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Use and behavioural intention of m-payment in GCC countries: Extending meta-UTAUT with trust and Islamic religiosity

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ABSTRACT

Mobile payments and their applications have grown lucratively across the globe. Yet limited studies have attempted to investigate user's attitude on m-payments and their behavioral intention. Taking this as a research gap, this research investigates the important variables that build a positive attitude, behavioral intention and use towards m-payments by using the meta-UTAUT framework, with Islamic religiosity as a moderating variable. This research follows a single cross-sectional design using a survey methodology. 510 sample was collected from Gulf countries and Structural equation modeling analysis was used to test the proposed conceptual model. The results indicate performance expectancy and facilitating conditions are important variables that structure the dependant variables. Trust is found to be significantly related to behavioral intention and use. Also, Islamic religiosity is found to positively moderating the relationship of behavioral intention to use of m-payments. This research extends the framework of meta-UTAUT with trust and introduces Islamic religiosity as a moderating variable. This research contributes extensively to the m-payment literature and theories associated with meta-UTAUT propositions. With in-depth arguments proposed in hypotheses, the propostions contribute to motivation and social learning theories as well.

Introduction

There has been prolific growth in the use of digital payments and technological advancements associated with banking operations during the last decade, which have made users' lives easier. This growth has been fuelled by omnichannel retailing and transactions happening in cyberspace, including increasingly prevalent mobile payments (m-payments), predicted to have up to 3 trillion users worldwide by 2024, with a value of 1.31 billion dollars by 2031 (eMarketer, 2021). The expansion of mobile payments and digital banking has been particularly notable in Gulf Cooperation Council (GCC) countries in the last five years. The six countries of the GCC, Bahrain, Kuwait, Oman, Qatar, the United Arab Emirates, and Saudi Arabia, have cultural similarities and populations largely comprising followers of Islam. Despite the wide use of m-payments in this region, however, there has been very limited research into behavioural intention and the use of such transactions there.

The adoption of technologies including mobile payments are affected by different types of factors (Alalwan et al., 2016a; Weerakkody et al., 2009). Most existing studies have investigated mobile usage from angles such as travel tracking (Medeiros et al., 2022; Raun et al., 2016), mobile banking (Jadil et al., 2021; Yu, 2012), mobile commerce (Marinković et al., 2020), mobile learning (Alghazi et al., 2021; Loh et al., 2021), mobile healthcare (Arfi et al., 2021; Wang et al., 2020), and mobile-based marketing (Wong et al., 2015). Meanwhile, the use of mobile payments has grown strongly in recent years, especially in emerging markets (Arjun et al., 2021). This growth can be attributed to benefits for users in terms of performance and functions (Kumar et al., 2021; Wu et al., 2021). M-payments are possible both through single party applications owned by banks and through third-party applications, owned by licensed digital wallet companies or digital bankers (Gong et al., 2021). M-payment applications have demanded that users integrate their banking details with the app to provide authorised services (Hwang et al., 2021). Such integration has also questioned the trust and privacy aspects of the m-payment system to enable behavioural penetration among potential users. In GCC countries, Islamic forms of banking transactions take account of both profitability and religiosity (Azmat et al., 2020), while various studies have found that religiosity can have a great impact on consumers' behaviour and attitudes (Bananuka et al., 2019). Other studies have viewed Islamic banking as influenced by perceptions of Islamic religiosity (Eid & El-Gohary, 2015; Usman et al., 2017), but there is little understanding of how m-payments are viewed from this angle.

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From the discussion above, four gaps can be identified. Given the growth in m-payments, there is a need to investigate (1) the precursors of associated behaviour (Chopdar & Balakrishnan, 2020), (2) attitudes to m-payment among GCC users (Alkhowaiter, 2020), (3) the role of trust in developing m-payment behaviour (Rahman et al., 2022), and (4) the effects of Islamic religiosity on behaviour and use of m-payments (Garrouch, 2021). To investigate these gaps, this research employs the meta-UTAUT framework (Dwivedi et al., 2019), extended with the inclusion of trust. Meta-UTAUT integrates the UTAUT factors with attitude to understand the dispositional structure of behaviour. This study uses the meta-UTAUT variables of performance expectancy, effort expectancy, social influence, facilitating conditions, and trust. The model also introduces Islamic religiosity as an intervening variable affecting behavioural intention and use. To address the gap identified above, the following research questions are posed:

RQ1: Which of the meta-UTAUT factors contribute to building stronger attitudes and behavioural intention towards m-payment?
RQ2: Does Islamic religiosity positively moderate the relationship of these factors with the behavioural intention to use m-payments?

By investigating these questions, this research contributes to literature and theory in multiple ways. (1) By investigating the precursors of the behavioural intention to use m-payments, it adds to the m-payment literature. (2) In employing the meta-UTAUT framework, it provides a more holistic framework for m-payments with the inclusion of attitude. (3) By including trust as a variable, it extends the theoretical understanding of meta-UTAUT. (4) The study makes a meaningful contribution to the literature associated with Islamic religiosity. (5) Besides the meta-UTAUT template, the hypotheses are developed via ideas derived from the expectancy theory of motivation (Van Eerde & Thierry, 1996; Vroom, 1964), Kelman's social influence theory (Davis et al., 1989; Kelman, 1958), behavioural learning theories (Bandura & Walters, 1977), and the theory of planned behaviour (TPB; Ajzen, 1991), thus showing that behaviour associated with m-payments can be viewed from the perspective of these theories and propositions. The remainder of this paper begins by discussing the theoretical background of the meta-UTAUT framework and Islamic religiosity. It then introduces the conceptual model, states the hypotheses, and explains the methodology adopted. The results are then presented, analysed, and discussed, with consideration of theoretical and practical implications.

