

Research article

Acceptance of mobile commerce in low-income consumers: evidence from an emerging economy

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ABSTRACT

This paper examines the intention to use m-commerce in low-income consumers in Ecuador by expanding the original unified theory of acceptance and use of technology (UTAUT2) model to include the trust and perceived security constructs. A total of 344 Ecuadorians were surveyed according to the following criteria: 1) had made at least one purchase through their mobile device in the last month and, 2) belonged to the low and medium-low socioeconomic segment of the selected country. The results showed that facilitating conditions, hedonic motivation, habit, and perceived trust significantly and positively predict the intention to use m-commerce. The best predictor was facilitating conditions followed by perceived trust. Contrary to expectations, performance expectancy, social influence, and perceived security did not significantly affect low-income consumers' intention to use m-commerce. This study produced diverging results in significant constructs used to validate the UTAUT2, highlighting the need to examine this model in different countries further. The relationships of the core constructs of UTAUT2 vary according to the country studied, possibly due to differences in national culture and economic development that could moderate the impact of explanatory constructs of technology adoption.

1. Introduction

The increasing interest in Emerging Markets (EM) observed in the global economic arena can be partly attributed to the fact that a high percentage of the world's population resides in these markets. These markets also display a steady gross domestic product growth that could surpass developed countries (Pels and Sheth, 2017). Emerging markets (EM) are desirable investment targets (Pels and Sheth, 2017) because of their volume, predominance, growth potential (Hill, 2002), and the purchasing power that they represent as a whole (Guesalaga and Marshall, 2008).

EMs are characterized by wealth distribution inequality, which produces significant asymmetries in the socio-demographic distribution where the lower-income or base-of-the-pyramid (BOP) social groups have greater participation compared to other markets (Sheth, 2011). Even though there is no agreement regarding low-income groups categorization (Greenacre and Akbar, 2019; Pels and Sheth, 2017), these have traditionally been identified as social groups whose incomes are below the official poverty levels (Sheth, 2011) or those with income below \$2USD per day (Tarafdar et al., 2012). They are also identified as

lacking the necessary resources to be perceived as the "normal" consumer group (Hamilton and Catterall, 2005). These are people who cannot fully access the goods and services available in the market (Tarafdar et al., 2012) or struggle to fulfill their basic needs.

Information and communication technology (ICT) has been acknowledged as a potential solution to overcome the conditions that characterize BOP markets as it can enable the development of markets and new business models (Howell et al., 2018; Tarafdar et al., 2012), positively impacting BOP's social-economic results (Tarafdar et al., 2012) while offering opportunities to implement social and economic inclusion (Howell et al., 2018) and reducing poverty levels (Zaremohzzabieh et al., 2016). The issue that arises from this recommendation is that ICT models were developed and tested in cultural contexts of developed economies and as McCoy et al. (2007) pointed out, there is a need to rigorously test theoretical models developed in specific cultural contexts, before generalizing them to other settings. Simply presenting and favoring models with extensive empirical evidence such as the Technology Acceptance Model (TAM) (Davis, 1989) does not provide an adequate explanation for specific cultures and technologies. For this reason, Venkatesh et al. (2016) incorporate national culture as one of the contextual

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factors that can moderate the impact of the explanatory constructs of technological adoption by users—ignoring the local sociocultural dynamics slows or restrains the adoption of ICT in certain social groups (Tarafdar et al., 2012).

This study was conducted to evaluate which aspects determine the acceptance of mobile commerce (m-commerce) among low-income consumers in an emerging economy represented by Ecuador. In order to do so, the authors propose an extended version of the unified theory of acceptance and use of technology (UTAUT2) model that includes trust and perceived security. According to the World Bank (2019), Ecuador is an upper-middle-income economy with an income poverty indicator of 25% (National Institute of Statistics and Census [INEC], 2019a). The INEC in Ecuador (2019b) defines low-income individuals as those with incomes equal to or lower than the current legal minimum wage (US\$ 386), making it challenging to cover the representative market basket valued at USD 715.08 per month.

The selection of m-commerce as the focus of this study stems from the growing availability of mobile devices and mobile Internet, which has resulted in a worldwide increase in transactions conducted on smartphones or tablets. This growth has enabled companies to increase the range of services, products, and benefits they can offer, constituting an area of opportunity for e-commerce (Yang, 2010) while also promoting different types of monetary transactions through mobile banking or mobile payments. This growth supported the design of innovative strategies to incorporate the low-income consumers of emerging economies by developing personalized products and services while also contributing to the reduction of exclusion and marginalization of this segment. Even though m-commerce is still in its infancy, the increase in mobile devices' popularity and the penetration of smartphones opens a new window of opportunity, requiring understanding the characteristics that determine the acceptance of m-commerce by consumers' representative of EMs in this group.

