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**Author(s):** Alamoudi, Hawazen O.; Alharthi, Majed D.; Shaikh, Aijaz A.; Haddoud, Mohamed Yacine

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**Examining the antecedents and consequences of perceived value – A case study of  
mobile banking application usage in the Kingdom of Saudi Arabia**

**Hawazen O. Alamoudi**

hoalamoudi@kau.edu.sa

College of Business in Rabigh, Marketing Department

P.O. Box 344, Zip Code 21911, King Abdulaziz University, Saudi Arabia

**Majed D. Alharthi**

mdalharthi@kau.edu.sa

College of Business in Rabigh, Finance Department

P.O. Box 344, Zip Code 21911, King Abdulaziz University, Saudi Arabia

**Aijaz A. Shaikh<sup>1</sup>**

aijaz.a.shaikh@jyu.fi

Jyväskylä University School of Business and Economics

P.O. Box 35, FI-40014 University of Jyväskylä, Finland

**Mohamed Yacine Haddoud**

mohamed.haddoud@plymouth.ac.uk

Plymouth Business School. Plymouth University.

Drake Circus, Plymouth. PL4 8AA. UK

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<sup>1</sup> Corresponding author  
+358 46 9516017

# **Examining the antecedents and consequences of perceived value – A case study of mobile banking application usage in the Kingdom of Saudi Arabia**

## **Abstract**

Recent advancements in information, communications, and mobile technologies have revolutionized banking and payment services as well as consumer behavior. This study examines the continuous usage experience of mobile financial services, and especially mobile banking services, in the Kingdom of Saudi Arabia (KSA), the context of this study. Data were collected from 300 experienced mobile banking users across the KSA using a pre-tested survey instrument. The partial least squares structural equation modelling (PLS-SEM) was used to analyze the data. The results supported most of the hypotheses and revealed that e-service quality, e-information quality, and experience flow have a significant and positive influence on the perceived value of mobile banking services. Furthermore, the perceived value of mobile banking services had a positive and the most substantial impact on advocacy intention compared to sustained usage. This study has important implications for banking and other financial institutions in the KSA and beyond.

## **Keywords**

Mobile financial services; mobile banking; perceived value; sustained usage; advocacy intention

## **1 Introduction**

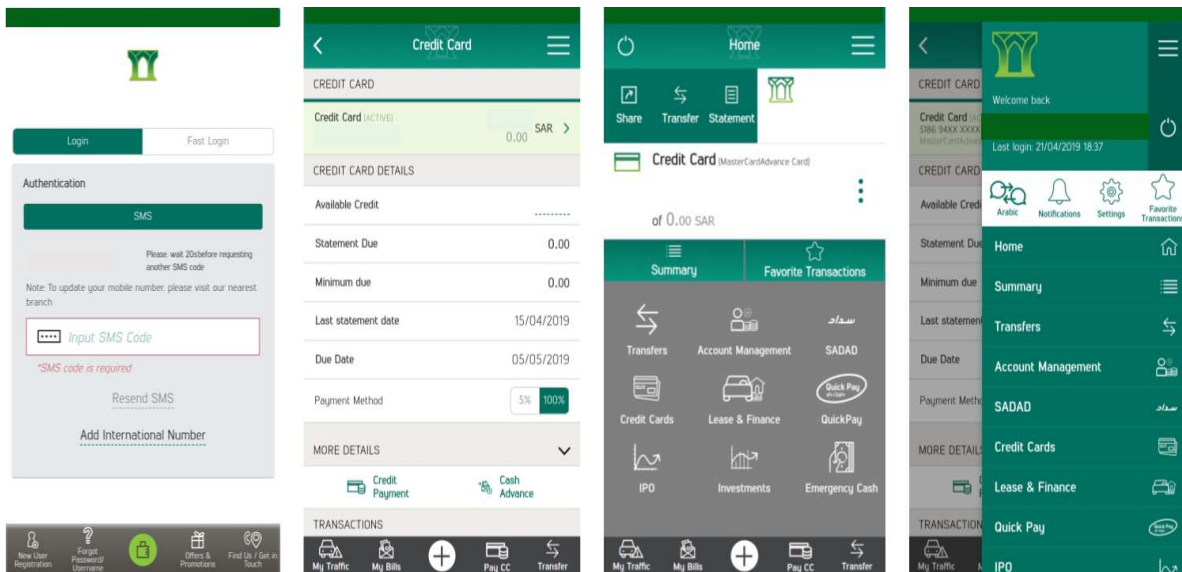
Organizations such as banks have been investing heavily in information and telecommunication technology and systems to support innovation and deepen relationships with consumers over time. Through these investments, various innovative banking and payment systems and mobile applications have been developed and deployed by banking and other financial entities, resulting in the mushrooming growth of retail digital payment channels globally. Notable retail delivery options include net banking, automated teller machines (ATMs), and point of sale banking. Mobile applications were first introduced in 2007 after the introduction of the first internet-supported smartphone by Apple Inc. These mobile applications expended cell phone usage and facilitate various value-added services and functions beyond voice calling and texting. Resultantly, mobile technology has brought

about a paradigm shift in the banking industry that has further infused the innovation process in banking and payment services. As a result of these mobile-based developments, a new form of banking, known as “portable banking,” conducted on smart devices, including smartphones, phablets, and tablets, has been introduced, mostly in developed markets.