Theoretical background

Extended meta-UTAUT

The factors underlying the behavioural intention to use m-payments has been investigated through the lens of various theories, including the theory of reasoned action (Fishbein & Ajzen, 1980), TPB (Ajzen, 1991), technology acceptance model (TAM; Davis, 1989), and the unified theory of acceptance and use of technology (UTAUT; Venkatesh et al., 2003). Research based on these theories has uncovered multiple variables associated with m-payment behaviour (Kim et al., 2010; Teo et al., 2015). However, a comprehensive understanding of their dispositional effects remains unaddressed. This gap can be narrowed by adopting the meta-UTAUT framework, proposed by Dwivedi et al. (2019), which introduced attitude as a subjective element that can influence behavioural intention as a favourable or unfavourable dispositional measure.

Meta-UTAUT has been applied in contexts including mobile banking (Baabdullah et al., 2019; Sharma & Sharma, 2019), service delivery (Gursoy et al., 2019), mobile internet (Alalwan et al., 2018a), mobile commerce (Shaw & Sergueeva, 2019), mobile wallets (Singh et al., 2020), wearable technology acceptance (Talukder et al., 2020), adoption of digital assistants (Vimalkumar et al., 2021), AI and organisational decision making (Cao et al., 2021), conversational commerce (Balakrishnan & Dwivedi, 2021), mobile health adoption (Santos-Vijande et al., 2022), and online purchase decisions (Yang et al., 2022). Meta-UTAUT was developed from the understanding arising from the evolution of TPB (Ajzen, 1991), TAM (Davis, 1989), and UTAUT (Venkatesh et al., 2003). The original UTAUT integrated four components affecting behavioural intention to use technology: perceived expectancy, effort expectancy, social influence, and facilitating conditions. Venkatesh et al. (2012) then added three variables (hedonic motivation, price value, and habit) to produce UTAUT2 and later researchers have extended UTAUT and UTAUT2 by integrating them with other theoretical approaches. Dwivedi et al. (2019) significantly augmented the model with attitude to measure its subsequent effect on behavioural intention.

Similar to UTAUT, meta-UTAUT comprises four important variables: performance expectancy, effort expectancy, social influence, and facilitating conditions. Performance expectancy explains how users expect to benefit when using an information system (IS) (Patil et al., 2020; Venkatesh et al., 2003). Effort expectancy specifies the degree of ease connected with the technology (Venkatesh et al., 2003). Performance expectancy and effort expectancy are similar to the measurement variables present in TAM, namely perceived usefulness and perceived ease of use. Facilitating conditions represent the support that is needed to perform an IS-based action (Venkatesh et al., 2003). Social influence is the degree to which consumers value the social importance of using a particular technology, mainly influenced by others' observed use (Verma & Sinha, 2018). Venkatesh et al. (2011) propose that these four variables are integral in affecting the behavioural and attitudinal elements of IS use.

This research extends the meta-UTAUT framework with trust (Fig. 1), which Araujo et al. (2020) identify as playing an important role in IS adoption. The meaning of trust can be seen through diverse lenses including psychology, human development, behavioural studies, and IS literature. Mayer et al. (1995, p. 172) define it as "the willingness of a party to be vulnerable to the actions of another party based on the expectation that the other will perform a particular action important to the trustor, irrespective of the ability to monitor or control that other party". Human-based and system-based trust can differ according to the elements of functionality and integrity (McKnight et al., 2011). As Fig. 1 shows, the present research takes an IS perspective and considers how trust can affect m-payment behaviour alongside the meta-UTAUT framework.

Religiosity

Religiosity can be interpreted as a commitment to follow the principles, doctrines, and beliefs of an established religious structure (Bhuian et al., 2018). It can be said to be either intrinsic or extrinsic. Intrinsic religiosity refers to profound immersion in a religion that explains an individual's way of living, whereas extrinsic religiosity is more concerned with behaviour and can also be connected with non-religious factors (Allport, 1966; Chang et al., 2019; Raggiotto et al., 2018). While previous studies have found that religiosity can mediate behavioural changes (Singh et al., 2021), no evidence is available in the IS context. Singh et al. (2021) found that both intrinsic and extrinsic religiosity can build a positive environmental attitude. Bhuian et al. (2018) propose that religiosity can influence a believer's attitudes and behaviours, affecting the implementation of ethical standards. In some Muslim countries, banking systems are structured according to Islamic principles (Bilal & Meera, 2015). For example, some have issued Islamic credit cards as an alternative to conventional credit, applying Islamic principles to the lending process (Jamshidi & Hussin, 2016). Thus, there is the potential for Islamic religiosity to impact the m-payment scenario. In the IS context, extrinsic religiosity can be expected to affect aspects of behaviour. The conceptual model

