An analysis of the factors affecting mobile commerce adoption in developing countries
Towards an integrated model

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Abstract
Purpose – This study aims to investigate the factors that may hinder or facilitate consumers’ adoption of mobile-commerce (m-commerce) activities in the context of developing countries exemplified here by Oman.

Design/methodology/approach – A conceptual model was developed through integrating factors from UTAUT2 (performance expectancy, expectancy effort, social influence, facilitating conditions, hedonic motivation, price value, habit and self-efficacy) and SERVQUAL (system quality, service quality and information quality). Data were collected from 530 Omani m-commerce users through a cross-sectional survey.

Findings – The results of the structural equation modelling showed that consumers’ behavioural intention (BI) towards m-commerce adoption was significantly influenced by information quality, habit, performance expectancy, trust, hedonic motivation, service quality, price value and facilitating conditions, in their order of influencing strength, and explained 65.5 per cent of the variance in BI. Unexpectedly, effort expectancy, social influence, self-efficacy and system quality had no significant effect on BI.

Practical implications – This study will explain the currently relatively low penetration rate of m-commerce adoption in Oman, which will help local m-commerce businesses to develop the right organizational strategies, especially related to marketing strategies and developing mobile applications, which will draw the attention of many users.

Originality/value – This is one of the few studies that integrates UTAUT2 with SERVQUAL and tests the proposed model in non-Western cultural contexts. Specifically, in contrast to previous studies, diversity of individuals’ acceptance behaviour is examined in Oman.

Keywords SERVQUAL, Developing countries, Structural equation modelling, Technology adoption, UTAUT, Mobile-commerce, Developed countries

Paper type Research paper

1. Introduction
The evolution of mobile-commerce (m-commerce) is on its way (Lee and Wong, 2016). M-commerce has caught the attention of researchers due to its effect on businesses worldwide,
M-commerce is an extension of the e-commerce ecosystem in which business activities are performed in a wireless environment through mobile devices. M-commerce is defined as an extension of e-commerce where the transactions take place over mobile devices (Abdennebi and Debabi, 2017). Eventually, it allows consumers to use mobile internet anywhere and anytime as, unlike e-commerce, it is not limited by geographical restraints. Furthermore, researchers have developed other definitions of m-commerce since its emergence. For instance, Lee and Wong (2016) state that m-commerce is an extension of e-commerce from having a business at a fixed location to one that can be accessed anywhere and anytime. Others define m-commerce as a “wireless electronic form of e-commerce” (Zhang et al., 2012). In fact, m-commerce has become increasingly important in today’s business environment. With the rapid adoption of m-commerce, its market has become one of the most promising growth markets worldwide (AlFahl, 2018). According to Srivastava (2014), the total number of mobile phone users globally is forecast to reach 5.13 billion by 2017, which is around 70 per cent of the world population. This demonstrates that there is a strong potential for m-commerce services worldwide.

Although several pieces of research have been conducted on consumer adoption behaviour towards e-commerce, our knowledge of m-commerce adoption behaviour is still limited due to its developing nature (Zhang et al., 2012). Akter and Wamba (2016) conducted a systematic literature review about m-commerce adoption, and found that m-commerce adoption was well researched in the context of developed countries; however, there is a dearth of empirical studies that focus on the adoption and acceptance of m-commerce in developing countries and, more specifically, the progress in the Middle Eastern countries is still in its infancy when compared to western countries (AlFahl et al., 2017; Madan and Yadav, 2018; Al-Adwan et al., 2019). Therefore, this paper aims to examine the factors that may hinder or enable the adoption of m-commerce in Oman. The outcomes of this research will be useful for local m-commerce businesses in developing the right organizational strategies, and especially marketing strategies and the development of mobile applications which will draw the attention of many users.

Although m-commerce in Oman is still at the development stage, its mobile internet services are ahead of other advanced countries (Budde.com, 2016). According to Budde.com (2016), Oman had 6.99 million subscribers in 2016 compared to 5.62 million in 2013. However, the actual number of m-commerce businesses remains low (Yadav et al., 2016), although the outlook is promising, showing potential for growth in m-commerce. As a matter of fact, due to the rapid technological competition and growth worldwide, the number of mobile internet users in Oman is lower than in other Middle Eastern countries, most of the mobile internet users being students and youth. Budde.com (2016) also mention that most of the mobile users in Oman engage in entertainment activities using mobile Internet, including playing games, listening to music, and sharing pictures and videos with other users (Moideenkutty et al., 2016; Abuzayed and Al-Fayoumi, 2016). However, they do not engage in consequential financial transactions that are m-commerce, i.e. financial transactions such as selling/buying products and services using mobile payments (Lee and Wong, 2016). The importance of this topic stems from the Arab world's integral and important role in the world economy (Bachkirov et al., 2016; Obeidat et al., 2017).

In recent years, a variety of well-known theories have been used to understand the user’s behavioural intention (BI) towards using and adopting a certain technology. From the stream of social psychology, innovation diffusion theory, theory of reasoned action (TRA), theory of planned behaviour (TPB), the social cognitive theory, technology acceptance model (TAM), Unified Theory of Acceptance and Use of Technology 2 (UTAUT2) and SERVQUAL are only a few of the major modular approaches that have lead the way in
analyses and results (Venkatesh et al., 2012). Table I summarizes the key constructs of each of these models along with their predictive power and key limitations.

This study will integrate factors from UTAUT2 (performance expectancy [PE], expectancy effort, social influence [SI], facilitating conditions [FC], hedonic motivation [HM], price value [PV], habit and self-efficacy [SE]) and SERVQUAL (system quality [SQ], service quality [SVQ] and information quality [IQ]), as well as trust and security, to predict the customer’s BI to adopt m-commerce services. The integration of these two models was due to solid theoretical basis, persistent predictive power (i.e. 40 per cent) and robustness when compared to other models and theories in research filed related to the potential acceptance or rejection or technology. In addition, UTAUT was developed through a review of the constructs of eight theories and models (TRA, motivational model, TPB, a combined TPB, TAM, model of personal computer use, diffusion of innovations theory and social cognitive theory). Moreover, researchers have obtained empirical support for the UTAUT model across different contexts and time (Venkatesh et al., 2012). The integration of UTAUT2 and SERVQUAL constructs (SQ, SVQ and IQ) with trust and security were due to their importance in the context of this study. Such a comprehensive, dynamic and social theoretical model will improve the parsimony, explanatory power and predictive ability and to overcome the limitations of other traditional adoption and acceptance model.