The idea of using mobile (or SMS) technology for banking and payment purposes was initiated in the 1980s by various banking companies located in the global north (i.e., developed countries). Slowly, this idea flourished and became popular in the global south (i.e., emerging and developing countries). Financial houses, including banks, located in the global south, faced several challenges in offering banking services (i.e., low-value, high-volume transactions) to demographically diverse populations. Maintaining brick-and-mortar branch and ATM networks was neither advisable nor economically and financially feasible, and mobile devices provided a highly cost-effective alternative delivery or payment channel. Consequently, mobile financial services have received considerable attention from regulators, banks, financial technology firms, consumers, and merchants as an alternative to using cash, check instruments, or payment cards (Oliveira et al., 2016).

As a result of these developments, many countries, including the Kingdom of Saudi Arabia (KSA), have introduced various digital banking models that suit the local needs and requirements as well as support the economy. M-banking, defined as the execution of banking and payment services to conduct financial (funds transfer) and non-financial (balance enquiry) transactions on cell phones or tablets (Shaikh and Karjaluo, 2016; Verissimo, 2016; Glavee-Geo et al., 2017), is one of the major initiatives the banking industry in the KSA has taken recently, and its growth and wide adoption by KSA residents has been considered to have been fast. For example, according to the Statistical Bulletin published by the Saudi Arabian Monetary Authority (2018), more than 90% of total utility bills paid during 2017 were paid through electronic channels, including mobile, compared to only 43% in 2007. Figure 1 depicts the banking application and services provided on mobile devices in Saudi Arabia.

**Figure 1.** Mobile banking application and services in the KSA



This study is valuable on four accounts. First, it contributes to the ongoing discussion on the customer use of innovative banking and payment services, systems, and applications. Marketing and information systems research (e.g., Venkatesh et al., 2003) has established that user views on information technology, including m-banking applications, are critical to the eventual success of that technology. Second, despite the increased use of mobile devices for conducting retail or everyday financial transactions in many developed and fast-emerging markets, prior financial marketing and information systems literature has shown that beyond these markets, broad acceptance of m-banking technology remains low (Moser, 2015), and m-banking has not reached a level of maturity (Shaikh and Karjaluto, 2016). Third, unlike pre-adoption or acceptance of information system research that has plagued the literature, this study has explicitly investigated the still-emerging post-adoption domain in the context of consumer usage of m-banking applications. Despite the pervasiveness of consumer post-adoption as an integral component of successful implementation of an information system, extant research on the continuous usage of m-banking in the KSA is still limited to a few studies (Al-Otaibi et al., 2018; Baabdullah et al., 2019). Fourth, this investigation was carried out in the KSA, which has recently started promoting services automation and the digitalization of society. Resultantly, the findings of this study will be beneficial for the banking industry and the Fintech industry in understanding consumer sustained-usage behavior in the KSA and also other regions within Arab countries, where banking technologies are still emerging, and banks are trying to gain a strong foothold as well as retain and expand consumer bases.

We consider m-banking an innovative information system and examine the relationships between three exogenous latent variables (e-information quality, e-service quality, and flow experience) and perceived value. We also discuss how customer-perceived value leads to sustained usage of the m-banking application in the KSA and customer advocacy intention. The reason for using the customer-perceived value in this post-adoption study as a dependent and outcome variable is based on the straightforward notion that to receive any value or benefit from a product or service; the consumer should first interact with the service. The term “customer-perceived value” has been conceptualized in past research as both unidimensional and multidimensional. Here, we have considered and measured customer-perceived value as unidimensional.

Next, we discuss the theoretical background (Section 2), followed by the conceptual research model and hypotheses development (Section 3) and research methodology (Section 4). The results are presented in Section 5. This study concludes with a discussion, managerial implications and limitations, and a future research agenda (Section 6).

## **2 Theoretical background**

### *2.1 Mobile banking – An innovative banking channel*

Smartphone culture, which began in early 2007 when Apple introduced the first smartphone to the market, revolutionized the retail sector on two major grounds: order placement and payment for purchases. Handheld devices increased consumer access to a plethora of information, services, and customer reviews, which simplified as well as accelerated the decision-making process among various consumer segments, including digital-native, tech-savvy millennials. M-banking has simplified banking services thanks to its increased convenience and ease of use. Unlike SMS-based mobile banking services, m-banking applications can be downloaded onto any smart device and provide a host of value-added services, such as transferring funds, paying off the utility of bills, making donations, conducting mobile commerce, and receiving service notifications and important alerts. Due to these innovative developments, m-banking has become a new lifestyle and an important banking method for consumers to conduct their banking, payment, and financial management (Tsai et al., 2018). The usage of portable devices has popularized the m-banking and payment services and applications and has expanded access to formal banking transactions in several countries, including the KSA; transformed distribution models; improved consumers’ quality of life; and bolstered consumer satisfaction and loyalty.

The COVID-19 pandemic has reiterated the need and importance of remote and portable services, such as mobile banking. To address customer safety, many banks and other financial institutions, including FinTech, have started investing heavily in the development of new platforms and solutions to facilitate remote transactions for different consumer segments, such as banked, underbanked, and unbanked. Mobile banking (M-banking) and similar solutions, such as mobile money, played a substantial role during the crisis and helped prevent the spread of COVID-19. They also continue to provide necessary access to banking and payment solutions for consumers globally.

## *2.2 Perceived value*

Perceived value is commonly defined as a user's comprehensive evaluation of services based on the perception of the potential benefits and sacrifices induced by service adoption and usage (Karjaluoto et al., 2018; Kim et al., 2007). McKinsey and Co. (1997) offered a simple yet comprehensive explanation of the term: the essence of "value" lies in the tradeoff between the benefits a user receives from a product, service, or a system and the price user pays for it. Here, McKinsey and Co argue that the quality and level of benefits offered by a company including banking institute correlates with the higher likelihood that people will choose or continuously use that product, service, or application. Moreover, improving the level of price value by customers will lead to adopting m-banking service, as a result saving time and money (Baabdullah et al., 2019).

