Assessing the Success of Mobile Banking in Saudi Arabia:

Re-Specification and Validation of the DeLone and McLean Model

Olfa Bouhlel, College of Business (ISGS), University of Sousse, Tunisia

Karim Garrouch, College of Administrative and Financial Sciences, Saudi Electronic University, Saudi Arabia

Mohamed Nabil Mzoughi, College of Business Administration, Dar Al-Uloom University, Saudi Arabia*

ABSTRACT

This study aims at re-specifying and extending the DeLone and McLean information systems success model and verifying the extended model in the context of mobile banking applications. The model integrates a relationship-driving indicator, namely perceived value and a condition that permanently predicts the use of technology: usefulness. This framework derives its originality from the integration of these variables and verification in timely and innovative service, namely mobile banking applications. The results allowed to accept the hypotheses assuming the impact of the perception of usefulness and value, as well as system and service quality on satisfaction. The latter has a significant influence on continuance intention. However, the impact of information quality was insignificant, and hypotheses assuming the dependence of continuance intention on usefulness and service quality are rejected. These results are discussed, and the conclusion deduces managerial recommendations and directions for future research.

KEYWORDS

DeLone and McLean Information Systems Success Model, Mobile Banking Applications, Perceived Value, PLS-SEM, Service Value, Usefulness

INTRODUCTION

Information technology and automation enable cost reduction, and efficiency enhancement, and help to scale up the financial sector by ensuring security and consistency (Chopra et al., 2015). Accordingly, the wide adoption of mobile technologies and advancement in their capacity for use in transactions has enabled consumers to migrate from Internet-based (Dwivedi et al., 2021) to mobile-based digital services (Al-Amin et al., 2022; Bui et al., 2022; Singh & Srivastava, 2020; Chopra et al., 2013; Dwivedi et al., 2022; Eneizan et al., 2023; Karjaluoto et al., 2021). As a result, this has led the banking sector to be aligned with information technology to provide innovative financial services to customers using technology (Dwivedi et al., 2022) and particularly to shift in favor of mobile banking (MB) markets (Gong et al., 2020; Jebarajakirthy & Shankar, 2021; Singh & Srivastava, 2020). The banks adopt more advanced technologies and innovations to meet consumers' and stakeholders' needs (Dwivedi et al., 2021) and encourage them to use MB services (Aslam et al., 2022). This can

*Corresponding Author

be explained by a strive to "keep up with the current trends and satisfy users' need for efficiency", to "enhance users' experience through mobile technology" and to make the "banking experience easier and more beneficial" (Elhajjar & Ouaida, 2020, p.352).

The long-term success of this sector does not rely only on user acceptance, recognizing that it may lead to target customers using MB just once or a few times. The long-term success of the MB system requires sustained use after initial adoption (Franque et al., 2020). For instance, Gong et al. (2020) reported that despite the successful implementation of mobile payment services, providers were struggling to drive consumers to trust these services.

This study highlights the potential factors predicting customers' successful and continuous adoption of MB services. DeLone and McLean's (2003) Information Systems Success Model (ISSM) has received much attention from information systems (IS) researchers. Initially, it was used to evaluate e-commerce (Rokhman et al., 2022). It provides the foundation for research in the field of MB. Although many studies have applied it to several IS environments, such as online shopping (e.g., Chen & Cheng, 2009), e-learning (e.g., Rokhman et al., 2022), and online communities (e.g., Lin & Lee, 2006), a few studies have examined the DeLone and Mclean model in the context of the latest mobile banking applications (MB apps). According to Noh and Lee (2015, p. 274), "the DeLone and McLean IS success model has not been validated in the smartphone-based mobile environment." Consequently, it is important to test and validate the model in this specific context. Our research applies the updated ISSM to MB apps to confirm its validity.

The study aims to:

− Verify the relationships between the essential dimensions of MB apps' success.
− Integrate two important variables as net benefits. The first is a relationship-driving indicator which is the perceived value. The second is a permanent condition of using technology, namely usefulness.
− Validate the model using the partial least square-structural equation modeling (PLS-SEM) method.

The paper is structured as follows. In section 1, we examine the theoretical background, focusing on MB technology and IS success model constructs. Section 2 presents the conceptual research model and the hypotheses. Section 3 deals with research methodology. In section 4, we present data analysis and results. Section 5 discusses the findings. Then we present the limitations and suggest potential new avenues for future research.

1. BACKGROUND AND LITERATURE REVIEW

1.1. Mobile Banking Applications

MB is the latest, most vivid, most advantageous, most promising, and most innovative feature in banking services (Alzaidi, 2022; Bui et al., 2022; Laukkanen and Kiviniemi, 2010; Laukkanen & Pasanen, 2008; Tran and Corner, 2016; Zhou et al. 2021). It is "one of the most important strategic changes to occur in retail banking in more than a decade" (Alsmadi et al., 2022). According to Eneizan et al. (2023), the use of mobile banking has been increasing in various industries. It is a subcategory of branchless banking, a kind of an extension (Laukkanen & Pasanen, 2008), or an evolutionary form (Bui et al., 2022) of e-banking. This "on-the-go" MB service (Tran and Corner, 2016) allows users to remotely make non-financial (Karjaluoto et al., 2021) and financial transactions (Riquelme & Rios, 2010).

MB is "a channel whereby the customer interacts with a bank via a mobile device" (Barnes & Corbitt, 2003, p.3). It links business applications and information technology (Munir et al., 2013). Specifically, it mixes financial services and mobile technology (Chung & Kwon, 2009). It uses an application created and conceived by the service provider (Alsmadi et al., 2022). Clients can access banks' services remotely using smartphones' wireless connections (Alsmadi et al., 2022). MB services include: checking the account balance, viewing the last few transactions made, checking the status of

a checkbook number, transaction history inquiries, funds transfer, requesting a transaction statement, demanding a checkbook, canceling a service request, checking the status of service requests, changing a password, paying bills, monitoring the use of credit cards, finding account information, obtaining product information, examining a branch listing, securities trading, access to international exchange markets, and insurance ordering (Alsmadi et al., 2022; Barnes and Corbitt, 2003; Gupta & Dhing, 2022; Zhou et al., 2010). These new technological innovations in the financial and banking industries have changed the way business is done (Alzaidi, 2022; Dwivedi et al., 2021), leading to changes in consumers' expectations (Dwivedi et al., 202) and changes in consumers' behavior (Alzaidi, 2022; Eneizan et al., 2023; Singh & Srivastava, 2020). Mobile banking is increasingly being part of the daily life of more and more people (Zhou et al., 2021). According to Alzaidi (2022), MB is "valuable" for banks and clients. Compared with traditional and Internet banking, MB has a huge potential and is more advantageous for mobile users (Zhou et al., 2010). It reduces the customer's need to visit a branch, helps to avoid consumer queue backlogs, and offers convenient access to bank accounts and other financial transactions. Instantaneity, mobility, timeless, accessibility, ubiquity, flexibility, convenience, accessibility, functionality, cost-efficiency, comfort, and user experience are the main advantages of MB (Alsmadi et al., 2022; Aslam et al., 2022; Alzaidi, 2022; Dwivedi et al., 2022; Gupta & Dhing, 2022; Karjaluoto et al., 2021; Noh & Lee, 2015; Zhou et al., 2010).

1.2. DeLone and McLean's Information Systems Success Model

Theory in the IS success is attributable to the research of DeLone and McLean (Brown & Jayakody, 2008). In 1992, they initially proposed the ISSM comprising six elements: system and information dimensions of quality, individual impact, satisfaction, use, and organizational impact. Their model suggests that system and information quality affect customers' usage and their satisfaction regarding the IS, further determining individual impact as well as organizational impact (see Figure 1). While system quality relates to "technical success," its information side assesses "semantic success" (Lin, 2008, p. 523). Besides, "satisfaction, use, individual impact, and organizational impact are measures of effectiveness" (Lin, 2008, p. 523). DeLone and McLean's model provides a scheme for categorizing IS success measures (Noh & Lee, 2015; Seddon, 1997). The framework also helps in modeling the temporal and causal interrelationships among success categories (Noh & Lee, 2015; Seddon, 1997).

Figure 1. Delone and McLean's information system success model (1992)
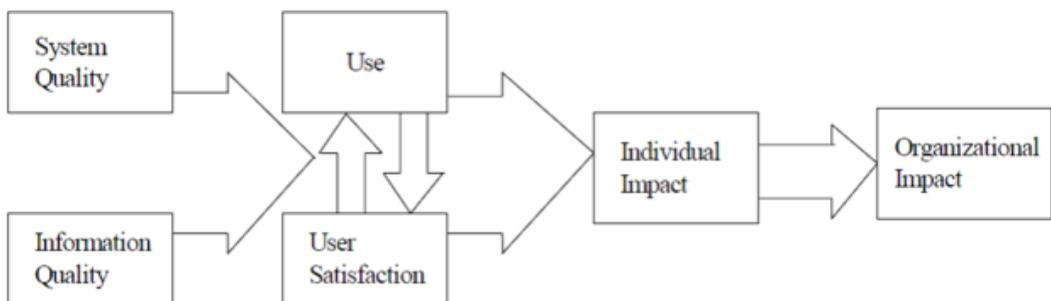
This model was criticized for the non-inclusion of new economic activities (Chen & Cheng, 2009). Another criticism is that the "use" construct can be measured if system use is mandatory, not voluntary (Seddon, 1997). Indeed, use is a behavioral attribute and not a measure of success (Seddon, 1997). The use construct is then replaced by perceived usefulness (Seddon, 1997). Besides, the model can be employed in two usage situations, namely volitional and non-volitional (Seddon, 1997).

Seddon's model (see Figure 2) is subdivided into two partial variance models (ISSM and partial behavioral model of IS use). It includes three types of constructs: measures of information quality and system quality, general perceptual measures of net benefits of IS use (perceived usefulness and user satisfaction), and other measures of net benefits of IS use (net benefit to individuals, organizations, and society).