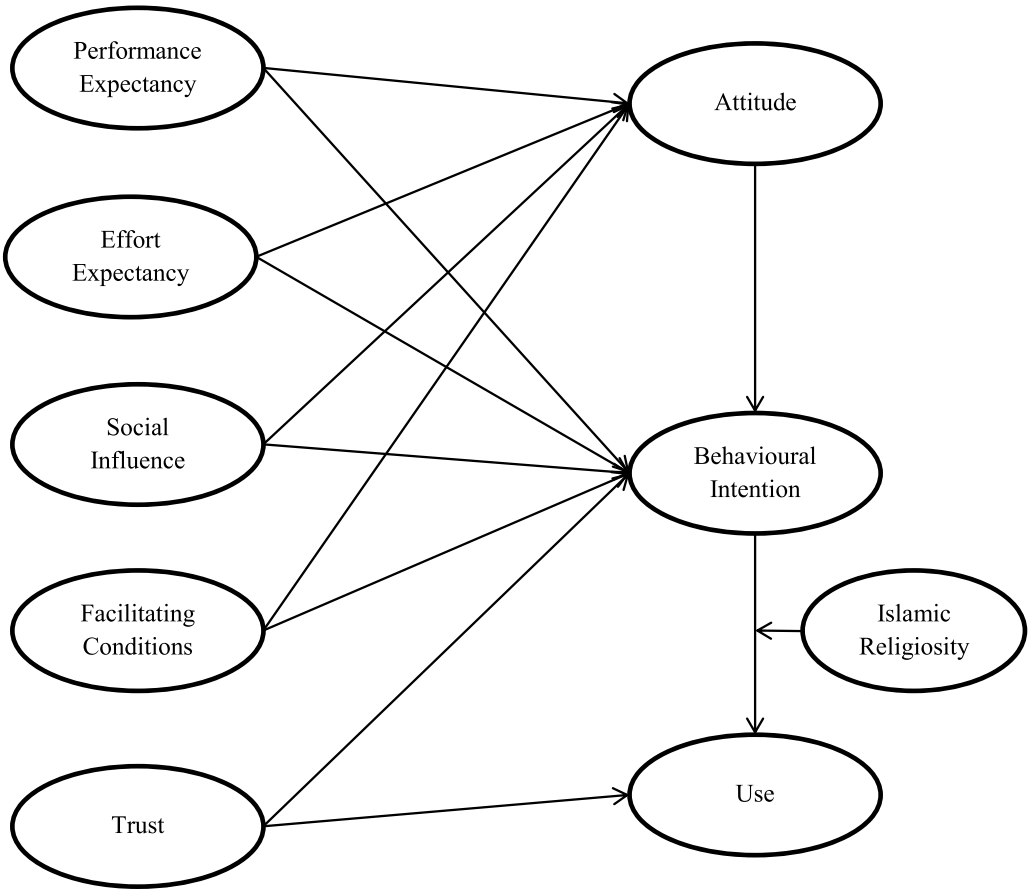

Fig. 1. Conceptual model (Source: Adapted from Alkhowaiter, 2020; Dwivedi et al., 2019).

adopted by this study therefore employs religiosity as a potential moderator.

Hypothesis development

Meta-UTAUT factors affecting attitude

As mentioned above, performance expectancy denotes the usability of the m-payment system and its ability to match perceptions. The expectancy theory of motivation (Van Eerde & Thierry, 1996; Vroom, 1964) proposes that every performance can lead to a reward, which is a behavioural outcome of an attitudinal disposition. In a technology context, an exhibited performance can build a positive attitude towards a system. In the case of m-payments, the system enables a contrasting performance to maximise the benefits to the users (Franque et al., 2022). The same can lead to a positive attitude towards the m-payment system. Dwivedi et al. (2019) found performance expectancy to be the most significant meta-UTAUT variable affecting attitude in an IS context. Based on the above discussion, we posit the following:

Hypothesis 1: Performance expectancy can positively influence attitude towards m-payment.

After performance expectancy, Dwivedi et al. (2019) identify effort expectancy as the second most significant variable in constructing attitude. As discussed earlier, effort expectancy denotes the facility that the system provides to reduce the effort required of users. The expectancy theory of motivation provides a holistic picture of how effort can engender performance and thus the achievement of reward (Van Eerde & Thierry, 1996; Vroom, 1964). Effort is a precursor of performance as well as of the attitudinal factors that can lead to productive rewards (Barling et al., 1996). Thus, it can be posited that effort reduction will also induce positive intrinsic rewards through the possible formation of dispositional elements. Therefore, effort expectancy can create a positive attitude to a system. M-payments have mitigated traditional impediments to providing easy access and convenience for users (Ku, 2021), setting an example to the growing use of technology in banking. Such mitigation of obstacles can induce positive attitudes to the m-payment system. A second hypothesis follows from this discussion:

Hypothesis 2: Effort expectancy can positively influence attitude towards m-payment.

Social influence is the variable contributing least to attitude in the meta-UTAUT framework proposed by Dwivedi et al. (2019). However, other studies have found a highly significant relationship between social influence and online banking adoption, suggesting that this variable is particularly relevant in the m-payment context. Similarly, Singh et al. (2020) found a positive relationship between social influence and mobile wallet adoption. Kelman's social influence theory integrates three factors, namely compliance, identification, and internalisation, that can build a positive attitude (Hwang, 2016; Kelman, 1958). These three elements are present in any IS use. In the case of m-payments, users may comply with social rules, exhibit a social identity in their transactions, and enjoy the process (Kar, 2021). Thus, the tenets of social influence theory support the assumption that social influence may significantly affect attitudes to the use of m-payments; hence hypothesis 3 is proposed:

Hypothesis 3: Social influence can positively influence attitude towards m-payment.

Previous research indicates that facilitating conditions in online banking can build a positive attitude towards the banks (Li et al., 2021). Dwivedi et al. (2019) predicted that facilitating conditions can positively influence attitudes towards IS. Providing enhanced facilities can correlate with effort reduction and performance expectation (Whitman, 1996), potentially leading to a positive attitude. Banks and third-party applications provide the advanced architecture required to deliver a seamless experience to m-payment users (Liébana-Cabanillas et al., 2014). Thusi & Maduku (2020) found that facilitating conditions can positively enhance the usage behaviour of online retail banking customers, a finding which can be extended to the m-payment context. From money transfers to commercial payments, m-payment apps have integrated features to build a positive attitude to m-payment systems. Thus, the study proposes Hypothesis 4:

Hypothesis 4: Facilitating conditions can positively influence attitude towards m-payment.