The rest of the paper is structured as follows: Section 2 presents the proposed theoretical framework. Section 3 presents the research methodology that guided our research. Section 4 presents the results. Finally, Section 5 provides a detailed discussion about the main findings and concludes the paper with the main limitations and suggests future directions for research.

2. Theoretical framework

Figure 1 depicts the proposed constructs, and the subsections that follow provide detailed explanations about each of these factors.

2.1 Performance expectancy

According to Venkatesh et al. (2012) and Zhou et al. (2010), PE is the extent to which individuals behave in a certain way as they are motivated by others to select a particular behaviour and where motivated individuals expect the results of using m-commerce will help them to accomplish commercial activities while saving cost, time, and effort. Moreover, PE has the same context as perceived ease of use. Although advanced countries like China are familiar with the innovation of m-commerce, it is still new to many internet users, especially when mobile application features are proposed frequently. These features (purchasing/selling) using a mobile can be difficult for new adopters (AlFahl, 2018). The physical appearance and performance of a mobile can become a limitation for some adopters. Examples are the small screen size, difficulties in filtering their requirements and difficulties in tracking their products (Kim et al., 2007).

The rapid adoption of internet mobile usage has created new opportunities for m-commerce (Zhang et al., 2012). However, there have been several inconsistencies in its results. To further illustrate this, AlFahl (2018) suggests that PE has a significant influence on consumers’ m-commerce, thus persuading them to take part in its activities and transactions, whereas Al-Somali et al. (2009) believes that PE is one of the most important characteristics in studying m-commerce. PE plays an important role in m-commerce adoption (Khalifa and Ning Shen, 2008; Zhang et al., 2012). For instance, in Taiwanese banks (Hsu and Yeh, 2018), Malaysia (Hung and Chou, 2014) and China (Sun and Chi, 2017) PE has positively influenced BI towards adopting m-commerce services.
<table>
<thead>
<tr>
<th>Theory/Model</th>
<th>Key constructs</th>
<th>Variance explained</th>
<th>Limitations</th>
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| TRA (Fishbein and Ajzen, 1975)     | 1. Attitude towards behaviour  
2. Subjective norm                      | 0.36               | 1. predicting future usage behaviour  
2. TRA will not be able to predict individual behaviour if his/her intention to use it is not known in the first place |
| Technology Acceptance Model (Davis, 1980) | 1. Perceived usefulness  
2. Perceived ease of use          | 0.53               | 1. Self-reported usage  
2. Existing measures is based on beliefs, attitude and intentions not on actual usage behaviour  
3. TAM ignores the effect of social, individual and cultural influence on the acceptance of technology |
| TPB (Ajzen, 1988)                  | 1. Attitude towards behaviour  
2. Subjective norm  
3. Perceived behavioural control  
4. perceived usefulness          | 0.39               | 1. There are more factors that might have an impact on behaviour but are not considered in TPB such as habit, moral obligation and self-identity.  
2. TPB fails to explain the mechanism by which the individual will perform that behaviour |
| 4. Decomposed TPB (Taylor and Todd, 1995) | 1. Attitude towards behaviour  
2. Subjective norm  
3. Perceived behavioural control | 0.36               | 1. Decomposition process of DTPB could lead to more complex models                                                              |
| Model of PC Utilization (MPCU) (Thompson et al., 1991) | 1. Job fit  
2. Complexity  
3. Long term consequences  
4. Affect towards use  
5. Social factors  
6. FC | 0.47               | 1. Ignored cultural and organizational factors                                                                                |
| SERVQUAL (Parasuraman et al., 1988) | 1. IQ  2. SQ 3. SVQ  
 6. FC | 0.32               | 1. Validity  
2. Dimensionality, the dimensions are not universal  
3. It is not known why certain attitudes lead to innovation adoption or rejection decision  
4. fails to link between the innovation properties and a proper expected attitude |
| Diffusion Innovation Theory (DIT) (Rogers, 1995) | 1. Outcome expectation  
2. SE 3. Affect 4. Anxiety | 0.40               | 1. UTAUT is designed from an internal perspective of the organization. Therefore, the factors which form UTAUT have a distinctly utilitarian character.  
2. Did not consider the HM, habit |
| Unified Theory of Acceptance and Use of Technology (UTAUT) (Venkatesh et al., 2003) | 1. PE  
2. EE  
3. SI  
4. FC | 0.56               | 1. Did not consider the cultural factor                                                                                         |
| Unified Theory of Acceptance and Use of Technology (UTAUT) 2 (Venkatesh et al., 2012) | 1. PE  
2. EE  
3. SI  
4. FC  
6. HM  
7. Habit  
8. PV | 0.74               | 1. Did not consider the cultural factor                                                                                         |

**Table I.**

Technology acceptance theories/models comparison

**Sources:** (Venkatesh et al., 2003; Venkatesh et al., 2012; Samaradiwakara and Gunawardena, 2014; Rondan-Catalutia et al., 2015; Tarhini et al., 2015)
Furthermore, Heinze et al. (2017) investigated consumers’ resistance to m-commerce adoption in the insurance industry and found lack PE. In addition to that, PE plays an important role in consumers’ BI of whether to accept or reject the use of m-commerce innovation in Oman. In Oman, the majority of consumers prefer to trade using the current traditional way as it is more secure, it being possible to avoid sharing personal information with other business individuals (Bhuiian and Sharma, 2017). Although m-commerce is still at the development stage, it is expected to acquire more adopters as long as it provides easy-to-use online services (Sharma, 2015; Sharma et al., 2013). As a result of this, the more individuals are motivated by others, the more likely it is that they will adopt m-commerce innovation. Hence, the proposed hypothesis is as follows:

H1. PE will have a positive influence on consumers’ BI to adopt m-commerce activities.