2. Research context

2.1. Emerging markets

The dynamics of emerging markets do not have to parallel the assumptions made by theories derived from developed markets, industrialized countries (Burgess and Steenkamp, 2006), or in countries in which technology adoption is the maturity stage already (Pipitwanichakarn and Wongtada, 2018). It is necessary to strengthen the technology adoption theoretical body that will explain what drives the use of technology in the BOP segment and develop accurate and reliable ICT acceptance behavioral models (Zaremohzzabieh et al., 2016) in order to guide organizations in the development of successful, profitable and sustainable initiatives supported by technology. Furthermore, low-income consumers represent a large group within these economies. Therein lies a significant potential for small changes in market conditions that can have a substantial social impact in their lives (Greenacre and Akbar, 2019). These social changes can include access to education, telemedicine, financial services, e-government initiatives, among others (Nemer, 2018; Tarafdar et al., 2012).

The lack of investigation conducted in EMs is considerable, especially in the Latin America and Caribbean regions, as evidenced in the research by Sanakulov and Karjaluoto (2015), who conducted a review of 67 previous research projects published between 2010 and 2013 on the adoption of mobile technology and found that none of the studies had been carried out in Central or South America. Likewise, it should be noted that in the literature review carried out by Zhang et al. (2018), of 60 publications on e-banking adoption from 2001 to 2016, none came from a Latin American country. Also, in the context of m-banking research, Shaikh and Karjaluoto (2015) found that none of the 55 studies analyzed were conducted in Central or South American countries. This deficit is also evident in what was reported by Williams et al. (2015), who, in their systematic literature review of the Unified Theory of

Acceptance and Use of Technology (UTAUT) from 2004 to 2011, did not find research based on data collected in Latin American countries and none of the authors of the articles published had a Latin American university affiliation.

The conditions discussed above make Ecuador an ideal EM for this study. In 2017, Ecuador was ranked 97 out of 176 countries in terms of the ICT Development Index and number 22 among the countries of Central and South America (International Telecommunication Union [ITU], 2017). The percentage of people using the Internet in Ecuador was 79.9% in 2017 (Internet World Stats, 2017), and the total active mobile-broadband subscriptions per 100,000 inhabitants were 47.21 (ITU, 2017). Subscriptions of mobile telephone services in Ecuador were 94.7% in 2019 (Euromonitor International, 2019). However, despite the rise of mobile telephony subscribers, only 42% of online shoppers in the country use a mobile telephone to make online purchases (Electronic Commerce Observatory of Ecuador 2019), making it an ideal EM market for the study of mobile commerce.

2.2. Bottom of the pyramid

Despite the limitations of the BOP's purchasing power, this group's total sum of disbursements significantly impacts the global economy. This was further corroborated by Guesalaga and Marshall (2008) when analyzing data on income and expenditure of BOP consumers in 36 countries. These results show that this sector's revenues amount to approximately 4,900,000 million dollars, of which 509,000 million correspond to Latin America and the Caribbean. Additionally, they estimated that the consumption of the BOP is around 6,000 billion dollars, of which 631 billion correspond to the Caribbean and Latin America. More recent studies suggest that, although global poverty has been reduced, approximately 3.5 billion people still belong to this segment (Prahald, 2019). It is estimated that it has a US \$ 5 billion value in purchases power parity (Rahman et al., 2018).

The social exclusion that characterizes the Bottom of the Pyramid (BOP) groups is partially due to physical constraints associated with their location in remote areas, inadequate infrastructure, and mobility limitations. These constraints can restrict BOP groups ability to benefit from market offers (Tarafdar et al., 2012) and act as entry barriers for organizations since the costs associated with bringing their product and service offers to BOP communities can be high if they do not have innovative technologies that allow them to shorten this gap profitably. Likewise, producers operating in the BOP segment are faced with multiple challenges, such as the development of connections with potential customers, the adoption of appropriate pricing procedures, and lastly, the distribution of their offerings (Tarafdar et al., 2012).

The BOP segment's situation is further complicated by the absence of information that also defines its reality. Lack of information can negatively affect the BOP segment's opportunities for inclusion, as well as the possibilities for the State and other organizations in emerging economies to develop initiatives tailored to their needs. Eighteen years ago, when Prahald and Hart (2002) introduced the possibility of profitably serving the poor and alleviating poverty, practitioners and academics showed great enthusiasm in developing proposals that would create value for this sector.