Meta-UTAUT factors, attitude, and behavioural intention

Previous studies have found that performance expectancy can lead to behavioural intention in diverse IS contexts (Alalwan et al., 2016a, 2016b; Kabra et al., 2017). Behavioural learning theories (Bandura & Walters, 1977) suggest that any changes in the prevailing context in a pleasurable or unpleasant way can change the behaviours of individuals. Performance expectancy is an outcome of a learning process related to various technologies and tools (Dalenogare et al., 2018). Thus, the expectation and its outcome can affect the behavioural intention to use a technology. Thusi & Maduku (2020) found that performance expectancy can positively enhance the behavioural intention to use online retail banking, a finding which can be posited to extend to the m-payment context. In the case of m-payment, knowledge, learning, and experience related to the expected performance of services is proposed to affect behavioural intention. Hypothesis 5 is derived from the above discussion.

Hypothesis 5: Performance expectancy can positively influence behavioural intention to use m-payment.

M-payment offers multiple benefits to users, mainly related to a reduction in the effort perceived to be required by traditional payment systems (Choudrie et al., 2018). According to motivation theorists, positive reinforcement has an impact on human behaviour (Rigby & Ryan, 2018). Rahi et al. (2019) found that effort expectancy can enhance behavioural intention to use internet banking. The same can be inferred to apply to how effort expectancy can influence behavioural intention among users of other tools including m-payment, where knowledge and learning about its ease of use may strengthen behavioural intention. Building on the above discussion, hypothesis 6 is proposed.

Hypothesis 6: Effort expectancy can positively influence behavioural intention towards m-payment.

The tenets of social cognitive theory consider social norms and their influence as environmental factors which determine human behaviour (Lin & Chang, 2018). Previous studies have found that social influence can significantly influence technology-related behavioural intention (Singh et al., 2020). Social influence constitutes extrinsic motivation which can build behavioural intention (Wang et al., 2019a). Zhang et al. (2018) found that social influence can positively build behavioural intention to adopt electronic banking. In the m-payment context, payments can be considered as private transactions but individual behaviours can act as stimuli, influencing others to change or impart behavioural intention. From the above discussion, hypothesis 7 is posited.

Hypothesis 7: Social influence can positively influence behavioural intention towards m-payment.

Facility is a structural factor from a traditional banking perspective (Arif et al., 2020). The emergence of online banking and m-payment has generated a set of related terms under various heads such as information technology (IT) infrastructure, IT architecture, archetypes, and IT functions (Sharma & Lenka, 2017). On the whole, these all amount to facilitating the use of IS to provide greater benefits to users. Previous research has found that facilitating conditions in IT can build positive behavioural intention (Kabra et al., 2017). This can be posited to apply to the m-payment case, since first-party and third-party m-payment apps are more dynamic (Wang et al., 2019b) and can provide enhanced facilities for users. Thence, hypothesis 8 is proposed.

Hypothesis 8: Facilitating conditions can positively influence behavioural intention towards m-payment.

According to TPB, beliefs and attitudes can build behavioural intention. The literature reports findings of a significant relationship between attitude and behaviour in diverse contexts including retailing (Quach et al., 2020), IS (Dwivedi & Weerakkody, 2007; Ismagilova et al., 2020), tourism (Tölkes, 2020), and services (Rahman et al., 2019). As discussed above, attitude is a disposition that formulates favourable or unfavourable notions, which can lead to behavioural change. Thus, a favourable attitude towards an m-payment system can positively affect behavioural intention; hence hypothesis 9 is proposed.

Hypothesis 9: Attitude towards m-payment can positively influence behavioural intention.

Trust, behavioral intention, and use

Previous studies have shown that trust can enhance behavioural intention towards technology (Sarkar et al., 2020). Trust includes both individual and social phenomena in its scope (Yahia et al., 2018). The modified commitment-trust theory states that trust can directly influence behavioural intention as well as indirectly affecting behavioural intention through commitment (Willis et al., 2021). Thus, trust can be significant in building behavioural commitment (Akrout & Nagy, 2018). In the case of m-payment, both first-party and third-party payment applications require users to provide sensitive banking information (Wang et al., 2019a). This in turn necessitates enhanced perceived trust to instil behavioural intention, which justifies the positing of hypothesis 10.

Hypothesis 10: Trust can positively influence behavioural intention towards m-payment.

It follows from the above that trust can positively impact behaviour. Indeed, published studies have found it to be positively related to actual end behaviours or use (Alalwan et al., 2018a, 2016b; Kamboj et al., 2018). In the case of technology, these end behaviours are mostly related to the use of technology (He et al., 2021). M-payments naturally involve sophisticated and secured transactions which demand trust, knowledge of which can modify usage behaviour (Chin et al., 2020). This leads to hypothesis 11 being proposed.

Hypothesis 11: Trust can positively influence the use of m-payment.

Intention and use are two interrelated and exclusive factors that are processed within the behavioural sphere. Intention is a near precursor that promotes use (Singh & Sinha, 2020). Use denotes the actual behaviour that is performed after a series of evaluations of a particular phenomenon in any given technology adoption (Singh & Sinha, 2020). In the case of m-payments, a potential user's intention can be converted to usage, as expressed in hypothesis 12.

Hypothesis 12: Behavioural intention towards m-payment can influence the use of m-payment.