Figure 2. Re-specified version of DeLone and McLean's (1992) model of information system success (Seddon, 1997)
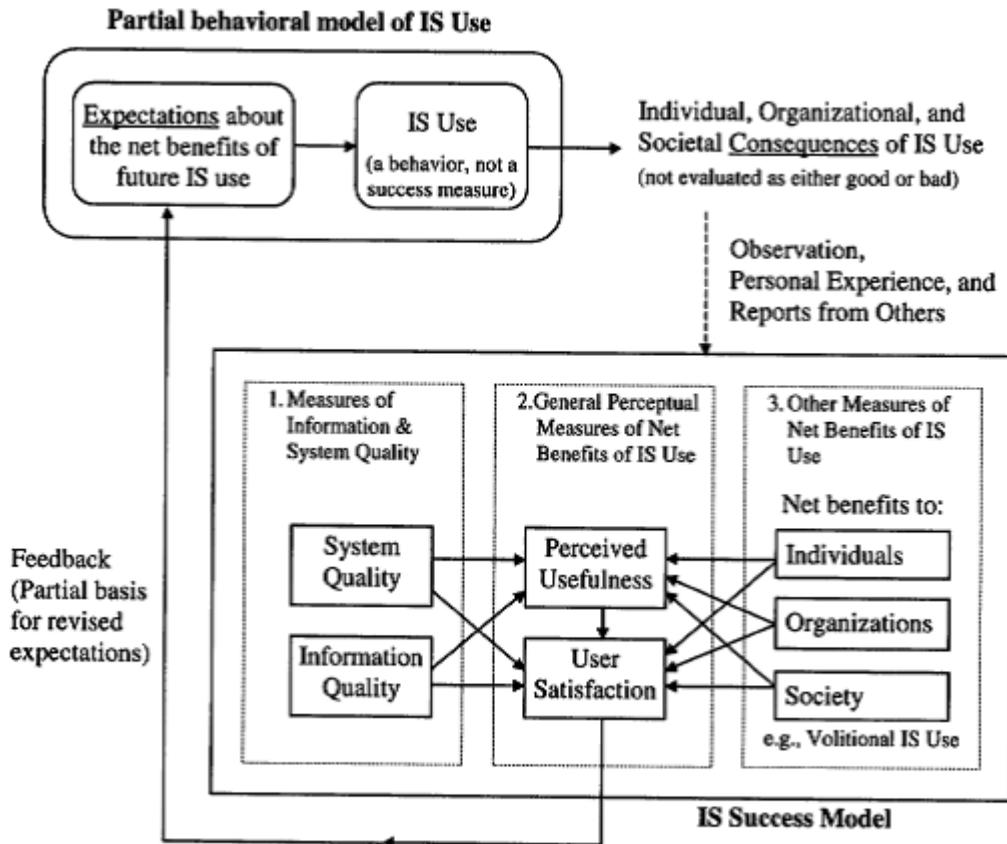
In 2003, DeLone and McLean proposed an updated version of ISSM. The "service quality" measure was integrated as a new dimension. Both individual and organizational impact measures were combined to produce a single impact category called net benefit. They demonstrate that the three facets of quality (system, information, and service) influence usage and client satisfaction, further affecting net benefits (see Figure 3). The success of IS is a multidimensional and interdependent construct. The interrelationships among the six dimensions must be studied. This update is a consequence of the growth of the electronic commerce environment (Chen & Cheng, 2009; Noh & Lee, 2015). The model, despite its generic character, still needs additional validation before it can be considered an appropriate IS measure (Chen & Cheng, 2009; Wu & Wang, 2006). Several criticisms have been formulated. The actors and the environment in which net benefits will be assessed should be determined (DeLone & McLean, 2004). Besides, by dividing the re-specified version of the ISSM (Seddon, 1997) into two partial variance models (ISSM and partial behavioral model of IS use), the model became too complicated.

The updated ISSM has been extensively verified in several contexts: electronic commerce (e.g., Brown & Jayakody, 2008; DeLone & McLean, 2003; 2004), online shopping (e.g., Chen & Cheng, 2009), mobile commerce (e.g., Zhou, 2011), mobile data services (e.g., Lee et al., 2009a; Zhou, 2011), virtual communities (e.g., Lin, 2008; Lin & Lee, 2006), and electronic government (e.g., Wang & Liao, 2008). However, only a few studies have examined the updated DeLone and McLean ISSM in the MB environment (e.g., Lee & Chung, 2009; Noh & Lee, 2015; Sanayei & Shaemi, 2011).

Figure 3. DeLone and McLean's updated information system success model (2003)
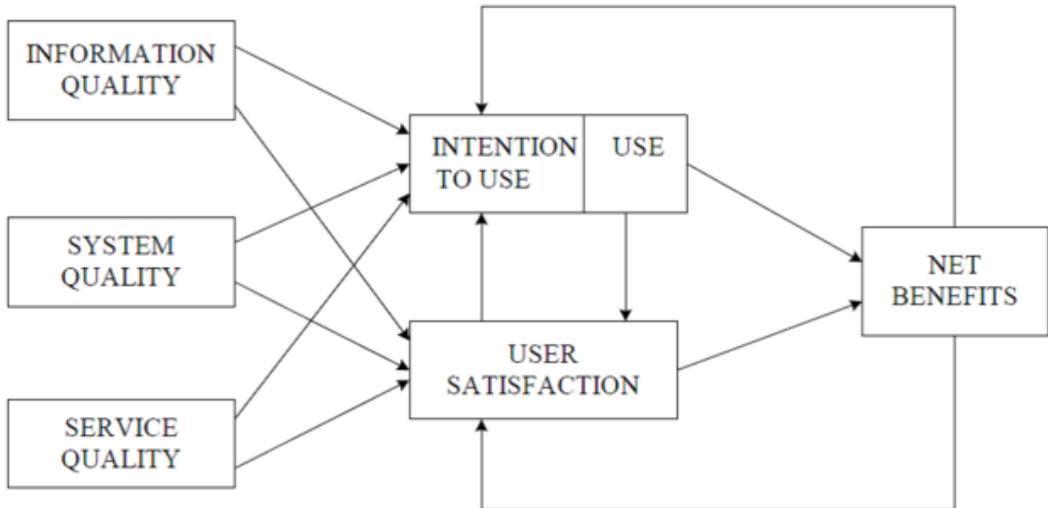
1.3. Mobile Banking Applications Success Model

1.3.1 Applicability of the Information Systems Success Model in Mobile Banking Applications

In the context of MB, the main system users are consumers who apply an Internet-based application to search for information and conduct transactions. In this way, it is viewed as an IS type (Chung & Kwon, 2009; Lee & Chung, 2009; Sanayei & Shaemi, 2011). Therefore, the context of MB fits DeLone and McLean's updated ISSM and its dimensions related to the success of MB: the three facets of quality (service, system, and information), use, satisfaction, and net benefits.

While researchers are interested in ISSMs, a few works have focused on assessing the success of MB systems. Thus, this investigation considers the updated ISSM as an appropriate model for explaining the antecedents of MB success. The purpose is to validate an extended multidimensional MB systems success model from a customer perspective.

In transforming the updated DeLone and McLean model into the context of MB, the specific meaning of several IS constructs must be clarified. This involves two important issues: focusing on MB use rather than on IS use, and precising net benefits by considering the concepts such as usefulness and value perception of the system. The main predictors include the core aforementioned ISSM quality dimensions and human dimensions (satisfaction, continuance intention, perceived usefulness, and perceived value).

1. System quality, in the MB environment, assesses the preferred features of an MB system: usability, availability, reliability, adaptability, and response time.

2. Information quality refers to the issue of MB content. Mobile content ought to be customized, comprehensive, appropriate, easy to comprehend, and secure so that users can initiate mobile transactions via Internet-based applications.

3. In 2003, DeLone and McLean proposed an updated ISSM by adding "service quality" as a new dimension.

4. As in the context of electronic commerce (DeLone & McLean, 2003), satisfaction is a key measurement tool of customers' favorable opinions about the MB app. Satisfaction has been used largely to assess the success of IS (DeLone & McLean, 2003; 1992; Seddon, 1997). It has also been used as a surrogate construct of system success (Wang & Liao, 2007).

5. Intention to use and use are two basic factors to apprehend IS success (Koo & Torkzadeh, 1998; Wu & Wang, 2006). However, they were dropped from the research model. Intention to use is a "predictive" (Wu & Wang, 2006) and "pre-adoption" (Davis, 1989) construct for system use. It is criticized for the lack of suitability in a post-adoption situation, where studies attempt to assess the success of IS. Given the difficulties of measuring general MB use, several studies have replaced it with continuance intention (DeLone & McLean, 2003). According to Brown and Jayakody (2008), it is "more suited to post-adoption research such as the investigation of IS success," and particularly to examine the success of the MB system. Our research employs continuance intention as a measure of MB system success to simplify the closed-loop relationships between use, satisfaction, and intention to use, as depicted in the updated DeLone and McLean model.

6. Whereas in some research studies, the title "net benefits" is used (DeLone & McLean, 2004; Seddon, 1997), others employ the terms impact (DeLone & McLean, 2003; 1992) or consequences (Seddon, 1997). According to DeLone and McLean (2004), the final success can be accurately described by the perceived net benefits, as it is the most relevant success measure (DeLone & McLean, 2004). Net benefits refer to the balance between negative and positive effects of MB on consumers, suppliers, employees, companies, economies, and society. There is not much consensus on how net benefits should be measured (Wu & Wang, 2006). In the same way, defining the actors and the situation where net benefits are to be assessed, is not always easy (DeLone & McLean, 2004; 2003; Wang & Liao, 2008; 2007). Since our research focuses on measuring the success of the MB app from the users' perspective, net benefits in this study refer to users' perceived net benefits toward using a specific MB system. For that reason, usefulness and value constructs are included. The perception of usefulness is an "easily assessable perceptual measure of net benefits" (Brown & Jayakody, 2008; Seddon, 1997; Wu & Wang, 2006).

1.3.2. Information Quality of Mobile Banking

Information quality assesses the information output (Sanayei & Shaemi, 2011), reflects the content quality (Brown & Jayakody, 2008), and is considered an essential indicator of IS success (DeLone & McLean, 1992). It refers to the "precision, timeliness, sufficiency, accuracy, completeness, currency, clarity, and relevance of the information provided by a system" (DeLone & McLean, 2003, p. 15). In the context of mobile commerce, content corresponds to various types of information such as images, text, or multimedia that consumers can find and use via mobile devices (Noh & Lee, 2015).

In the MB context, information quality reveals the timeliness, accuracy, format, and comprehensiveness of the information. The manner in which the information is organized on a limited interface must be considered (Sanayei & Shaemi, 2011). The use of MB may be based on perceived information quality (Noh & Lee, 2015).

1.3.3. System Quality of Mobile Banking

System quality is the ability of an information technology artifact to provide information to consumers (Ding & Straub, 2008). It can also be presented as "quality manifested in a system's overall performance and measured by individuals' perceptions" (Lee & Chung, 2009, p. 387). In MB, it indicates to which level a system helps the customer when implementing various portfolio tasks (Tam & Oliveira, 2017).

It can be linked to the many characteristics of the system such as reliability, predictability, usability, availability, answer time, and adaptability (DeLone & McLean, 2003; Wu & Wang, 2006). According to Seddon (1997), it deals with the existence of bugs, interface reliability, ease of use, documentation quality, as well as the maintainability and quality of the program code (Seddon, 1997).