## *2.3 Personal innovativeness, e-service quality, e-information quality, and flow experience*

According to Leicht et al. (2018), personal innovativeness is the degree to which a customer or an individual is early in adopting new technology or idea compared to the average member of his or her social system. Thakur et al. (2016) considered personal innovativeness a personal trait, which is related to risk-taking behavior when a user tries new, innovative services. Prior research has considered personal innovativeness a central factor in the adoption and usage of information systems and has examined it in the context of innovative m-banking applications (Hepola et al., 2016).

According to Parasuraman et al. (1988, p. 15), service quality is "consumer's judgment about an entity's overall excellence or superiority". E-service quality, on the other hand, explains "the extent to which an e-commerce or m-commerce website and mobile technology facilitate effective shopping, purchasing, payment, and delivery" (Parasuraman et al., 2005, p. 217). Similarly, the research (e.g., Li et al., 1999; Värlander, 2007, Sharma et al.,

2013) has defined “information quality” as the degree to which any information is accurate, precise, relevant, easy to find, timely, and up to date. The same parameters apply to e-information quality, and therefore, no difference is observed between information quality and e-information quality. Nonetheless, Delone and McLean (2003) have suggested that online information quality is achieved if the digital content available on a website and social media channels are personalized according to the needs and requirements of the user and updated regularly.

The different preferences of the online or tech-savvy consumers (Bressolles et al., 2014) increase the need for e-service and e-information quality parameters. Therefore, e-service and e-information quality are now considered key determinants of successful digital or e-commerce business strategy (Santos, 2003) to attract and retain customers. The same applies to m-banking technology. M-banking offers remote access to account information; therefore, consumer reliance on e-services and e-information from the service provider has increased significantly.

The experience of flow can be achieved by defining explicit activities and goals. Csikszentmihalyi (1990) originally introduced the concept of flow, describing it as a holistic experience that a user/customer feels when acting with total involvement. Schaik and Ling (2007) examined flow experience in the use of online shopping and websites. They found that more fabulous flow experience affects online shopping positively. Resultantly, consumer shop longer, spend more money and perceive more value.

#### *2.4 Sustained usage and advocacy intention*

Sustained usage (also, continuous usage, usage, use, post-adoption) refers to the prolonged usage of any product, service, or information system after its first acceptance. The sustained use is defined as the “degree to which an adopter of an m-banking service uses the service over an extended period of time” (Kang et al., 2012, p. 136). Research (e.g., Shen and Ball, 2009) has considered sustained use a necessary prerequisite for any system or service benefits to materialize. These arguments lead us to conclude that the successful deployment of any online channel or information system, such as m-banking, largely depends on the post-adoption or continuous use of the channel for banking, payment, and even shopping purposes.

Advocacy intention is closely associated with “word-of-mouth,” “recommendation intention,” and “referrals.” Here advocacy intentions refer to actions or positive recommendations posted or shared enthusiastically by consumer or user on the product, technology, or service. Researchers (e.g., Wu and Chang, 2018) have widely

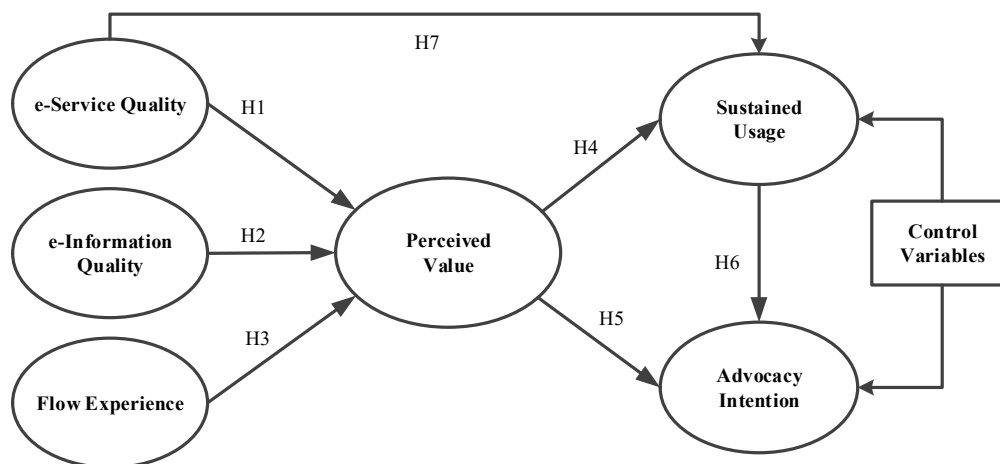


considered advocacy intention a key element in marketing and customer relationship to retain customers and attract prospects.

### 3 Conceptual model and hypotheses development

Our study has developed and validated a theoretical model based on the perceived value literature in the context of m-banking application usage in the KSA. This theoretical model has postulated various relationships between constructs. For example, the proposed conceptual model, as depicted in Figure 2, suggests that three exogenous variables (e-service quality, e-information quality, and flow experience) are positively related to the endogenous variable perceived value. Also, perceived value is positively associated with the outcome variables, sustained usage and advocacy intentions.

