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Mobile payments for bottom of the pyramid: Towards a positive social change

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ABSTRACT

Mobile payment systems are increasingly seen as the lifeline of an economy and recognized as a harbinger of financial inclusion for the bottom of the pyramid (BoP). The present study aims to examine key antecedents of continued intention to use mobile payments by the BoP segment, which has shown increased usage of mobile payments. Whether this trend will lead to continued usage of the same is a moot point. To explore this, we collected data from 387 BoP respondents (auto drivers, cab drivers, local food vendors, street vendors, and others) and analyzed the data using structural equation modeling (SEM). Following the attribute-consequence-value approach of mean end theory (ACVMET), an empirical model is employed to test the effect of perceived value and service quality on continuance intention. We also examine the influence of perceived risk as a moderator in the relationship. Findings suggest that service quality is influenced by attribute-based variables that impact perceived value and continuance intention. The significant moderating role of perceived risk is also confirmed. The implications of the study for mobile payment service providers have been discussed.

1. Introduction

The advancement of digital platforms in emerging markets, such as India (Kautish et al., 2023), has led to the evolution of various digital or mobile-based services, including Mobile Payment Systems (MPS) for consumers. A few studies have shown that mobile payments are important for bottom of the pyramid (BoP) users (Senyo et al., 2022; Shukla et al., 2023) due to their high convenience and easy accessibility (Glavee-Geo et al., 2020). MPS is known as "a type of payment transaction processing in the course of which, within an electronic procedure, the payer (at least) uses mobile communication techniques in conjunction with mobile devices for the initiation, authorization, or completion of payment" (Jaradat et al., 2018). Many MPS utilise QR (quick response) technology to streamline transactions and let users follow their process easily. In 2024, mobile payments will exceed USD 1.40 trillion (CIO and Leader, 2020). Purohit and Arora (2021) identified MPS as the lifeline of an economy and a source of financial inclusion for the poor. BoP groups like street sellers started using mobile payment systems due to the launch of Indian government's Bharat Interface for Money (BHIM) app in 2016, which uses the unified payment interface that instantly do mobile payments.

According to Prahalad (2012, p. 6), "BoP consumers earns up to $2". Several studies have examined the behavioural intentions of these consumers in emerging markets towards new technologies. These studies include the work of Odoom and Kosiba (2020), Purohit et al. (2021), and Neelam and Bhattacharya (2023). However, as Akter et al. (2021) discuss, there is a dearth of research that specifically examines the factors that influence BoP consumers' continued intention, particularly in the context of mobile payment systems (MPS), as Glavee-Geo et al. (2020) discuss. The majority of these studies indicate that these customers possess distinct needs that vary from those of middle-of-the-pyramid consumers. Recent research has, however, shown that BoP users have comparable lifestyles to other consumers and seek similar value and quality of services (Howell et al., 2018; Maity and Singh, 2021). Subrahmanyan and Tomas Gomez-Arias (2008) described BoP markets as smart, value conscious, and cultured and urbane when

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choosing goods and services. However, the digital divide, limited connectivity to the internet, and poor service quality hinder MPS' capacity to effectively engage with BoP users. These factors hinder the continuous use of a technology (Li and Shang, 2020; Abbasi et al., 2022). These results underline the need to understand BoP consumers' perspectives regarding MPS in addition to the significance of other critical factors, such as perceived value and service quality, that support continued usage of these services. This study thoroughly examines these dimensions.

After reviewing the existing literature, the study identifies some gaps in the literature on MPS: First, past studies confirm the potential of MPS for growth, and academic researchers have talked about its initial or continued usage (Glavee-Geo et al., 2020; Fu et al., 2022; Singh et al., 2022; Hussain et al., 2019). There are also a few new insights, such as post-COVID consumer shifts (Vinerean et al., 2022), adoption across various demographics, i.e., older generations (Sinha and Singh, 2022), and renewed adoption (Bhatia et al., 2022). However, the use of MPS for the BoP sections is in an emerging state (Purohit and Arora, 2021). Second, recent studies showed the potential of MPS, to promote financial inclusion for individuals at the BoP (Hasan et al., 2019; Gupta and Kanungo, 2022). However, as a result of the digital divide, the efficiency with which MPS can continue to meet the needs of its users is severely restricted. A review of literature on the post-consumption behaviour of a new technology (Jun et al., 2018; Purohit et al., 2022) found that there is a dearth of research on the drivers of continued intention of MPS in the Indian BoP context (Purohit et al., 2022).

Third, UTAUT, TAM, and TPB are among the most commonly used technology-based theories in the literature on BoP that focus entirely on the initial adoption behaviour of consumers (Purohit and Arora, 2021; Purohit et al., 2022). Most of these studies observed the adoption of services by BoP consumers, such as mHealth services, mobile phone or smart phone adoption, etc. (Akter et al., 2013; Baishya and Samalia, 2020), with very little research on MPS (Hussain et al., 2019) and continued intention drivers (Glavee-Geo et al., 2020). The literature has not extensively explored the demand of BoP consumers for service quality and comparable value to other segments (Maity and Singh, 2021). Most studies assessing the consumer's value perception after consumption of the product are not context-specific (Singh et al., 2020b; Fu et al., 2022; Abbasi et al., 2022; Wang, 2022), with very sparse technology-based literature on examining value creation in the BoP consumers' context (Akter et al., 2021). These customers may seek higher quality and become more value-conscious, as reflected by past studies (Subrahmanyan and Tomas Gomez-Arias, 2008). Thus, this study believes that BoP consumers continued usage of services may be based on factors such as quality and perceived value.

Next, a few recent studies argue that the utilisation of technology has the potential to improve the accessibility and affordability of high-quality services for the BoP sector, thereby improving consumer well-being (Shukla et al., 2023). This emphasizes the need to determine MPS service features that may affect BoP users' values and continued intention, which has not been widely studied. The attribute-consequence-value approach of mean end theory (ACVMET) provides a paradigm for analyzing MPS' continued intention. Research on ACVMET to measure how consumer values are related to MPS service attributes and benefits and its impact on continued intention behaviour is still ongoing for BoP consumers (Kabengele and Hahn, 2021), with little discussion on the association of these three crucial dimensions. We aim to extend the ongoing research (Kabengele and Hahn, 2021) on how consumer values are related to service attributes and how perceived value and service quality affect consumers' continued intention using the ACVMET approach.

Finally, Prahalad (2012) stated that BoP consumers' socio-cultural contexts, literacy levels, lack of access to, and inadequate training for such services made the technology innovation process critical. This may affect their risk perception and create worries about utilizing a new technology, especially among illiterate or semi-literate BoP users (Kansal, 2016; Purohit and Arora, 2021; Neelam and Bhattacharya, 2023). Risk perception may negatively impact BoP consumers' views of payment service simplicity and convenience, impacting their behavioural intentions (Savas-Hall et al., 2022). Thus, entering this market may require a strategy that emphasizes perceived value, service qualities, and risk perception mitigation. Past studies have focused on increasing BoP awareness and reaching for new technological offerings (Hussain et al., 2019). Still, the justification for comprehending the continuing behaviour of these consumers to facilitate long-term social changes towards advanced technology is sometimes considered counter-intuitive and, as a result, has received limited research attention. (Howell et al., 2018; Attri and Bapuji, 2021).

In order to address these research gaps, the present study attempts to identify the factors that are particularly pertinent and applicable for the continuous use of MPS by customers belonging to the BoP. In this regard, the study proposes the following research objectives (RO):

RO1: To determine the factors influencing BoP consumers' perceptions of MPS service quality.

RO2: To find out how service quality and perceived value affects BoP consumers' continued intention to use MPS.

RO3: To determine the effect of risk perception on BoP consumers' continued intention to use MPS.