The system quality depicts the stability, navigation, and design of MB services. Banks must depend on a reliable, trustworthy, and well-designed interface to deliver ubiquitous information and services to their customers.

1.3.4. Service Quality of Mobile Banking

Service quality results from an evaluation through which customers compare their expectations with actual benefits. It corresponds to the perception of service superiority and excellence (Parasuraman et al., 1988).

Service quality is an important dimension in the banking industry (Zhou et al., 2021). It has been highlighted as a key variable in the MB context (DeLone & McLean, 2003; Lee & Chung, 2009; Sanayei & Shaemi, 2011). We are interested in consumers' perceived MB service quality.

1.3.5. Satisfaction with Mobile Banking

Satisfaction has received considerable attention in several fields, such as psychology, sociology, economics, business, management science, and marketing. Each has its understanding and different ways to operationalize it. Moreover, satisfaction has been used in various fields: electronic commerce (e.g., Tandon et al., 2020), Internet banking (e.g., Raza et al., 2020), M-commerce (e.g., Brown et al., 2010; Wang & Liao, 2007), and MB (e.g., Chung & Kwon, 2009).

Satisfaction is an important and pervasive factor in the ISSM (Brown & Jayakody, 2008; Chung & Kwon, 2009; DeLone & McLean, 2004; 2003; 1992; Seddon, 1997; Wang & Liao, 2007; Zhou, 2011). It is among the most frequently studied features (Wu & Wang, 2006), a "prevailing proxy" (Wang & Liao, 2007), and "the most appropriate" (Gelderman, 1998) measure of IS success.

Satisfaction occurs as a result of a comparison between perceived performance and consumer's expectations (Zhou, 2011). Based on prior user satisfaction research (e.g., DeLone & McLean, 2003), satisfaction with MB is a summary affective response of changing intensity that follows MB actions (Zhou, 2011). It is aroused by various elements, such as the three previously defined dimensions of IS quality. It is the response of a customer based on his/her experience with all perceived features of a good or service. Namely, satisfaction with the MB system is established continuously after each interaction with banks offering MB services (Zhou, 2011). These technological advances are aimed at promoting a significant expansion in customer satisfaction, hence boosting customer loyalty, which will prevent the loss of customers to competing banks (Alsmadi et al., 2022).

1.3.6. Perceived Usefulness of Mobile Banking

Perceived usefulness is considered in the technology acceptance model (TAM). It is the extent "to which an individual believes that using a system would improve his or her job performance" (Davis, 1989, p. 320). It is an essential factor of new technology adoption (Davis, 1989; Tran & Corner, 2016) in MB (Mortimer et al., 2015). Perceived usefulness is the belief that the MB system improves job performance and benevolence toward the mobile application (Gu et al., 2009). It reflects that bank clients realize their expected utility associated with using MB services. It depends on customers' expectations about how MB services can improve and simplify their financial activities and life. An MB app is useful if it delivers services to a consumer.

1.3.7. Perceived Value of Mobile Banking

The perceived value concept is examined not only in the traditional business environment but also in the electronic commerce environment (Bui et al., 2022). Zeithaml (1988, p. 14) presents perceived value as the "consumer's overall assessment of a utility of a product (or service) based on the perception of what is received and what is given." It reflects the output of the comparison opposing

perceived benefits to perceived sacrifices (Zeithaml, 1988). This broadly accepted concept arises from the utilitarian approach (Kim et al., 2007). Another method adopts a multidimensional view of the construct (Sweeney & Soutar, 2001). The theory of consumption values (Sheth et al., 1991) highlights the five following dimensions: functional, social, emotional, conditional, and epistemic. The two last dimensions were eliminated because they were considered less important (Sweeney & Soutar, 2001). Therefore, consumers' perceived value encompasses three dimensions: functional, emotional, and social. This concept is coherent in the MB context, and it is worth understanding which MB app the consumer has in mind (Jebarajakirthy & Shankar, 2021). Thus, we choose the operational definition of the MB app's perceived value as consumers' overall assessment of the utility of the MB app.

1.3.8. Continuance Intention Toward Mobile Banking

Continuance intention is critical in an IS environment, such as online shopping, electronic banking, M-commerce, MB, and self-service technologies (e.g., Chen, 2012).

From a post-adoption perspective, continuance intention replaces pre-adoption constructs: intention to use and use (Davis, 1989). Continuance intention is more appropriate in investigating an MB success model.

The decision of MB consumers of whether to remain in the relationship corresponds to continuance intention, which is the individual's intent to use the MB system sustainably.

2. RESEARCH MODEL AND HYPOTHESES

Following DeLone and McLean (2003), our research proposes a comprehensive and multidimensional model showing the success of MB systems (see Figure 4), which advocates that the three facets of quality (information, system, and service dimensions) and their outcomes, namely satisfaction, perceived usefulness, and continuance intention, are the success variables of the MB app. The relationships between these factors are discussed below.

The feedback relationships from satisfaction and continuance intention to perceived usefulness are excluded from the current research. In DeLone and McLean's (2003) model, system use has an impact on satisfaction. It seems to indicate a temporal rather than a causal relationship (Chen & Cheng, 2009; Wu & Wang, 2006). Nevertheless, the use of an MB system does not guarantee

Figure 4. Conceptual model
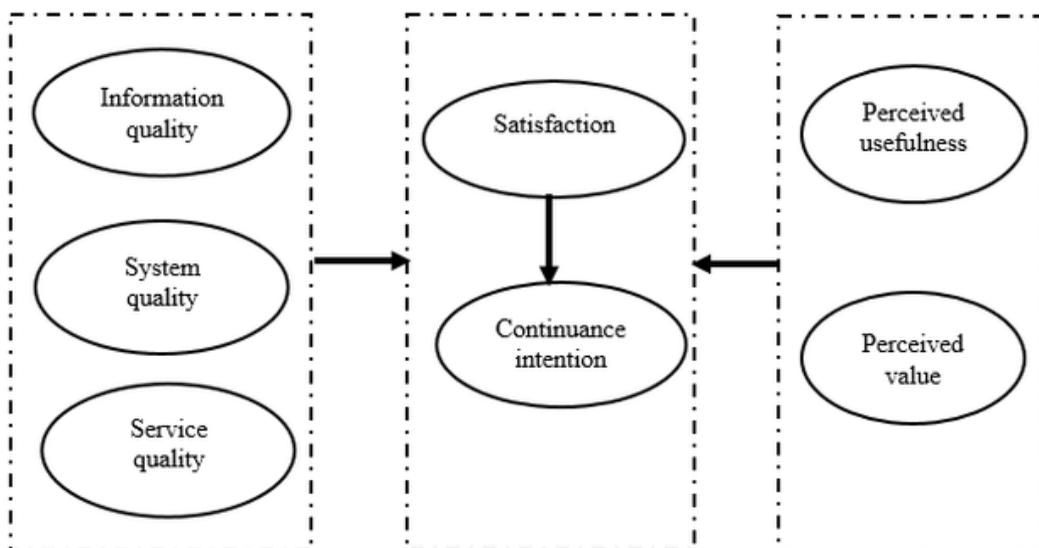
customer satisfaction. Prior studies have suggested that satisfaction leads to system use rather than the contrary (Chen & Cheng, 2009). Therefore, we specify a relationship linking continuance intention to satisfaction through a unidirectional path.

2.1. Relationship Between Information Quality and Satisfaction

DeLone and McLean (2004; 2003; 1992) argue that information quality is a factor enhancing customer satisfaction, as verified in several contexts: electronic commerce (e.g., Brown & Jayakody, 2008; DeLone & McLean, 1992), web-based learning (e.g., Rokhman et al., 2022), virtual communities (e.g., Lin, 2008; Lin & Lee, 2006), and mobile commerce (e.g., Wang & Liao, 2007), MB (e.g., Brown et al., 2010; Chung & Kwon, 2009; Lee & Chung, 2009; Tam & Oliveira, 2017).

If the information is outdated or inaccurate, customers will perceive MB apps' utility as low, and they will not feel satisfied. Indeed, users can be frustrated by low-quality information (Tam & Oliveira, 2017). Therefore, information must be reliable and prompt. Geebren et al. (2021) verified the impact of information quality on trust and the effect of the latter on satisfaction. Trust played a partial mediation role. Accordingly:

H1: Information quality of a mobile banking application positively contributes toward customer satisfaction.

2.2. Relationship Between System Quality and Satisfaction

Prior studies about the success of IS provide evidence about the dependence of satisfaction development on system quality: electronic commerce (e.g., Brown & Jayakody, 2008), web-based learning (e.g., Rokhman et al., 2022), and virtual communities (e.g., Lin, 2008; Lin & Lee, 2006), MB (e.g., Brown et al., 2010; Chung & Kwon, 2009; Lee & Chung, 2009; Tam & Oliveira, 2017).

In the MB environment, system quality becomes the "mobile storefront" by which first impressions are formed (Chung & Kwon, 2009; Lee & Chung, 2009). It stands to reason that if a customer perceives a MB system to be of high quality, he/she will be likely satisfied and willing to continue demanding MB services. An unappreciated level of system quality increases customers' hassle with using MB services, thereby reducing their satisfaction (Tam & Oliveira, 2017). In the case of low system quality, consumers may experience frequent service interruptions and/or spend too much time on information retrieval. These may be caused by a "lack of efficient navigation and clear layout" (Zhou, 2011, p. 640). This will increase consumers' difficulties with using MB apps.). Geebren et al. (2021) verified the impact of system quality on trust and the relationship between trust and satisfaction. Trust played a partial mediation role. Accordingly,

H2: System quality of a mobile banking application positively influences customer satisfaction.

2.3. Relationship Between Service Quality and Satisfaction

Service quality is an important determinant of satisfaction in contexts such as IS (e.g., (DeLone & McLean, 2003), electronic commerce (e.g., Brown & Jayakody, 2008), web-based learning (e.g., Rokhman et al., 2022), mobile commerce (e.g., Wang & Liao, 2007), mobile services (e.g., Zhao et al., 2012), and MB (e.g., Geebren et al., 2021; Brown et al., 2010; Bui et al., 2022; Chung & Kwon, 2009; Tam & Oliveira, 2017; Zhou et al., 2021).

In MB, the cognitive determinants of satisfaction, especially service quality, have been scarcely studied. Satisfaction is the result of an evaluative process, where customers examine the benefits of their prior MB use and decide whether to continue using it. Poor service quality can decrease customers' satisfaction with MB services (Tam & Oliveira, 2017; Zhou et al., 2021). Geebren et al. (2021)'s work is among the rare studies linking service quality with satisfaction indirectly through trust. They found that trust plays a partially full role. Based on the previous literature, the hypothesis is stated as follows:

H3: Perceived quality of a mobile banking application positively affects satisfaction with mobile banking applications.