**Figure 2.** Conceptual Model



#### 3.1 E-service quality's effects on perceived value

In marketing research, the variables perceived value and service quality have been recognized as sources of competitive advantage, and past studies have established their relationship. For example, Kuo et al. (2009) found that service quality impacts perceived value and customer satisfaction positively in mobile value-added services. Similarly, focusing on the telecom industry, a few investigations have been conducted on mobile services in Canada and China. Here, prior research (Wang et al., 2004; Turel and Serenko, 2006) found a direct relationship between service quality and perceived value. In gaming tourism, Wu (2014) and Chen and Dubinsky (2003) found a significant correlation between e-service quality and perceived value. Thus:

**H1:** E-service quality positively influences customer perceived value.

### *3.2 E-information quality's effects on perceived value:*

Consumers generally consider having relevant and reliable information delivered through information systems and applications, such as m-banking, paramount for fulfilling their everyday needs and making informed decisions. In determining website loyalty intentions, Pearson et al. (2012) found a correlation between e-information quality and perceived value. Examining a mobile hotel reservations system, Wang and Wang (2010) found that the perceptions of information and system quality are two essential components that significantly influence the perceived value of such systems. In other words, it is highly likely that low or sub-standard information quality parameters will distort consumer value perception. In line with these findings, we hypothesized that:

**H2:** E-information quality positively influences customer perceived value.

### *3.3 Flow experience and perceived value*

Flow experience is widely considered as a useful variable for describing human-computer interactions, and it has a strong relationship with consumers' attitudes and usage intentions (Chang and Zhu, 2012; Piyathasanan et al., 2015). Earlier, flow experience has been investigated in the context of online banking (Lee et al., 2007), online games (Lee and Tsai, 2010), virtual worlds (Piyathasanan et al., 2015), and mobile instant messaging (Zhou and Lu, 2011).

According to Zhou (2012), m-banking service and application users feel disappointed as soon as their application usage skills are lower than threshold values. In other words, the m-banking application users experience flow when their skills match or exceed the threshold values. Hung et al. (2010) argued that flow experience affects users' perceived value positively, especially their hedonic value. Thus, we proposed:

**H3:** Flow experience has a positive influence on perceived value.

### *3.4 Perceived value and sustained usage*

Prior studies (Cronin et al., 2000; Zeithaml and Bitner, 2000) have shown that perceived value is closely associated with sustained use (Kang et al., 2012), which implies that a higher perceived value in the product or service, will increase the consumer continuous or sustained usage. Similarly, in the m-banking services continuous usage context, Shaikh and Karjaluoto (2015) found a positive correlation between perceived value and continuous or sustained usage. Thus:

**H4:** Perceived value has a positive influence on sustained usage.

### *3.5 Perceived value and advocacy intention*

Customer's value perceptions occupy an essential position in the marketing field, and these value propositions predict consumers' buying and usage behavior. Moreover, customer advocates are considered vital sources of future revenue streams (Mosavi and Ghaedi, 2012). Customer advocacy includes sharing customer-specific information as well as word-of-mouth referrals (Lacey et al., 2007). Thusi and Maduku (2020) found that price value is statistically insignificant predictor with behavioral intention to adopt mobile banking apps.

Despite its significance, the research on e-word of mouth is still in its initial phases (Shaikh et al., 2018). Nonetheless, some studies have investigated the relationship between perceived value and advocacy intention, including word of mouth. For example, Shaikh et al. (2018) found a direct correlation between perceived value and WOM and eWOM, which implies that increasing the value derived from services such as m-banking transforms customers into advocates and spreads positive eWOM. It is, therefore, hypothesized that:

**H5:** Perceived value has a positive influence on advocacy intention.

### *3.6 Sustained usage's effects on advocacy intention*

Sustained usage commonly refers to the continuous usage of the application, technology, product, or service after its first adoption. Advocacy intention refers to recommending the product, service, or company to others. Advocacy intention has occupied a significant position and is widely considered an important element in relationship marketing promoting a product or service; it is also considered a representation of a customer's loyalty

(Wu and Chang, 2018). According to Choudhury (2013), the return on customer relationship is primarily driven by customer advocacy, customer retention, and growth.

A few studies have examined the relationship between sustained or continuous usage and advocacy intention or word of mouth. For example, Shaikh and Karjaluoto (2016) examined m-banking continuous usage and found a strong positive relationship between the continuous usage of m-banking services and word of mouth. Therefore, the following hypothesis is proposed:

**H6:** Sustained usage has a positive influence on advocacy intention.

### *3.7 E-information quality and sustained usage*

According to Wixom and Todd (2005), the information quality (including e-information quality) shapes consumer attitudes about information and application, product, service, or system satisfaction, which in turn influences behavior and sustained usage. Prior literature (Alla and Faryadi, 2013) has assumed that the standards concerning information quality in the electronic commerce and information systems field relate to the accuracy or the correctness of the information, the timely renewal of the information, the integrity of the information, and the availability of the information when it is needed.

Past research has examined the association between information quality and continuous or sustained usage as well as intention to use digital services, products, or systems. For example, Urbach et al. (2010) found a direct association between information quality and use in the employee portal context. Sharma and Sharma (2019) found a positive and statistically significant relationship between information quality and intention to use m-banking services. It is, thus, proposed:

**H7:** E-information quality has a positive influence on sustained use.

## **4 Research methodology**

### *4.1 Survey development*

Since this is the first major study conducted in the KSA examining the antecedents and outcomes of perceived value in using m-banking applications, the survey was carefully designed and pre-tested with the help of three banking executives who have worked in the KSA for over ten years. Necessary changes were incorporated based on the

feedback received from the bank executives. For the second round of pre-testing, a few master's degree students from a local university were recruited to fill out the questionnaire and provide feedback. The survey was further refined based on the comments received from the students. Still, in order to preserve the content validity (Glavee-Geo et al., 2017), the items in the survey were adopted from the literature. For example, items measuring advocacy intention were adopted from Zeithaml et al. (1996) and Yang et al. (2015), flow experience (Lee et al., 2005), e-information quality and e-service quality (Kim et al., 2010), perceived value (Yang et al., 2015), and sustained usage (Kang et al., 2012).