Islamic religiosity as moderator

Religiosity, as noted above, can be both intrinsic and extrinsic in nature. Extrinsic religiosity can impact people's materialistic behaviour (Casabayó et al., 2020), but its impact is more orientated towards achieving recognition and social approval (Çavuşoğlu et al., 2021). Although little research has gone into understanding how religiosity is related to IT influence, it has been found that religiosity can influence environmental attitudes (Felix et al., 2018). Islamic religiosity is significant in GCC countries and the strength of religious adherence affects every aspect of life at both intrinsic and extrinsic levels (Usman et al., 2020). Indeed, the norms and tenets of Islam are globally influential at every level of human life, including in technology usage (Suhartanto et al., 2019). Thus, it is possible for religiosity to moderate positively the relationship between behavioural intention and use of m-payments. Hypothesis 13 is thus proposed.

Hypothesis 13: Islamic religiosity can positively moderate the relationship between behavioural intention towards m-payment and the use of m-payment.

Methodology

Research design and data collection

The study, following a single-cross sectional survey design, was conducted in GCC countries, where m-payment use has grown significantly in recent years (Alkhowaiter, 2020). The participants were banking users who were primarily using m-payment for their transactions. A representative sample of 760 users were contacted, providing 510 final usable responses. The data was collected through an online Google link, with a statement in the questionnaire that respondents should have at least six months of experience with m-payment. This helped to ensure that the sample was representative. Respondents' socio-demographic characteristics are given in Table 1.

Constructs and questionnaire

The measurement items for the constructs were derived from previous studies (Foon & Fah, 2011; Luarn & Lin, 2005; Sripalawat et al., 2011; Vejacka & Stofa, 2017; Venkatesh & Zhang, 2010; Yu, 2012; Chavali & Kumar, 2018; Dwivedi et al., 2019; Sharma et al., 2015; Soomro, 2019). The scale for performance expectancy, effort expectancy, social influence, and facilitating conditions was derived from Foon & Fah (2011), Luarn & Lin (2005)), Venkatesh & Zhang (2010), Yu (2012), and Sripalawat et al. (2011). The scale for trust and attitude was derived from Luarn & Lin (2005)), Vejacka & Stofa (2017), Chavali & Kumar (2018), and Sharma et al. (2015). That for behavioural intention was derived from Sripalawat et al. (2011), Venkatesh & Zhang (2010), Yu (2012), and Luarn & Lin (2005)); for use from Vejacka & Stofa (2017); and for Islamic religiosity from Soomro (2019). All were five-point Likert-type scales with 5 denoting 'strongly agree' and 1 'strongly disagree'.

Table 1
Sociodemographic characteristics of respondents.

Characteristics		Frequency	Percent
Gender	Male	265.00	51.96
	Female	245.00	48.04
Age	18 to 25 years	126.00	24.71
	26 to 35 years	162.00	31.76
	36 to 45 years	136.00	26.67
	46 to 55 years	82.00	16.08
	56 years and above	4.00	0.78
Marital status	Single	181.00	35.49
	Married	329.00	64.51
Income level	Below 10,000 SR	237.00	46.47
	10,000–20,000 SR	207.00	40.59
	20,001–30,000 SR	52.00	10.20
	30,001–40,000 SR	10.00	1.96
	Above 40,000 SR	4.00	0.78
Education	High school or below	8.00	1.57
	Bachelor's	465.00	91.18
	Master's	18.00	3.53
	PhD	19.00	3.73
Type of mobile payment application used	Apple pay	111.00	21.76
	STC pay	43.00	8.43
	Mada Pay	42.00	8.24
	Samsung Pay	1.00	0.20
	Google Pay	2.00	0.39
	STC Pay, Apple Pay, Mada Pay	116.00	22.75
	STC Pay, Apple Pay	111.00	21.76
	STC Pay, Mada Pay	42.00	8.24
	Apple Pay, Mada Pay	42.00	8.24

Key: SR = Saudi riyal.

Analysis

We performed a two-step structural equation modeling (SEM) analysis to test the hypothetical model. First, the measurement model was tested with confirmatory factor analysis to check the consistency and validity requirements, specifically the content, convergent, and discriminant validity requirements. SEM analysis using maximum likelihood estimation was then used to support or reject the hypotheses, depending on the significance level. The strength of the measurement model and SEM analysis was assessed by testing using the model fit. Finally, the moderation of Islamic religiosity was tested in the proposed model (Hypothesis 13). All steps in the analysis and the estimations were performed using IBM SPSS and AMOS 27.0.

Results

Confirmatory factor analysis

Table 2 lists the measurement model results, showing composite reliability values above 0.75, which confirms that they were consistent with the scale (Portney & Watkins, 2000). The Cronbach's alpha values were found to be above 0.75. All three validity requirements were found to be fulfilled and all standardised factor loadings were above 0.70 and significant at a 99% confidence level, confirming content validity (Nunnally, 1978). Table 2 also shows the average variance extracted (AVE) values to be above 0.50, meeting the requirements of convergent validity (Fornell & Larcker, 1981). Table 3 shows the inter-correlation values and the square root of AVE values in the diagonal, which were all above inter-correlation values of the respective constructs, fulfilling the discriminant validity requirement (Fornell & Larcker, 1981). As noted in the footnote of Table 2, the fit of the measurement model was found to be good (Byrne, 2010; Hair et al., 2012; Kline, 1998). Table 3 also shows the mean and standard deviation values of each item. The common method bias was checked

Table 2
Results of the measurement model.