2.4. Relationship Between Quality and Continuance Intention

Information quality is among the factors triggering favorable intentions toward a technological or informational system (Geebren et al., 2021; Chen & Cheng, 2009; DeLone & McLean, 2003; Lin & Lee, 2006; Noh & Lee, 2015). This applies to the continuity of using a system as per the user's intentions (DeLone & McLean, 2003).

Consumers expect to be able to access the MB system to fulfill their financial activities anywhere and at any time. When consumers can easily access information, they consider their MB system and banks capable of providing reliable service (Noh & Lee, 2015). High-quality MB systems help banks deliver convenient and high-value mobile services to their consumers.

Service quality, in terms of a customer's overall evaluation of a MB system, is an important dimension of service success. In DeLone and McLean's updated model (2003), service quality is an essential element of success, as it influences usage intentions (Lin & Lee, 2006; Noh & Lee, 2015). This relationship linking service quality to continuance intentions finds empirical proof in different studies on electronic commerce (e.g., Brown & Jayakody, 2008) and mobile payment services (e.g., Zhou, 2013), etc.

According to the theoretical development mentioned above, the following assumptions are hypothesized:

H4: Continuance intention toward mobile banking applications is influenced by information quality.
H5: Continuance intention toward mobile banking applications is influenced by system quality.
H6: Continuance intention toward mobile banking applications is influenced by service quality.

2.5. Relationship Between Satisfaction and Continuance Intention

The link between satisfaction and behavioral intentions is verified in several studies (e.g., Chang & Zhu, 2012; Hsiao & Chang, 2014). Satisfaction influences future purchase intention (Wang & Liao, 2007) and word-of-mouth communication (Wang & Liao, 2007) as it is a strong predictor of continuance intention (Brown & Jayakody, 2008; Tam & Oliveira, 2017). Satisfied consumers establish a re-use intention, whereas dissatisfied consumers discontinue their use (Chang & Zhu, 2012).

This relationship has been demonstrated in several contexts: social networks (e.g., Chang & Zhu, 2012), and mobile advertising (e.g., Hsiao & Chang, 2014).

The relationship between a MB system and its users depends on how satisfied they are with the services received. For instance, clients' intention for continued use of MB services may be conditioned by past experiences. Satisfied clients would have higher intentions to continue using the MB system. Thus, customer satisfaction from using a MB app may be a salient factor in shaping MB continuance intention. Accordingly,

H7: In a mobile banking context, customer satisfaction influences continuance intention positively.

2.6. Relationship Between Usefulness Perception and Satisfaction

Many previous studies have advocated and verified the link between perceived usefulness and satisfaction in different contexts: mobile commerce (e.g., Zhou, 2011), and mobile advertising (e.g., Hsiao & Chang, 2014).

Some researchers have provided evidence regarding the impact on consumer satisfaction with the MB system (Yuan et al., 2014). The more likely a MB app enables clients to achieve their goals, the more likely they are satisfied with the app. Consumers always expect MB apps to be useful. "The main reason that people exploit mobile service systems is that they find the systems useful to their transaction" (Wang et al., 2006, p. 162). Accordingly,

H8: In a mobile banking context, perceived usefulness has a positive influence on consumer satisfaction.

2.7. Relationship Between Perceived Usefulness and Continuance Intention

Customers may continue using a MB app if they consider it useful, even if they may be dissatisfied with a previous use (Gu et al., 2009). This relationship has been verified in prior studies (Jadil et al., 2021; Ho, et al., 2020; Gu et al., 2009; Tran & Corner, 2016; Bhattacherjee, 2001). Specifically, it has been tested in several contexts: mobile advertising (e.g., Hsiao & Chang, 2014), and MB (e.g., Jadil et al., 2021; Gu et al., 2009). We posit that a useful MB app could make them highly predisposed to continue using it. Consequently:

H9: In a mobile banking context, perceived usefulness has a positive influence on continuance intention.

2.8. Relationship Between Perceived Value and Satisfaction

Value perception has many differences with satisfaction, namely in terms of components and their impact that occurs before and after the purchase or the experience, while satisfaction is experienced in the post-purchase stage. It only affects the level after the purchase or product use (Rizan et al., 2020). Perceived value is most likely a cause of satisfaction. If a consumer perceives that the transaction or the service is or has been a source of value, then expectations are fulfilled in a high proportion, which is a sign of high levels of satisfaction. Prior studies confirm this assumption as they have verified that perceived value is a predictor of satisfaction in both traditional and online commercial environments (Bui et al., 2022). It has been examined in the e-commerce context (Rizan et al., 2020), banking services context (Omoregie et al., 2019), and MB (Poromatikul, et al., 2021; Berraies et al., 2017).

Berraies et al. (2017) show that the perceived value of MB has an impact on trust, which in turn affects satisfaction, but did not test the direct impact. Similarly, Mbama and Ezepue (2018) proved the impact of customer experience with digital banking, which is an output of perceived value on satisfaction and loyalty. Several authors have verified the direct impact in a traditional banking context (Omoregie et al., 2019) and mobile banking one (Poromatikul, et al., 2021). Consistent with these prior studies in the mobile banking environment (Bui et al., 2022; Poromatikul, et al., 2021), it is suggested that satisfaction is influenced by value. Accordingly,

H10: In a mobile banking context, perceived value positively impacts consumer satisfaction.

2.9. Relationship Between Perceived Value and Continuance Intention

This relationship has been tested in the context of various technologies: social commerce (e.g., Gan & Wang, 2017), mobile applications (e.g., Xu et al., 2015), mobile Internet (e.g., Kim et al., 2007), and MB (e.g., Jebarajakirthy & Shankar, 2021; Thye Goh et al., 2014; Yang et al., 2014).

An individual's perception of an MB app value has a foremost bearing on his/her behavioral intention (Jebarajakirthy & Shankar, 2021) According to Karjaluoto et al. (2021) as well as Jebarajakirthy & Shankar (2021), perceived value may influence the intention to use m-banking services. Consumers who receive a good value, as per their perception, are likely to use (Jebarajakirthy & Shankar, 2021; Karjaluoto et al., 2021) and to continue using the technology, stay loyal to the service provider, and are predisposed to recommend it (de Matos & Rossi, 2008). By contrast, if the value is perceived as low or inappropriate, consumers are likely to terminate the use of the MB app and engage in a negative word-of-mouth attitude. Thus, we assume that perceived value is a determining factor of behavioral intention about MB apps. A consumer tends to continue using the MB app if he/she believes that it could offer a benefit.

H11: In a mobile banking context, perceived value positively impacts continuance intention.

3. RESEARCH METHODOLOGY

3.1. Mobile Banking in Saudi Arabia

In Saudi Arabia, banks use information technology to show a certain differentiation (Sohail & Al-Jabri, 2014). The widespread use of smartphones and the improved range of services that operators offer are factors leading to constant improvement in service quality (Al-Jabri, 2015; Al-Jabri & Sohail, 2012).

The high frequency of smartphone usage in Saudi Arabia is one of the reasons for the change in payment habits. Indeed, smartphone users attained 92% of the Saudi population in 2020. Moreover, 34% of this segment use MB Apps (Trend, 2020). For these reasons, banks have offered this new service to their customers (Al-Jabri, 2015; Al-Jabri & Sohail, 2012; Sohail & Al-Jabri, 2014).

All banks operating in Saudi Arabia offer mobile services as a way of retaining their customers. Indeed, they provide services that can be informational and/or transactional, namely access to details regarding bank accounts, check accounts, and check customer feedback. The service also allows funds transfer between banks, credit cards payment, mutual fund subscriptions, and redemption (Al-Jabri, 2015; Al-Jabri & Sohail, 2012; Sohail & Al-Jabri, 2014).

3.2. Development of the Survey Instrument

A questionnaire was developed to gather data including multi-item measures using a five-point Likert scale, with statements ranging from "strongly disagree" to "strongly agree," The survey items were designed by adapting measures of prior studies. The survey was organized into two parts. The first one was designed to capture information on constructs affecting MB usage. The second section captured demographic characteristics including gender, age, education, employment status, and income.

As the data were collected in the Kingdom of Saudi Arabia, the questionnaire was then translated into Arabic and submitted to two academics for review and correction. Then, it was translated back to English by a bilingual marketing researcher, mainly to validate the translation and ensure consistency. We refined the initial version of the survey through extensive pre-testing by an array of people that included three academics with significant expertise in marketing research, a management of information systems (MIS) lecturer, two English teachers, and three bank employees. A pilot test was conducted on 18 randomly selected MB users with varied backgrounds. This ensured that the questionnaire was easy to comprehend and that it had been professionally compiled. Based on respondents' feedback, the wordings of some questions were modified, specifically those that lacked clarity.

3.3. Sample and Data Collection Procedure

The target population comprised individual adults residing in Saudi Arabia and operating bank accounts in a local national bank that provides MB services, owns a smartphone or a tablet, and with mobile internet access. For customers, the use of MB services is a completely voluntary decision. Due to the inaccessibility of a sample frame for such a study and the privacy and confidentiality of banks' clients, we were constrained to adopt convenience sampling. An online survey link was shared during the period January–March 2019. The respondents should have had the experience of using MB services and continue to use them. Indeed, our research captures information quality, system quality, service quality, value perception, usefulness perception, satisfaction, and continuance intention in a post-use situation.

Data cleaning was done for a more detailed treatment of obtained responses, checking mainly the completeness of each observation's answers. Finally, we had 202 valid questionnaires, slightly above the recommended level of 200 (Bagozzi & Yi, 2012).

4. DATA ANALYSIS AND RESULTS

Partial least squares structural equation modeling (PLS-SEM) was used to verify the model and hypotheses. It "works efficiently with small sample sizes and complex models" (Hair Jr. et al., 2014, p. 15). We used SmartPLS version 3.2.7 for validating the measurements and verifying the structural model.

4.1 Respondents' Demographic Profile

A total of 355 Saudi Arabian MB users were contacted during the survey, and 241 agreed to participate. Post-survey, we had 202 valid responses concerning the form of mobile apps-based banking that the respondents used most frequently. About 51% of respondents were male and 49% were female. More than 44% were aged between 31 and 50 years and 82.6% held a university degree.

4.2 Measurement Model

Reliability and validity (content, convergent, and discriminant) tests were conducted and content validity was acknowledged based on the literature. Indeed, scales are already validated by prior studies. Besides, we had conducted a pilot test and pre-tests with experts.