However, the high costs of innovation and digital literacy make these initiatives profitable discouraged many organizations (Dakduk et al., 2010). It would be expected that the access and increased use of mobile devices, the reduction in access costs to the service, and the progress in literacy due to the increase in mobile telephony penetration would contribute to overcoming these entry barriers. Therefore, the need for more research focusing on low-income segments is further highlighted by the resulting incongruences identified when established service theories and empirical generalizations developed from studies conducted in the medium- and high-income segments are applied to BOP markets (Heinonen et al., 2013).

Capitalizing on the considerable potential of the BOP segment implies changing a series of false beliefs about these consumers (Hamilton and

Catterall, 2005; Sheth, 2011) such as labeling them as homogeneous, risky, and unprofitable markets (Hamilton and Catterall, 2005) and that only operate under informal mechanisms and have difficulties in adopting new technologies (D'Andrea et al., 2004). However, mobile telephony's accelerated growth has contributed substantially to digital literacy at all levels, closing social gaps, and granting greater freedom to its people to become consumers and more participatory services providers. For some years now, some initiatives have successfully demonstrated that the implementation of ICT is a valuable resource for the development and inclusiveness of business models adapted to these markets' realities. The Grameen Village Phone Program in Bangladesh (Hart and Christensen, 2002) and the M-Pesa payment system in Kenya (Wenner et al., 2017) are examples of this. Grameen Bank launched the Grameen Village Phone Program, and Grameen Telecom in 1997 has allowed that women access micro-credit to acquire digital GSM cellular phones and subsequently resell phone calls and phone services within their villages in Bangladesh (Richardson et al., 2000). This program has demonstrated that telecommunications and digital adoption play an essential role in enhancing rural social and economic development (Talukdar and Sayeed, 2020). M-Pesa is an m-payment system that has experienced rapid growth since its introduction in 2007 (Wenner et al., 2017). This system offers various services to users, such as making payments with the mobile phone, sending and receiving money between users (and non-users), withdrawing cash at ATMs. G-Cash in the Philippines (Pelletier et al., 2020), Nequi in Colombia (Agidi, 2018), Swazi MTN in Eswatini (Myeni et al., 2020), WIZZIT and MTN Mobile Money in South Africa, and CELPAY in Zambia (Andrianaivo and Kpodar, 2012) are also considered successful implementations of mobile money in low-income countries. However, it is important to highlight the fact that while similar m-payment systems and technology initiatives can be found in various developing countries, only a few have achieved high adoption rates capable of supporting the scale required for extensive use Potnis et al. (2020).

3. Theoretical framework and hypothesis model

3.1. The UTAUT model

Although various theories have been applied to explain technology adoption, the most frequently used ones are Davis' (1989) TAM and Venkatesh et al. (2003) unified theory of acceptance and use of technology (UTAUT) (Williams et al., 2015). This can also be observed in the case of the adoption of mobile technologies: m-banking, m-payment, m-commerce, m-financial services, mobile data services, mobile online gaming (Sanakulov and Karjaluo, 2015; Shaikh and Karjaluo, 2015; Slade et al., 2013). Although models such as TAM and UTAUT have reached relative maturity, this is not the case with UTAUT2. UTAUT2 currently accounts for a reduced amount of replication, making it difficult to generalize its applicability. This is evidenced by a recent systematic literature review of 650 citations that used UTAUT2 revealing that 77% of the citations mentioned UTAUT2 for general citations purposes only. The remaining 23%, regardless of UTAUT2 usage, reported employing it in combination with alternative theories, where the moderators of UTAUT2 were rarely considered, framing it in a relatively early developmental stage (Tamilmani et al., 2020). These findings on UTAUT2 usage corroborate Venkatesh et al. (2012), where a recommendation to explore further the extended version of UTAUT2 across different countries and technologies was made. They also recommended identifying other relevant variables to continue expanding this portion of the theory (Oh and Yoon, 2014) as it could help increase its applicability to a broader range of contexts, cultures, and users (Mahfuz et al., 2017; Chang, 2012; Venkatesh et al., 2012, 2007).