Constructs	Items	Mean	Standard Deviation	Standardised Factor Loadings	AVE	CR
Performance Expectancy	PE1	4.533	0.746	0.929	0.690	0.898
	PE2	4.475	0.774	0.871		
	PE3	4.316	0.745	0.753		
	PE4	4.204	0.758	0.755		
Effort Expectancy	EE1	4.545	0.755	0.633	0.713	0.907
	EE2	4.471	0.799	0.931		
	EE3	4.439	0.866	0.906		
	EE4	4.631	0.758	0.873		
Social Influence	SI1	4.367	0.806	0.899	0.643	0.843
	SI2	4.237	0.830	0.784		
	SI3	4.016	0.695	0.712		
Facilitating Conditions	FC1	4.347	0.843	0.820	0.598	0.816
	FC2	4.380	0.758	0.679		
	FC3	4.482	0.764	0.813		
Trust	T1	4.327	0.825	0.930	0.811	0.928
	T2	4.316	0.963	0.902		
	T3	4.206	0.812	0.868		
Attitude	Att1	4.100	0.915	0.881	0.670	0.924
	Att2	4.510	0.782	0.780		
	Att3	4.339	0.915	0.775		
	Att4	4.478	0.852	0.872		
	Att5	3.963	1.201	0.704		
	Att6	4.108	0.896	0.881		
Behavioural Intention	BI1	4.357	0.811	0.964	0.874	0.972
	BI2	4.322	0.861	0.930		
	BI3	4.437	0.741	0.921		
	BI4	4.347	0.829	0.905		
	BI5	4.333	0.840	0.954		
Use	U1	4.488	0.901	0.876	0.861	0.949
	U2	4.457	0.776	0.945		
	U3	4.427	0.847	0.960		
Islamic Religiosity	IR1	3.982	0.883	0.941	0.687	0.867
	IR2	4.192	0.948	0.726		
	IR3	4.067	0.871	0.806		

Notes: All standardised factor loadings are significant at 99% confidence level; AVE = average variance extracted; CR = composite reliability.
Model fit indices: $\chi 2$ /df = 2.919; AGFI = 0.922; NFI = 0.932; CFI = 0.952; RMSEA = 0.042.

as per the recommendations in previous research (MacKenzie & Podsakoff, 2012; Podsakoff et al., 2003). The common latent factor (CLF) model was compared with the non-CLF model, yielding a difference in standard regression weights below 0.05, thus confirming that the items and measurements were unlikely to suffer from common method bias issues.

SEM results

The structural equation modeling results are shown in Table 4, where model 1 represents the model without moderation and model 2 with moderation. In model 1, it can be seen that almost all of the variables were found to be significant at 99% confidence level, except for hypothesis 3, which relates facilitating conditions to attitude. Among the remaining hypotheses, H13 was found to have the highest coefficient of 0.697, showing a strong relationship between behavioural intention and use. The next highest value was for H10, indicating a highly significant relationship between trust and behavioural intention. Hypotheses 1 to 4, concerning the respective relationships of performance expectancy, effort expectancy, social influence, and facilitating conditions to attitude, were all significantly supported, the highest coefficient of the four being for facilitating conditions, followed in descending order by performance expectancy, effort expectancy, and social influence. The r^2 value of attitude was found to be 0.283, indicating that the construct relationships explain 28% of the variance with attitude as an endogenous factor. among hypotheses 5 to 8, relating to the respective relationships of performance expectancy, effort expectancy, social influence, and facilitating conditions with behavioural intention, that of performance expectancy to behavioural intention was found to be most highly significant, followed by social influence, effort expectancy, and facilitating conditions. The relationship between attitude and behavioural

Table 3
Intercorrelation values and √AVE.

Constructs	1	2	3	4	5	6	7	8	9
1. Trust	**0.900**								
2. Performance Expectancy	0.710	**0.830**							
3. Effort Expectancy	0.705	0.782	**0.844**						
5. Facilitating Conditions	0.623	0.727	0.687	**0.802**					
6. Attitude	0.790	0.696	0.790	0.756	**0.773**				
7. Behavioural Intention	0.721	0.647	0.657	0.561	0.693	**0.818**			
8. Use	0.856	0.775	0.755	0.721	0.701	0.731	**0.935**		
9. Islamic Religiosity	0.817	0.680	0.674	0.601	0.724	0.698	0.901	**0.928**	
	0.258	0.207	0.136	0.197	0.242	0.162	0.231	0.306	**0.829**

Note: The diagonal represents the square root of average variance extracted.

Table 4
Standardised estimates of the proposed model concerned with m-payments.

Hypotheses	Exogenous Variable	Endogenous Variable	Model 1 Coefficient	Model 2 Coefficient	r^2
H 1	Performance Expectancy	Attitude	0.309***	0.309***	0.283
H 2	Effort Expectancy		0.280***	0.280***	
H 3	Social Influence		0.102**	0.102**	
H 4	Facilitating Conditions		0.315***	0.315***	
H 5	Performance Expectancy	Behavioural Intention	0.236***	0.236***	0.418
H 6	Effort Expectancy		0.168***	0.170***	
H 7	Social Influence		0.207***	0.207***	
H 8	Facilitating Conditions		0.119***	0.119***	
H 9	Attitude		0.178***	0.178***	
H 10	Trust		0.617***	0.616***	0.495
H 11	Trust	Use	0.198***	0.184***	
H 12	Behavioural Intention		0.697***	0.660***	
H 13	Behavioural Intention X Islamic Religiosity			0.203***	

Notes: *** values significant at 99% confidence level; ** values significant at 95% confidence level. Model fit indices: $\chi 2$ /df = 3.269; AGFI =0.901; NFI = 0.912; CFI = 0.911; RMSEA = 0.058.

intention (H9) was also found to be highly significant, as was that (noted above) between trust and behavioural intention (H10). The r^2 of behavioural intention, at 0.418, indicates that the construct relationships explain 41.8% of the variance with behavioural intention as an endogenous factor. Hypotheses 11 and 12, on the relationships of trust and behavioural intention to use, are both supported significantly, with the relationship between trust and use found to be very strong. The r^2 of use (0.495) indicates that the construct relationships explain 49.5% of the variance with use as an endogenous factor. Table 4 also shows that the structural model was a good fit for the hypothetical model (Byrne, 2010; Hair et al., 2012; Kline, 1998).