4.2.1. Reliability

To check reliability, we used Cronbach's alpha in the first stage and composite reliability (CR) in the second step (Chin, 1998; Fornell & Larcker, 1981). Table 1 shows that the lowermost CR (0.904) is above the benchmark value of 0.7 (Fornell & Larcker, 1981; Hair Jr. et al., 998). Cronbach's α values are between 0.829 and 0.941. These values are above 0.7, indicating the absence of reliability issues (Chin, 1998; Hair Jr. et al., 1998).

Table 1. Composite reliability and Cronbach's alpha

	Composite reliability	Cronbach's α
Continuance intention	0.962	0.941
Information quality	0.908	0.874
Satisfaction	0.948	0.932
Service quality	0.932	0.904
System quality	0.904	0.857
Perceived usefulness	0.941	0.916
Perceived value	0.922	0.874

4.2.2 Convergent validity

Table 2 shows that loadings are above 0.7 after retrieving the fifth item of "information quality" (0.693) and the first item of "perceived value" (0.602). Deleting these two items caused an increase in the CR and the average variance extracted (AVE) above the recommended threshold value. Furthermore, the AVE is higher than 0.5. These results show satisfactory convergent validity.

4.2.3 Discriminant Validity

This type of validity is judged at two levels: item and construct. The former is acceptable if all cross-loadings (displayed in Table 3) with the respective constructs surpass those with other constructs (Chin, 1998).

Table 2. Factor loadings and average variance extracted

	Items	Item loadings	Average variance extracted
Continuance intention	CI-1: I intend to continue using mobile banking application in the future CI-2: I will use mobile banking apps because of their convenience CI-3: Given the opportunity, I will continually use mobile banking applications	0.945 0.943 0.950	0.895
Information quality Tam and Oliveira (2017)	IQ-1: The information provided by mobile banking is useful IQ-2: The information provided by mobile banking is understandable IQ-3: The information provided by mobile banking is interesting IQ-4: The information provided by mobile banking is reliable IQ-6: The information provided by mobile banking is up-to-date	0.883 0.873 0.718 0.794 0.802	0.666
Satisfaction Lee and Chung (2009)	S-1: I strongly recommend mobile banking to others S-2: I think that I made the correct decision to use mobile banking S-3: I am satisfied with the way that mobile banking has carried out transactions S-4: I am satisfied with the service I have received from mobile banking S-5: Overall, I was satisfied with mobile banking	0.864 0.881 0.895 0.888 0.902	0.785
Service quality Tam and Oliveira (2017)	SQ-1: The responsible service personnel are always highly willing to help whenever I need support with the m-banking SQ-2: The responsible service personnel provide personal attention when I experience problems with the m-banking SQ-3: The responsible service personnel provide services related to the m-banking at the promised time SQ-4: The responsible service personnel have sufficient knowledge to answer my questions regarding the m-banking	0.888 0.893 0.874 0.865	0.774
System quality Lee and Chung (2009)	SyQ-1: I would find mobile banking secure enough to conduct my banking transactions SyQ-2: Mobile banking provides convenient access SyQ-3: Mobile banking is easy to use SyQ-4: I could use mobile banking at anytime, anywhere I want	0.801 0.877 0.872 0.796	0.701
Perceived usefulness Yuan *et al.*, (2014)	PU-1: Mobile banking improves efficiency in managing my personal finances PU-2: Mobile banking improves convenience in managing my personal finances PU-3: Mobile banking lets me manage my personal finances more quickly PU-4: Overall, mobile banking is useful in managing my personal finances	0.851 0.920 0.896 0.907	0.799
Perceived value Sirdeshmukh *et al.* (2002)	PV-2: Compared to the effort I need to put in, the use of mobile banking is beneficial to me PV-3: Compared to the time I need to spend, the use of mobile banking is worthwhile to me PV-4: Overall, the use of mobile banking delivers me good value	0.919 0.831 0.927	0.798

Table 3. Items cross-loadings

	CI	IQ	PU	S	SQ	SyQ	PV
CI							
CI-1	**0.945**	0.597	0.748	0.794	0.388	0.676	0.764
CI-2	**0.943**	0.566	0.752	0.790	0.432	0.686	0.745
CI-3	**0.950**	0.551	0.724	0.791	0.385	0.688	0.828
IQ							
IQ-1	0.500	**0.883**	0.516	0.589	0.412	0.614	0.497
IQ-2	0.562	**0.873**	0.578	0.629	0.427	0.657	0.525
IQ-3	0.345	**0.718**	0.431	0.409	0.454	0.385	0.359
IQ-4	0.508	**0.794**	0.503	0.587	0.358	0.684	0.523
IQ-6	0.512	**0.802**	0.575	0.595	0.471	0.665	0.534
PU							
PU-1	0.609	0.529	**0.851**	0.699	0.535	0.589	0.567
PU-2	0.710	0.580	**0.920**	0.769	0.467	0.632	0.686
PU-3	0.741	0.585	**0.896**	0.747	0.368	0.636	0.717
PU-4	0.732	0.599	**0.907**	0.807	0.440	0.674	0.706
S							
S-1	0.775	0.645	0.713	**0.864**	0.491	0.685	0.723
S-2	0.746	0.616	0.709	**0.881**	0.443	0.709	0.741
S-3	0.714	0.588	0.768	**0.895**	0.464	0.719	0.685
S-4	0.737	0.595	0.783	**0.888**	0.526	0.697	0.685
S-5	0.735	0.646	0.778	**0.902**	0.515	0.732	0.704
SQ							
SQ-1	0.387	0.455	0.463	0.497	**0.888**	0.439	0.368
SQ-2	0.320	0.428	0.404	0.440	**0.893**	0.382	0.309
SQ-3	0.294	0.436	0.379	0.417	**0.874**	0.359	0.327
SQ-4	0.457	0.481	0.498	0.554	**0.865**	0.479	0.458
SyQ							
SyQ-1	0.560	0.666	0.600	0.645	0.348	**0.801**	0.522
SyQ-2	0.609	0.638	0.588	0.665	0.417	**0.877**	0.518
SyQ-3	0.529	0.660	0.575	0.636	0.448	**0.872**	0.508
SyQ-4	0.698	0.555	0.604	0.716	0.389	**0.796**	0.689
PV							
PV-2	0.801	0.611	0.719	0.784	0.403	0.675	**0.919**
PV-3	0.612	0.447	0.547	0.583	0.328	0.495	**0.831**
PV-4	0.776	0.547	0.729	0.753	0.398	0.623	**0.927**

Note: CI: Continuance intention, IQ: Information quality, S: Satisfaction, SQ: Service quality, SyQ; System Quality, PU: Perceived usefulness, PV: Perceived value

As for the "construct discriminant validity," Chin (1998), Fornel and Larker (1981) recommend that the square root of the AVE on each construct must surpass the estimated "inter-construct correlations." Table 4 shows that the values in diagonal terms (square root of AVE) are superior to other correlations. This allows us to conclude that the measurements have acceptable discriminant validity.

Diagonal terms are the square roots of the AVE.

4.3 Structural Model

In this phase, we focus on the structural model and the assumed hypotheses. The path coefficients and their significance levels were also tested. Bootstrapping (with 5000 re-samples) was accomplished to test the statistical significance of path coefficients using t-tests.

Table 4. Latent variable correlations based on Fornell-Larcker Criterion

	CI	IQ	S	SQ	SyQ	PU	PV
CI	**0.946**						
IQ	0.604	**0.816**					
S	0.837	0.698	**0.886**				
SQ	0.424	0.515	0.551	**0.880**			
SyQ	0.723	0.750	0.800	0.479	**0.837**		
PU	0.784	0.643	0.847	0.503	0.709	**0.894**	
PV	0.824	0.605	0.799	0.424	0.676	0.752	**0.893**

Note: CI: Continuance intention, IQ: Information quality, S: Satisfaction, SQ: Service quality, SyQ; System Quality, PU: Perceived usefulness, PV: Perceived value

4.3.1 Hypotheses Testing

The path parameters are presented in Table 5. Significant paths are characterized by T-statistics having a value above 1.96 and a P value less than 0.05. Seven hypotheses were accepted: H2 (System quality → Satisfaction), H3 (Perceived quality → Satisfaction), H5 (System quality → Continuance intention), H7 (Satisfaction → Continuance intention), H8 (Perceived usefulness → Satisfaction), H10 (Perceived value → Satisfaction), and H11 (Perceived value → Continuance intention). However, four hypotheses were rejected: H1 (Information quality → Satisfaction), H4 (Information quality → Continuance intention), H6 (Service quality → Continuance intention), and H9 (Perceived usefulness → Continuance intention).

Table 5. Path coefficients of the research hypotheses

Hypotheses	Relationship	T statistics	P values	Path coefficients	Test results
H1	Information quality → Satisfaction	0.696	0.486 ns	0.0350	Not supported
H2	System quality → Satisfaction	4.644	0.000	0.2814	Supported
H3	Perceived quality → Satisfaction	2.714	0.006	0.0958	Supported
H4	Information quality → Continuance intention	0.767	0.442 ns	-0.0469	Not supported
H5	System quality → Continuance intention	2.000	0.045	0.1246	Supported
H6	Service quality → Continuance intention	1.210	0.226 ns	-0.0501	Not supported
H7	Satisfaction → Continuance intention	2.828	0.004	0.3494	Supported
H8	Perceived usefulness → Satisfaction	5.232	0.000	0.3799	Supported
H9	Perceived usefulness → Continuance intention	1.843	0.065 ns	0.1636	Not supported
H10	Perceived value → Satisfaction	4.920	0.000	0.2616	Supported
H11	Perceived value → Continuance intention	4.859	0.000	0.3873	Supported

Note: Path coefficients are the standardized beta coefficients from the PLS analysis.
Significant at $p^{***} \leq 0.001$, $p^{**} \leq 0.01$, $p^* £ 0.05$
ns: not significant

4.3.2 Model's Predictive Relevance

This criterion was assessed via R^2 (squared multiple correlation), Cohen's f^2 (method of effect size), and Q^2 (Stone-Geisser test for predictive relevance).

For endogenous constructs, R^2 is presented in Table 6. Chin (1998) suggested that values of R^2 above 0.67 are considered high, those between 0.33 and 0.67 are moderate, values between 0.19 and 0.33 are weak, and any value less than 0.19 is unacceptable.

The model's R^2 equals 83.3, which refers to the percentage of the variance in satisfaction explained by system quality (H2; $\beta = 0.281$; t = 4.64; p =0.000), perceived quality (H3; $\beta = 0.095$; t = 2.714; p =0.006), perceived usefulness (H8; $\beta = 0.379$; t = 5.232; p =0.000), and perceived value (H10; $\beta = 0.261$; t = 4.920; p = 0.000). Furthermore, the structural model explains 78% of the variance pertaining to continuance intention, which depends on satisfaction (H7; $\beta = 0.349$; t = 2.828; p = 0.004), system quality (H5; $\beta = 0.124$; t = 2; p = 0.045), and perceived value (H11; $\beta = 0.387$; t = 4.859; p = 0.000). Conclusively, the model describes reasonably well the variance explained for each endogenous construct.