Venkatesh et al.'s (2003) UTAUT consists of four core constructs: (a) performance expectancy, (b) effort expectancy, (c) social influence, and (d) facilitating conditions, applied to determine behavioral intention, which in turn, predicts usage behavior (B). Behavioral intention (BI)

refers to "indications of how hard people are willing to try, how much of an effort they are planning to exert, in order to perform the behavior" (Ajzen, 1991, p.181). The positive and significant relationship between this variable and use behavior has been confirmed in different literature reviews (Khechine et al., 2016; Williams et al., 2015). Behavioral intention was found to significantly and positively predict the use of established digital payment systems (Sivathanu, 2018), mobile app-based shopping (Savita Panwar, 2017), adoption of Internet banking (Martins et al., 2014; Sánchez-Torres et al., 2018), and the use of m-banking (Al Mashasba and Othman Nassar, 2012; Oliveira et al., 2014; Yu, 2012). The use of new technological systems can also be predicted by the intention to use it (Venkatesh and Zhang, 2010) and consequently increasing online purchases intention (Pavlou, 2003; Pavlou et al., 2007; Perea y Monsuwé et al., 2004; Sheppard et al., 1988; Sing and Matsui, 2017).

Based on the recommendations discussed above, the present investigation employed the UTAUT2 as the starting point and expanded the initially proposed model with the inclusion of two particularly relevant variables considered in previous research applied to mobile payment forms: perceived trust and perceived security.

3.2. Performance expectancy (PE)

PE is defined as the "degree to which technology will provide benefits to consumers in performing certain activities" (Venkatesh et al., 2012, p.159). The significance of the positive relationship between PE and BI has been identified in the following contexts: intention to use payment system via mobile phone, mobile shopping apps, digital payment systems, and mobile technology (Morosan and DeFranco, 2016; Savita Panwar, 2017; Sivathanu, 2018; Venkatesh et al., 2012); intention to adopt m-banking (Al Mashagba and Othman Nassar, 2012; Baptista and Oliveira, 2015; Oliveira et al., 2014; Yu, 2012); intention to use Internet marketing (Mohd-Isa and Wong, 2015) and in Internet banking (Martins et al., 2014; Sánchez-Torres et al., 2018; Sok Foon & Chan Yin Fah, 2011); intention to use a new technology service (Lee and Song, 2013; Venkatesh and Zhang, 2010). The positive relationship between PE and BI identified in these studies is consistent with results found in different countries in which the intention to make online purchases has been studied (Escobar-Rodríguez and Carvajal-Trujillo, 2014; Musleh et al., 2015; Pascual-Miguel et al., 2015; Sánchez-Torres et al., 2017; Sing and Matsui, 2017). However, although there is a broad consensus on PE's explanatory power over the other constructs of the UTAUT model, literature reviews that have analyzed the PE - BI relationship show differences in the contribution of this variable over BI.

The reviews by Khechine et al. (2016) and Williams et al. (2015) found that in 87% (71 of 62) and 80% (93 of 116) of the studies in which the PE-BI relationship was evaluated, PE significantly and positively predicted BI on adoption and use of technology. However, these reviews were conducted with reduced and widely diverse samples using the UTAUT model in different fields. It is interesting to point out that reviews in specific technological contexts by Zhang et al. (2018) in Electronic Banking and Sanakulov and Karjaluo (2015) in Mobile adoption showed a lower sample weight mean correlation between PE - BI. As a consequence, these authors recommend further research of this relationship to determine more precisely its contribution in specific technological contexts. Therefore, it is proposed that:

H1. Performance expectancy will positively influence low-income consumer's behavioral intention to accept m-commerce in an emerging market

3.3. Social influence (SI)

SI is defined as the "extent to which consumers perceive that important others (e.g., family and friends) believe they should use a particular technology" (Venkatesh et al., 2012, p. 159). Considering the

findings of several literature reviews and meta-analysis, SI is another variable that systematically and significantly predicted BI (Khechine et al., 2016; Sanakulov and Karjaluo, 2015; Williams et al., 2015) with a medium effect in the case of the adoption and use of technology (Khechine et al., 2016), but with a high effect in the case of the intention to use e-banking (Zhang et al., 2018). SI has been argued to have a positive and significant impact on the intention to use mobile shopping apps, mobile technology, mobile shopping services, digital payment systems (Savita Panwar, 2017; Sivathanu, 2018; Venkatesh et al., 2012; Yang, 2010) and the intention to adopt m-banking, Internet banking, Internet marketing, and use to payment system via mobile phone (Al Mashagba and Othman Nassar, 2012; Mohd-Isa and Wong, 2015; Morosan and DeFranco, 2016; Shaikh and Karjaluo, 2015; Sok Foon & Chan Yin Fah, 2011; Yu, 2012). Moreover, SI was found to significantly influence the intention to use a new technology service (Lee and Song, 2013) and e-commerce (Escobar-Rodríguez and Carvajal-Trujillo, 2014; Musleh et al., 2015; Pascual-Miguel et al., 2015; Sánchez-Torres et al., 2017).