Our study has adopted a five-point Likert scale following previous studies (Luo et al., 2010; Zhou, 2012; Yang et al., 2015) to estimate the measures of each item from 1 (strongly disagree) to 5 (strongly agree). Additionally, the study controlled for several variables, namely age, gender, income, education, duration of cell phone use, and frequency of m-banking application use. The items used in this study, along with other essential data, are listed in Table 1.

#### 4.2 Sample and data collection

The primary data for this study were collected in July 2018. Email and social media channels (LinkedIn) were used to reach the potential study participants and distribute the pre-tested questionnaire. A purposeful sampling method was used from a sample recruited for the study. The purpose of the study was clearly defined on the first page of the survey instrument, and the researchers ensured that the participants had been using m-banking applications (and not SMS banking) on their cell phones or tablets for a minimum of the past six months. In total, 400 respondents completed the questionnaire from Saudi mobile banking users. After carefully checking the submitted questionnaires and the respondents' profiles, the researchers identified 300 valid responses, that represents an effective response rate of 75 per cent, for consideration in this study in order to ensure that non-response bias is unlikely to have occurred. While a study in mobile banking (Baptista and Oliveira, 2015) who had lower responses (compared to our study) includes 252 valid respondents from Mozambican mobile banking users.

**Table 1.** Demographic profile of the respondents ( $n = 300$ )

| <b>Demographic characteristics</b> | <b>Frequency</b> | <b>Percent</b> |
|------------------------------------|------------------|----------------|
| <i>Gender</i>                      |                  |                |
| Female                             | 155              | 51.7           |
| Male                               | 145              | 48.3           |

|  |     |       |
|--|-----|-------|
| Total  | 300 | 100.0 |
| <i>Age (years)</i>   |     |       |
| 15-25  | 43  | 14.3  |
| 26-35  | 105 | 35    |
| 36-45  | 75  | 25    |
| 46-55  | 42  | 14    |
| 56-65  | 25  | 8.3   |
| 66-75  | 9   | 3     |
| > 75 years   | 1   | 0.3   |
| Total  | 300 | 100.0 |
| <i>Highest level of education</i>                            |     |       |
| Primary School   | 57  | 19    |
| Intermediate High School                                     | 43  | 14.3  |
| Secondary School   | 35  | 11.7  |
| Bachelor   | 83  | 27.7  |
| Master   | 53  | 17.7  |
| PhD  | 29  | 9.7   |
| Total  | 300 | 100.0 |
| <i>Income in Saudi Riyal</i>                                 |     |       |
| < 1000   | 27  | 9.0   |
| 1,000-5,000  | 43  | 14.3  |
| 5,000-1,0000   | 58  | 19.3  |
| 10,000-15,000  | 72  | 24.0  |
| 15,000-20,000  | 40  | 13.3  |
| 20,000-25,000  | 36  | 12.0  |
| 25,000-30,000  | 0   | 0     |
| > 30,000   | 24  | 8.0   |
| Total  | 300 | 100.0 |
| <i>Profession</i>  |     |       |
| Student  | 58  | 19.3  |
| Unemployed   | 143 | 47.7  |
| Employee/professional  | 30  | 10.0  |
| Entrepreneur   | 19  | 6.3   |
| Retired  | 50  | 16.7  |
| Total  | 300 | 100.0 |
| <i>Frequency of mobile banking application use (per day)</i> |     |       |
| < 1 month  | 70  | 23.3  |
| 1-4 months   | 115 | 38.3  |
| 5-8 months   | 46  | 15.3  |
| 9-12 months  | 26  | 8.7   |
| 13-16 months   | 18  | 6.0   |
| 17-20 months   | 13  | 4.3   |
| > 20 month   | 12  | 4.0   |
| Total  | 300 | 100.0 |

## 5 Results

SmartPLS 3.0 was used to test the hypothesis in this study because it focuses on explaining variance. Moreover, the PLS-SEM method was selected to predict the perceived value and sustained usage of m-banking applications, which were the core foci of this study. This is a recognised method of determining reasonably complex cause-effect relationship

models using an iterative algorithm; therefore, it was considered to be an appropriate approach to data analysis (Evermann & Tate, 2016; Hair et al., 2017; Thusi and Maduku, 2020). This technique focuses on explaining the variance occurring in the dependent variable by capturing the total variance in the observed indicators rather than the correlations between the indicators. Here, a maximised explanation is achieved by producing latent variable scores that jointly minimize residuals (Richter et al., 2016; Sarstedt et al., 2016). PLS-SEM does not assume normality and involves the assessment of two models, namely the measurement model and the structural model. The former assesses the relationship between the constructs and their indicators, whereas the latter captures the relationships between the study constructs (Jarvis et al., 2003).

Participants from different background and educational levels participated in our research. The age range of the majority of the research participants falls between 26 to 35 years, as it seems the younger the generation, the more they adopt technology for using mobile shopping activity. This phenomenon has been considered by (San-Martín, Prodanova, & Jiménez, 2015). In this study, the highest number of respondents' age range between 26-35 (105 respondents represent 35% of the sample). This range of age is highly using technology and applications compared to the rest ranges of ages in the sample.

