictions extend beyond technology to include social, economic, legal, family and culture (Ameen & Willis, 2016). The restrictions may discourage Arab women to use smartphones more in order to stay connected while they are at home. However, since they have not had the opportunity to use this technology extensively in the past, they are less likely to enjoy using it as much as men do. The lower the level of experience, the higher the significance of ease of use would be; thus, the level of enjoyment would be low (Akram & Mishra, 2017). Therefore, the following hypothesis was proposed:

Hypothesis 3. Gender will moderate the effect of enjoyment on behavioural intention so that the effect is stronger among men.

3.4 Price value (PV)

Price value has an important effect on behavioural intention in the UTAUT2 (Venkatesh et al., 2012). This construct is defined as “consumers’ cognitive trade-off between the perceived benefits of the applications and the monetary cost for using them” (Venkatesh et al., 2012, p. 161). Along with infrastructure and service, price value is relevant to the adoption of mobile phones (Van Biljon & Kotze, 2008). The price factor has been highlighted in previous studies

(e.g., Hakim & Neaime, 2014; ITU, 2013; Kalba, 2008; Kamel & Farid, 2007; UNDP, 2013). It is also important in the context of Arab users (e.g., Kamel & Farid, 2007; Puumalainen, Frank, Sundqvist, & Tuppur, 2011). In Jordan and the UAE, there is a large gender gap in the labour participation rate. In Jordan, only 16% of women participated in the labour force in 2016 (World Bank, 2017a). This is below the average participation rate for women in the Arab world, 23% in 2016 (World Bank, 2017a). It is also much lower than men's participation rate in Jordan, which was 64% in 2016 (World Bank, 2017b). In the UAE, only 42% of women participated in the labour force in 2016, as opposed to 91% of men (World Bank, 2017b). In both countries, women have fewer chances of earning than men do, which makes price value more important when it comes to buying or using a smartphone. Venkatesh et al. (2012) found that price value is moderated by gender so that price value has a stronger effect on behavioural intention among women. Therefore, the following hypothesis was proposed:

Hypothesis 4. Gender will moderate the effect of price value on behavioural intention so that the effect is stronger among women.

3.5 Habit (HT)

Based on a study conducted by Limayem, Hirt, & Cheung (2007), habit is defined by Venkatesh et al. (2012, p. 161) as “the extent to which people tend to perform behaviours automatically because of learning”. According to Limayem et al. (2007), when habit is formed (by frequently using technology for a certain period in a stable environment), it becomes a key driver of actual use and can override the effect of behavioural intention. The effect of habit on behavioural intention and actual use was tested in the present research, following the research carried out by Venkatesh et al. (2012). Habit was found to have a stronger effect among men (Venkatesh et al., 2012). Because Arab women use smartphones less than Arab men do (GSMA, 2015; ITU, 2013), we anticipate that the effect of habit will be stronger among men. Therefore, the following hypotheses were proposed:

Hypothesis 5. Gender will moderate the effect of habit on behavioural intention so that the effect is stronger among men.

Hypothesis 6. Gender will moderate the effect of habit on actual use so that the effect is stronger among men.

3.6 Culture-specific beliefs and values (CSBVs)

Straub et al. (2001) define culture-specific beliefs and values as “those specific beliefs, values and meanings that are thought to have a downstream effect on the use of information systems”. Culture-specific beliefs and values were found to be important in the studies conducted by Hill, Loch, Straub, & El-Sheshai (1998), Loch et al. (2003) and Straub et al. (2001). Ghanem, Kalliny, and Elgoul (2013) explained that there have been some changes in Arab cultural values, such as a preference for obtaining more information. This is due to economic and education development in some Arab countries (e.g., the Gulf countries). However, Ghanem et al. (2013) pointed out that the online environment does not allow for the visibility of some important contextual factors that are relied upon heavily in communication in the Arab world, such as authority, status and prestige. This is similar to the findings of an earlier study conducted by Al Omoush, Yaseen, and Alma'aitah (2012) but the authors explained that in some Arab countries, developments in technology are motivating individuals to move towards technology-mediated communications. Nevertheless, a more recent study conducted by Alf, Gómez, and Ivanov (2017) showed that young individuals in Egypt and UAE still prefer face-to-face communication when learning, which indicates that this Arab cultural value might not

have completely changed yet. Despite some changes in the Arab culture, however, culture-specific values still have a significant effect on how people behave – whether online or face to face (Al Omoush et al., 2012; El Alfy et al., 2017). Straub et al. (2001) found that culture-specific beliefs and values affect IT system outcomes, which the authors define as actual use of or intention to use a technology system. This construct was included in the conceptual framework of the present research because we expected it to be significant due to the nature and characteristics of Arab culture.

Straub, Loch, Evaristo, Darahanna, & Strite (2002) recommend studying a subset of cultural values at an individual level, which is related to the key area of enquiry. Although previous research does not indicate that moderating factors (including gender) have any effect on the relationship between culture-specific beliefs and values, and behavioural intention, gender was included based on the previous literature on the adoption of technology in Arab countries.