However, according to Sánchez-Torres and Arroyo-Cañada (2016), the SI-BI relationship is the most omitted variable based on the country of origin in electronic commerce. Current evidence against this argument is supported by existing differences between developed countries and poor or emerging countries. Some authors argue that social influence will tend to have high levels of impact on the intention to use e-commerce when its diffusion in a country is at initial levels and will lose this influence as the digital literacy decrease and the e-commerce market share increases (Sánchez-Torres and Arroyo-Cañada, 2016). Additionally, low-income households are characterized by larger families consisting of different family nuclei and generations that cohabit in the same physical space. This unique dynamic introduces a significant social influence on shopping behaviors since a large part of the products they purchase are goods and services shared by many people in the household, so the consultation and influence of people from the immediate environment would be an intrinsic component of the decision processes.

Likewise, it is reasonable to assume that this conceptualization of social influence linked to individuals has higher relevance in consumers with less experience with technology and environments with less digital maturity. For this reason, it is pertinent to continue the study of this variable in the context of emerging economies. In particular, it is beneficial to analyze the relationship between the nation's technology development and the consumer profile. Therefore, it is proposed that:

H2. Social influence will positively influence low-income consumer's behavioral intention to accept m-commerce in an emerging market

3.4. Facilitating conditions (FC)

FC refers to "consumers' perceptions of the resources and support available to perform a behavior" (Venkatesh et al., 2012, p. 159). Even though the FC-BI relation has not been as researched as the PE-BI and SI-BI relationships, the predictive power of FC has been supported in more than 50% of the research studies analyzed by Khechine et al. (2016) and Williams et al. (2015), and in 86% of the studies and reviews of mobile technology adoption by Sanakulov and Karjaluo (2015). The evidence suggests that FC has a direct effect on behavioral intention in different contexts of adoption of technology: use of mobile shopping services and payment system via mobile phones (Morosan and DeFranco, 2016; Yang, 2010); use of mobile shopping app (Savita Panwar, 2017); adopt m-banking and e-banking services (Oliveira et al., 2014; Sok Foon & Chan Yin Fah, 2011; Yu, 2012); use digital payment systems (Sivathanu, 2018), use Internet marketing (Mohd-Isa and Wong, 2015) and make online purchases (Sánchez-Torres et al., 2017). Nevertheless, there is also evidence that contradicts the influence of FC - BI in emerging economies and developed countries, as well in different contexts of technology adoption. Such is the case of the investigations carried out by Baptista and Oliveira (2015) in Mobile Banking in Mozambique, Musleh

et al. (2015) in Ecommerce in Palestina, Oh and Yoon (2014) online shopping in Japan, and Venkatesh and Zhang (2010) new technology system in USA and China in which the relationship between these variables was not confirmed.

Despite the differences presented in the previous evidence, it is possible to assume that in contexts of less development of electronic commerce and with consumers with less technological literacy, the role of institutional support to help them has a positive impact on the intention to use mobile commerce. Therefore, we hypothesize that:

H3. Facilitating conditions will positively influence low-income consumer's behavioral intention to accept m-commerce in an emerging market.

3.5. Effort expectancy (EE)

The last construct included in the UTAUT model is EE, defined as the "degree of ease associated with consumers' use of technology" (Venkatesh et al., 2012, p. 159). Several researchers have found evidence of the EE-BI relationship, reporting that EE has a positive effect on behavioral intention in different contexts (Escobar-Rodríguez and Carvajal-Trujillo, 2014; Ghalandari, 2012; Martins et al., 2014; Mohd-Isa and Wong, 2015; Musleh et al., 2015; Nov and Ye, 2009; Oh and Yoon, 2014; Pahnla et al., 2011; Sahu and Gupta, 2007; Sánchez-Torres et al., 2017; Savita Panwar, 2017; Sivathanu, 2018; Sok Foon & Chan Yin Fah, 2011; Venkatesh et al., 2012; Williams et al., 2015).

Despite these results, EE was not included in the model hypothesized in the present study because the predictive power of this construct is lower than that of the other components of the model (Lee and Song, 2013; Morosan and DeFranco, 2016; Pascual-Miguel et al., 2015; Venkatesh and Zhang, 2010). In fact, the EE did not significantly predict the intention to adopt m-banking or e-banking (Al Mashagba and Othman Nassar, 2012; Baptista and Oliveira, 2015; Oliveira et al., 2014), Sánchez-Torres et al. (2018); Yu (2012), or the intention to use a new technology service and online media to buy (Lee and Song, 2013; Sing and Matsui, 2017). Likewise, the reviews by Khechine et al. (2016), Sanakulov and Karjaluo (2015), and Williams et al. (2015) show that the relationship between EE and BI has been confirmed in a lower percentage of research studies, in comparison with the PE-BI, SI-BI and FC-BI relationships. Furthermore, EE does not significantly affect the adoption of e-commerce in countries where it is in the early stages of development (Sánchez-Torres and Arroyo-Cañada, 2016).