2.2 Effort expectancy
Effort expectancy (EE) is the degree of ease associated with the use of technology by consumers (Venkatesh et al., 2003). Researchers found that if the users found m-commerce services effortless and easy to use then it would be more likely to encourage more users to adopt the innovation. EE “reflects the desire of an individual to engage in an activity because of external rewards” (Venkatesh, 2000). Internet users might prefer using e-commerce to m-commerce. To illustrate this, looking for clarifications about a certain product using different websites or downloading videos can be done on a personal computer using a Wi-Fi connection. “EE” is similar to the concept of “perceived usefulness”; although
m-commerce users have the advantage of buying/selling different products and services online with no physical effort, users will only adopt it if they find m-commerce to be useful (Tsu Wei et al., 2009; Rana et al., 2019; Rodriguez-Torrico et al., 2019). EE is one of the significant determinants of technology acceptance (Sharma et al., 2017). As a result, according to Venkatesh et al. (2003) EE has a positive impact on the use of m-commerce. In the m-commerce context, inconsistencies in the results were observed according to the m-commerce context and the sample size. To illustrate this, EE has an effect on m-commerce, but this effect is weak (Yoon and Steege, 2013; Chantzaras et al., 2017; Sun and Chi, 2017; Hsu and Yeh, 2018; Al-Adwan et al., 2019). In contrast, many studies found that EE has a strong positive effect on m-commerce (Martins et al.; 2014; Chantzaras et al., 2017; Sun and Chi, 2017; Hsu and Yeh, 2018). Several GCC countries have started adopting the idea of m-commerce. However, more users in Oman started adopting the innovation by paying their bills, and ordering food using mobile internet, as these users wanted to fulfill commercial services as fast and effortlessly as possible (Sharma, 2015). If, however, they encountered difficulties in using m-commerce innovation, they would be less likely to adopt the idea. Accordingly, the proposed hypothesis is as follows:

\[ H2. \] EE will have a positive influence on consumers’ BI to adopt m-commerce activities.

2.3 Social influence

In the m-commerce context, SI can be considered as a new concept that is complicated and growing in importance (Chhonker et al., 2017). It can involve different domains such as social value, and using innovation and entrepreneurial skills (Sufian and Kamarudin, 2016). Furthermore, it can bring many benefits to the society and to consumers such as an increase in income and loyalty, and a reduction in unemployment, while it also has a positive effect on the consumers’ BI to use m-commerce (Moorthy et al. 2017). SI happens when an individual’s beliefs, attitude, behaviour, and opinion are affected by others. It plays a key role in our behaviours and practices (Venkatesh et al., 2012). Influence from friends, family members and social media could well influence users to adopt m-commerce. Many researchers found that SI was a strong predictor of m-commerce adoption (Chong et al., 2012; Omonedo and Bocij, 2017; Moorthy et al., 2017). In the context of this study, it is expected that SI will be a major player in the adoption of m-commerce services in Oman, as more people in Oman rely on word of mouth and the experience of their family members, friends, etc. And when it comes to social media, users are more likely to adopt m-commerce if local public figures and leaders of opinion influence them to do so, when they feel secure and motivated to adopt such innovations (Omonedo and Bocij, 2017). Hence, the following hypothesis is proposed:

\[ H3. \] SI will have a positive influence on consumers’ BI to adopt m-commerce activities.

2.4 Hedonic motivation

HM in the m-commerce context is managed by the consumers’ desire for fun, entertainment and satisfaction, which are stimulated by using mobile Internet (Venkatesh et al., 2012). Kourothananassis et al. (2007) state that researchers have studied motivation with respect to m-commerce, and the consumers’ perception of trust and fun when buying items. In addition to this, the perceived enjoyment has been identified as being the most important factor in the adoption self-service technology (Dabholkar et al., 2003; Zheng et al., 2019; Verkijika, 2018). There are six elements of HM, according to Arnold and Reynolds (2003), which are:
(1) Social: by socializing with family members and friends.
(2) Idea: keeping up with the latest technological trend in the market.
(3) Gratification: treating oneself.
(4) Role: enjoyment while doing m-commerce activities.
(5) Value: taking advantage of sales and discounts.
(6) Adventure: experiencing the feeling of being in another world.

However, “hedonic” is not only used for motivation but also can be applied to the experience of using the technology. Having a fun experience while doing m-commerce activities has been associated with innovation satisfaction and frequency of use (Kourouthanassis et al., 2007). HM aims to merge the consumers’ experience of the technology with their emotions for them to interact effectively. Hence, the higher the degree of entertainment provided to users, the more of them become m-commerce adopters. Accordingly, the following hypothesis is as following:

**H4.** HM will have a positive influence on consumers’ BI to adopt m-commerce activities.

2.5 Habit

Habit was defined by Venkatesh et al. (2012, p. 161) as “the extent to which people tend to perform behaviours automatically because of learning”. Conceptually, this means that habits are learned activities and goal-oriented, and can be viewed as unconscious behavioural responses caused by a situational stimulus due to the association between behaviour and satisfactory outcomes. In addition to this, habit is more related to automatic behaviour, which is formed by an aggregation of experience, knowledge and skills over time (Venkatesh et al., 2012). Once users create a habit, they perform the behaviour automatically (Tarhini et al., 2015; Hsu and Yeh, 2018). However, it requires a specific level of practice (Venkatesh et al., 2012). In the m-commerce context, the consumers’ habit of using m-commerce can increase the usage intention, thus creating a strong tie between habit and loyalty in m-commerce. Alalwan et al. (2017) argues that habit positively influences the consumer’s BI to use m-commerce. Users may find it hard to switch to alternatives once the habit is established, despite having easy-to-use, “anytime and anywhere” mobile Internet. Once they create a habit of using m-commerce, they are more likely to perceive the innovation easily. Thus, it can be assumed that habit positively affects the use of m-commerce activities. Accordingly, the fifth hypothesis is as follows:

**H5.** Habit will have a positive influence on consumers’ BI to adopt m-commerce activities.

2.6 Price value

PV is defined as “the consumers’ cognitive trade-off between the perceived benefits of the application and the monetary cost of using it” (Venkatesh et al., 2012, p. 161). According to Moorthy et al. (2017), the consumer’s selection process of commerce channels may be affected by the perceived price of the channel. Consumers using m-commerce always look for price information from different suppliers for the same product to make the right decision (Moorthy et al. 2017). In the marketing context, the perceived value is identified by how subjectively the users compare how much they should pay with the utilities and quality attained (Al-Somali et al., 2009; Shaw and
Additionally, Al-Somali et al. (2009) believe that being able to compare the best price is one of the main reasons that most of the consumers purchase online. Although the price factor of m-commerce can be affordable to consumers, Tsu Wei et al. (2009), mentions that it slows down the development of m-commerce. So, is it really worth its cost. If m-commerce activities, which a user can access by adopting a high-tech service, are higher than the financial cost, the PV will positively affect the users’ intention to use m-commerce innovation (Venkatesh et al., 2012). Furthermore, Chhonker et al. (2017), Moorthy et al. (2017), Chhonker et al. (2017), Hsu and Yeh (2018) all found that PV plays a significant role in m-commerce adoption. Thus, the following hypothesis is formulated:

**H6.** PV will have a positive influence on consumers’ BI to adopt m-commerce activities.

### 2.7 Facilitating conditions

FC is defined as “the degree to which an individual believes that an organizational and technical infrastructure exists to support the use of the system” (Venkatesh et al., 2003, p. 453). In the context of m-commerce, this creates an urgent need for acquiring resources and technical infrastructure, which are not free from the customers’ perspective (Zhou et al., 2010; Chantzaras et al., 2017; AlFahl, 2018; Farah et al., 2018). To work more effectively and efficiently as a unique service, m-commerce requires mobile users to have up-to-date technology. Accordingly, if users are provided with the latest features that these technologies have to offer, then they are more likely to adopt them. Therefore, the proposed hypothesis is as follows:

**H7.** FC will have a positive influence on consumers’ BI to adopt m-commerce activities.

### 2.8 Self-efficacy

SE refers to “beliefs in one’s capabilities to mobilize the motivation, cognitive resources, and courses of action needed to meet given situational demands’ (Wood and Bandura, 1989). A SE decision depends upon performance accomplishments, vicarious experience, verbal persuasion, and physiological state (Bandura, 1977). M-commerce consumers can often find themselves in a precarious position regarding their ability to sue the m-commerce. This might be due to lack of motivation (Hung and Chou, 2014). The consumer might feel uncomfortable using m-commerce and “consumers who consider m-commerce too complex and believe that they will never be able to master m-commerce technology will prefer to avoid it and are less likely to use it” (Islam et al., 2011). SE plays an important role in the intention to use technology (Choi, 2017; Chhonker et al., 2017). For instance, in Taiwan and Malaysia (Hung and Chou, 2014; Chou et al., 2018), Saudi Arabia (Alfahl et al. 2017), China (Sun and Chi, 2017), SE was found to play a significant role in predicting users’ BI towards adopting m-commerce activities. Therefore, the following hypothesis is proposed:

**H8.** SE will have a positive influence on consumers’ BI to adopt m-commerce activities.

### 2.9 Trust

According to Gefen et al. (2003, p. 161), trust was conceptualized as “individual willingness to depend on a belief based on ability, benevolence, and integrity”. Regarding most online businesses, the relationship between trust and m-commerce has been widely discussed
Understanding users’ trust has become one of the key focuses in recent technology adoption research (Choi, 2017; Singh et al., 2018; Pandey and Chawla, 2019; Liu and Li, 2019). It is more related to the consumer’s belief that m-commerce has the ability and integrity to perform services based on their needs and desires. Also, it has a positive effect on the adoption of e-commerce where it allows consumers to become vulnerable to suppliers online to secure their information and services (Palvia, 2009). Furthermore, using m-commerce is most likely to constitute a financial transaction, which could make consumers perceive risk in performing these activities (Chantzaras et al., 2017; Heinze et al., 2017). In addition to that, there is no human interaction involved in performing these kinds of activities, where it increases uncertainty in the results if using m-commerce (Omonedo and Bocij, 2017). As a result, users become less motivated to adopt m-commerce if they do not fully trust such activities online. In fact, there is a significant positive impact of trust on the consumer’s BI to use m-commerce. Further studies have shown that trust could lead to consumer satisfaction in the m-commerce context (Hillman and Neustaedter, 2017; Madden et al., 2017). Compared to traditional commerce channels, especially in Oman, trust in m-commerce is more difficult due to lack of sales personnel. Many consumers fear sharing personal information with other users online. As a result, in the retail business the salesperson is the most prominent source of trust at this stage. M-commerce has now made it easier, as the salesperson is now replaced by one single button and search features online. So, the fear of salesperson absence during m-commerce is more likely to be reduced (Sanakulov and Karjaluoto, 2015). Hence, it is hypothesized that:

**H9.** TR will have a positive influence on consumers’ BI to adopt m-commerce activities.

### 2.10 Information quality

One of the most important considerations of m-commerce is the content of the system, website or mobile application. Content refers to the information, service and main features offered by the system in a way that is clear to all users (Liu and Forsythe, 2011). The content and IQ positively affect m-commerce adoption (Hamed et al. 2011, Vasileiadis, 2014; Abdennabi and Debabi, 2017; Liebana-Cabanillas et al., 2017). According to Liu and Forsythe (2011), a successful system that contains clear information attracts users from the get-go, as it appears to be reliable and trustworthy. Similarly, m-commerce information has a significant impact on enabling consumers to make buy-and-sell decisions, and it is also important to understand what gives consumers satisfaction regarding m-commerce IQ. Therefore, consumer’s information can be: user personal information, product information, supplier information, and so on. Although there is enough information available to users, is usually difficult and time consuming to go through each product and evaluate it to make the right decision. Thus, we propose the following hypothesis:

**H10.** IQ will have a positive influence on consumers’ BI to adopt m-commerce activities.

### 2.11 System quality

According to Vasileiadis (2014), the system used in websites and mobile applications allows users to purchase products using mobile Internet. It enables them to search for information about their products easier and faster. SQ is defined as the number of business processes that meet customer needs and requirements to enhance their satisfaction. In addition to that, the quality of the system design affects consumers’ m-commerce decisions (Shergill and
Elliott and Speck (2005) mention that there are five main system factors, which are:

1. product information;
2. entertainment;
3. currency;
4. ease of use; and
5. relative to the quality affecting consumers’ BI to use m-commerce.