In this research, culture-specific beliefs and values were expected to affect behavioural intention to use smartphones. The culture-specific value selected was ‘face-to-face versus mobile-mediated meetings’, as the preference is closely related to whether consumers decide to adopt and use smartphones. This important factor must be considered when studying smartphone use (Kim, 2017). It is important to stress that mobile devices are supplementary to face-to-face communication. Rose and Straub (1998) and Straub et al. (2001) indicate that a preference for face-to-face meetings is an important Arab cultural value.

As mentioned previously, gender differences exist in Arab culture (Baker, Al-Gahtani, & Hubona, 2007). Women are less powerful and less independent than men (Kirdar, 2010), and they are more reserved in their interactions with others (Ameen & Willis, 2016). Therefore, it can be contended that a preference for face-to-face meetings is stronger among men. This implies that a preference for mobile-mediated meetings is stronger among women. Thus, the following hypothesis was proposed:

Hypothesis 7. Gender will moderate the effect of culture-specific beliefs and values on behavioural intention so that a preference for mobile-mediated meetings is stronger among women.

3.7 National IT development (ND)

National IT development is defined as “specific technology policies that guide the development of information systems in a specific country together with the existing structure of computing and communication capabilities and the ability of the population to operate and utilise these capabilities. The overall construct reflects the level of support for technological development within a given nation” (Straub et al., 2001, p. 9). This construct was included to test the effect of a country’s policies and ICT development on consumers’ behavioural intention to use smartphones. National IT development was included in studies conducted by Loch et al. (2003) and Straub et al. (2001). The items included in this construct in Loch et al.’s study were the privatisation of IT industries, the perception of current demand for IT, the perception of current supply of IT, government IT initiatives, taxation on IT imports, and other IT tariffs and restrictions, software piracy and tax benefits for IT use (Loch et al., 2003, p. 46). Jordan and the UAE differ from more developed countries in terms of privatisation, competition, taxation, supply and demand (GSMA, 2016). Therefore, we investigated these aspects from a consumer point of view in these two countries.

Women in Arab countries do not travel as frequently as men do, and by law they cannot travel unless their husbands agree (Kirdar, 2010). In addition, Arab men are usually responsible for

providing the household income (Kirdar, 2010). Fewer women work in Arab countries than in other countries (Elborgh-Woytek et al., 2013; World Bank, 2017a, 2017b). All this means that Arab men are more exposed to issues related to IT development. Therefore, the effect of national IT development is expected to be stronger among men. Thus, the following hypotheses were proposed:

Hypothesis 8. Gender will moderate the effect of national IT development on behavioural intention so that the effect is stronger among men.

Hypothesis 9. Gender will moderate the effect of national IT development on actual use so that the effect is stronger among men.

3.8 Behavioural intention (BI)

Behavioural intention refers to the process of the individual's readiness (cognitively) to perform a certain behaviour. Accordingly, the possibility of a person performing a certain behaviour depends on their intentions (Ajzen & Fishbein, 1980). In this study, we hypothesise that behavioural intention will have a significant effect on the actual use of smartphones among both males and females.

Hypothesis 10. Behavioural intention has a significant effect on actual use of smartphones among both men and women.

Fig. 1 shows our proposed model.