The UTAUT model also proposes that the relationships between PE, EE, SI, FC, and BI are moderated by sex, age, experience, and voluntariness of use (Venkatesh et al., 2003). However, in the studies using this model, these moderating variables are often excluded (Venkatesh et al., 2012). In fact, in the review by Slade et al. (2013), it was observed that three of the four studies that empirically validated UTAUT in the context of m-payment or m-banking did not include the moderating variables.

3.6. The UTAUT2 model

In order to account for the consumer technology acceptance context, Venkatesh et al. (2012) developed UTAUT2, which incorporates three new variables in the UTAUT that directly predict the consumer's behavioral intention to use technology and mobile Internet technology. These three new variables are: (a) hedonic motivation, (b) price value, and (c) habit, and in which the voluntariness of use is eliminated as a moderating variable since, in the case of the use of the mobile Internet, the behavior is always voluntary.

3.7. Hedonic motivation (HM)

HM refers to the pleasure derived from technology usage (Brown and Venkatesh, 2005) and reflects consumers' perception of this experience's potential entertainment. Empirical evidence suggests that in the context

of the use of information technologies, hedonic benefits are important drivers of intention to use or adopt the use of technologies (Alalwan et al., 2016; Morosan and DeFranco, 2016; Poong et al., 2016; Venkatesh et al., 2012). Additionally, Savita Panwar (2017) found that HM significantly influenced the intention to use a mobile shopping app. Sivathanu (2018) found that HM significantly and positively predicted intention of using digital payment systems by Indians, being the best predictor of behavioral intention. Likewise, it also has been observed in emerging economies that MH increases the intention to use m-banking in Mozambique (Baptista and Oliveira, 2015), and digital payment system in India (Sivathanu, 2018), leading to the idea that using technology is a pleasant experience that predicts the intention to use it. This allows us to propose the following hypothesis:

H4. Hedonic motivation will positively influence low-income consumer's behavioral intention to accept m-commerce in an emerging market

3.8. Habit (H)

Habit (H) reflects the "extent to which people tend to perform behaviors automatically because of learning" (Venkatesh et al., 2012; page 161). Within the context of the UTAUT2, this variable is used to predict behavioral intention and current usage behavior. In line with this approach, the study of consumer behavior establishes that consumer habits exert an effect on their intentions, buying behavior, and consumption (Escobar-Rodríguez and Carvajal-Trujillo, 2014; Morosan and DeFranco, 2016; Venkatesh et al., 2012). Ajzen and Fishbein (2005) also affirmed that previous experiences would influence beliefs and future behavioral intention and performance. In this context, the intention to use digital payment systems is determined by habit, being the second-best predictor of intention to use after HM (Sivathanu, 2018). Habit was also the best predictor of intention to use mobile banking by Mozambique's citizens (Baptista and Oliveira, 2015). Furthermore, these authors found that habit directly and positively affects the behavior of current use. This result also was confirmed by Savita Panwar (2017) when evaluating mobile app-based shopping in Indian consumers. In the same way, the predictive power of habit has been observed when evaluating the intention to use electronic means to make online purchases of various products (Sing and Matsui, 2017) and the intention to use Internet marketing in Taiwan (Mohd-Isa and Wong, 2015).

Despite the evidence, a meta-analytic evaluation of UTAUT2 showed that the relationships between habit and use behavior, facilitating conditions and use behavior and lastly habit and behavioral intention were the three least examined in the extension model (Tamilmani et al., 2020). The same review indicates that these three relationships are also the three most robust identified consistently as the top three strongest paths amongst all UTAUT2 relationships. In summary, although it is a positive and significant relationship established in the literature, the fact that it is less studied also invites its inclusion in the model to expand its generalizability in the UTAUT2 model, as a contrast to the original model as indicated for general citations purpose (Tamilmani et al., 2017).

On the other hand, assessing the contribution of habit has important practical implications. If habit, as theoretically predicted, impacts the intention to use mobile commerce in low-income consumers, this would allow us to measure the relevance of the education process for these consumers in initiatives aimed at the BOP. Therefore, we posit that:

H5. Habit will positively influence low-income consumer's behavioral intention to accept m-commerce in an emerging market.