To achieve these objectives, the study surveyed 387 BoP consumers (food vendors, hawkers, vegetable vendors, car washers, tailors, and many others) using SPSS 20 and AMOS 18. These respondents were contacted using the non-probability sampling technique by approaching municipal offices, mobile payment vendor premises, local markets, and other mass places. The study makes a significant contribution to practice, as the results would enable marketers to isolate the criteria considered important by loyal users and would lead to better design of features that may help companies retain the BoP segment. The remaining part of the document proceeds as follows: At the outset, a review of the literature as well as the proposed hypotheses is presented. Thereafter, the research model, drawn from a literature review, is put forward. The methodology section follows next, and analysis of the data and discussion of the findings are provided next. In conclusion, the study's implications and suggestions for future studies are discussed.

2. The theoretical background and hypotheses' development

2.1. Background of technology continued research in BoP context

In the emerging market context, a few studies talked about the behavioural intention of BoP consumers towards new technologies (Odoom and Kosiba, 2020; Akter et al., 2021; Purohit et al., 2021; Neelam and Bhattacharya, 2023), with limited studies that explained BoP consumers' continued intention drivers (Akter et al., 2021), particularly in the context of MPS (Glavee-Geo et al., 2020). Continuous usage of MPS indicates "a usage stage when using mobile payments becomes part of normal routine activity" (Purohit and Arora, 2021). Odoom and Kosiba (2020) assessed the continued intention to use mobile money services by microenterprises. In the context of BoP consumers, a study by Hussain et al. (2019) confirmed that the BoP segment does not want to rely on banks and gain experience with mobile payment services, ultimately turning the experience into a habit and continuing to use the service. In the BoP context, we have a dearth of similar research. Further, recognizing BoP consumers as quality-driven and value-conscious consumers (Maity and Singh, 2021; Purohit et al., 2021), there is an enhanced need to understand these variables for their long-term association with the service (Zeithaml et al., 2020). In this regard, Akter et al. (2013) explained that perceived service quality and trust are the most influential drivers of continued intention to use mHealth services by BoP consumers using expectation confirmation theory.

The present study is significant as we assess the drivers of service quality and measure their importance for BoP consumers. We include

perceived enjoyment, simplicity, and interactivity as antecedents of service quality, which were found inappropriate in the literature for mHealth services (Akter et al., 2013) but crucial for MPS (Glavee-Geo et al., 2020). Further, unlike previous studies, we explain the association between service quality and consumers' perceived value by highlighting the multidimensional character of the value construct and suggesting that it incorporates multiple concepts, including quality, using the ACVMET concept (Zeithaml et al., 2020; Zietsman et al., 2020). Literature has largely explored these variables independently, with inadequate discussion on the direct association between both variables.

Furthermore, risk perception has been identified as a significant factor influencing consumer intentions (De Kerviler et al., 2016; Purohit and Arora, 2021), and this appears to be a concern among Indian consumers as well (Pal et al., 2020), particularly among the largely illiterate or semi-literate BoP users (Kansal, 2016; Purohit and Arora, 2021; Neelam and Bhattacharya, 2023). Researchers have reported that perceived risk may have a negative effect on BoP consumers' perceptions about the ease and convenience of payment services, which impact their behavioural intentions (Kansal, 2016; Savas-Hall et al., 2022). It is our contention that the risk perceptions may be antithetical to these consumers' continued intentions due to low literacy and fear of losing money (Neelam and Bhattacharya, 2023). Perceived risk has been used as a moderator in past work (Schmidthuber et al., 2020; Purohit and Arora, 2021; Belanche et al., 2022) regarding adoption. Therefore, in this paper, we propose to introduce perceived risk as a moderator in the association between service quality, perceived value, and the desire to continue using mobile payment services. Table I provides an overview of studies on continued intention in varied contexts, including BoP.

2.2. Continued intention to use MPS -an attribute-consequence-value approach of mean end theory (ACVMET)

The present study is influenced by mean-end theory to explain the psychological process through which consumers perceive the attributes, consequences, and values linked with the product or service, represented by the attribute-consequence-value approach (Shen, 2021). The theory assumes that consumers adopt a product to realize greater value and purpose that connect with their psychology. The approach connects three layers, ranging from tangible attributes, values and desired consequences for consumers (Sankaran and Chakraborty, 2021). The first layer includes attributes that can be tangible or intangible features of a service. Dabholkar (1996) extended the service attributes framework using Zeithaml's (1988) work, based on the mean-end model, where the perspective on quality has been examined through the lens of consumers rather than service providers. Subsequently, a number of scholars, such as Shamdasani et al. (2008), Xu et al. (2021), and Pai et al. (2022), have conducted research in the context of technology-based self-service options. Shamdasani et al. (2008) and Pai et al. (2022) have included a few salient dimensions constituting service quality attributes and established the influence of those attributes on continued interaction, mediated by perceived value and satisfaction. While these studies examined the role of various drivers of service quality such as functionality, ease of use, reliability, enjoyment, assurance, customization, control, etc., we have employed three specific antecedents of quality in the current study based on a literature review (Al-Qudah et al., 2022; Pai et al., 2022). We postulate that reliability is a predictor of dissatisfaction and does not affect satisfaction to that extent. We contend that ease of use and user control are basic characteristics of MPS that are expected benefits for its adoption that consumers would anyway look for in any mobile payment service (Maity and Singh, 2021). We posit that factors such as simplicity, interactivity, and perceived enjoyment can give MPS a competitive advantage and positively impact customers' perceptions of service quality, leading to continued use (Pai et al., 2022; Park et al., 2022).

The second layer includes values, which are defined as personal values that a person uses to define what is important and meaningful (Reynolds and Olson, 2001). Consumer value perceptions have been found to play an important role in determining their intent to continue using MPS (Lin et al., 2020; Park et al., 2022; Savas-Hall et al., 2022). With respect to mobile payments, studies influenced by the ACVMET approach have conceptualized perceived value along three dimensions: utilitarian (e.g., convenience of mobile payment functions), emotional (hedonic value because of feelings generated by mobile services), and social (enhanced self-conception due to adoption of mobile services) (De Kerviler et al., 2016; Sankaran and Chakraborty, 2021). Past studies have largely considered perceived value as a unidimensional construct, primarily following Zeithaml's (1988) proposition that this is based on the overall assessment of the utility of the product (Shamdasani et al., 2008; Zeithaml et al., 2020; Pai et al., 2022). However, based on multidimensional perceived value theories, namely mean-end theory (Pastuszak et al., 2019; Zietsman et al., 2020), perceived value is conceptualized as utilitarian benefits, functional benefits, emotional benefits, and values derived after consumption of the product (Singh et al., 2020b). This theory was widely used to assess consumers' perceived value in relation to their intention to use service technologies (Pal and Triyason, 2018; Kabengele and Hahn, 2021). In this context, studies have indicated the multidimensional nature of the construct, suggesting that it embedded various concepts, including quality, confirmation, benefits, price, performance, etc., in the context of technology services, including the ACVMET approach (Tan et al., 2013; Zeithaml et al., 2020; Zietsman et al., 2020).

Finally, regarding the third layer that connects attributes and values to achieve higher-order consequences (Sankaran and Chakraborty, 2021), existing research has identified several service attributes that influence perceived value regarding technology-based services. Xu et al. (2021, p. 717–723) emphasized that the "means-end theory is an exchange theory that defines value in terms of economic benefits, efficiency, progress, and service quality". When these ends are achieved, consumers feel satisfied and show a willingness to continue using technology services like e-commerce. While assessing the continued intentions of customers for MPS, several studies established the effect of perceived value on continued use (Lin et al., 2020; Pai et al., 2022). Further, perceptions regarding the quality of services have an impact on

Table I
Literature review.