Similarly, the higher the quality of the system, the higher the number of m-commerce adopters (Vasileiadis, 2014; Choi, 2017; Abdennebi and Debabi, 2017). Therefore, the following hypothesis is inferred:

$H11$. SQ will have a positive influence on consumers' BI to adopt m-commerce activities.

2.1.2 Service quality
SVQ is the extent to which consumers perceive the system to be secure, credible, and reliable (DeLone and McLean, 2004). Two of the most important factors of SVQ are: personalization (enjoyment, for example: sales and discounts) and interactivity in relation to the consumers’ m-commerce adoption. SVQ also plays a key role in contributing to the users’ trust in the system. As a result, users are more likely to be encouraged to adopt m-commerce if they perceive that there is a high standard of service provided by the system (website, mobile apps, etc). According to Chong et al. (2012); Moorthy et al. (2017); Abdennebi and Debabi (2017) and Hsu and Yeh (2018), SVQ has a significant impact on consumers’ willingness to adopt m-commerce activities. Furthermore, Heinze et al., 2017 investigated consumers’ resistance to m-commerce adoption in the insurance industry and found a lack of quality in the service. Hence, we propose the following hypothesis:

$H12$. SVQ will have a positive influence on consumers' BI to adopt m-commerce activities.

3. Methodology
3.1 Participants and survey instrument
Data were collected using a convenience sampling technique. Specifically, a self-administrated questionnaire containing 57 items was used to collect data from Omani m-commerce users between February and April 2017. The questionnaire was divided into two main parts. The first part obtained items related to the demographic variables (age, gender, educational level, internet and computer experience). The second part obtained the potential factors that may influence the adoption of m-commerce by Omani users. The questionnaire was pre-tested with four academics (who had expert knowledge) to refine the items if needed, and also to check the relevancy and accuracy of the items in answering the purpose the questionnaire was designed for, and thus obtain content validity. A very constructive feedback was provided by the academics which led the researchers to revise some of the questions before producing the final version of the questionnaire. Also, the questionnaire was pilot-tested with 35 potential participants to ensure the clarity of the questionnaire items and to check if the data collected answers the investigated questions and provide face validity (Bryman, 2015). The instrument was modified and redesigned according to the feedback obtained in the pilot study. Therefore, preliminary support for
reliability and validity of the questionnaire was obtained before proceeding to the data
collection stage.

The questionnaire was distributed to a convenience sample of 530 Omani m-commerce
users, of which 432 were returned, which indicates a high response rates (81.5 per cent).
After screening for missing data, we retained 430 questionnaires for data analysis. These
included 56.3 per cent (242) male, and the mean age range varied from 19 to 54, with 78.1 per
cent experienced in the use of computers and the internet.

3.2 Variables and measurement
The proposed conceptual framework is based on the relationship between twelve
independent and one dependent variable. The items used in the proposed research model
were adapted from previous studies related to UTAUT2 proposed by Venkatesh et al. (2012)
and the Delone and Mclean (2004) IS model, where their internal reliability and convergent
validity have been tested successfully in previous research studies. Specifically, PE, EE, SI,
HB, SE and FC were measured using four items, whereas HM, PV and BI were measured
using three items. These items were adapted from Venkatesh et al. (2012) and the related
work of Venkatesh and Zhang (2010), Simintiras et al. (2014); Yadav et al. (2016); Awigah
et al. (2016); Marinkovic and Kalinic (2017) and Alalwan et al. (2016). Four items were used to
measure IQ, SymQ, and SerQ and were adopted from the Delone and Mclean (2004) IS model
and the related work of Shih and Venkatesh (2004) and Clemes et al. (2014). Finally, TR were
measured using five items adopted from the work of Hong and Che (2013) and Tarhini et al.
(2015). These items were anchored on a seven-point Likert scale, ranging from 1-strongly
disagree to 7-strongly agree. The demographic information about the respondents such as
gender, age, experience and educational level were measured using a nominal scale.

4. Data analysis
A two-stage approach of structural equation modelling (SEM) was used, which is a method
highly recommended by Anderson and Gerbing (1988). In the first phase, confirmatory
factor analysis (CFA) was used to test the model fitness, as well as to examine the reliability
and validity of the proposed conceptual framework. Next, a structural model was applied to
examine the hypothesized model (Hair et al., 2010).

4.1 Descriptive analysis
The results in Table II show that the mean values for all the questionnaire items were above
the midpoint (3.5) which indicates that respondents had positive responses to the items
being measured in the questionnaire. Also, the standard deviations ranged from 1.05 to 1.33,
which show a narrow spread around the mean.

4.2 Analysis of measurement model – examination of reliability and validity
CFA based on AMOS 21.0 was applied to examine the relationships between the proposed
factors in the research model (Arbuckle, 2016). This was conducted using the maximum-
likelihood estimation procedure to estimate the model’s parameters, where all analyses were
conducted on variance-covariance matrices (Hair et al., 2010). Hair et al. (2010) and Kline
(2010) recommend some fit indices to assess the model goodness-of-fit. These indices are
root mean square residuals (RMSR); the root mean square error of approximation (RMSEA),
comparative fit index (CFI), adjusted goodness-of-fit index (AGFI), parsimony normed fit
index (PNFI), goodness-of-fit index (GFI) and normed fit index (NFI). Table III shows the
level of acceptance fit and the fit indices for our sample after the improvement in model fit.
Five items (EE4, SI3, SI4, HM2, IQ1, SymQ3, BI4) have to be deleted to improve the model fit. It is clear from the table that all fit indices were in the recommended range. Therefore, we can proceed to assess convergent validity, discriminant validity in addition to reliability to evaluate whether the psychometric properties of the measurement model are adequate.

As recommended by Hair et al. (2010), composite reliability (CR) and average variance extracted (AVE) were used to assess the reliability, convergent validity and discriminant validity. Hair et al. (2010) suggest that CR should be above 0.7 to establish good reliability and that the AVE should be above 0.5 and CR greater than the AVE to establish convergent validity, whereas the total AVE of the average value of variables should be larger than their correlation value to support discriminant validity (Hair et al., 2010). The results in Table IV show that the average variances extracted (AVE) of all the constructs were above 0.519 and above 0.741 for CR, and this suggests that the constructs had adequate reliability and convergent validity. In addition, the square root of AVE is higher than their correlation values which suggest that all the constructs illustrated have sufficient discriminant validity.