Moreover, of the 300 participants, 52% were male, and 48% were female. Also, approximately 55% had at least a bachelor's degree. Regarding salary, about 65% earned less than 15,000 Saudi riyals every month, with the rest mainly earning up to 30,000. Around 48% of the sample were unemployed, with the remaining being a mix of students, employees, entrepreneurs, and retirees. Finally, over 75% of the respondents used mobile banking application at least once a day.

### *5.1 Measurement model*

It is essential to assess measurement models using reliability and validity to determine if they adequately represent the topics of interest in a study (Hair et al., 2011). Reliability considers the extent to which a measure yields consistent outcomes under similar conditions; validity refers the degree to which a group of indicators jointly capture what they are expected to assess (Hair et al., 2016). In this study, the reliability for each indicator was assessed through its load factor (see Confirmatory Factor Analysis PLS Approach in Appendix A). The composite reliability coefficient and Cronbach's alpha were then examined to determine the constructs' reliability. The average variance extracted (AVE) was also assessed to examine the constructs' convergent validity (see Table 2). The HTMT method

was used to assess discriminant validity, and the results can be found in Table 3 (Henseler et al., 2015; Voorhees et al., 2016). Previous studies have suggested a cut-off value of HTMT < 0.9 to confirm discriminant validity (Henseler et al., 2015). As per Table 2, scores of the composite reliability and Cronbach's alpha were all greater than the 0.7 threshold (Mackenzie et al., 2011), suggesting good reliability of the measurement model.

Similarly, all AVEs scores exceeded the cut-off value of 0.5, reflecting good convergent validity of all constructs (Henseler et al., 2009; MacKenzie et al., 2011; Schmiedel et al., 2014). Moreover, as per Table 3, discriminant validity was also established, as the majority of the values are below the critical value of 0.90. Finally, no multicollinearity issues were noted, since the constructs' variance inflation factors (VIFs) range between 1.1 and 2.6. In summary, the measurement model meets all reliability, validity, and collinearity criteria.

**Table 2.** Composite reliability, Cronbach's alpha and AVE coefficients

|                              | <b>Cronbach's Alpha</b> | <b>Composite Reliability</b> | <b>Average Variance Extracted (AVE)</b> |
|------------------------------|-------------------------|------------------------------|---|
| <b>Advocacy Intention</b>    | 0.886                   | 0.913                        | 0.636                                   |
| <b>Experience Flow</b>       | 0.781                   | 0.873                        | 0.696                                   |
| <b>e-Information Quality</b> | 0.825                   | 0.884                        | 0.656                                   |
| <b>Perceived Value</b>       | 0.859                   | 0.905                        | 0.703                                   |
| <b>Sustained Usage</b>       | 0.801                   | 0.870                        | 0.626                                   |
| <b>e-Service Quality</b>     | 0.854                   | 0.901                        | 0.695                                   |

## 5.2 Structural model

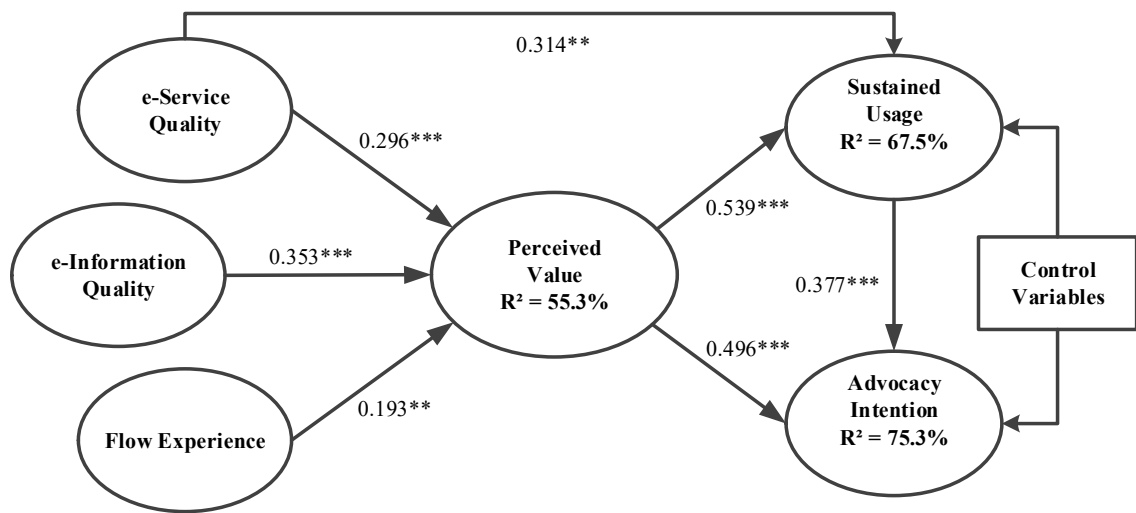
Figure 3 depicts the path coefficients ( $\beta$ ) and the p values of the relationships hypothesized in this study. These values determine the significance, direction, and strength of the relationships involved in the structural model, as well as explain variance in the dependent variable.