3.9. Price value (PV)

PV refers to the perceived benefit of using technology relative to its cost (Dodds et al., 1991). In the model proposed for this study, this variable was not included because the intention and use of a specific product category were not evaluated, but rather the intention and use of

m-commerce. Additionally, a Meta-Analytic Evaluation of UTAUT2 based on 20 investigations that evaluated the PV - BI relationship reported all instances of the relationship as significant at $p < 0.00$ level except for PV→BI, which was significant at $p < 0.012$. This relation was also denser towards the lower end comprising lower path coefficient values except for Tamilmani et al. (2017). However, compared to UTAUT, UTAUT2 results showed a substantial improvement in the variance explained in behavioral intention to use mobile Internet technology (56%–74%) and technology use (40%–52%) (Venkatesh et al., 2012).

Venkatesh et al. (2016) proposed a multi-level framework of technology acceptance and use, in which they maintain only the central constructs of the UTAUT2. Within this context, these variables are grouped into what would be the user's attributes, included in the level referred to as individual contextual factors. Additionally, Venkatesh et al. (2016) incorporate a higher level of contextual factors that include aspects such as (a) the characteristics of the physical environment and (b) location attributes, such as national culture, economic development, industry competition, etc. As a result, Venkatesh et al. (2016) incorporate the empirical evidence that shows the relationships between the basic constructs of the UTAUT2 may vary depending on the specific countries in which the research is performed (Baptista and Oliveira, 2015; Mohd-Isa and Wong, 2015). Zhang et al. (2018) observed that the cultural dimensions proposed by Hofstede (2011): power distance, uncertainty avoidance, individualism, and masculinity, moderated the relationships between PE-BI and between SI-BI; as well as the relationships between BI and perceived trust, and BI and perceived risk.

3.10. Extended model

Along with all the previous variables, the literature shows the relevance of perceived trust and perceived security, variables included by different authors in similar research using UTAUT/UTAUT2 (Lee and Song, 2013; Sing and Matsui, 2017). The present study was based on previously established theoretical foundations and relevant literature which suggest the importance of increasing scientific research in countries with emerging economies, especially in Latin America and in the segment of low-income consumers (Burgess and Steenkamp, 2006; Guesalaga and Marshall, 2008; Hamilton and Catterall, 2005; Pels and Sheth, 2017; Prahalad, 2019). This study aimed to evaluate an adaptation of the UTAUT2 model to explain m-commerce behavior (See Figure 1) in BOP consumers in Ecuador. This adaptation considers the variables of the UTAUT2 model with the additional variables perceived trust and perceived security.

3.11. Perceived trust

Trust is conceptualized as a set of specific beliefs between parties that include integrity/sincerity/honesty, benevolence, ability/competence/expertise, and predictability of another part, or a willingness to be vulnerable to the actions of another person or people (Flavián and Guinalfú, 2006; Gefen et al., 2003; Gefen and Straub, 2004; Morgan and Hunt, 1994; Tan and Sutherland, 2004). More specifically, Interpersonal trust can be said to be based on the expectation of responsible behavior on the part of the other party involved (Pavlou, 2003) who will then not take advantage of the ensuing dependence that develops upon him or her (Gefen et al., 2003; Gefen and Straub, 2004). Consequently, trust can be considered a critical component in economic relations in online environments due to the uncertainty and risk associated with these environments (Ashraf et al., 2014; Flavián and Guinalfú, 2006; Gefen et al., 2003; Gefen and Straub, 2004; Hansen et al., 2018; Nguyen and Huynh, 2018; Nor and Pearson, 2007; Pavlou, 2003; Sing and Matsui, 2017), and the most vulnerable condition in which the consumer can be found (Tan and Sutherland, 2004).

Tan and Sutherland (2004) proposed a trust model that highlights the relevance of dispositional trust, which refers to the ability and disposition of an individual to have confidence in general terms. This constitutes the