4.3 Structural model and hypotheses testing
The next step after establishing good convergent and discriminant validity was to assess the structural model to test hypothesized relationships.

The results in Table V show that consumers’ BI towards m-commerce adoption was significantly influenced by IQ, habit, PE, trust, HM, SVQ, PV and FC, in their order of influencing strength, and explained 65.5 per cent of the variance in BI. These results provide
support for $H1$, $H4-7$, $H9$, $H10$ and $H12$. However, EE, SI, SE and SQ had no significant effect on BI. These results indicate that $H2$, $H3$, $H8$ and $H11$ were not supported in this research.

5. Discussion
This paper was conducted with the intention of providing a deep understanding of the main factors that could shape customers’ intention to adopt m-commerce in Oman. More understanding of this phenomenon could help practitioners to obtain more clues regarding the main aspects of m-commerce that should be considered and, accordingly, ameliorate the customers’ perception and accelerate the adoption of this technology in Oman. As presented in the results section, the proposed conceptual model was able to match the standards of goodness of fit and predictive validity. In detail, about 65.5 per cent of variance was predicted in the BI. The main factors (PE, FC, HM, PV, TR, IQ, HB and SRV) were supported in having a significant impact on the customers’ intention to adopt M-commerce.

Noticeably, IQ predicted the largest variance in the Omani customers’ intention to adopt m-commerce. Our results support the largest variance in the Omani customers’ intention to adopt m-commerce. Our results support the results of Abdennebi and Debabi (2017) and Liébana-

<table>
<thead>
<tr>
<th>CR</th>
<th>AVE</th>
<th>SQ</th>
<th>PE</th>
<th>EE</th>
<th>SI</th>
<th>FC</th>
<th>HM</th>
<th>TR</th>
<th>PV</th>
<th>SE</th>
<th>HB</th>
<th>BI</th>
<th>SRQ</th>
<th>IQ</th>
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<tr>
<td>SQ</td>
<td>0.774</td>
<td>0.561</td>
<td>0.818</td>
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<td></td>
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<td></td>
<td></td>
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<td></td>
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<td></td>
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<td>0.412</td>
<td>0.805</td>
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<tr>
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<td>0.473</td>
<td>0.518</td>
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<tr>
<td>FC</td>
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<td>0.519</td>
<td>0.528</td>
<td>0.509</td>
<td>0.535</td>
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<td>0.787</td>
<td>0.370</td>
<td>0.434</td>
<td>0.557</td>
<td>0.469</td>
<td>0.629</td>
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<tr>
<td>TR</td>
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<td>0.565</td>
<td>0.523</td>
<td>0.310</td>
<td>0.365</td>
<td>0.425</td>
<td>0.493</td>
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<td>0.418</td>
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<td>SE</td>
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<td>0.521</td>
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<td>0.422</td>
<td>0.451</td>
<td>0.489</td>
<td>0.633</td>
<td>0.519</td>
<td>0.470</td>
<td>0.409</td>
<td>0.507</td>
<td>0.519</td>
<td>0.767</td>
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<td>SRQ</td>
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<td>0.387</td>
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<tr>
<td>IQ</td>
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<td>0.502</td>
<td>0.485</td>
<td>0.451</td>
<td>0.642</td>
<td>0.606</td>
<td>0.557</td>
<td>0.487</td>
<td>0.557</td>
<td>0.536</td>
<td>0.529</td>
<td>0.585</td>
</tr>
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</table>

Table IV. Construct reliability, convergent validity and discriminant validity (factor correlation matrix with $\sqrt{AVE}$ on the diagonal)

<table>
<thead>
<tr>
<th>Hypotheses</th>
<th>Relationship</th>
<th>Result</th>
<th>Supported/Not supported</th>
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<td>$H1$</td>
<td>PE $\rightarrow$ BI</td>
<td>0.183*</td>
<td>Supported</td>
</tr>
<tr>
<td>$H2$</td>
<td>EE $\rightarrow$ BI</td>
<td>0.053</td>
<td>Not supported</td>
</tr>
<tr>
<td>$H3$</td>
<td>SI $\rightarrow$ BI</td>
<td>0.044</td>
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</tr>
<tr>
<td>$H4$</td>
<td>HM $\rightarrow$ BI</td>
<td>0.163*</td>
<td>Supported</td>
</tr>
<tr>
<td>$H5$</td>
<td>HB $\rightarrow$ BI</td>
<td>0.205**</td>
<td>Supported</td>
</tr>
<tr>
<td>$H6$</td>
<td>PV $\rightarrow$ BI</td>
<td>0.155*</td>
<td>Supported</td>
</tr>
<tr>
<td>$H7$</td>
<td>FC $\rightarrow$ BI</td>
<td>0.141*</td>
<td>Supported</td>
</tr>
<tr>
<td>$H8$</td>
<td>SE $\rightarrow$ BI</td>
<td>0.035</td>
<td>Not supported</td>
</tr>
<tr>
<td>$H9$</td>
<td>TR $\rightarrow$ BI</td>
<td>0.173*</td>
<td>Supported</td>
</tr>
<tr>
<td>$H10$</td>
<td>IQ $\rightarrow$ BI</td>
<td>0.216**</td>
<td>Supported</td>
</tr>
<tr>
<td>$H11$</td>
<td>SQ $\rightarrow$ BI</td>
<td>0.062</td>
<td>Not supported</td>
</tr>
<tr>
<td>$H12$</td>
<td>SRV $\rightarrow$ BI</td>
<td>0.160*</td>
<td>Supported</td>
</tr>
</tbody>
</table>

Table V. The research model results

Notes: *$p < 0.05$; **$p < 0.01$
Cabanillas et al. (2017), who found that IQ positively influenced m-commerce adoption. With the findings expressed differently, Omani customers seem to be more interested in the information, data, products and services presented by such a system. This means that if this information is well presented and easily navigated, customers are more likely to have a positive experience and perception that this technology is useful, credible and trustworthy. Thus, customers will be more attracted to using this system (Liu and Forsythe, 2011).