Researcher/year	Antecedents of continued intention to use	Study context
Franque et al. (2023)	Task-technology fit, satisfaction, value, competence, benevolence	Mobile payments continuance intention
Akter et al. (2021)	Value co creation, value in use, quality	Digital platforms adoption (BoP)
Purohit et al. (2022)	UTAUT, subjective well-being	Mobile payments continuance intention
Wang (2022)	Value perception	Mobile service adoption
Savas-Hall et al. (2022)	Lack of trust, awareness, affordability, availability	Mobile service adoption
Purohit and Arora (2021)	Perceived usefulness, perceived ease of use, attitude, perceived risk	Mobile banking adoption in India (BoP)
Lin et al. (2020)	Perceived value, social norms, social self-image	Mobile payment services in Taiwan
Glavee-Geo et al. (2020)	Perceived risk, UTAUT variables	Mobile money continued usage (BoP)
Pal et al. (2020)	Price benefit, network externality, trust, habit, perceived risk, unavailability of facilitating conditions and operational constraints	Mobile payment services in India
Jun et al. (2018)	Perceived value	Mobile payment service in south Korea
Akter et al. (2013)	Perceived usefulness, service quality, trust, satisfaction, confirmation	mHealth services (BoP)

Source: developed by authors.

the perceived value of customers (Abbasi et al., 2022; Pai et al., 2022). Certain studies have explored service quality as an antecedent of perceived value (Özkan et al., 2020; Purohit and Arora, 2021). With regard to mobile value-added services, Li and Shang (2020) established the influence of service quality on perceived value. In India, Raman and Aashish (2021) discovered the significant impact of service quality on the intention to continue using mobile payments. However, there is a need to examine consumers' attribute-consequences-value processes for mobile payment services in the context of BoP like India. The present study aims to fill this gap in the existing literature. Therefore, we propose to investigate this association in the current study.

The hypotheses for the study are developed in the following subsections:

2.3. Hypotheses development

2.3.1. Simplicity

The satisfaction of consumers would depend on the kind of experience they have using the product or its usability (Lee et al., 2015a; Park et al., 2022). The characteristic of simplicity has been recognized as a factor that could enhance the market acceptance of a mobile payment system (Jun et al., 2018; Pai et al., 2022). Verkijika and De Wet (2019) found that consumers develop positive perceptions of the ease of use of mobile payment services and have positive experiences when they find the system to be simple to use. Previous studies have defined simplicity as user-friendliness and have demonstrated its significant influence on consumers' emotions (Al-Qudah et al., 2022). John Maeda from the MIT media lab has proposed that simplicity is a crucial aspect of interface design (Lee et al., 2007). The less educated segments of the BoP would benefit from a simplified mobile payment experience that minimizes complexity and uncertainty (Amin et al., 2018; Senyo et al., 2022). We contend that the simplicity of a mobile payment system may lead to a favorable perception of its quality among BoP consumers. Therefore, we put forward the following hypothesis:

H1. Simplicity positively influences the service quality of mobile payments.

2.3.2. Interactivity

Lee et al. (2015b, p. 296) refer to interactivity as "a state experienced by a user during his or her engagement with a mobile phone that subsequent perceived performance quality". In this study, interactivity is defined as the user's experience with the features and technology of the mobile payment system during the interaction process. Previous research suggests that consumer satisfaction is influenced by the type of experience and usability of a product (Kang et al., 2021). Therefore, it is crucial for consumers to have a positive interactive experience with the mobile payment system (Park and Yoo, 2020). In the case of the BoP user, multilingual content, which may include information in local languages, also enhances the consumer experience (Baishya and Samalia, 2020). Wang et al. (2019) investigated the influence of MPS interaction quality on consumer trust in the service, which is a key factor in determining service quality. A more interactive mobile payment system may lead to a higher perceived service quality by users (Kang et al., 2021). Therefore, we propose the following hypothesis:

H2. Interactivity positively influences service quality of mobile payments.

2.3.3. Perceived enjoyment

This has been referred to as "an intrinsic motivation that emphasizes the usage process and reflects the pleasure and enjoyment associated with using a system" (Praveena and Thomas, 2014; Pai et al., 2022). Also, perceived enjoyment has been defined as "the extent to which the activity of using a specific system is perceived to be enjoyable in its own right, aside from any performance consequences resulting from system use" (Lee et al., 2015b; Park et al., 2022). Previous work in the domain of information systems and technology has highlighted the role of intrinsic motivation factors (including perceived enjoyment) in influencing consumers towards using new systems and applications (Al-Qudah et al.,2022; Pai et al., 2022). Park et al. (2022) have found a significant impact of enjoyment, along with reliability and compatibility, considered critical service quality attributes, on customer satisfaction regarding technology-based self-service options. Similarly, De Leon et al. (2020) reported that perceived enjoyment and customization are among the most significant dimensions of service quality, which in turn have a significant influence on the perceived value of consumers. Hence, we propose the following hypothesis:

H3. Perceived enjoyment positively influences service quality of mobile payments.

2.3.4. Service quality and perceived value

Service quality is based on customer expectations and confirmation of the performance of a product (Xu et al., 2021; Pai et al., 2022). Service quality and perceived value have been considered distinctive variables to evaluate customers' opinions about a technology service (Shamdasani et al., 2008; De Leon et al., 2020). However, some studies have suggested that service quality is a predictor of perceived value (Özkan et al., 2020; Purohit and Arora, 2021) and a component of a technology service's overall value evaluation (Li and Shang, 2020).

Zietsman et al. (2020, p. 721) provided empirical support for the multidimensional aspect of perceived value and offered a definition of "perceived value as a tradeoff between price and quality". Studies indicated that service quality contributes to perceived value by assessing customer value in exchange for the expectations and costs of digital services (Sankaran and Chakraborty, 2021). According to Tan et al. (2013), service quality may be value-oriented and measured based on the customer's evaluation of benefits and costs. Lee (2020) has utilized the service quality dimensions (expectations and disconfirmation) using the value-oriented approach to measure their effect on perceived value. As indicated by recent literature on the ACVMET approach and multidimensional nature of perceived value (Pastuszak et al., 2019; De Leon et al., 2020; Kabengele and Hahn, 2021), we propose the following hypothesis:

H4. Service quality positively influences perceived value regarding mobile payments.

2.3.5. Service quality and continued intention to use

Literature abounds in studies pertaining to service quality (Tan et al., 2013; Xu et al., 2021). Various dimensions of service quality, including responsiveness, reliability, tangibility, assurance, empathy, product quality, corporate quality, etc., have been discussed, and their relevance has been assessed in specific industry contexts (De Leon et al., 2020). Some studies have tested the importance of these dimensions and assessed their positive impact on customers' commitment (indicated through loyalty, satisfaction, continued intention, etc.) (Pai et al., 2022; Park et al., 2022). Service quality is considered an important dimension to evaluate customers' actions and loyalty (De Leon et al., 2020; Senyo et al., 2022). These studies asserted that service quality is measured based on customer experience and product performance, and when it matches customer expectations and perceptions related to the product, it leads to high customer satisfaction, a willingness to recommend, and continued usage of the service (De Leon et al., 2020).

Quality of service delivery was found to influence users' perceptions regarding mobile payments (De Leon et al., 2020). According to Li and Shang (2020), poor service quality motivates consumers to stop the use of a service or discourage reuse. Regarding BoP consumers, it was pointed out that BoP consumers are considered to be value conscious, and quality of service plays a role in affecting their intention to use such services (Maity and Singh, 2021). According to Jalis et al. (2023), if service providers enhance their service quality, this may serve as a building block for boosting perceived values and leading to continued

usage of mobile payments due to an improvement in users' experiences. Therefore, we propose the following hypothesis:

H5. Service quality positively influences continued intention to use mobile payments.