The f^2 measure changes in R^2 and provides a way to verify the presence of a practical impact of each construct (Cohen, 1988). The size effect is deemed to be large if f^2 surpasses 0.35, medium from 0.15 to 0.35, and small from 0.02 to 0.15 (Cohen, 1988). Values less than 0.02 are considered as having no effective size. Table 7 indicates that system quality and satisfaction have a small effect on continuance intention. Perceived quality has also a small effect on satisfaction. The other impact on satisfaction and continuance intention is medium.

We can observe that our model explains a satisfactory amount of variance of continuance intention with high R^2 values.

The Stone–Geisser test (Q^2) allowed us to assess the model fit in *PLS* analysis (Geisser, 1974; Stone, 1974). Since all Q^2 values are not null, all the models are of satisfactory "predictive relevance" (Henseler et al., 2009). The blindfolding procedure showed that Q^2 for satisfaction and continuance intention were respectively 0.605 and 0.644 (Table 6).

Table 6. Results of analysis

Dependent variable	Independent variable	f^2	Result	R2	Result	Q^2
Satisfaction	System quality Perceived quality Perceived usefulness Perceived value	0.157 0.037 0.293 0.160	Medium Small Medium Medium	0.833	High	0.605
Continuance intention	System quality Satisfaction Perceived value	0.020 0.093 0.230	Small Small Medium	0.780	High	0.644

4.3.3 Model's Predictive Quality

Following Tenenhaus et al., (2005), we considered the global goodness-of-Fit model (GoF) as per the following equation:

$$\text{Global Goodness of Fit} = \sqrt{R^2 \times \overline{Communality^*}}$$

*Communality = Average variance extract (AVE):

The GoF (0.823) exceeded the recommended cut-off value of 0.36 (Wetzels et al., 2009). Thus, it is large enough to demonstrate adequate global *PLS* model validity.

5. DISCUSSION

The study results show that information quality does not influence satisfaction. This result is misaligned with the proposition and outcomes of previous studies regarding MB (e.g., Geebren et al., 2021; Brown et al., 2010; Chung & Kwon, 2009; Lee & Chung, 2009; Tam & Oliveira, 2017). This is explicated by the action-oriented facet of mobile applications. Indeed, most MB apps are used for short actions such as mobile payment or money transfer. It does not fit with the detailed information for two reasons: real important information cannot be read on the go, and users may prefer to consult information on wide screens and more personal spaces. However, several studies have found no significant impact of information quality (e.g., Brown & Jayakody, 2008; Franque et al., 2020; Tam & Oliveira, 2017; Zhou, 2013). This also explains the rejection of hypothesis 4 assuming the effect of information quality on continuance intention. This is divergent with those of prior research works (Chen & Cheng, 2009; DeLone & McLean, 2003; Lin & Lee, 2006; Noh & Lee, 2015).

Satisfaction is influenced by service quality, which is similar to the result of MB literature result (Geebren et al., 2021; Brown et al., 2010; Chung & Kwon, 2009; Tam & Oliveira, 2017). This facet of MB app quality focuses on the assessment of the availability of timely personnel support, attention, and knowledge when any problem occurs. These elements are crucial in case of system failure, lack of knowledge, or wrong use by customers. However, even if these problems occur, customers' awareness that the MB app service will find a timely solution is an important source of satisfaction.

The third aspect of MB app quality is system quality, which has proven to have a positive impact on satisfaction. This result is similar to the findings of prior studies in the field of MB (e.g., Geebren et al., 2021; Brown et al., 2010; Chung & Kwon, 2009; Lee & Chung, 2009; Tam & Oliveira, 2017). Besides, the magnitude of the impact of system quality is greater than that of service quality. Indeed, the most important elements of quality, in terms of shaping a level of satisfaction, are MB system security, access convenience, ease of use, and mobility possibilities. System and service facets of quality showed a non-significant impact on continuance intention (H6 and H5, respectively), which is misaligned with the results of Noh and Lee (2015) applied on smartphone apps. This result may be explained by the nature of the impact that may be indirect via satisfaction. Indeed, although we have not specifically tested the mediation, our results show that these dimensions of quality influence satisfaction significantly (H2 and H3 discussed previously), which have positive effects on continuance intention (H7). The confirmation of H7 is consistent with previous studies about mobile services (e.g., Hsiao & Chang, 2014).

The same logic applies to the significant effect of perceived usefulness on satisfaction (H8) and its insignificant influence on continuance intention (H9). In fact, the mediation of satisfaction is likely to explain these results.

The acceptance of H8 is consistent with earlier studies on mobile services (Hsiao & Chang, 2014; Zhou, 2011). The more likely an MB app enables clients to achieve their goals, the more likely that they are to be satisfied with it. When expectations about the usefulness of the studied services are met, consumers will be satisfied. Wang et al. (2006) have even stated that usefulness is the principal reason why people adopt mobile-service systems as a transaction means. Jadil et al. (2021) found that effort expectancy, which is a similar concept, has a direct impact on intentions, but they did not include satisfaction. Samely, Ho et al. (2020) did not test the direct impact of usefulness on intentions but found that it influences attitudes which predicts adoption intentions. Combining our results with those of Jadil et al. (2021), Ho et al. (2020) can inspire the idea of the mediation role of satisfaction.

Perceived value has a positive influence on satisfaction, leading to the acceptance of H9. This result fits with the outcomes of previous studies in the banking services field (Omoregie et al., 2019).

In MB research, our findings are in line with recent studies' results (Bui et al., 2022; Poromatikul, et al., 2021), and provide additional insights about the direct impact of value perception on satisfaction, while this link has been indirect, via trust in the research of Berraies et al. (2017).

The direct path linking perceived value to continuance intention is verified. This is in accordance with the literature that mainly focuses on behavioral intentions as a dependent variable in the context of mobile

applications (Xu et al., 2015), mobile Internet (e.g., Kim et al., 2007), and MB (e.g., Jebarajakirthy & Shankar, 2021; Thye Goh et al., 2014; Yang et al., 2014). The novelty in this research is that we focused on continuance intention, which has a long-term focus and is a post-adoption concept. Thus, evidence from data shows that consumers perceiving high value from their experience with the MB app continue using this service.

CONCLUSION

This study emphasizes MB apps and verifies a model explaining continuance intention toward this innovative service. Information quality is not influential, while usefulness, system quality, and service quality of MB apps impact satisfaction. The latter is a factor directly explaining continuance intention. The study results also highlight the importance of perceived value as a crucial factor in the success of an MB app, as it enhances satisfaction and the user's continuance intention. This is a theoretical contribution, as perceived value has not been previously verified as a direct antecedent of continuance intention and satisfaction in technology adoption literature.

In the case of MB apps, the impact of system quality on satisfaction showed a strong magnitude. The main elements are MB system security, access convenience, ease of use, and mobility possibilities. Thus, we advise MB apps managers to reinforce app security by applying multi-step entry verification. For instance, the app may request both passwords and fingerprints. To combine convenience and security, eye authentication and fingerprinting may be used successively or simultaneously.

In terms of advertising, the copy strategy should integrate two elements: system quality and security of the application, in addition to the value that can be obtained when using MB apps for transactions (offers, lower fees, timesaving).

Although this research is a worthwhile endeavor in the domain of MB acceptance and usage, like most studies, it is constrained by some limitations. First, the current study's data was gathered using a convenience sample of Saudi bank customers in just two cities (Riyadh and Jeddah). Future research in Saudi Arabia should broaden the geographic scope to include all of the country's cities as well as rural and urban locations. The small size of the sample is another limitation. Future studies should involve a higher number of interviewees. These limitations could have a detrimental impact on the generalizability of the study findings. Thirdly and since only customers provided the information, it accurately showed the demand side. Future research may collect information from bankers and customers that will, respectively, reflect the demand and supply sides. The fourth limitation is the choice of a one-dimensional perspective of value. The multi-dimensional perspective involving the experiential and social aspects of value may reveal other facets of MB apps. Thus, we propose the adoption of Holbrook's axiology of value, which includes eight values following three dichotomies intrinsic vs extrinsic, self-oriented vs others oriented, and active vs reactive (Holbrook, 1999). A fifth limit is the non-verification of the potential mediating effect of satisfaction between continuance intention and characteristics of the MB app, namely perceived usefulness, system quality, and service quality. We propose to investigate this mediation in future research. Lastly, future studies should take into account how other elements of the multi or omnichannel user experience may have an impact, particularly when examining the adoption of self-service technologies.

ACKNOWLEDGMENT

DISCLOSURE STATEMENT

No potential conflict of interest was reported by the authors.

REFERENCES

Al Amin, M., Arefin, M. S., Alam, M. S., & Rasul, T. F. (2022). Understanding the predictors of rural customers' continuance intention toward mobile banking services applications during the COVID-19 pandemic. *Journal of Global Marketing*, *35*(4), 1–24. doi:10.1080/08911762.2021.2018750

Al-Jabri, I. M. (2015). The intention to use mobile banking: Further evidence from Saudi Arabia. *South African Journal of Business Management*, *46*(1), 23–34. doi:10.4102/sajbm.v46i1.80

Al-Jabri, I. M., & Sohail, M. S. (2012). Mobile banking adoption: Application of diffusion of innovation theory. *Journal of Electronic Commerce Research*, *13*(4), 379–391.

Alsmadi, A. A., Shuhaiber, A., Alhawamdeh, L. N., Alghazzawi, R., & Al-Okaily, M. (2022). Twenty years of mobile banking services development and sustainability: A bibliometric analysis overview (2000–2020). *Sustainability*, *14*(17), 10630. doi:10.3390/su141710630

Alzaidi, M. S. (2022). Exploring the Determinants of Mobile Banking Adoption in the Context of Saudi Arabia. *International Journal of Customer Relationship Marketing and Management*, *13*(1), 1–16.

Aslam, W., de Luna, I. R., Asim, M., & Farhat, K. (2023). Do the preceding self-service technologies influence mobile banking adoption? *IIM Kozhikode Society & Management Review*, *12*(1), 50–66. doi:10.1177/22779752211073552

Bagozzi, R. P., & Yi, Y. (2012). Specification, evaluation, and interpretation of structural equation models. *Journal of the Academy of Marketing Science*, *40*(1), 8–34. doi:10.1007/s11747-011-0278-x

Barnes, S. J., & Corbitt, B. (2003). Mobile banking: Concept and potential. *International Journal of Mobile Communications*, *1*(3), 273–288. doi:10.1504/IJMC.2003.003494

Berraies, S., Ben Yahia, K., & Hannachi, M. (2017). Identifying the effects of perceived values of mobile banking applications on customers: Comparative study between baby boomers, generation X and generation Y. *International Journal of Bank Marketing*, *35*(6), 1018–1038. doi:10.1108/IJBM-09-2016-0137

Brown, I., & Jayakody, R. (2008). B2C e-Commerce Success: A Test and Validation of a Revised Conceptual Model. *Electronic Journal Information Systems Evaluation*, *11*(3), 167–184.