SVQ was another important factor, from the IS success model approved, to have a significant influence on the BI to adopt m-commerce. Our results are in accordance of the findings of Moorthy et al. (2017) and Hsu and Yeh (2018) who found that m-commerce adoption positively influenced by SVQ. Indeed, customers who perceive using m-commerce as a simple and fast way to find what they want to purchase, are more motivated to adopt m-commerce for different purposes (i.e. shopping, payment of bills, banking) in their daily lives. Moreover, a friendly and usable system design makes customer experience more innovative and entertaining. This explains why Omani customers are more motivated by increasing the level of the experience in m-commerce. These results are parallel with what has been proposed by Delone and Mclean (2004) and other studies that have tested the role of SQ (Shergill and Chen, 2005; Elliott and Speck, 2005).

As for the UTAUT2 factors, PE, FC, HM, PV and HB are found to have a significant impact on the customers’ intention to adopt m-commerce. Our results support the findings of Omonedo and Bocij, 2017; AlFahl (2018), Hsu and Yeh, (2018) Rana et al. (2019); Rodríguez-Torrico et al. (2019). This confirms the selection of UTAUT2 as the theoretical foundation in the current study model. For example, Omani customers were found to be more interested in the utilitarian aspects of m-commerce and find using such systems more useful and productive in their daily life. This was proved by confirming a statistical relationship between PE and BI. This could also relate to m-commerce as a movable technology that could be used anywhere and at any time by customers who, in turn, save time and effort (Abdennebi and Debabi, 2017). FC was also observed to be a significant factor in predicting Omani customers’ intention to use m-commerce. Indeed, the degree of compatibility and the availability of requested resources and support are very critical dimensions that have attracted considerable attention when in the process of using innovative technologies such as m-commerce. Such results are in line with what has been supported by Venkatesh et al. (2012) who supported the role of FC on the BI for the adoption of mobile internet technology. Such a relationship between FC and BI was also proved by Zhou et al. (2010) and Limayem et al. (2004).

The intrinsic benefits in the form of HM were statistically proved to shape Omani customers’ intention to adopt m-commerce. Expressed differently, m-commerce is a more novel and innovative technology (Laukkanen and Lauronen, 2005; Mallat et al., 2004; Püschel et al., 2010), and this in turn would empower the customer’s feelings of pleasure and joy by using such a system, as argued by Venkatesh et al. (2012) and Van der Heijden (2004). As for consumer technologies, hedonic aspects attract more interest from individuals in formulating their decision to adopt or reject such systems (Awiagah et al., 2016; Alalwan et al., 2017). The monetary value was another issue of Omani customer attention when they were in the process of accepting or rejecting m-commerce. Statistical results of the current study were found to be parallel with what was proposed in the conceptual model. Generally speaking, customers are engaged in a trade-off between how much is paid and the benefits received in return. This is especially the case because using m-commerce requires important facilities like smart phones and internet services and mobile applications that need to be downloaded and paid for. Such issues have been proposed by Venkatesh et al. (2012) to support including PV over UTAUT2 and supported later by Awiagah et al. (2016) and
Alalwan et al. (2017). Habit was the strongest factor among UTAUT2 constructs predicting customers’ intention to adopt m-commerce. Indeed, individuals are currently more attached to their mobile phones, considering them to be an integral part of their daily lives and not easily for anyone keeping away from his or her smart phone. This explains why habit in the current study could have this impact rather than any other factors over UTAUT2. As discussed in the conceptual model, customers in Oman are more likely to have a habitual behaviour towards mobile technologies and their applications (i.e. mobile social media, mobile banking and m-commerce). This, in turn, enhances their willingness to adopt, and even continue to use, m-commerce. These results are in line with what is proposed by Venkatesh et al. (2012) in UTAUT and other researchers who supported the role of habit (Tarhini et al., 2015; Alalwan et al., 2017).

As proposed in the conceptual model, trust was found to have a statistical impact on the customers’ intention to adopt m-commerce in Oman. Our result is in accordance of the findings of Chantzaras et al., 2017 and Heinze et al., 2017. This means that Omani customers are more likely to adopt m-commerce if they perceive it to be more reliable and trustworthy. Over the online area, customers largely depend on themselves to perform any transactions and shopping activities, and all interactions are with technology and devices rather than human beings (Alalwan et al., 2017). Thus customers who perceive a degree of risk could have concerns regarding the outcomes of using technology for financial and purchasing activities. Therefore, without a good degree of trust, customers would not be fully motivated to use these systems (Gefen et al., 2003). In the afore-mentioned literature there are many studies that have proved the importance of trust regarding the customer intention to adopt new systems and thus, mobile technology (Palvia, 2009; Alalwan et al., 2017).

On the other hand, four factors, namely, EE, SI, SQ and SE, are not supported according to the structural model results. Our results contradict the findings of most of previous literature such as Sun and Chi (2017), Alalwan et al. (2017) and Choi, 2017. Omani customers are not concerned about the ease of use existing the m-commerce. This could be attributed to the fact that most customers in the current study are well-educated and have had a good experience in dealing with technology. This is what has been proved regarding the role of habit, which indicates that Omani customers get used to m-commerce and they can easily override any difficulties encountered in the system. By the same token, as customers gain more experience and knowledge in using new systems, they are less likely to depend on the support coming from the social system surrounding them. This shows why SI does not have an impact on the Omani customer’s intention to adopt m-commerce.

5.1 Practical implications
Firstly, this study was conducted with the intention of providing further understanding for researchers and practitioners who are interested in the area of m-commerce, especially in Oman. Indeed, this study could be the first study that addresses the related issues of m-commerce in Oman. This attempt could considerably add to the current understanding of what the main aspects are that shape Omani customers’ intention to adopt m-commerce. This study was initially able to discover the main literature gap in the related area, which could be summarized by proposing a conceptual model based on a solid theoretical foundation. This was reached by integrating the current study model according to two strong theories (UTAUT2 and IS success model). Other external factors such as trust, privacy and security were included in the conceptual model as these factors have been highly cited as key predictors of the customer’s intention to adopt different kinds of systems. Further, a solid methodology was adopted to conduct the empirical part of the current study. This accordingly helps to reach more valid and reliable results that can be
generalized for a large number of Omani customers. This also supports the predictive validity of the current study model, which could be used again by other researchers to test different mobile applications.