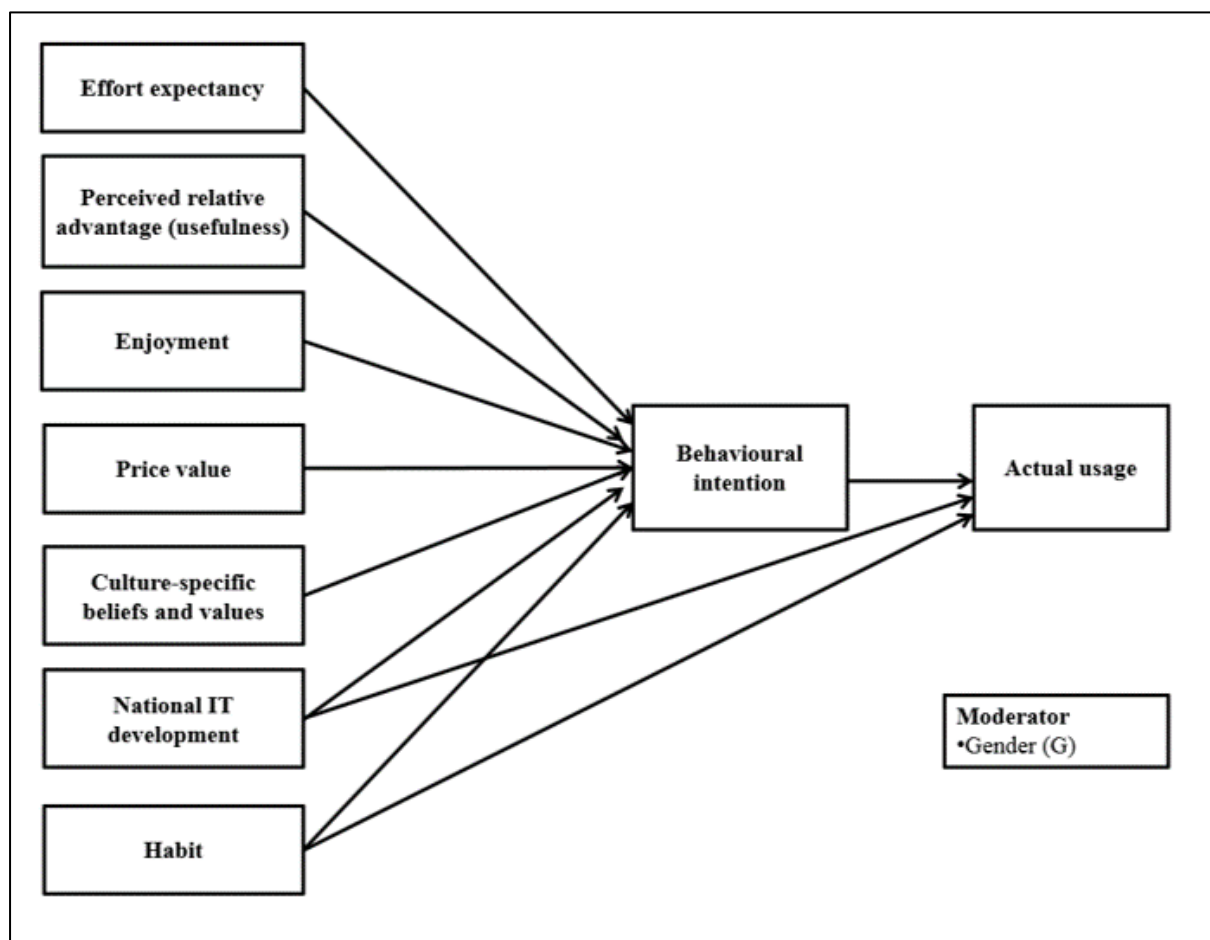


Fig. 1. Proposed research model.

4. Methodology

4.1 Sampling and data collection

A total of 1,066 questionnaires were distributed to individuals aged 18–29 who were residing in the UAE or Jordan. The questionnaire was originally written in English. The first stage was to translate it to Arabic using a professional translator. The second stage was to carry out a back-translation, which is a good way of ensuring that the questionnaire is accurately translated (Sekaran, 2003). The final stage was to show the Arabic and English versions of the questionnaire to a second accredited translator to carry out another back-translation process to ensure that it was accurately translated and to ensure both idiomatic and conceptual equivalence. The 18–29 age group represents the early adopters of any new mobile phone introduced to the market, including smartphones, so users in this age group have high potential for technology adoption and use (GSMA, 2015). Previous studies have stated that the 15–29 age group is the largest in the Arab population (Dhillon & Yousef, 2009; GSMA, 2013, 2014; Hayutin, 2009; Kronfol, 2011). The 2014 GSMA report states that one in five people in the region is aged between 15 and 24 and that over 60% of the population is younger than 30 (GSMA, 2014, p. 9). In Jordan, 70% of the population is under 30 (UNDP, 2013). In the UAE, 51% of the population is under the age of 30 (United Arab Emirates National Bureau of Statistics, 2015).

Multi-stage cluster sampling is common in research carried out in developing countries (Yansaneh, 2005). Area sampling is one type of multi-stage cluster sampling (Sekaran, 2003). This sampling technique is appropriate when no list of target units is available. It was particularly useful for this research as the research covered a large geographical area. The questionnaires were distributed face to face in two cities: Amman (Jordan) and Dubai (the UAE). When a household included more than one individual within the target age group, one individual was selected. This helped to reduce bias, as individuals living in the same household may have similar characteristics and provide similar responses.

There were three target districts in each city: Amman Qasabat, Marka and Wadi Essier in Amman; and Al-Twar, Jumeirah and Al-Barshaa in Dubai. The questionnaires were distributed to individuals aged 18–29 in all communities in these districts. Based on Yamane's (1967) formula, the minimum sample size in each country was 400 so to ensure that the minimum sample size is reached, 533 questionnaires were distributed in each country. The number of completed questionnaires was 429 in Jordan (the response rate was 80%) and 437 in the UAE (the response rate was 82%). Non-response bias was assessed using the Mann-Whitney-U-Test in the Statistical Package for the Social Science (SPSS) IBM Statistics version 20 software for the early responses (early 50 respondents) and the late responses (last 50 respondents), having distributed the questionnaires over nearly a two-month period. For the Jordanian sample, the results showed that none of the differences between the two groups was significant, i.e., when $p \leq 0.05$ (Pallant, 2010). Therefore, non-response bias was not a problem in this sample. The results of the Mann-Whitney-U-Test revealed for the UAE sample showed that there were no significant differences between the early and late responses, as all p values were higher than the threshold value of 0.05 with the lowest p value of 0.120.

4.2 Survey instrument and measures

The first section of the survey included questions to gather demographic information about the respondents: their age, gender, and education. The second section asked questions about whether respondents owned a smartphone. The third section included the measures for each construct in the model. The measures and their sources are provided in Appendix A.