2.3.6. Perceived value

From a customer's point of view, achieving value through a purchase is significant, and this is evaluated based on the trade-off between benefits and costs (Zeithaml, 1988; Savas-Hall et al., 2022). According to the ACVMET, perceived value is considered a multidimensional construct that talks about the utilitarian, emotional, and social attributes of a service. When these attributes match consumers' experiences and perceptions, they lead to high usage of services (Sankaran and Chakraborty, 2021). Subsequent studies found high relevance of the concept and a positive relation between the variables studied (linking attributes with consumer values) and consumer commitment towards digital technologies (Zeithaml et al., 2020; Singh et al., 2020b; Kabengele and Hahn, 2021; Pai et al., 2022).

Similarly, the means-end theory of perceived value has discussed product attributes and their role in achieving the desired state of experience by consumers (Xu et al., 2021). De Kerviler et al. (2016) explains value in terms of quality, confirmation of expectations, and consumer needs. When these ends are achieved, consumers feel satisfied and show a willingness to continue using mobile payment services (Pai et al., 2022). Studies based on ACVMET confirm that perceived value could serve as a predictor of consumer purchase intentions and shape consumers perceptions of attributes of a service like mobile payment services (De Kerviler et al., 2016; Pastuszak et al., 2019; Senyo et al., 2022). The ACVMET has been used to define the customer value hierarchy model that indicates and compares desired and received value (Pastuszak et al., 2019; Zietsman et al., 2020). When these values match, perceived value and the consumer experience get enhanced, leading to high satisfaction and the intention to use digital services. Therefore, we propose:

H6. Perceived value positively influences continued intention to use mobile payments.

2.3.7. Perceived risk

Chen et al. (2022) describe the concept of perceived risk as perceived negative outcomes arising from the use of a new product or service that increase resistance. Thus, in their view, when outcomes are unknown or perceived as risky, as in the case of technology adoption, perceived risk negatively influences the intentions and behaviors of consumers (Savas-Hall et al., 2022). The majority of studies contend that user fear and anxiety reduce the perceived value of technology services, influencing users' intentions to use such services (Singh et al., 2020a; Purohit et al., 2022; Neelam and Bhattacharya, 2023). Regarding mobile payments, several studies have explored the perceived risk of consumers while using the service (De Kerviler et al., 2016; Savas-Hall et al., 2022). It has been pointed out that the risks associated with mobile payments may involve both financial as well as privacy risks since consumers could be wary of misuse of personal information, fraudulent uses, and transaction errors (Mogaji and Nguyen, 2022; Neelam and Bhattacharya, 2023). Certain studies demonstrate that perceived risk enhances consumer disbelief or distrust in the service and leads to a reduction in intention or reuse of such services (Belanche et al., 2022; Glavee-Geo et al., 2020). Hence, we propose:

H7. Perceived risk negatively influences continued intention to use mobile payments.

2.3.8. Moderating role of perceived risk

Customers seek ambiguity or uncertainty in evaluating attributes and the quality of products, which leads to perceived risk and affects their decision-making (De Kerviler et al., 2016; Jaradat et al., 2018; Chen et al., 2022). Such ambiguities in decision-making lead to avoidance or discontinuation of use of the products or services (Belanche et al., 2022). According to Moon and Armstrong (2020), the service quality of a service is evaluated on both tangible and intangible aspects of perceived risk, which in turn significantly influence revisit intention towards e-commerce services. Perceived risk is related to future costs or risks such as the product not performing as per expectations, indicating lower service quality and a lower intention to use the product (Purohit et al., 2022). The authors confirmed the significant negative effect of perceived risk on service quality on consumers' decision-making or willingness to purchase (Savas-Hall et al., 2022). Perceived risk is considered a multidimensional construct that consists of financial, product, or information risks (Moon and Armstrong, 2020), which are important antecedents of users' perceptions regarding the quality of services. This may further influence their decisions due to the uncertainty or risk associated with technology usage. High risk leads to more searches about the quality of the product, ultimately delaying and affecting the consumer's intention to use the service (Lee et al., 2021). Service quality can be explained as the overall evaluation of a service that forms favorable consumer expectations towards the service (Jaradat et al., 2018; Belanche et al., 2022). However, when users perceive the service as risky, they ignore its features or quality and ultimately avoid using such services (Purohit et al., 2022). Hence, we propose:

H8a. Perceived risk negatively moderates the influence of service quality on continued intention to use mobile payments.

Several studies have explored dimensions of customer personal value, and these include perceived risk as an important variable (Singh et al., 2020a). Perceived value is measured as a tradeoff between current quality received and price paid (Pal and Triyason, 2018; Lin et al., 2020). When a consumer expects future costs to be high and risky, as well as greater than the derived benefits, their perception of perceived value and intention to use the product get reduced (Wang et al., 2019). According to them, under different risk levels, the perceived value of a service may change, which may influence consumers purchase decisions. Such future shifts or uncertainties are defined as "perceived risk," where consumers assess perceived value based on uncertain or different risks associated with the product (Singh et al., 2020b). This means that in a riskier environment, consumers may retract their intent to consume a product or service, even if they perceive the product to have high or positive values linked to it (Zietsman et al., 2020). Many studies have used perceived risk related to privacy and service performance as a moderator (Chiu et al., 2014; Wang et al., 2019) and observed a negative impact on customer value (Purohit et al., 2022). The rationale behind arguing that perceived risk may have a moderating effect is conditional on the risk associated with the use of mobile payments. We contend that if the risk perceptions of users about performance are high, then even high service quality and high perceived value would not induce the user to continue using mobile payments. In other words, the positive impact of consumer values on their willingness to continue using MPS will decline as perceived risk rises. We anticipate it to be true in the context of BoP consumers:

H8b. Perceived risk negatively moderates the influence of perceived value on continued intention to use mobile payments.

Based on the above, research model is proposed as follows (Fig. I):

3. Research methodology

3.1. Data collection and demographics

Street vendors in Delhi and the NCR (national capital region) in India were the subject of this study, as they have a strong presence in the city (Chopra, 2019). According to official figures from the municipal corporation of Delhi, there are roughly around 1,25,000 vendors, of which around 30 % are women (Sekhani et al., 2019). The data collection

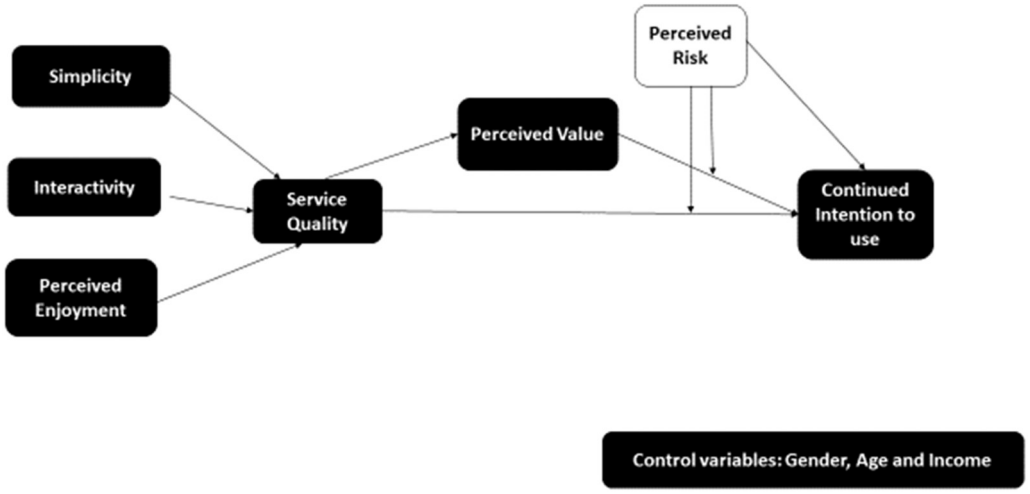


Fig. I. Proposed framework.

process was structured into the following phases: At the outset, we conducted a pilot study on 50 BoP respondents using the individual administration method to check the appropriateness of the scales as well as evaluate possible improvements to the questions. These 50 respondents were existing users of mobile payment services and were approached through personal references. These were auto drivers, cab drivers, local food vendors, street vendors, etc., and were approached at various places in Delhi/NCR. During the second stage, the survey instrument was personally administered to 600 respondents during the months of June and December 2021. There is a lack of a sampling frame to reach these respondents, so we used a non-probability sampling procedure to collect the data. These respondents were selected at different local marketplaces, mobile payment vendor premises, bus stands, railway stations, and many more such mass-residing places using standardized questionnaires. Respondents were explained the purpose of the study and asked for their consent to participate in the study. Also, data was collected at different times or days of the week.