Brown, I., Licker, P., & Kashora, K. (2010). Customer Satisfaction with Cell Phone Banking in South Africa. *Americas Conference on Information Systems*, 444. https://aisel.aisnet.org/amcis2010/444

Bui, N., Moore, Z., Wimmer, H., & Pham, L. (2022). Predicting Customer Loyalty in the Mobile Banking Setting: An Integrated Approach. *International Journal of E-Services and Mobile Applications*, *14*(1), 1–22. doi:10.4018/IJESMA.296576

Chang, Y. P., & Zhu, D. H. (2012). The role of perceived social capital and flow experience in building users' continuance intention to social networking sites in China. *Computers in Human Behavior*, *28*(3), 995–1001. doi:10.1016/j.chb.2012.01.001

Chen, C. W. D., & Cheng, C. Y. J. (2009). Understanding consumer intention in online shopping: A respecification and validation of the DeLone and McLean model. *Behaviour & Information Technology*, *28*(4), 335–345. doi:10.1080/01449290701850111

Chen, S. C. (2012). To use or not to use: Understanding the factors affecting continuance intention of mobile banking. *International Journal of Mobile Communications*, *10*(5), 490–507. doi:10.1504/IJMC.2012.048883

Chin, W. W. (1998). *The partial least squares approach to structural equation modeling* (Vol. 295). Modern Methods for Business Research.

Chopra, S., Dwivedi, R., & Sherry, A. M. (2013). Leveraging technology options for financial inclusion in India. *International Journal of Asian Business and Information Management*, *4*(1), 10–20. doi:10.4018/jabim.2013010102

Chopra, S., Sherry, A. M., & Dwivedi, R. (2015). Role of Technology Options for Financial Inclusion: Case Study in India. In P. Ordóñez de Pablos (Ed.), *Technological Solutions for Sustainable Business Practice in Asia* (pp. 1–18). IGI Global. doi:10.4018/978-1-4666-8462-1.ch001

Chung, N., & Kwon, S. J. (2009). The effects of customers' mobile experience and technical support on the intention to use mobile banking. *Cyberpsychology & Behavior*, *12*(5), 539–543. doi:10.1089/cpb.2009.0014 PMID:19772441

Cohen, J. (1988). Statistical Power Analysis (2nd ed.). Psychology Press.

Davis, F. D. (1989). Perceived Usefulness, Perceived Ease of Use, and User Acceptance of Information Technology. *Management Information Systems Quarterly*, *13*(3), 319–340. doi:10.2307/249008

de Matos, C. A., & Rossi, C. A. V. (2008). Word-of-mouth communications in marketing: A meta-analytic review of the antecedents and moderators. *Journal of the Academy of Marketing Science*, *36*(4), 578–596. doi:10.1007/s11747-008-0121-1

DeLone, W. H., & McLean, E. R. (1992). Information systems success: The quest for the dependent variable. *Information Systems Research*, *3*(1), 60–95. doi:10.1287/isre.3.1.60

DeLone, W. H., & McLean, E. R. (2003). The DeLone and McLean Model of Information Systems Success: A Ten-Year Update. *Journal of Management Information Systems*, *19*(4), 9–30. doi:10.1080/07421222.2003.11045748

DeLone, W. H., & McLean, E. R. (2004). Measuring e-Commerce Success: Applying the DeLone & McLean Information Systems Success Model. *International Journal of Electronic Commerce*, *9*(1), 31–47. doi:10.1080/10864415.2004.11044317

Ding, Y., & Straub, D. (2008). Quality of IS in Services: Theory and Validation of Constructs for Service, Information, and System. *International Conference on Information Systems*, 101.

Dwivedi, P., Alabdooli, J. I., & Dwivedi, R. (2021). Role of FinTech Adoption for Competitiveness and Performance of the Bank: A Study of Banking Industry in UAE. *International Journal of Global Business and Competitiveness*, *16*(2), 130–138. doi:10.1007/s42943-021-00033-9

Dwivedi, R., Alrasheedi, M., Dwivedi, P., & Starešinic, B. (2022). Leveraging Financial Inclusion Through Technology-Enabled Services Innovation: A Case of Economic Development in India. *International Journal of E-Services and Mobile Applications*, *14*(1), 1–13. doi:10.4018/IJESMA.289633

Elhajjar, S., & Ouaida, F. (2020). An analysis of factors affecting mobile banking adoption. *International Journal of Bank Marketing*, *38*(2), 352–367. doi:10.1108/IJBM-02-2019-0055

Eneizan, B., Obaid, T., Abumandil, M. S., Mahmoud, A. Y., Abu-Naser, S. S., Arif, K., & Abulehia, A. F. (2023). Acceptance of Mobile Banking in the Era of COVID-19. In *International Conference on Information Systems and Intelligent Applications* (pp. 29-42). Springer. doi:10.1007/978-3-031-16865-9_3

Fornell, C., & Larcker, D. F. (1981). Evaluating structural equation models with unobservable variables and measurement error. *JMR, Journal of Marketing Research*, *18*(1), 39–50. doi:10.1177/002224378101800104

Franque, F. B., Oliveira, T., Tam, C., & de Oliveira Santini, F. (2020). A meta-analysis of the quantitative studies in continuance intention to use an information system. *Internet Research*, *31*(1), 123–158. doi:10.1108/INTR-03-2019-0103

Gan, C., & Wang, W. (2017). The influence of perceived value on purchase intention in social commerce context. *Internet Research*, *27*(4), 772–785. doi:10.1108/IntR-06-2016-0164

Geebren, A., Jabbar, A., & Luo, M. (2021). Examining the role of consumer satisfaction within mobile eco-systems: Evidence from mobile banking services. *Computers in Human Behavior*, *114*, 106584. doi:10.1016/j.chb.2020.106584

Geisser, S. (1974). A predictive approach to the random effect model. *Biometrika*, *61*(1), 101–107. doi:10.1093/biomet/61.1.101

Gelderman, M. (1998). The relation between user satisfaction, usage of information systems and performance. *Information & Management*, *34*(1), 11–18. doi:10.1016/S0378-7206(98)00044-5

Gong, X., Zhang, K. Z. K., Chen, C., Cheung, C. M. K., & Lee, M. K. O. (2020). Transition from web to mobile payment services: The triple effects of status quo inertia. *International Journal of Information Management*, *50*, 310–324. doi:10.1016/j.ijinfomgt.2019.08.006

Gu, J. C., Lee, S. C., & Suh, Y. H. (2009). Determinants of behavioral intention to mobile banking. *Expert Systems with Applications*, *36*(9), 11605–11616. doi:10.1016/j.eswa.2009.03.024

Gupta, S., & Dhingra, S. (2022). Past, present, and future of mobile financial services: A critique, review and future agenda. *International Journal of Consumer Studies*, *46*(6), 2104–2127. doi:10.1111/ijcs.12855

Hair, J. F. Jr, Hult, T. G., Ringle, C. M., & Sarstedt, M. (2014). *A primer on partial least squares structural equation modeling (PLS-SEM)*. Sage Publications.

Hair, J. F. Jr, Joseph, F., Anderson, R. E., & Tatham, R. L. (1998). *Multivariate Data Analysis with Readings*. Macmillan.

Henseler, J., Ringle, C. M., & Sinkovics, R. R. (2009). *The use of partial least squares path modeling in international marketing.* E. G. Limited.

Ho, J. C., Wu, C. G., Lee, C. S., & Pham, T. T. T. (2020). Factors affecting the behavioral intention to adopt mobile banking: An international comparison. *Technology in Society*, *63*, 101360. doi:10.1016/j.techsoc.2020.101360

Holbrook, M. B. (Ed.). (1999). *Consumer value: a framework for analysis and research*. Psychology Press.

Hsiao, W. H., & Chang, T. S. (2014). Understanding consumers' continuance intention towards mobile advertising: A theoretical framework and empirical study. *Behaviour & Information Technology*, *33*(7), 730–742. doi:10.1080/0144929X.2013.789081

Jadil, Y., Rana, N. P., & Dwivedi, Y. K. (2021). A meta-analysis of the UTAUT model in the mobile banking literature: The moderating role of sample size and culture. *Journal of Business Research*, *132*, 354–372. doi:10.1016/j.jbusres.2021.04.052

Jebarajakirthy, C., & Shankar, A. (2021). Impact of online convenience on mobile banking adoption intention: A moderated mediation approach. *Journal of Retailing and Consumer Services*, *58*, 102323. doi:10.1016/j.jretconser.2020.102323

Karjaluoto, H., Glavee-Geo, R., Ramdhony, D., Shaikh, A. A., & Hurpaul, A. (2021). Consumption values and mobile banking services: Understanding the urban–rural dichotomy in a developing economy. *International Journal of Bank Marketing*, *39*(2), 272–293. Advance online publication. doi:10.1108/IJBM-03-2020-0129

Kim, H. W., Chan, H. C., & Gupta, S. (2007). Value-based Adoption of Mobile Internet: An empirical investigation. *Decision Support Systems*, *31*(1), 111–126. doi:10.1016/j.dss.2005.05.009

Laukkanen, T., & Kiviniemi, V. (2010). The role of information in mobile banking resistance. *International Journal of Bank Marketing*, *28*(5), 372–388. doi:10.1108/02652321011064890

Laukkanen, T., & Pasanen, M. (2008). Mobile banking innovators and early adopters: How they differ from other online users? *Journal of Financial Services Marketing*, *13*(2), 86–94. doi:10.1057/palgrave.fsm.4760077

Lee, K. C., & Chung, N. (2009). Understanding factors affecting trust in and satisfaction with mobile banking in Korea: A modified DeLone and McLean's model perspective. *Interacting with Computers*, *21*(5), 385–392. doi:10.1016/j.intcom.2009.06.004

Lee, S., Shin, B., & Lee, H. G. (2009a). Understanding Post-adoption Usage of Mobile Data Services: The Role of Supplier-side Variables. *Journal of the Association for Information Systems*, *10*(12), 860–888. doi:10.17705/1jais.00217

Lin, H. F. (2008). Determinants of successful virtual communities: Contributions from system characteristics and social factors. *Information & Management*, *45*(8), 522–527. doi:10.1016/j.im.2008.08.002

Lin, H. F., & Lee, G. G. (2006). Determinants of success for online communities: An empirical study. *Behaviour & Information Technology*, *25*(6), 479–488. doi:10.1080/01449290500330422

Mbama, C. I., & Ezepue, P. O. (2018). Digital banking, customer experience and bank financial performance: UK customers' perceptions. *International Journal of Bank Marketing*, *36*(2), 230–255. doi:10.1108/IJBM-11-2016-0181

Mortimer, G., Neale, L., Hasan, S. F., & Dunphy, B. (2015). Investigating the factors influencing the adoption of m-banking: A cross cultural study. *International Journal of Bank Marketing*, *33*(4), 545–570. doi:10.1108/IJBM-07-2014-0100

Munir, A. R., Idrus, M., & Kadir, A. R., & Jusni. (2013). Acceptance of Mobile Banking Services in Makassar: A Technology Acceptance Model (TAM) Approach. *Journal of Business and Management*, *7*(6), 52–59.