Participants were asked to respond to a set of statements using a seven-point Likert scale, where 1 = strongly disagree and 7 = strongly agree, as used in the study by Venkatesh et al. (2012). The Likert scale enables the measures to be listed, which makes the survey easier and quicker for respondents to complete (Bertram, 2010; Collis & Hussey, 2014,). A seven-point Likert scale was also used in other studies on technology acceptance (e.g., Al-Gahtani et al., 2007). Foddy (1994) recommends using a seven-point Likert scale as a minimum for validity and reliability. Additional items related to smartphones were included. Podsakoff, MacKenzie, Lee and Podsakoff (2003, p. 879) defined common method variance (CMV) as “Variance that is attributable to the measurement method rather than to the construct the measures represent”. This test was used in previous studies that tested the UTAUT (e.g., Chopdar, Korfiatis, Sivakumar, & Lytras, 2018; El Ouiridi, El Ouiridi, Segers, & Pais, 2016; Lu, Yu, Liu, & Wei, 2017; Oliveira, Thomas, Baptista, & Campos, 2016). CMV inflates the relationships between the variables. CMB was assessed using Harman’s test in SPSS. The results showed that with the unrotated factor analysis, the first factor accounted for 38.552% of the variance in the Jordanian sample and only 31.11% of the total variance in the UAE sample. This is still lower than 50%. Thus, CMB was not an issue.

3.2 Analytical procedures

The data was analysed using partial least squares-structural equation modelling (PLS-SEM) and SmartPLS 3.0 software. Chin (1998) explained that there are major differences between reflective and formative constructs. Formative indicators are the items that cause the construct to exist. If one item is omitted, the construct is affected negatively (Chin, 1998). Jarvis, MacKenzie, and Podsakoff (2003) provided a set of recommendations to guide researchers’ decisions on whether a construct is formative or reflective. These are based on four main criteria. First, direction of causality: from item to construct (formative) or from construct to item (reflective). Second, interchangeability of indicators: whether indicators have similar content, which makes them interchangeable (reflective), or whether they do not share a common theme or similar content, which makes them not interchangeable (formative). Third, covariance of indicators: reflective indicators should co-vary with each other, while formative indicators do not. Fourth, the nomological net of the construct indicators: reflective indicators have no differences in their nomological net and all indicators should have the same consequences, while formative indicators may have differences in their nomological net and are not required to have the same consequences. Based on Jarvis et al.’s (2003) categorisation of reflective and formative factors, the constructs actual use and national IT development were formative, while the remaining constructs were reflective. Similarly, Venkatesh et al. (2012) classified all the UTAUT2 constructs as reflective except actual use, which was classified as formative. The data was analysed in two stages. The first stage tested the reflective measurement model and then the formative measurement model. The second stage assessed the relationships using non-parametric partial least squares-multi-group analysis (PLS-MGA).

Sarstedt, Henseler, and Ringle (2011) proposed the non-parametric confidence set approach. This approach overcomes the limitations of the parameter approach. The PLS-MGA is a non-parametric approach which is based on estimating the path model for each group and it is assessed using a separate bootstrap analysis (Henseler, 2012). In this approach, the analysis relies on assessing the observed distribution of the bootstrap outcomes instead of making distributional assumptions (Henseler, 2012). First, the centred bootstrap estimates of the groups are compared. Then the difference between the groups is divided by the total number of bootstrap samples to indicate the probability that the significance in the second group is greater than the first group, and is evaluated using the *p* value (Henseler, 2012). *P* values of .05 or lower, or .95 or higher indicate that there are significant differences between the paths in the

groups (Henseler, Ringle, & Sinkovics, 2009). PLS-MGA includes a set of different techniques to compare PLS model estimates (Hair, Hult, Ringle, & Sarstedt, 2014). Because the collected data was not normally distributed, we used this method of analysis to assess the effects of the moderators.

5. Results

5.1 Descriptive statistics

The first stage of the analysis was to assess the demographic characteristics of the respondents from each country: their age, gender, and education. All the respondents owned a smartphone.

In Jordan, 38.9% of the respondents were aged 18–22 and 61.1% were aged 23–29. With regard to gender, 46.9% were male and 53.1% were female. The results show that a large percentage of respondents (58.3%) had a bachelor's degree, while 23.5% had a diploma, 9.3% had a master's degree, 8.9% were high-school graduates and none had a PhD. In the UAE, the sample was distributed almost evenly between the two age groups: 51.7% were aged 18–22 and 48.3% were aged 23–29. The split between the genders was also fairly even: 52.9% were male and 47.1% were female. In terms of education, a larger percentage of respondents had higher levels of education in the UAE sample than in the Jordan sample: 55.4% of the respondents had a bachelor's degree, 7.6% had a master's degree and 8% had a PhD, while 11.4% were high-school graduates and 17.6% had a diploma. The demographic information for the samples is presented in the table in Table 4.

Table 4
Demographic profile: Jordan and the UAE.