In the present study, we define existing users as "those who have more than 6 months of usage experience with mobile payments." The questionnaires were not administered to non-users of smartphones, mobile payment apps, or existing users with usage experience of <6 months. To ensure that the criteria were met, there was an initial query ascertaining whether respondents were existing users or non-users of smart phones and mobile payment apps. The questionnaire automatically ended once a respondent chose the "non-user" option or the "existing users with usage experience of less than 6 months" option. After checking the data for completeness, 387 complete forms were collected and compiled. These responses were considered appropriate and used for the analysis. Out of 387 respondents, 56.3 % were male, and the rest were female. Around 67 % of respondents were <25 years old, and the remaining were >25 years old. The usage experience of 50 % of respondents was between 1 and 3 years, and the remaining 50 % had usage experience of >3 years. Out of these respondents, around 56 % are using MPS for less than or >1 transaction per month. The use of MPS is largely done for fund transfers (26 %), checking account balances (29 %), paying bills and fees (17 %), and other related transactions. According to Bentler and Chou (1987), the sample size requirement is measured based on the ratio of sample size to the number of parameters for normal distributions. This value is estimated to be 17.59 in our case with 22 items, which is greater than the threshold value of 5:1. Hence, the minimum sample size criteria are met.

We used 7-point Likert scales, ranging from strongly disagreeing (1 point) to strongly agreeing (7 points). The present research utilized seven constructs: perceived risk, simplicity, service quality, perceived value, interactivity, perceived enjoyment, and continued intention. Scales for simplicity and interactivity were influenced by the work of Lee et al. (2015b). A scale of service quality has been drawn from Shamdasani et al. (2008). The perceived value scale has been taken from Rita et al. (2018). The scale suggested by Praveena and Thomas (2014) on perceived enjoyment has been used in the present study. Scales pertaining to the moderating variable "perceived risk" were adopted from Schmidthuber et al. (2020). Finally, the continued intention scale has been adapted from Bhattacherjee (2001). Scale items are presented in Appendix A. Furthermore, to control the socio-demographic differences, the survey questionnaire contained three control variables: gender, age, and monthly income of existing users of mobile payment apps.

4. Results

4.1. Measurement model

We have used structural equation modeling (SEM) in AMOS 18 to measure the proposed framework. SEM is a widely used technique to perform multivariate analysis on cross-sectional data. It is also used to examine the fitness of empirical models (Bagozzi and Yi, 2012). To measure reliability and validity, techniques such as composite reliability, convergent validity, and discriminant validity have been utilized. To remove low factor loading (loadings <0.7) items, we have used exploratory factor analysis (EFA), which helped in reducing 29 items to 22 items. EFA results were confirmed with a Kaiser-Meyer-olkin value of 0.951, which is considered good. Bartlett's test of sphericity, as suggested by Bartlett (1954), shows a very low value (0.000). Cronbach's alpha coefficient for various constructs was found to be in the range of 0.72 to 0.88. The threshold value considered for the coefficient was 0.70. Based on Hair et al. (2010), our scales are reliable since composite reliability (CR) was found to be >0.7. To test its validity, the average variance extracted (AVE) was measured and found to be higher than 0.5. Maximum shared variance (MSV) and average shared variance (ASV) values were found to be low in comparison to AVE values. In addition, we calculated the descriptive values (mean, skewness, and kurtosis) of all the scales. As per the data, all the values fulfil the normality criteria with negative skewness in Table II.

To measure the issue of common method bias (CMB), the single-factor process developed by Harman's was used. We used unrotated factor analysis in EFA with principal components and found the variance to be 43.19 %. This value is less than the accepted value of 50 % and shows no sign of CMB. Table III shows the square root of the AVE value for each antecedent, which is found to be greater than its related correlation coefficients to confirm validity. In addition, to assess the probability of multi-collinearity issues, we found the variance inflation

Table II
Constructs robustness.

Determinants	Cronbach's alpha	AVE	CR	MSV	ASV	Standardized FL range	Mean	SD	SKEW	KURT
SIMP	0.859***	0.727	0.841	0.455	0.247	0.865–0.840	4.57	1.66	−0.361	−0.852
SERVQUAL	0.764***	0.673	0.859	0.522	0.331	0.747–0.876	4.02	1.34	0.090	−0.608
PERENJOY	0.729***	0.592	0.852	0.588	0.337	0.700–0.829	4.71	1.50	−0.516	−0.456
INTERACT	0.884***	0.662	0.886	0.588	0.316	0.892–0.781	5.00	1.43	−0.698	−0.187
PERRISK	0.756***	0.656	0.850	0.570	0.267	0.759–0.856	4.05	1.49	−0.142	−0.744
PERVALUE	0.869***	0.681	0.864	0.555	0.322	0.827–0.866	4.76	1.48	−0.557	−0.442
CONUINT	0.884***	0.653	0.848	0.555	0.328	0.723–0.882	4.90	1.42	−0.687	−0.138

*** p < 0.01; ** p<0.05; * p<0.10.

Table III
Construct correlations and average variance extracted.

	SIMP	SERVQUAL	PERENJOY	INTERACT	PERRISK	PERVALUE	CONUINT
SIMP	**0.852**						
SERVQUAL	0.669	**0.820**					
PERENJOY	0.606	0.716	**0.769**				
INTERACT	0.619	0.728	0.767	**0.813**			
PERRISK	0.384	0.649	0.755	0.597	**0.809**		
PERVALUE	0.624	0.726	0.692	0.695	0.667	**0.825**	
CONUINT	0.675	0.728	0.698	0.695	0.640	0.745	**0.807**

Diagonal bold values are Average Variance Extracted square root values.

factor (VIF) to be <10 and the tolerance value to be higher than 0.10. There is no issue of multi-collinearity in the sample.

Finally, the study measured fit indices for both the measurement model and structural models (Table IV). For the measurement model, the study found all the values above the threshold values (/df = 2.66, GFI =0.886; AGFI =0.839; RFI =0.878; CFI =0.938; NFI =0.906; TLI =0.919; RMSEA = 0.066). The study contains two models: Model 1, in which independent variables were included to measure the direct effects. In Model 2, perceived risk is included as a moderator. The fit indices values of both models were above threshold values, which supports the findings of Hair et al. (2010). This confirms a decent model fit.

GFI: goodness of fit index; AGFI: adjusted goodness of fit index; CFI: comparative fit index; NFi: normed fit index; TLI: Tucker-Lewis index; RFI: relative fit index; RMSEA: root mean square error of approximation.