Noh, M. J., & Lee, K. T. (2015). An analysis of the relationship between quality and user acceptance in smartphone apps. *Information Systems and e-Business Management*, *14*(2), 273–291. doi:10.1007/s10257-015-0283-6

Omoregie, O. K., Addae, J. A., Coffie, S., Ampong, G. O. A., & Ofori, K. S. (2019). Factors influencing consumer loyalty: Evidence from the Ghanaian retail banking industry. *International Journal of Bank Marketing*, *37*(3), 798–820. doi:10.1108/IJBM-04-2018-0099

Parasuraman, A., Zeithaml, V. A., & Berry, L. L. (1988). Servqual: A multiple-item scale for measuring consumer perceptions of service quality. *Journal of Retailing*, *64*(1), 12.

Poromatikul, C., De Maeyer, P., Leelapanyalert, K., & Zaby, S. (2020). Drivers of continuance intention with mobile banking apps. *International Journal of Bank Marketing*, *38*(1), 242–262. doi:10.1108/IJBM-08-2018-0224

Raza, S. A., Umer, A., Qureshi, M. A., & Dahri, A. S. (2020). Internet banking service quality, e-customer satisfaction, and loyalty: The modified e-SERVQUAL model. *The TQM Journal*, *32*(6), 1443–1466. Advance online publication. doi:10.1108/TQM-02-2020-0019

Riquelme, H. E., & Rios, R. E. (2010). The moderating effect of gender in the adoption of mobile banking. *International Journal of Bank Marketing*, *28*(5), 328–341. doi:10.1108/02652321011064872

Rizan, M., Febrilia, I., Wibowo, A., & Pratiwi, R. D. R. (2020). Antecedents of Customer Loyalty: Study from the Indonesia's Largest E-commerce. *The Journal of Asian Finance, Economics, and Business*, *7*(10), 283–293. doi:10.13106/jafeb.2020.vol7.n10.283

Rokhman, F., Mukhibad, H., Bagas Hapsoro, B., & Nurkhin, A. (2022). E-learning evaluation during the COVID-19 pandemic era based on the updated of Delone and McLean information systems success model. *Cogent Education*, *9*(1), 2093490. doi:10.1080/2331186X.2022.2093490

Sanayei, A., & Shaemi, A. (2011). An Analysis of the Factors Affecting Customers Satisfaction and Trust in Mobile Banking (Case Study: Branches of Bank Mellat in Isfahan. *Interdisciplinary Journal of Contemporary Research in Business*, *3*(7).

Seddon, P. B. (1997). A respecification and extension of the Delone and McLean model of IS Success. *Information Systems Research*, *8*(3), 240–253. doi:10.1287/isre.8.3.240

Seddon, P. B., Staples, S., Patnayakuni, R., & Bowtell, M. (1999). Dimensions of information systems success. *Communications of the Association for Information Systems*, *2*, 5. doi:10.17705/1CAIS.00220

Sheth, J. N., Newman, B. I., & Gross, B. L. (1991). Why we buy what we buy: A theory of consumption values. *Journal of Business Research*, *22*(2), 159–170. doi:10.1016/0148-2963(91)90050-8

Singh, S., & Srivastava, R. K. (2020). Understanding the intention to use mobile banking by existing online banking customers: An empirical study. *Journal of Financial Services Marketing*, *25*(3–4), 86–96. doi:10.1057/s41264-020-00074-w

Sohail, M. S., & Al-Jabri, I. M. (2014). Attitudes towards mobile banking: Are there any differences between users and non-users? *Behaviour & Information Technology*, *33*(4), 335–344. doi:10.1080/0144929X.2013.763861

Stone, M. (1974). Cross-validation and multinomial prediction. *Biometrika*, *61*(3), 509–515. doi:10.1093/biomet/61.3.509

Sweeney, J. C., & Soutar, G. N. (2001). Consumer perceived value: The development of a multiple-item scale. *Journal of Retailing*, *77*(2), 203–220. doi:10.1016/S0022-4359(01)00041-0

Tam, C., & Oliveira, T. (2017). Understanding mobile banking individual performance: The DeLone & McLean model and the moderating effects of individual culture. *Internet Research*, *27*(3), 538–562. doi:10.1108/IntR-05-2016-0117

Tandon, A., Aakash, A., & Aggarwal, A. G. (2020). Impact of EWOM, website quality, and product satisfaction on customer satisfaction and repurchase intention: Moderating role of shipping and handling. *International Journal of System Assurance Engineering and Management*, *11*(2), 349–356. doi:10.1007/s13198-020-00954-3

Tenenhaus, M., Vinzi, V. E., Chatelin, Y. M., & Lauro, C. (2005). PLS path modeling. *Computational Statistics & Data Analysis*, *48*(1), 159–205. doi:10.1016/j.csda.2004.03.005

Thye Goh, T., Mohd Suki, N., & Fam, K. (2014). Exploring a consumption value model for Islamic mobile banking adoption. *Journal of Islamic Marketing*, *5*(3), 344–365. doi:10.1108/JIMA-08-2013-0056

Tran, H. T. T., & Corner, J. (2016). The impact of communication channels on mobile banking adoption. *International Journal of Bank Marketing*, *34*(1), 78–109. doi:10.1108/IJBM-06-2014-0073

Wang, Y.-S., & Liao, Y.-W. (2007). The conceptualization and measurement of m-commerce user satisfaction. *Computers in Human Behavior*, *23*(1), 381–398. doi:10.1016/j.chb.2004.10.017

Wang, Y. S., & Liao, Y. W. (2008). Assessing eGovernment systems success: A validation of the DeLone and McLean model of information systems success. *Government Information Quarterly*, *25*(4), 717–733. doi:10.1016/j.giq.2007.06.002

Wang, Y. S., Lin, H. H., & Luarn, P. (2006). Predicting consumer intention to use mobile service. *Information Systems Journal*, *16*(2), 157–179. doi:10.1111/j.1365-2575.2006.00213.x

Wetzels, M., Odekerken-Schröder, G., & Van Oppen, C. (2009). Using PLS path modeling for assessing hierarchical construct models: Guidelines and empirical illustration. *Management Information Systems Quarterly*, *33*(1), 177–195. doi:10.2307/20650284

Wu, J. H., & Wang, Y. M. (2006). Measuring KMS success: A respecification of the DeLone and McLean's model. *Information & Management*, *43*(6), 728–739. doi:10.1016/j.im.2006.05.002

Xu, C., Peak, D., & Prybutok, V. (2015). A customer value, satisfaction, and loyalty perspective of mobile application recommendations. *Decision Support Systems*, *79*, 171–183. doi:10.1016/j.dss.2015.08.008

Yang, S., Lu, Y., Chen, Y., & Gupta, S. (2014). Understanding consumers' mobile channel continuance: An empirical investigation of two fitness mechanisms. *Behaviour & Information Technology*, *34*(12), 1135–1146. doi:10.1080/014492 9X.2014.988176

Yuan, S., Liu, Y., Yao, R., & Liu, J. (2014). An investigation of users' continuance intention towards mobile banking in China. *Information Development*, 1–15.

Zeithaml, V. A. (1988). Consumer perceptions of price, quality, and value: A means-end model and synthesis of evidence. *Journal of Marketing*, *52*(3), 2–22. doi:10.1177/002224298805200302

Zhao, L., Lu, Y., Zhang, L., & Chau, P. Y. (2012). Assessing the effects of service quality and justice on customer satisfaction and the continuance intention of mobile value-added services: An empirical test of a multidimensional model. *Decision Support Systems*, *52*(3), 645–656. doi:10.1016/j.dss.2011.10.022

Zhou, Q., Lim, F. J., Yu, H., Xu, G., Ren, X., Liu, D., Wang, X., Mai, X., & Xu, H. (2021). A study on factors affecting service quality and loyalty intention in mobile banking. *Journal of Retailing and Consumer Services*, *60*, 102424. doi:10.1016/j.jretconser.2020.102424

Zhou, T. (2011). An empirical examination of initial trust in mobile banking. *Internet Research*, *21*(5), 527–540. doi:10.1108/10662241111176353

Zhou, T. (2013). An empirical examination of continuance intention of mobile payment services. *Decision Support Systems*, *54*(2), 1085–1091. doi:10.1016/j.dss.2012.10.034

Zhou, T., Lu, Y., & Wang, B. (2010). Integrating TTF and UTAUT to explain mobile banking user adoption. *Computers in Human Behavior*, *26*(4), 760–767. doi:10.1016/j.chb.2010.01.013

Olfa Bouhlel is an Assistant Professor of Marketing at the 'Institut Supérieur de Gestion de Sousse'. Her main research line is the relationship between marketing and online consumer behaviour. She participated in international conferences of several associations: International Business Information Management Association, and The International Group of E-systems Research and Applications. Her publications have featured in journals as Journal of Internet Business, Journal of Customer Behavior, Innovative Marketing Journal, International Journal of Services, Economics and Management and the International Journal of Electronic Marketing and Retailing.

Karim Garrouch is an associate-professor of management at the College of Administration and Finance, Saudi Electronic University, Saudi Arabia. His research focuses on experiential shopping value, consumer behavior, and ethics in retailing and e-retailing. They have been presented in international conferences and have been published in international journals such as International Journal of Marketing Studies, International Journal of Business and Emerging Markets, International Journal of Business Administration, Journal of Internet Business.

Mohamed-Nabil Mzoughi is a professor of marketing at the College of Business, Dar Al-Uloom University in Riyadh, Saudi Arabia and a former professor at King Saud University. He is a reviewer for numerous scientific journals and international conferences. Dr. Mzoughi supervised many PhD dissertations and published in leading journals such as Internet Research, International Journal of Technology & Human Interaction, International Journal of Business & Emerging Markets, and Journal of Global Information Technology Management. His papers appear in the proceedings of various international conferences.