Demographic	Jordan (%)	UAE (%)
Age		
18–22	38.9	51.7
23–29	61.1	48.3
Gender		
Male	46.9	52.9
Female	53.1	47.1
Education		
High school	8.9	11.4
Diploma	23.5	17.6
Bachelor's degree	58.3	55.4
Master's degree	9.3	7.6
PhD	0.0	8.0

5.2 Assessment of the measurement model

The data from each country was analysed separately. The first stage involved assessing the reflective measurement model. The convergent validity was assessed, and the average variance extracted (AVE) was greater than .50 (Hair et al., 2014). Cronbach's alpha exceeded the minimum threshold of .70 for all reflective constructs in both samples, and the composite reliability for each of the reflective constructs was well above .70. In addition, factor loadings were assessed. The loadings should be .70 or above (Hair et al., 2014). In this research, all

reflective measurement items with loadings greater than .70 were retained. In the Jordan sample, two items were below the threshold value of .70: PV5 (.524) and PV6 (.546). These were removed. The remaining items had high loadings (from .761 to .904) and were retained. In the UAE sample, the results show that some indicators had loadings lower than .70: Enj1 (.190), PV5 (.416), PV6 (.541) and PRA4 (.583). These were removed. All other items loaded significantly (from .761 to .961).

Discriminant validity was also assessed by examining the cross-loadings of each construct, as the constructs should load higher on their own indicators than on the indicators of the other constructs (Chin, 1998). This was the case in both samples. The Fornell–Larcker criterion was also assessed. In this assessment, a construct should share more variance with its own indicators than it shares with the other constructs (Hair, Black, Babin, Anderson, & Tatham, 2006). In both samples, the square root of each construct’s AVE was greater than its highest correlation with any other construct. The results of the reflective measurement model in both countries are shown in Tables 5 and 6.

Table 5
Assessment of convergent validity and reliability: Jordan.

Construct	AVE	Cronbach’s alpha	Composite reliability
BI	.806	.919	.947
CSBV	.858	.918	.949
EE	.819	.947	.957
Enj	.868	.926	.951
HT	.793	.874	.929
PRA	.833	.939	.958
PV	.805	.916	.946

Table 6
Assessment of convergent validity and reliability: UAE.

Construct	AVE	Cronbach’s alpha	Composite reliability
BI	.807	.918	.944
CSBV	.828	.893	.935
EE	.826	.947	.957
Enj	.923	.919	.958
HT	.786	.865	.913
PRA	.889	.938	.956
PV	.805	.911	.945

For the formative measurement model, collinearity was assessed using SPSS software. The collinearity diagnosis was conducted using behavioural intention as a dependent variable in linear regression. The variance inflation factor (VIF) value should be smaller than 5 and the tolerance value should be greater than .20 (Hair et al., 2014). The VIF of the formative indicators ranged from 1.387 to 4.090 in the Jordan sample and from 1.170 to 3.223 in the UAE sample; therefore, the VIF values for all formative indicators were smaller than 5. In addition, the tolerance values for all formative indicators were greater than .20. To assess the

significance of the formative indicators, the bootstrapping procedure was run in SmartPLS software with 5,000 samples and no sign changes at a significance level of .05 ($p \leq .05$). In the Jordan sample, two formative indicators were removed. The first of these was m-commerce, as the outer weight was insignificant ($p = .591$) and the outer loading was less than .5 (.100) and insignificant ($p = .131$). The second was m-banking, as the outer weight was insignificant ($p = .775$) and the outer loading was less than .5 (.085) and insignificant ($p = .253$). In the UAE sample, no issues were found with the significance or relevance of the formative indicators.

5.3 Multi-group analysis

For each country, the sample was split into two groups: male users and female users. In the Jordan sample, there were 201 men in the males group and 228 women in the females group.

The R^2 values for BI and USE in the males group were .776 (78%) and .466 (47%), respectively. In the females group, the R^2 values for BI and USE were .811 (81%) and .582 (58%), respectively. As shown in Table 7, the results of the PLS-MGA test revealed no significant differences between the two groups in most of the relationships. Only three paths were significantly different in the two groups. First, the effect of ND on BI (hypothesis 8) was stronger among women compared to men ($p = .993$). Second, PRA had a stronger effect on BI (hypothesis 1) for men than for women ($p = .042$). Third, the effect of PV on BI (hypothesis 4) was stronger among men compared to women ($p = .050$). BI had a significant effect on USE among both groups.

Table 7
PLS-MGA results for the effect of the gender moderator: Jordan.

Hypothesis	Relationship	Subsample 1: male users		Subsample 2: female users		Path coefficients: difference	P (male vs female)
		t	p	t	p		
H1	PRA -> BI	2.487	.013	.961	.337	.142	.042
H2	EE -> BI	.783	.434	2.480	.013	.067	.756
H3	Enj -> BI	1.618	.106	1.947	.052	.011	.431
H4	PV -> BI	3.772	.000	1.873	.062	.164	.050
H5	HT -> BI	2.444	.015	1.484	.139	.095	.128
H6	HT -> USE	.922	.357	3.291	.001	.138	.845
H7	CSBV -> BI	1.879	.061	1.920	.055	.068	.722
H8	ND -> BI	2.346	.019	4.960	.000	.268	.993
H9	ND -> USE	2.306	.022	2.593	.010	.004	.499
H10	BI->USE	2.940	.000	2.900	.000	.093	.134

In the UAE sample, there were 231 respondents in the males group and 206 respondents in the females group. The R^2 values for BI and USE in the males group were .884 (88%) and .490 (49%), respectively. In the females group, the R^2 values for BI and USE were .805 (81%) and .469 (47%), respectively. The results of the PLS-MGA, shown in Table 8, revealed that there were significant differences between the two groups in five paths. First, the effect of CSBV on BI (hypothesis 6) was stronger among men ($p = .028$). Second, the effect of Enj on BI

(hypothesis 3) was stronger among women ($p = .998$). Third, the effect of HT on BI (hypothesis 5) was stronger among men ($p = .018$). Fourth, the effect of PRA on BI (hypothesis 1) was stronger among women ($p = 1.000$). Finally, PV had a stronger effect on BI (hypothesis 4) among men ($p = .000$). BI had a significant effect on USE among both groups.