4.2. Analysis of hypotheses statements

We evaluated the significance of each path for different models with standardized estimates and error values by using the SEM technique (Table V). Model 1 measured the effect of independent variables, with a total r-squared value of 0.748. At first, we determined the significant influence of perceived enjoyment, interactivity, and simplicity on service quality. Second, we confirmed the positive impact of service quality on perceived value and on continued intention. Next, we confirmed the positive impact of perceived value on continued intention. The study demonstrates the strong direct and positive association between service quality and perceived value. Both variables were also found to have a positive impact on continued intention. Additionally, the results indicate a strong negative association between perceived risk and continued intention. This confirms H1, H2, H3, H4, H5, H6, and H7.

In model 2, all independent and moderating variables were used together. In relation to model 1, the r-squared value of the moderating value has improved from 5.48 % to 0.789 in model 2. With respect to direct effects, the positive influence of perceived enjoyment, interactivity, and simplicity on service quality remains the same. Also, the positive influence of service quality on perceived value and on continued intention improves, whereas the impact of perceived value on continued intention remains the same. Additionally, perceived risk is found to be negative and thus affects the user's continued intention

Table IV
Goodness-of-fit indicators (model 1 and 2).

Fit indices	Model 1	Model 2	Recommended value	References
x^2/df	2.899	3.100	<5	Hair et al. (2010)
GFI[1]	0.883	0.865	>0.90	
AGFI[2]	0.846	0.822	>0.80	
NFI[3]	0.913	0.906	>0.90	
CFI[4]	0.941	0.934	>0.90	
TLI[5]	0.929	0.920	>0.90	
RFI[6]	0.895	0.886	>0.90	
RMSEA[7]	0.070	0.072	<0.08	

Note: x2/df is the ratio between Chi-square and degrees of freedom.

Table V
Results analysis.

IV	DV	Model 1	Model 2
		IVs	Moderating effect of PERRISK
		Coe. (SE)	Coe. (SE)
PERENJOY	SERVQUAL	0.424*** (0.047)	0.433*** (0.047)
INTERACT	SERVQUAL	0.638*** (0.071)	0.720*** (0.074)
SIMP	SERVQUAL	0.158 (0.044)	0.110 (0.043)
SERVQUAL	PERVALUE	0.589*** (0.062)	0.688*** (0.060)
SERVQUAL	CONUINT	0.605 (0.389)	0.691 (0.386)
PERRISK	CONUINT	−0.157 (0.044)	−0.216*** (0.052)
PERVALUE	CONUINT	0.487 (0.364)	0.411 (0.351)
SERVQUAL* PERRISK	CONUINT		−0.107*** (0.046)
PERVALUE* PERRISK	CONUINT		−0.217*** (0.073)
R^2		0.748	0.789
Adjusted R^2		0.741	0.783
Durbin Watson results		1.879	1.888
Number of observations		387	387

Coe means standardized coefficients; IV means independent, DV means dependent; NS means non-significant.
Controls are considered.
*** *** p < 0.01; ** p<0.05; * p<0.10

regarding mobile payments.

Table V further explains the negative moderating impact of perceived risk between service quality and continued intention, as well as perceived value and continued intention. The moderating effect of perceived risk on service quality, perceived value, and continued intention to use mobile payment services is found to be significant but negative (Rita et al., 2018). This supports our hypotheses, H8a and H8b. An interaction graph was also developed to further elaborate the effect of service quality and perceived value at different values of the moderating variable of perceived risk (Fig. II). Both graphs indicate that the effect of independent variables on dependent variables gets larger as the moderation value increases. This shows that users with high perceived risk have lower continued intentions to use mobile payment services compared to users with low perceived risk, even though they may have a positive perception regarding service quality and perceived value. The variable perceived value had the greatest dispersion effect, followed by service quality.

5. Discussion

The ACVMET has been utilized in our study (Sankaran and Chakraborty, 2021; Pai et al., 2022). In this regard, the effect of simplicity, perceived enjoyment, and interactivity as attributes of service quality in the MPS context has also been examined. The study results confirm the significant impact of all these factors on service quality. This indicates that if service providers create an interface that is simple to use, interactive, enjoyable, and interesting for BoP users, then the users will perceive the service quality to be good. This supports the findings of previous researchers regarding perceived enjoyment and interactivity in the context of technology-based services (De Leon et al., 2020; Senyo et al., 2022). However, there is no direct support in the literature regarding the effect of simplicity on service quality in mobile payments. But Jun et al. (2018) reported the influence of simplicity on perceived value. The authors highlighted that simplicity has been conceptualized as the degree of ease of use that has a substantial influence on consumers' affective responses. This lends support to our findings regarding simplicity.

Next, study results reveal the impact of service quality on both perceived value and continuance intention. This suggests that in the case of technology services like mobile payments, service quality would have an impact on consumers' positive perceptions of the value they obtain relative to costs. This has been reiterated through the work of previous researchers (De Leon et al., 2020). Our findings emphasize that the high use of mobile payments depends on service quality. Poor quality is the main barrier to fulfilling users' expectations about the technology using a value-based approach (Lee, 2020). In the context of mobile payment services, according to Zietsman et al. (2020), service quality can be conceptualized as a multidimensional construct that encompasses perceived value. Thus, our hypotheses H4 and H5 are supported by the existing literature.

Moreover, hypothesis H6, which confirms that perceived value positively affects continued intention in the case of digital services, supports the findings of Zeithaml et al. (2020) and Kabengele and Hahn (2021). This indicates that when consumers perceive these services as worthwhile and providing good value in relation to the efforts involved, they will consider using mobile payments in the long run. Other researchers (Pastuszak et al., 2019; Lin et al., 2020; Senyo et al., 2022) have further reiterated this.

Furthermore, as per the study results, perceived risk has a significant effect on continued intention. This indicates that mobile payment users are risk-averse and willing to use low-risk technology services. Perceived risk has been widely used in previous technology-based research to explain uncertainty about probable usage and concern about data protection, privacy, and security threats (Purohit et al., 2022; Neelam and Bhattacharya, 2023). Glavee-Geo et al. (2020) explained the negative impact of risk on a user's continued usage intention; their findings confirmed perceived risk as one of the major barriers to using a service. This supports our hypothesis H7.

Lastly, we found that perceived risk has a significant role as a moderator; it has a buffering effect on the impact of service quality on the continued intention to use mobile payment services. In a study of UK students using UTAUT2 variables, Schmidthuber et al. (2020) confirmed perceived risk as an important moderator and found its significant influence on users' usage of e-learning programs. Further, as per the results, perceived risk also has a moderating impact on the association between perceived value and continued intention to use mobile payments. This is supported by the literature (Wang et al., 2019; Purohit et al., 2022) that uses perceived risk as a moderator to assess consumer intentions to use mobile payments. Hence, hypotheses H8a and H8b find support.