Moderation results

In model 2, Hypothesis 13 addressed the moderating effect of Islamic religiosity on the relationship of behavioural intention to use. Results for hypotheses 1 to 10 were similar to model 1, whereas the coefficient values for hypotheses 11 and 12 were slightly lower. The results of moderation analysis given in Table 4 shows that Islamic religiosity can positively moderate the relationship between behavioural intention and use.

Discussion and implications

This section first summarises the results then discusses them in relation to previous research, before considering the theoretical and practical implications. The research investigated the significant precursors of attitude, behavioural intention, and use of m-payments in GCC countries. A model based on the meta-UTAUT framework (Dwivedi et al., 2019) was tested using the data from 510 questionnaire survey participants. Twelve hypotheses were supported significantly at the 99% confidence level and one (H3) at 95%.

Hypotheses 1 to 4 concerned the respective relationships of performance expectancy, effort expectancy, social influence, and facilitating conditions to attitude, addressing a gap in the literature whereby most previous studies involving the UTAUT model excluded attitude as factor. However, Dwivedi et al. (2019) introduced attitude as an important precursor of behaviour. Hypotheses 1 to 4 were found to be significantly consistent with previous studies (Bu et al., 2021). Facilitating conditions were found to be most highly significant in creating attitude, followed by performance expectancy. These results indicate the importance of providing more functions in m-payment systems and improving their performance. Previous research has similarly found facilitating conditions to constitute an important variable in online banking adoption (Thusi & Maduku, 2020). Most studies have identified social influence as very important in IS adoption (Singh et al., 2020), but this study detected little effect on the relationship between social influence and attitude. This may be because of the existing knowledge system and the more involved actions of users of m-payment systems.

Hypotheses 5 to 8 addressed the impact of performance expectancy, effort expectancy, social influence, and facilitating conditions on behavioural intention. In contrast to the first four hypotheses, facilitating conditions was found to be the least significant variable and social influence the second most significant. Overall, the H5-H8 results were significant and consistent with previous studies (Dwivedi et al., 2020), confirming the importance of performance expectancy and social influence in stimulating behavioural intention among users. Most earlier studies have emphasised the importance of performance expectancy in building behavioural intention (Alalwan et al., 2018a, 2016b), which this study extends to the context of m-payments. Notably, social influence was found to have the least significant relation with attitude but exhibited a considerably stronger association with behavioural intention. This shows that social influence may not create a favourable disposition but can affect aspects of behaviour.

Hypotheses 9 and 10 interrogated the relationship of trust and attitude with behavioural intention. While both results were significantly consistent with previous studies (Vahdat et al., 2021), trust was found to have a very strong relationship with behavioural intention (Singh & Srivastava, 2018), emphasising the role of trust in behaviour. Especially in the context of m-payments, involving both first-party and third-party applications, it is essential for privacy and trust to be inherently present in the system (Wang et al., 2019b). The results of the present study empirically emphasise this point.

The testing of hypotheses 11 and 12 showed that trust and behavioural intention can influence the use of m-payments. The results are consistent with those of Pérez-Morote et al. (2020), who found that trust can affect the use of information technology. However, in contrast to the results for hypotheses 9 and 10, trust was found to be relatively less influential on the use of m-payments (Talwar et al., 2020). This indicates that trust is more of an organismic variable that relates to creating intention, rather enforcing end behaviour (here, the use of m-payments). The relationship between behavioural intention and use was found to be very strong across all results, which explains how intention can lead to end behaviour. It has been well documented in the literature that intention is an immediate precursor of end behaviour (Singh & Sinha, 2020).

Finally, the results for Hypothesis 13 confirm the positive moderation of Islamic religiosity in the model, showing that a high degree of Islamic religiosity can enhance the relationship of behavioural intention with use. A few studies have found that Islamic religiosity can positively affect behavioural intention with regard to information systems (Suhartanto et al., 2019), but this study has empirically analysed this finding from an interactional perspective.

Theoretical implications

The study contributes to theory in the following ways. (1) Research into m-payment is scarce; thus, the present findings contribute to the literature on m-payment and online banking. (2) The meta-UTAUT framework extended with attitude is little mentioned in the IS literature, so these findings will contribute to this line of research. (3) This research extends the meta-UTAUT model with trust as an important predictor of behavioural intention and use of m-payments. (4) The study introduces Islamic religiosity as a moderator in the model, thus contributing to the online banking and Islamic banking literature. (5) The hypotheses interrogated here were developed from the propositions of a number of theoretical approaches established and rigorously examined over many decades, showing that the concept of m-payment can be viewed from the perspective of these theories and propositions.

Most of the existing research into the UTAUT variables in the context of banking and commercial information systems has investigated online banking (Rahi et al., 2019), online payments (Al-Saedi et al., 2020), online buying (Erjavec & Manfreda, 2022), mobile purchases (Marinković et al., 2020), and mobile banking (Raza et al., 2019). This study has extended the understanding of UTAUT in the context of m-payments, leading to a consolidated understanding of mobile banking and payments. It has also brought the UTAUT variables, attitude, behavioural intention, and use into a single framework, which allows a holistic empirical understanding of the m-payment scenario. In particular, by incorporating attitude into the model, the study has investigated behavioural intention through a procedural lens, as proposed by the originators of meta-UTAUT (Dwivedi et al., 2019) and TPB (Ajzen, 1991). Existing IS research concerned with online banking (Erjavec & Manfreda, 2022) has mostly focused on investigating behavioural intention or continuation intention, but without consideration of attitude. This research fills this void by providing a comprehensive framework that integrates the attitudinal and behavioural variables.