Table 8

PLS-MGA results for the effect of the gender moderator: UAE.

Hypothesis	Relationship	Subsample 1: male users		Subsample 2: female users		Path coefficients: difference	P (male vs female)
		t	P	t	p		
H1	PRA -> BI	2.318	.021	5.706	.000	.551	1.00
H2	EE -> BI	1.992	.047	2.166	.031	.024	.623
H3	Enj -> BI	.875	.382	3.743	.000	.141	.998
H4	PV -> BI	4.916	.000	3.360	.001	.341	.000
H5	HT -> BI	3.805	.000	1.116	.265	.133	.018
H7	CSBV -> BI	2.566	.011	1.776	.076	.139	.028
H8	ND -> BI	3.618	.000	4.249	.000	.055	.748
H9	ND -> USE	1.797	.073	2.767	.006	.063	.633
H10	BI->USE	4.844	.000	4.980	.000	.093	.126

Table 9

Comparison of results: Jordan and the UAE.

Hypothesis	Relationship	Hypotheses testing (Jordan)	Hypotheses testing (UAE)
H1	PRA -> BI	Supported	Partially supported
H2	EE -> BI	Not supported	Not supported
H3	Enj -> BI	Not supported	Partially supported
H4	PV -> BI	Partially supported	Supported
H5	HT -> BI	Not supported	Supported
H6	HT -> USE	Not supported	Not supported
H7	CSBV -> BI	Not supported	Partially supported
H8	ND -> BI	Partially supported	Not supported
H9	ND -> USE	Not supported	Not supported
H10	BI -> USE	Supported	Supported

Table 9 provides a summary of the results of hypotheses testing in both countries. The results showed that differences exist between the two countries in terms of how the model fits among males and females.

6. Discussion

This research studied the factors that can affect men's and women's smartphone adoption and use in Jordan and the UAE. The research utilised the UTAUT2 (Venkatesh et al., 2012). It

extended the theory by integrating two factors – one related to culture and the other to national IT development (Loch et al., 2003; Straub et al., 2001). The model was empirically tested among young male and female smartphone consumers in Jordan and the UAE. The results showed that our proposed extension of the UTAUT2 fits well in the two selected countries and both men and women in both countries have strong intentions to use smartphones. However, the model fits differently with the two genders. Our results partially support the studies conducted by Loch et al. (2003), Straub et al. (2001) and Venkatesh et al. (2012). The findings concur with studies that have found that gender is an important factor (Venkatesh et al., 2000; Venkatesh et al., 2017), as gender was found to be a significant factor in Jordan and even more important in the UAE. Our empirical analysis of the data from the UAE and Jordan shows that the factors national IT development, enjoyment, effort expectancy, perceived relative advantage and price value have a significant effect on Arab women's adoption of smartphones.

The findings regarding the awareness of the benefits obtained from smartphones were contradicting in the two countries. Only Jordanian men are aware of the importance of the usefulness of smartphones and mobile applications. On the contrary, despite that the benefits of the smartphones and mobile applications are viewed as important among both males and females in the UAE, Emirati women are more aware of its importance. This shows that Jordanian women are significantly less exposed to smartphones, hence less aware of their benefits in comparison to the other groups. Hence, it is vital initiate awareness campaigns specifically targeted towards women in Jordan. The awareness of the benefits of the smartphones and mobile applications can encourage these women to use them to their full potential.

There were no major differences in terms of how men and women view the importance of the ease of using mobile phone and applications in both countries. All groups found the level of efforts required to use smartphones and mobile application important in both countries except Jordanian men. This is associated with the low level of smartphones and mobile applications use among women (GSMA, 2016, 2017; ITU, 2013). Hence, further support for these women should be provided.

The findings regarding the effect of enjoyment contradict with our original hypothesis and the findings in Akram and Mishra's (2017) study. Our original assumption was that since these females do not use smartphones frequently, it may not be easy for them to use the device and this may lead to less recognition of the fun or pleasure associated with its use. Despite that men and women's views on enjoyment of using smartphones and mobile applications were not significantly different in both countries, the findings suggest that both Jordanian and Emirati women place a great emphasise on the fun associated with their use.