5.1. Theoretical contributions

In theory, this study contributes to the research on the BoP segment's continued intention to use MPS. It specifically focuses on BoP consumers, considering them as quality-driven and value-conscious consumers, an area that is still in the early stages of development. In addition, this study expands the existing literature on the attribute-

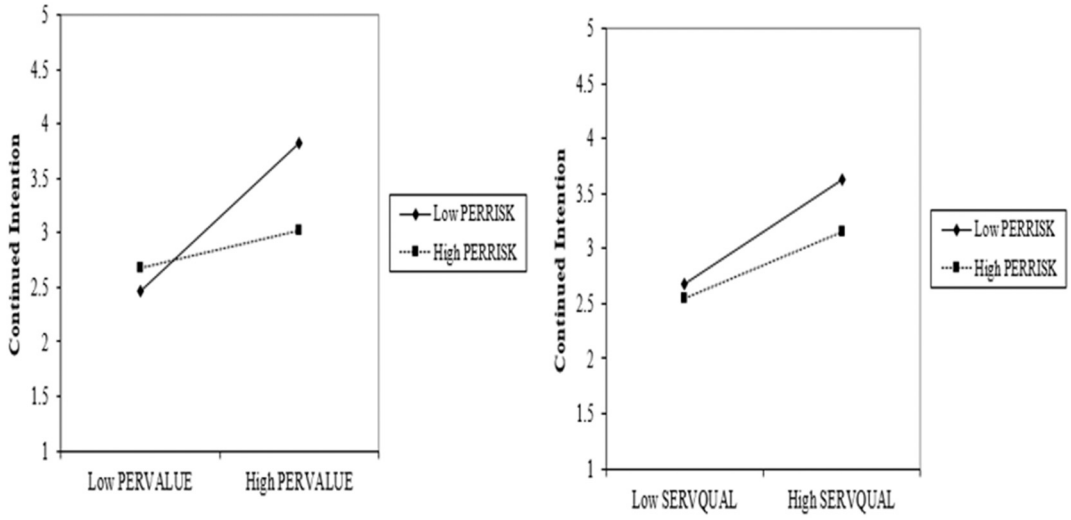


Fig. II. Moderating role of perceived risk.

consequence-value approach of mean end theory in the context of the BoP segment by demonstrating the associations between service quality, perceived value, and continued intention. Unlike previous studies that primarily focused on technological and behavioural factors, this study contributes by investigating the factors that drive MPS service quality for the BoP segment and how they lead to value creation for these consumers. This, in turn, affects the continued intention of these consumers to utilise MPS. Literature is scarce in assessing the effect of service quality on continued intention via perceived value (Shamdasani et al., 2008; Sankaran and Chakraborty, 2021; Pai et al., 2022), particularly in the context of the BoP. The present study can help us assess how attributes, consequences, and values are connected and how important these factors are to influencing BOP segments to use MPS in the long term. This can be further expanded to identify other attributes for the multidimensional value constructs of the BoP segment.

Interestingly, the study indicates a high and positive impact of three variables: perceived enjoyment, interactivity, and simplicity, on service quality perception (Pai et al., 2022). BoP consumers evaluate the service quality of mobile payments by considering the interactive elements and level of control. In addition, they have a preference for a service that is enjoyable and user-friendly, which indicates a high level of service quality. In order to affect BoP customers' continued intention to use MPS, the study highlights the importance of looking beyond the fundamental anticipated technical benefits of MPS and concentrating more on the interactive, controlling and hedonic aspects of quality. Future studies may further extend the literature in this direction.

The study supports the literature indicating service quality as a predictor of perceived value, considering customers' evaluations of benefits and costs. This contributes to the literature by indicating the key role of service quality attributes in influencing perceived value and, in turn, continued intention. The literature is extensive in assessing the multidimensional perceived value theory in this context (Park et al., 2022). But, following the attribute-consequence-value approach to perceived value (Pal and Triyason, 2018; Sankaran and Chakraborty, 2021), it is shown that service quality affects perceived value of BoP, which is turn influence continued intention is crucial. This adds to the existing body of research that has already been done on the subject. Future studies may explore this context further.

Finally, the findings highlight the prominence of perceived risk in consumers' perceptions regarding service quality and the perceived value of mobile payment services. In some studies, perceived risk as a moderator turns the positive effect of dimensions into a negative relationship (Purohit and Arora, 2021; Sankaran and Chakraborty, 2021; Belanche et al., 2022). This study adds to the existing technology adoption models by including perceived risk as a moderator. The role of perceived risk is crucial in the BoP context, as they lack awareness and knowledge of digital technologies. The risk needs to be assessed to understand future usage intentions. Studies may extend the literature on perceived risk by understanding its negative impact on continued usage of a service despite its high quality and high value to consumers.

5.2. Managerial implications

The study's findings show that perceived value significantly affects the intention to continue using MPS, and that perceived value and continued usage intention are both impacted by service quality. In addition, service quality has been found to be influenced by factors like perceived enjoyment, interactivity, and simplicity. For practitioners, the study indicates the importance of variables such as service quality and perceived value on a consumer's continued intention to use a service. Largely due to the consumer behaviour shift towards contactless transactions that mobile wallets enable. The users have acknowledged the significance of service quality and the perceived value of the transactions. A comprehensive understanding of both dimensions would enable marketing managers, retailers, other service firms, transaction firms, etc. to increase continual usage among users who represent the BoP segment (Türker et al., 2022; Verma and Sinha, 2018). Recent literature affirms that consumers who derive pleasure and fun from using technologies are likely to adopt them (Türker et al., 2022), which has been established by the present study. Hence, the study recommends mobile payment firms review the dimensions of service quality, which are measured through the variables of interactivity, perceived enjoyment, and simplicity, paying highest attention to the interactivity of the service. The study suggests that mobile payment services should be interactive, pleasurable, and simple to use to provide high control to BoP users with the insertion of smart yet simple features and icons (Singh et al., 2020b). Paytm, one of the most successful MPS in India, loudly announces the amount of money received, reassuring the illiterate and semiliterate street vendors of the successful transaction (The Hard Copy, 2021; Kajol et al., 2022).

It may be suggested that technology-based service companies should perform quality checks regularly and collect feedback from users to update the process. These service quality dimensions must be popularized among various groups of BoP users to enhance the continued adoption of mobile wallet technology. There are issues of PoS (point of sale) friction, network constraints, and poor last-mile connectivity that may lead to transaction dropouts and failures. Considering this, the central bank in India, the Reserve Bank of India (RBI), has launched the “payments infrastructure development fund (PIDF)” to provide Indian medium and small merchants with a digital payment acceptance touchpoint across the country. It may ensure the continued usage of MPS.

Another variable, perceived value, has been given high importance by consumers. Perceived value is assessed by comparing both monetary (price) and non-monetary (efforts) aspects of cost with the benefits (service quality) received from using mobile payment services. We suggest that firms should perform a cost-benefit analysis and share it with consumers to influence their decision-making. In addition, an understanding of the moderation effect of perceived risk would help service companies, technology providers, and app designers review privacy issues and threats pertaining to service quality and perceived consumer risk. The customer-service company relationship mandates assurances of the safety of customers' information and protection from financial fraud and other threats (Mogaji and Nguyen, 2022). Service firms may include provisions to update the apps or processes regularly to secure the system from hacking and personal data theft. The BoP segment is an underserved market with many challenges and barriers. Accordingly, they are not able to ascertain their own human potential or that of society at large. As a result, marketers will need an effective communication strategy to persuade the BoP market to continue using the mobile wallet.

The m-wallet service is more practical because of the high penetration of mobile devices among the BoP segments. The justification for investigating uses of the technology for the unbanked among the BoPs has been the perception that mobile phones are ubiquitous across all societal groups, including the BoP (Purohit et al., 2022). The know-your-customer (KYC) regulations, however, may have an impact on perceived enjoyment related to the pride of being able to use new technology because they may find it challenging to get the necessary identification cards, documentation, and other requirements (Kawamura, 2022). The difficulty facing policymakers is in promoting access to these records, which could be helpful for their endeavours aimed at providing monetized social benefit through m-wallets.

Mobile wallets are simple to use, yet, to further promote usage of this system, it would be necessary to consider how the BoP population acquires the necessary technical skills. People in rural areas and low-income metropolitan areas do not use social media websites like Facebook and Twitter. Poor text quality and unreliable Internet connectivity are two issues that limit social media's ability to reach people at the base of the pyramid. The widespread usage of speech and video material may be the method for developing social media ecosystems in this domain. Voice communication automatically overcomes literacy obstacles, and the widespread use of mobile phones, even in the BoP, offers a ready

medium for video material. The Brihanmumbai municipal corporation (BMC) has started training for 1.33 lakh hawkers to increase Mumbai hawkers' knowledge of digital payment methods (Mid-day, 2023). These measures add to the perceived value of the continual use of the mobile payment system.