Patil et al. (2020) recommend using the meta-UTAUT framework to ensure the most holistic approach to building research models. However, most of the researchers who have used meta-UTAUT (Upadhyay et al., 2022) have simply investigated the model in different contexts, rather than extending it with appropriate variables. The present research differs in having empirically extended meta-UTAUT with trust to add meaning to the framework, thus contributing to the literature on m-payment. Given the growth of concern with privacy issues affecting the digital payment ecosystem (Park et al., 2018), trust is an integral element that should necessarily be addressed in any online transactional system (Jansen & Van Schaik, 2018). However, little attention has been given to trust in the m-payment domain. Thus, this research is valuable both in adding to current knowledge on meta-UTAUT and m-payment and in opening avenues for future growth in such knowledge. Alongside trust, it makes another important contribution by the integration of Islamic religiosity into the model. Most previous research has investigated the direct impact of Islamic religiosity on technology behaviour (Bananuka et al., 2019). This research makes a twofold contribution by introducing Islamic religiosity as a moderating variable and doing so in the context of m-payments. Its findings will guide future studies into the interaction effects of Islamic religiosity and provide an extended understanding of existing studies related to Islamic religiosity. More broadly, the findings extend the available knowledge in the domains of religiosity, morals and ethics beyond Islam (Çavuşoğlu et al., 2021).

The assumptions on which the present research hypotheses were built are derived from a wide range of well-tested theoretical stances, namely the expectancy theory of motivation (Van Eerde & Thierry, 1996; Vroom, 1964), social influence theory (Davis et al., 1989; Kelman, 1958), behavioural learning theories (Bandura & Walters, 1977), and TPB (Ajzen, 1991), thus providing a more overarching understanding of how meta-UTAUT is connected with these theories. For example, the proposition expressed in H1 was derived from the expectancy theory of motivation, allowing readers to understand the construct of performance expectancy from an integrated perspective involving both meta-UTAUT and expectancy theory, thus providing an element missing from previous research. Similarly, this research integrates social influence theory, behavioural learning theories, and TPB (Ajzen, 1991) with the meta-UTAUT propositions.

Practical implications

This research has productive implications for various categories of stakeholders in the m-payment architecture, involving, for example, m-payment networks, marketing, and e-governance. In the case of m-payment networks, the study has provided a roadmap for designing a facilitating architecture, by finding facilitating conditions to be an important variable in forming attitude. M-payment networks can build more enabling structures to optimise their performance and facilitating conditions. Research has suggested integrating online banking and payment with virtual reality, IoT, and augmented reality to enhance user-perceived performance and conditions (Arjun et al., 2021; Mühlematter & Donno, 2016). The emergence of the metaverse can be seen to offer the potential for payment portals to provide better facilities and new directions. The extended range of functions such as the use of m-payments for purchases and omnichannel payments will help to increase the scope of m-payment networks (Lu et al., 2011).

As to marketers, they can strive to focus on developing positive attitudes and behavioural intention to extend the use of m-payments. The present results indicate that marketers can aim to provide improved functions, such as easy pay and convenient m-payment options (Pal et al., 2021) to develop positive attitudes and behavioural intention. These results emphasise the role of trust in creating positive behavioural intention towards m-payment apps. Marketers can use this as a major marketing communication strategy to develop similar communication metrics. Batra & Keller (2016) provide a robust framework to build trust, in which situation, consumers, and communication should be aligned in the same context. Importantly, the results provided a positive structure showing how Islamic religiosity can impact behavioural intention and the use of m-payments, allowing marketers in GCC countries to frame appropriate marketing strategies for their wider adoption and use. Given the growth in analytics, it is increasingly possible to align consumers' expectations with communications. Thus, a similar strategy can be used to build trust in marketing communications about m-payment promotions.

Limitations and future research directions

As the study was conducted in GCC countries, its findings can be tentatively generalised to other countries with similar cultures. However, a non-probabilistic sampling technique was used to collect data, whereas a probabilistic sampling technique with a defined sampling frame would allow future researchers to make stronger claims of representativeness. As it stands, the research offers multiple avenues for future studies. (1) The meta-UTAUT framework could be extended with other variables such as intelligence, animacy, and likeability (Balakrishnan & Dwivedi, 2021). Since most of the features of m-payment are integrated in either a simulated or an AI-based environment, such variables would make the model more holistic. (2) M-payment scenarios could be investigated using a stimulus-based method, incorporating the meta-UTAUT factors into the design, thus allowing academicians to decode the effect size of the relationships. (3) As the growth of the metaverse in retailing is gradually approaching the next phase of omnichannel retailing, a similar structure could be applied to m-payment to investigate how the metaverse banking

structure enables and improves attitude, behavioural intention, and the increased use of m-payments. (4) The study's model and results could be tested in other countries to extend the contribution to knowledge.

Conclusion

This research has examined the factors affecting attitude, behavioural intention, and the use of m-payments through the lens of the meta-UTAUT framework (Dwivedi et al., 2019) augmented with Islamic religiosity as a moderating variable in the relationship of behavioural intention to use. The results identify performance expectancy as the most important predictor of attitude and behavioural intention. The study also extends meta-UTAUT with trust, revealing it as an important variable for predicting behavioural intention and use of m-payments. The findings make contributions to the m-payment literature, the meta-UTAUT framework, and other theories invoked in this study, namely TPB, expectancy theory of motivation, Kelman's social influence theory, and other behavioural learning theories.

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