All hypothesized relationships in this study were supported. Flow experience, e-information quality, and e-service quality were all significant and positive predictors of perceived value; information quality had the strongest influence ( $\beta=0.353^{***}$ ), followed by e-service quality ( $\beta =0.296^{***}$ ) and flow experience ( $\beta =0.193^{**}$ ). Similarly, information quality impacted sustained usage positively and significantly ( $\beta =0.314^{***}$ ). Furthermore, the perceived value had a positive and significant impact on both advocacy intention and sustained usage; however, it had a stronger effect on sustained usage ( $\beta =0.539^{***}$ ). Finally, sustained usage had a positive and significant influence on advocacy intention ( $\beta =0.377^{***}$ ). About the explained variances,  $R^2$  values indicated that 55.3%, 75.3%, and 67.5% of the



perceived value, advocacy intention, and sustained usage, respectively, were caused by the proposed predictors. Additionally, to measure the conceptual model’s predictive validity, a blindfold procedure was performed (Sarstedt et al., 2014). This produced cross-validated redundancy (Stone–Geisser’s Q2) values greater than zero for the endogenous construct (Q2 perceived value = 0.381; Q2 advocacy intention = 0.468; Q2 sustained usage = 0.409), which supports the model’s predictive relevance.

**Figure 3. Structural Model**



\*\*\* Significant at 0.1%; Significant at 1%; Significant at 5%

## 6 Discussion and implications

Mobile banking post-adoption in developing countries, especially in Saudi Arabia, has recently been an interesting topic to a number of researchers due to the Vision 2030 plan the KSA announced. The underlying purpose of this vision is to achieve growth, deploy technology-based solutions and modernize the Kingdom. This study has examined several hypotheses based on related literature regarding the m-banking application that would make some important contributions to the financial sector in the KSA and beyond.

### 6.1 Theoretical implications

The study considered both antecedents and outcomes of perceived value in m-banking application usage in Saudi Arabia, a country known to be less accepting of and willing to adopt innovations. Nonetheless, this research demonstrated significant relationships that strongly portray consumer concern for perceived value as well as sustained usage behavior towards new technologies.

E-information quality and e-service quality are significant drivers of perceived value, as the previous study has also demonstrated (Kuo et al., 2009; Pearson et al., 2012). Our results, however, contribute to the literature on flow experience and confirm a direct and positive relationship between flow experience and perceived value. This finding implies that the users in Saudi Arabia have developed a certain level of skills and control, and they found more involved in using m-banking applications.

Furtherer, we developed a link between perceived value and two marketing constructs: sustained usage and advocacy intention. Here, perceived value exerts a strong influence on both of these outcomes. This being said, the relationship between perceived value and sustained usage is slightly stronger than that of perceived value and advocacy intention. Our results confirmed earlier findings (e.g., Kang et al., 2012; Shaikh et al., 2018) that increased perceived value of service and application usage directly leads to increased usage and advocacy intention, including word of mouth. In line with the literature (Shaikh and Karjaluoto, 2016), our study confirmed the direct and positive relationship between sustained usage and advocacy intention, showing that the sustained usage of m-banking applications leads to increased advocacy intention. Finally, a direct relationship between e-information quality and sustained usage was also recorded, therefore confirming earlier studies' finding (Urbach et al., 2010).

## *6.2 Managerial implications*

With the perceived value of m-banking increasing, the consumers in the KSA are more likely to form a positive intention about m-banking application usage. E-information quality (i.e. the quality of the information provided by the m-banking application) occupies a prominent position, and according to our study findings, it maintains a strong relationship with the perceived value as well as consumer sustained or increased usage of the m-banking application. Also, e-service quality and flow experience have direct and positive effects on perceived value. Therefore, when designing and managing such applications, banks and other financial institutions in the KSA and beyond should consider the significance of e-information quality and value perceived by providing prompt and efficient service, reliable information, and smooth experience to promote the advantages of m-banking over more traditional banking methods. Here, various aspects, such as low latency in m-banking application, high flexibility, instant access, convenience, and 24-hour support should all be emphasized and fully developed to encourage sustained usage.

**Table 3.** Discriminant validity (HTMT.90 criterion)

|                       | 1     | 2     | 3     | 4     | 5     | 6     | 7     | 8     | 9     | 10    | 11    | 12    |
|-----------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 1. Advocacy Intention |       |       |       |       |       |       |       |       |       |       |       |       |
| 2. Age                | 0.089 |       |       |       |       |       |       |       |       |       |       |       |
| 3. DCP                | 0.218 | 0.430 |       |       |       |       |       |       |       |       |       |       |
| 4. DMM                | 0.212 | 0.361 | 0.619 |       |       |       |       |       |       |       |       |       |
| 5. Education          | 0.293 | 0.317 | 0.584 | 0.579 |       |       |       |       |       |       |       |       |
| 6. FMM                | 0.381 | 0.215 | 0.019 | 0.032 | 0.012 |       |       |       |       |       |       |       |
| 7. Flow               | 0.698 | 0.085 | 0.086 | 0.115 | 0.125 | 0.245 |       |       |       |       |       |       |
| 8. Gender             | 0.040 | 0.099 | 0.201 | 0.135 | 0.052 | 0.024 | 0.194 |       |       |       |       |       |
| 9. Income             | 0.068 | 0.595 | 0.500 | 0.406 | 0.523 | 0.186 | 0.066 | 0.058 |       |       |       |       |
| 10. e-InfQual         | 0.894 | 0.062 | 0.180 | 0.129 | 0.297 | 0.307 | 0.716 | 0.123 | 0.112 |       |       |       |
| 11. Perceived Value   | 0.943 | 0.117 | 0.167 | 0.141 | 0.280 | 0.373 | 0.724 | 0.077 | 0.051 | 0.799 |       |       |
| 12. Sustained Usage   | 0.941 | 0.131 | 0.178 | 0.147 | 0.207 | 0.393 | 0.703 | 0.127 | 0.053 | 0.858 | 0.933 |       |
| 13. e-SQ              | 0.824 | 0.045 | 0.200 | 0.072 | 0.262 | 0.296 | 0.821 | 0.124 | 0.139 | 0.839 | 0.784 | 0.826 |

More importantly, m-banking application designers should ensure that consumers are able to access relevant, reliable, complete, and accurate information through such applications. This is crucial since our findings show that information quality has the strongest influence on both perceived value and sustained usage (indirect effect).