To make mobile wallet use more accessible and user-friendly for India's bottom of the pyramid (BOP), especially those with limited digital skills and illiteracy, a comprehensive approach is required. Here are a few strategies that the service providers and other stakeholders, such as the government, can use to achieve this objective:

Create a user-friendly interface: Develop mobile wallet applications with a streamlined and user-friendly interface that utilises icons, voice commands, and visual cues for enhanced usability. This feature enhances the accessibility of the app, enabling users with limited literacy skills to effortlessly navigate and carry out transactions.

Integrating voice recognition technology into mobile wallets enables users to effortlessly perform transactions through voice commands. This has the potential to revolutionise the experience for users who may struggle with typing or navigating menus.

Enhancing Accessibility: The MPS app can reach a diverse user base by offering support for multiple local languages, making it more accessible to a wider audience. This encompasses not only the interface but also the provision of customer support and instructional materials.

Organise community-based training sessions that focus on enhancing financial literacy and teaching the fundamentals of digital transactions. Collaborating with local NGOs, government bodies, and community leaders can enhance the effectiveness of reaching out to the target audience.

QR Code Payments: Promote the adoption of QR codes for transactions due to their user-friendly nature and ease of use. Merchants have the option to conveniently present their QR codes for customers to scan and complete their payments.

Encouraging Adoption: Provide attractive incentives, such as discounts, cashback, or loyalty points, to vendors and customers as a way to promote the use of mobile wallets. This could potentially encourage a wider adoption of digital payment methods.

Enhanced Customer Support: Develop a strong and convenient customer support system that offers a toll-free helpline, support through voice calls, and in-person assistance whenever feasible. This contributes to the establishment of trust and confidence among users.

Encourage Peer Influence and Empower Community Champions: Identify and train individuals who are enthusiastic early adopters of mobile wallets to serve as influential figures within their communities. They have the power to influence their peers and offer informal support, which can help speed up adoption within their communities. By making mobile wallets more accessible and user-friendly for the BOP segment, India can help facilitate their inclusion in the digital economy through a collective effort.

5.3. Limitations and directions for future research

Although the present research delivered a few relevant findings, there are some limitations that should be highlighted. First, we applied a cross-sectional survey of respondents, which may not effectively explain the effect of different constructs on the continued intention of users at different time points. Longitudinal studies may be preferred in future research. Second, this study is done in India, which may limit the scope of generalization and application of outcomes to different social, cultural, and regional backgrounds, even if they are emerging economies. We suggest that future studies may examine the conceptual model in different demographic and geographic contexts. Third, the study explores the multidimensional aspect of perceived value and includes the impact of service quality and perceived risk. Future studies may include other dimensions, such as innovativeness, credibility, and other utilitarian attributes, to refine the findings. The study examined the direct correlation between service quality, perceived value, and continued intention without delving into the underlying mechanism or rationale for this relationship. Further study endeavours could examine the role of perceived value in facilitating (mediating) the association between service quality and the intention to continue using a service.

Studies may be undertaken to review the current model from the perspective of new technologies such as artificial intelligence, big data, the internet of things, etc. and examine their association with users' satisfaction and continued intention. We also suggest that variables such as interactivity and enjoyment should be reviewed with respect to various segments based on gender, age, education, experience, culture, etc. Studies in the future may include the effects of different types of risk, for example, time loss, overall threats, technical issues, performance challenges, etc., to explain current users' perceptions.

The results of the study are significant as the adoption of a new technology such as a mobile wallet, ushers in a social change towards a cashless society. Continuous use of mobile wallets can be a tool for inclusive development among the BoP population. People in BoP have seen friends and family members adopt wallets and noticed their efficacy. Wallets have traditionally been an urban phenomenon, but there has been tremendous growth even in smaller cities. Even the inexperienced urban immigrant values the security of his meagre income sources, and going cashless provides the solution. Digital footprints pave the way for marginalized people to gain access to many governments' assistance programs. Future studies in this area can address these issues scientifically and systematically. Mukherjee et al. (2020) provide several insights and ideas to undertake future research in this context. Following prior studies (Gupta and Dhingra, 2022; Bhukya and Paul, 2023; Behera and Kumra, 2024; Paul et al., 2023; Chakraborty and Paul, 2023; Sharma, 2024), it would be prudent to build up new models, frameworks and carry out different studies using mixed methods, experimental design, qualitative analysis etc. in this area deriving ideas.

6. Conclusion

Researchers on the continued intention of information systems and their applications have rarely analyzed the adoption pattern of the BoP segment. India has pole vaulted to the next orbit of economic interconnectedness with an increasing appetite for mobile wallet usage by the base of the pyramid population during the recent years, yet widespread adoption and continued usage of mobile payment services is still a challenge, thus necessitating more research on factors influencing continued usage. The results of the study indicate that perceived value has a significant impact on the intention to continue using MPS. Moreover, service quality has been found to impact both perceived value and continued usage intention. Besides, factors such as simplicity, interactivity, and perceived enjoyment have been found to influence perceptions regarding service quality. Finally, the role of perceived risk as a moderator in the relationships between service quality and continued intention, as well as perceived value and continued intention, has been established. The theoretical and managerial implications of the study have been provided to add to the understanding of the continued use of mobile payment services in emerging countries.

CRediT authorship contribution statement

Neena Sinha: Conceptualization, Data curation, Supervision, Writing – original draft, Writing – review & editing. **Justin Paul:** Conceptualization, Data curation, Investigation, Methodology, Supervision, Visualization, Writing – original draft. **Nidhi Singh:** Data curation, Formal analysis, Supervision, Visualization, Writing – original draft, Writing – review & editing.

Data availability

Data will be made available on request.

Appendix A. Survey Questionnaire Scales

Constructs	Items	References
Simplicity (SIMP)	SIMP1: My mobile payment systems have simple steps to manage. SIMP2: I can find and complete frequently used functions without any difficulty in my mobile payment systems.	Lee et al. (2015b)
Service quality (SERVQUAL)	SERVQUAL1: Mobile payments respond promptly to user needs and demand. SERVQUAL2: Mobile payments service delivers whatever is promised. SERVQUAL3: Mobile payments understand user's specific needs and take feedback.	Shamdasani et al. (2008)
Perceived value (PERVALUE)	PERVALUE 1: Mobile payments are good value for money and are worthwhile. PERVALUE 2: Considering the efforts I put in, using mobile payments is worthwhile. PERVALUE 3: Overall mobile payments deliver good value.	Rita et al. (2018)
Interactivity (INTERACT)	INTERACT 1: I can handle my mobile payments well. INTERACT 2: Specialized instructions concerning use of mobile payments are available to me. INTERACT 3: My mobile payments provide interactive interface by using icons, images and moving pictures. INTERACT 4: Guidance is available to me regarding the selection of mobile payments.	Lee et al. (2015a, 2015b)
Perceived risk (PERRISK)	PERRISK 1: Mobile payment is not safe to use because of privacy and security reasons. PERRISK 2: I think taking payments through mobile payments has possible risk. PERRISK 3: Mobile payments expose me to overall risk.	Schmidthuber et al. (2020)
Perceived enjoyment (PERENJOY)	PERENJOY 1: Using mobile payments is fun. PERENJOY 2: Using mobile payments is enjoyable. PERENJOY 3: Using mobile payments is pleasurable. PERENJOY 4: Using mobile payments is very interesting.	Praveena and Thomas (2014)
Continued intention (CONUINT)	CONUINT 1: I would consider using mobile payments apps in the long term. CONUINT 2: If I could, I would like to continue my use of mobile payments. CONUINT 3: All things considered; I will expect to continue to use mobile payments into the future.	Bhattacherjee (2001)

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