Surprisingly, while we anticipated that culture-specific beliefs and values would have a significant effect on behavioural intention among women due to cultural restrictions (Ameen & Willis, 2016), this factor was only significant among men, and only in the UAE. The results showed that culture-specific beliefs and values, which in this research referred to Arabs' preference for face-to-face meetings vs. technology-mediated meetings (Straub et al., 2001; Loch et al., 2003), was found to be significant in the case of young Arab users' adoption of smartphones. Previous studies have shown that Arabs prefer face-to-face meetings (Straub et al., 2001). Within the context of smartphone use, this finding indicated that young Arab men in UAE do not object to technology-mediated meetings since they are possibly more interactive with smartphones among all groups in the two countries.

The findings related to the effect of habit on the consumers' behavioural intention were different in the two countries. In Jordan, there were no significant differences between men and women. In UAE, there were significant differences between men and women in terms of the effect of habit on behavioural intention towards using smartphones. As anticipated, since habit requires a good level of experience in using technology (Limayem et al., 2007), this factor was only significant among men. This was consistent with the study by Venkatesh et al. (2012). In both countries, habit had a strong effect on men's behavioural intention. This proves that men have a higher frequency of use of smartphones than women and are more familiar with their use that made them form habits (Limayem et al., 2007). Once habit is formed, it becomes a key driver to enhance behavioural intention and becomes a motive for the frequent use of smartphones.

Both genders in both countries are aware of the importance of decreasing the prices of smartphones, mobile Internet and mobile applications. Contrary to what was anticipated, the price of smartphones, mobile Internet and mobile applications was more significant among men than among women in both countries. This may be because women depend on men financially: the man has the main financial responsibility in the family (Kirdar, 2010). The reduction of these prices will encourage women in both countries to use smartphones further and exploit their full potential in terms of the use of different mobile services that are important for their daily lives such as access to government services, education and finance.

Similarly, the presence of national IT development and policies that can support the effective use of smartphones is significant among both men and women in both countries. An interesting finding is that the presence of national IT development and policies was more significant for Jordanian women than Jordanian men. The advocates the importance of ensuring a transparent environment for policy-making that can support these women's use of smartphones and different mobile applications. This is also possibly related to the taxation policies which led to a significant increase in the prices of smartphones and mobile Internet in Jordan (GSMA, 2016). Both men and women in UAE showed a strong awareness of the impact of IT policies and the regulatory environment as well as transparency in the market on their use.

6.1 Theoretical and practical implications

Three relevant contributions emerge from the present research. First, this is the first research to study gender differences in smartphone adoption and use in a cross-national context in emerging markets in the Middle East. Second, this research shows how an extended UTAUT2 fits among both genders in a cross-national context. Third, this paper contributes to bridging research gaps in studying gender differences in the adoption of smartphones, including making calls and other mobile applications as part of the user's experience. The analysis of the literature concerning technology adoption in Arab countries showed that most of the previous studies that tested UTAUT focused on one mobile application/service (as shown in Table 2). Williams et al. (2015) recommended the inclusion of more than one single task when investigating technology adoption and testing UTAUT. Hence, this research makes an important contribution in that aspect.

It is vital to close the economic, technological and social gender gap in Arab countries. Smartphones can be an effective tool to empower women, as they enable women to access different mobile services for various purposes, including managing a business (Ameen & Willis, 2016). The findings of this research advocate the importance of acknowledging gender differences when marketing smartphones and mobile applications. This will help to improve social reform and provide benefits for women in Arab countries as they can access various

services and applications through the device such as m-learning, m-government and m-banking.

Ease of use is a significant factor for smartphone adoption and use from the perspective of women in Jordan and the UAE. Hence, mobile companies can provide training programmes that support these women to learn how to use the various mobile applications that can be accessed through the device. The training can also inform women of the uses of these applications (e.g., m-banking, m-commerce, m-social media, m-learning and m-email). This facilitates using smartphones and mobile applications. These mobile applications can be used as enablers for these women to overcome the cultural and social restrictions they face and become economically independent as some of these applications are economically empowering for women. For example, those women who are interested in starting their own business. These training programmes may also require government support to be successful and for these women to be able to exploit the available opportunities fully.

Surprisingly, the advancement of national IT development and the presence of effective policies were found to be vital among women in both countries studied. This indicates that it is vital to create supportive ICT infrastructure and policies. For example, in the case of Jordan, tax reduction (of both general and specific taxes for using mobile phones and mobile Internet) is required, as the country has one of the highest taxation rates in the world (GSMA, 2016). In the context of the UAE, previous reports have shown that there is no freedom of information (Freedomhouse, 2013) and that restrictions are in place on voice over Internet protocol (VoIP) applications. Hence, removing restrictions on mobile phone applications in the UAE is necessary from the perspective of Arab female consumers. Policymakers need to create a transparent regulatory environment, which is open and easy for consumers to understand and evaluate. Furthermore, a change in policies on women's use of smartphones and their applications is required. Policymakers should publish policies that support Arab women and collaborate with mobile companies to set affordable tariffs that meet these women's needs and preferences.

6.2 Limitations and future research directions

The context of this research was consumers in urban areas (two major cities: Dubai and Amman), where the education and economic levels are generally higher than in other urban areas. There are major differences between consumers in urban and rural areas; therefore, the findings of this research cannot be applied to consumers in rural areas. A study covering rural areas or other geographical locations could provide interesting insights into that population segment.