Mobile banking applications should also allow consumers to make a direct contact with bank employees when needed, either through integrated online chat systems or voice calls. This will increase not only the quality of the information received but also its relevance and accessibility. We also recommend bank managers creating awareness about the usage of m-banking applications as well as train their account holders with the potential to use information technologies and encourage them to invite their relatives and friends towards the usage of innovative products and services such as m-banking. Finally, the results of this study show that perceived value has a positive effect on sustained usage and advocacy intention. These findings illustrate that customers' perceived gain has a high impact on post-adoption of m-banking in Saudi Arabia.

### *6.3 Limitations and future research directions*

First, we have used the cross-sectional data to study sustained usage of the m-banking application. While previous studies used this approach widely, we call for further research using a conditional approach to better capture the "sustained" dimension of m-banking usage. Second, our study only uses data from a single country (Saudi Arabia). While we believe that our findings could be generalized to other Middle Eastern countries, future studies could replicate our model in different countries in the region to validate the model. Third, one valuable contribution could be to examine the gender (male and female) differences in the Gulf region in the adoption or use of innovative banking services, including m-banking. Fourth, the challenges that come with the COVID-19 pandemic are difficult to ignore. Future research should consider the effect of coronavirus on consumer behavior when choosing to adopt and to use innovative and remote payment services, such as mobile banking. From a Business-to-Business (B2B) perspective, managers and executives serving the banking and payment industry should consider how COVID-19 has affected them and develop new opportunities and revenue streams. This could provide valuable insight into this industry.

**Appendix A. Factor Analysis PLS approach (measurements scales)**

| Constructs and Items  | Means | SD    | Loadings |
|---|-------|-------|----------|
| <i>Advocacy Intention (Zeithaml et al., 1996; Yang et al., 2015)</i>                                      |       |       |          |
| I intend to use the m-banking application in the future (AI)  | 3.897 | 1.077 | 0.82     |
| I expect to adopt m-banking application very soon (AI)  | 3.883 | 1.082 | 0.781    |
| I am willing to use the m-banking application in the near future (AI)                                     | 3.957 | 1.081 | 0.823    |
| I say positive things about the m-banking application to other people (ADV1)                              | 3.847 | 1.103 | 0.773    |
| I recommend the m-banking application to someone who seeks my advice (ADV2)                               | 3.897 | 1.064 | 0.803    |
| I encourage my friends and relatives to use m-banking application (ADV3)                                  | 3.903 | 1.114 | 0.784    |
| <i>Flow Experience (Lee et al., 2005)</i>   |       |       |          |
| When using the m-banking application, my attention was focused on the activity (FLOW1)                    | 4.203 | 0.953 | 0.842    |
| When using the m-banking application, I felt in control (FLOW2)   | 3.81  | 0.973 | 0.789    |
| When using the m-banking application, I found a lot of pleasure (FLOW3)                                   | 3.983 | 1.034 | 0.869    |
| <i>e-Information Quality (Kim et al., 2010)</i>   |       |       |          |
| The m-banking application provides me with information relevant to my needs (INF1)                        | 3.807 | 1.053 | 0.792    |
| The m-banking application provides me with sufficient information (INF2)                                  | 3.843 | 1.055 | 0.799    |
| The m-banking application provides me with accurate information (INF3)                                    | 3.833 | 1.064 | 0.845    |
| The m-banking application provides me with up-to-date information (INF4)                                  | 3.837 | 1.106 | 0.803    |
| <i>Perceived Value (Yang et al., 2015)</i>  |       |       |          |
| Considering the cost, risk, and benefits, I think the m-banking application is valuable (PV1)             | 3.98  | 1.029 | 0.793    |
| Despite the time, effort, and capital involved in the m-banking application, it is worthwhile to me (PV2) | 3.917 | 0.961 | 0.843    |
| There are greater benefits than disadvantages of using the m-banking application (PV3)                    | 3.953 | 1.041 | 0.849    |
| Overall, m-banking application delivers value (PV4)   | 3.88  | 1.039 | 0.867    |
| <i>e-Service Quality (Kim et al., 2010)</i>   |       |       |          |
| The m-banking application provides on-time services (SER1)  | 3.907 | 0.986 | 0.839    |
| The m-banking application provides prompt responses (SER2)  | 3.873 | 1.009 | 0.845    |
| The m-banking application provides professional services (SER3)   | 3.893 | 1.024 | 0.837    |
| The m-banking application provides personalized services (SER4)   | 3.883 | 1.091 | 0.813    |
| <i>Sustained Usage (Kang et al., 2012)</i>  |       |       |          |
| I have been using m-banking application increasingly since I first used it (SU1)                          | 3.907 | 1.057 | 0.805    |

|  |       |       |       |
|--|-------|-------|-------|
| I use the m-banking application more than any other banking services (face-to-face banking, ATM, internet banking or telebanking) these days (SU2) | 3.843 | 1.058 | 0.764 |
| I have been using the m-banking application continuously ever since I first used it (SU3)  | 3.92  | 0.997 | 0.796 |
| The m-banking application has become a critical part of my daily banking activities (SU4)  | 3.887 | 1.052 | 0.799 |

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