One of the main purposes of the current study is to provide practical guidelines that could help in designing and implementing a successful manner of m-commerce in Oman and, accordingly, enhance the actual adoption of this technology by Omani customers as well. According to the main outcomes of the empirical part of this current study, a number of factors (i.e. PE, FC, HM, PV, HB, TR, SQ, and IQ) were found to have a significant impact on the customers’ intention. This, in turn, gives clues regarding the main dimensions that have to be the focus of attention for practitioners in the m-commerce area.

The strong impact of PE on the BI points up the importance of m-commerce and how much more useful and beneficial it is for customers than traditional commerce tools. Therefore, organizations should design good promotional programs to convince customers and educate them about the main functions and advantages of using m-commerce (i.e. saving time, cost and effort, while increasing productivity). Designers have to ensure that m-commerce application can help and serve customers efficiently and effectively without deficits and errors. This could increase the level of usefulness perceived in using m-commerce in the eyes of potential customers (Shareef et al., 2012; Simintiras et al., 2014; Lai and Lai, 2014). In this instance, designers should make more effort to maintain the services provided using m-commerce, as well as expanding the commercial activities introduced using these applications (Zhou et al., 2010; Yadav et al., 2016).

Indeed, experiencing an innovative system for the first time is the main challenge for a successful implementation of this system as reported by Meuter et al. (2005). Thus, motivating customers and letting them have a go at using m-commerce for the first time without any financial consequences could encourage those customers to have a real experience of using this system and, accordingly, perceive the use of m-commerce as being a more credible, simple, useful, and secure way of carrying out commercial activities (Marinkovic and Kalinic, 2017; AlFahl, 2018). Furthermore, organizations also have to concentrate more on teaching the customer that using m-commerce activities can save them time and effort as these educational programs will provide customers with the knowledge and skills to apply m-commerce activities more safely and securely (Laukkanen et al., 2009). Indeed, such educational activities could help in forming a good habits on the customer side and perceiving using M-commerce as any other habits or normal behaviours they could have. In addition, marketers have to promote the idea that using m-commerce is a normal extension of the uses of other mobile applications such as using social media or phone calls through smart phones.

Marketers could also focus on the main qualities that improve customers’ intimacy and enjoyment of using m-commerce. Therefore, marketers can encourage the idea that m-commerce is more pioneering and that these novel systems could add more to their life style and shopping experience as well (Venkatesh et al., 2012). Marketers can also use different kinds of social media platforms (i.e. Facebook, YouTube, Instagram, Twitter) to convince customers that using m-commerce is simple and represents an innovative and novel way of conducting many commercial activities (AlFahl, 2018). Accordingly, such marketing plans through social media platforms will enhance not only the level of HM but also the level of PE encompassed in using m-commerce.

As for the SVQ, and the IQ, having an innovative and high quality interface designed with the customers’ preferences in mind will add more for the aspects related to SVQ and IQ. Further, the information available through m-commerce should be more accurate and comprehensive, and be updated more regularly. Initially, banks have to concentrate on
providing SST channels in a manner that is compatible with other common technologies used by customers, while convincing them that using these channels is not very much different from other technologies (Koenig-Lewis et al., 2010; Simintiras et al., 2014; Mansour et al., 2016; Kuriakose and Paul, 2016).

Customers should be empowered to deal with any problem that could come up while using m-commerce (Zhou et al., 2010). This could be attained through providing customers with the necessary skills and knowledge that will help them to override any problem and mitigate against any risk. Customer service should be available at any time should there be a problem.

The important technical and informational facilities should be developed in a way that will help customers to use m-commerce activities safely as well. This could require more collaboration with banks, financial organizations, and mobile and internet service providers to provide more effective and secure platforms to share customers’ financial and non-financial information (Palvia, 2009; Aghimien et al., 2016).

Results of the current study proved that PV has a role. Therefore, organizations that are interested in presenting their products through m-commerce should pay more attention to the monetary aspects to enhance the customers’ perception that using m-commerce is more effective financially than traditional channels. Therefore, introducing m-commerce applications should be free to customers, who should feel that prices for products presented through m-commerce applications should cost less than those in the brick and mortar stores. Furthermore, marketers could use sales promotions for products sold via m-commerce applications. This could lead to an increase in PV through using m-commerce (Venkatesh et al., 2012; Wessels and Drennan, 2010).

Designers could utilise authentication mechanisms available in smart phones; e.g. biometric tools such as fingerprints, voice tag, and iris recognition to enhance the level of customers trust in using m-commerce applications (Awiagah et al., 2016). Marketers could also use different mechanisms such as more guarantees and warranties or even money-back policies if the customer has any problem in finalizing a transaction through m-commerce. This will not only enhance the level of customers’ trust but will also reduce the level of customers’ risk in using m-commerce (Simintiras et al., 2014).

5.2 Limitations and future research directions
There are a number of limitations that really restrict the current study. First, this study depends mainly on quantitative data to examine the research problem. Even though such data help to present a more objective view regarding the fundamental factors affecting Omani customers’ intention to adopt m-commerce, there is still a need to gain a deeper and more accurate view explaining how these factors could affect the customers’ intention and adoption of m-commerce. Therefore, such qualitative studies could be in high demand by future researchers to provide an accurate and comprehensive explanation for this problem. Second, this study examines the customer’s intention to adopt m-commerce. Therefore, actual adoption should be the focus of attention for future studies. Third, as presented in the results sections, a number of factors (i.e. EE, SI and SQ) were not supported to have had any impact. Such results require further analysis to see if they could be moderated by age, gender, and educational level. Fourth, this study only considers one mobile application (m-commerce); other applications such as mobile government, mobile banking, and mobile internet could be targeted individually or be examined together. Finally, this study was conducted in Oman, which may restrict the generalization of the current study results. Therefore, future studies could consider other countries and cultures to gain a more comprehensive and general view of the adoption of m-commerce.
References


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