Future studies can test or extend the model to make it applicable to the demographic area where the research is conducted and the type of technology under investigation. This study was concerned with young users in major cities. It would be interesting for future studies to test the model by investigating smartphone adoption in rural areas, where the ICT infrastructure is less developed, access to technology is more difficult, technological development is weaker, and cultural beliefs may be stronger. We also suggest investigation of gender differences in models that have been developed to study the adoption of technology in emerging countries, more specifically, Arab countries. This will make important theoretical and practical contributions.

7. Conclusion

This research sought to examine gender differences in Jordan and the UAE in order to bridge the gender gap in smartphone adoption and use. This is the first research to study smartphone adoption and use by testing an extended version of the UTAUT2 with gender as a moderator in both Jordan and the UAE. The study has revealed that national IT development and policies, low prices of smartphones and mobile Internet, and the ease of using a phone and its applications are important factors for these women. The findings are important to understanding how the extended UTAUT2 fits among Arab women and how to enhance their use of smartphones and mobile applications. This will reduce gender inequality in the Arab region, not only in the adoption and use of technology but also in other aspects of life.

Declaration of conflicting interests

The authors declare no potential conflict of interests with respect to the authorship and/or publication of this article.

Funding

This research did not receive any specific grant from funding agencies in the public, commercial or not-for-profit sectors.

Appendix A. Items for each construct and their sources

Table A1. Items and sources

Item (by variable)	Source
Enjoyment (Enj)	
Enj1. Using mobile phones is fun	Venkatesh et al. (2012)
Enj2. Using mobile phones is enjoyable	Venkatesh et al. (2012)
Enj3. Using mobile phones is very entertaining	Venkatesh et al. (2012)
Price value (PV)	
PV1. Mobile phones are reasonably priced	Venkatesh et al. (2012)
PV2. Mobile applications are reasonably priced	Authors' own
PV3. My mobile phone is good value for money	Venkatesh et al. (2012)
PV4. Mobile applications are good value for money	Authors' own
PV5. At the current price, mobile phones provide good value	Venkatesh et al. (2012)
PV6. At current prices, mobile applications provide good value	Authors' own
Habit (HT)	
HT1. The use of mobile phones has become a habit for me	Venkatesh et al. (2012)
HT2. I am addicted to using mobile phones	Venkatesh et al. (2012)
HT3. I must use mobile phones	Venkatesh et al. (2012)
Perceived relative advantage (PRA) (usefulness)	
PRA1. I find that a mobile phone is useful in my daily life	Venkatesh et al. (2012)

PRA2. Using a mobile phone helps me to achieve things more quickly	Venkatesh et al. (2012); Moore and Benbasat (1991)
PRA3. Using a mobile phone helps me to stay connected to people	Authors' own
PRA4. Using a mobile phone makes it easier to carry out my daily activities	Moore & Benbasat (1991), with minor modifications
Effort expectancy (EE)	
EE1. Learning how to use mobile phones is easy for me	Venkatesh et al. (2012)
EE2. Learning how to use mobile applications is easy for me	Authors' own
EE3. My interaction with mobile phones is clear and understandable	Venkatesh et al. (2012)
EE4. I find mobile applications easy to use	Authors' own
EE5. It is easy for me to become skilful at using mobile phones	Venkatesh et al. (2012)
Behavioural intention (BI)	
BI1. I intend to continue using mobile phones in the future	Venkatesh et al. (2012)
BI2. I will always try to use mobile phones in my daily life	Venkatesh et al. (2012)
BI3. I plan to continue to use mobile phones frequently	Venkatesh et al. (2012)
BI4. I envisage using mobile phones in the future	Authors' own
Actual use (USE)	
Usage frequency for each of the following:	Initially adopted from Venkatesh et al. (2012). Additional items related to mobile services are the authors' own
a. Mobile phone (for making calls)	
b. SMS	
c. Mobile Internet	
d. Mobile games	
e. Mobile e-mail	
f. Mobile messaging apps (e.g., Viber, Skype or WhatsApp)	
g. Mobile social media	
h. Mobile banking	
i. M-commerce	
Culture-specific beliefs and values (CSBVs)	
CSBV1. The fact that a mobile phone supports technology-mediated meetings is an important element in its ultimate success or failure	Originally adopted from Straub et al. (2001), with some modifications to fit face-to-face vs technology-mediated meetings and smartphone adoption
CSBV2. My focus on technology-mediated meetings is a factor in the final outcome	Originally adopted from Straub et al. (2001), with some modifications to fit face-to-face vs technology-mediated meetings and smartphone adoption

CSBV3. I prefer technology (mobile) mediated meetings to face-to-face meetings	Authors' own, based on Straub et al. (2001)
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National IT development (ND)

ND1. I find that the current demand for IT is high	Loch et al. (2003)
ND2. I find that the current supply of IT is high	Loch et al. (2003)
ND3. Government IT initiatives in policy-making are working well	Loch et al. (2003) (with adjustments)
ND4. I find current mobile tariffs acceptable	Loch et al. (2003)
ND5. I find that currently there are no restrictions on using different mobile applications	Based on Loch et al. (2003) with modifications to test restrictions on mobile applications

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