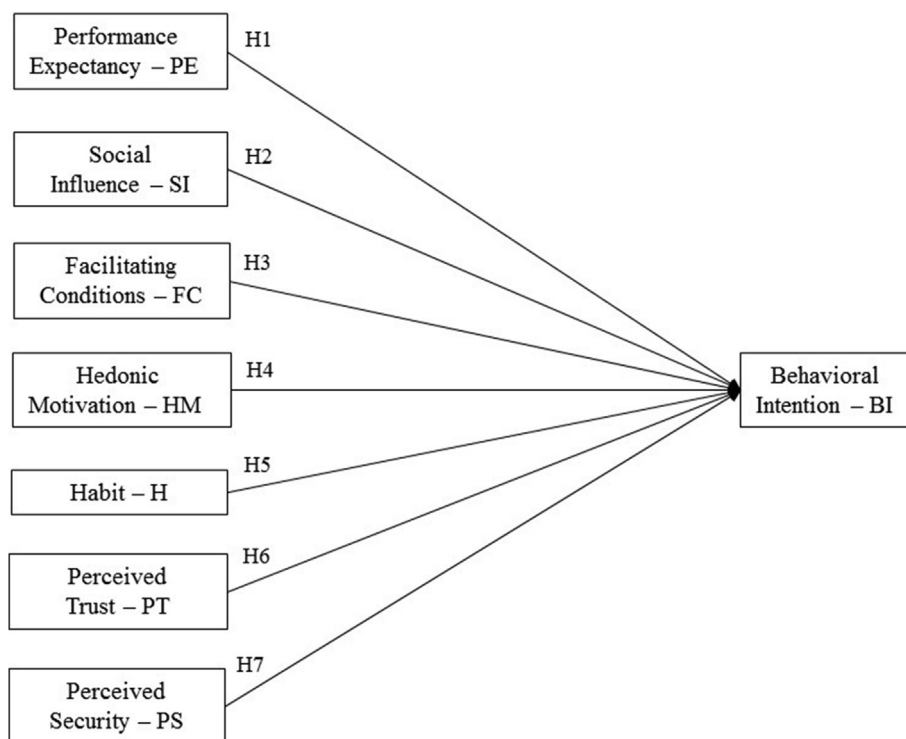


Figure 1. Research model of hypothesis.

basis for the development of interpersonal trust (Tan and Sutherland, 2004). In this sense, people differ culturally in how confident they are in general (Tan and Sutherland, 2004). In fact, Zhang et al. (2018) found that the strength of the relationship between trust and intention to adopt electronic banking was affected by the cultural dimension “avoidance of uncertainty”: the confidence to make decisions about the adoption of e-banking was more important for people from cultures with high scores in avoidance of uncertainty.

A review carried out by Williams et al. (2015) found that trust was one of the most frequently included constructs in the studies in which UTAUT was used. Similarly, in a review of empirical studies on m-payment and m-banking adoption by Slade et al. (2013), the additional variables posited in the UTAUT model were: (a) trust, confirming their significant and positive relationship with BI in 78% of the studies in which it was included; and, (b) perceived risk, whose relationship with BI was significant in 71% of the studies in which it was included. These authors incorporated trust and perceived risk in their recommendation to extend UTAUT2 to the context of m-payment and m-banking.

Perceived trust proved to be positively related to the intention to use m-commerce (Pipitwanichakarn and Wongtada, 2018), to adopt e-payment and m-payment (Nguyen and Huynh, 2018; Shin, 2009), to use e-banking (Sánchez-Torres et al., 2018; Zhang et al., 2018), to adopt m-banking (Shaikh and Karjaluoto, 2015), to the intention to use e-commerce (Ashraf et al., 2014; Gefen et al., 2003; Gefen and Straub, 2004; Sing and Matsui, 2017; Tavera and Londoño, 2014) and to use a new technology service (Lee and Song, 2013). On the other hand, Oh and Yoon (2014) observed that perceived trust was the second predictor of the intention to use online information services. The inclusion of this variable into UTAUT increased the explained variance of the behavioral intention, while Nor and Pearson (2007) and Shin (2010) found that perceived trust had an indirect impact on the intention to use Internet banking and social networking, through the direct effect that this variable had on attitude. Likewise, it has been reported that perceived trust has an indirect impact on the intention to use social media for transactions through the direct effect it has on attitude, perceived ease of use, and perceived behavioral control (Hansen et al., 2018).

It is of interest to note that additional research studies carried out in emerging economies demonstrated the influence of perceived trust in the adoption of m-commerce in Bangladesh and Pakistan (Ding et al., 2019; Rind et al. 2015), m-payment services in India (Liébana-Cabanillas et al., 2020), Smartphone banking applications in Malaysia (Wasiul et al., 2020), e-commerce in Indonesia (Muflih et al., 2020) and Colombia (Sánchez-Torres et al. 2019). Conversely, research on business initiatives targeting BOP customers has shown that they rarely fit their needs. Traditional initiatives to serve the BOP have consisted of redirecting the offer of products designed for other higher-income segments, with some changes in the marketing mix (smaller sizes, cheap versions, a simple structure of attributes) with low quality (Dakduk and Malavé, 2014). These initiatives are consistent with beliefs that BOP customers are only motivated by low prices and are not interested in innovations. For this reason, some initiatives in emerging economies have not been successful because they do not contribute to perceived trust in these sectors (Puente and López, 2011). Therefore, we posit that:

H6. Perceived trust will positively influence low-income consumer's behavioral intention to accept m-commerce in an emerging market.

3.12. Perceived security (PS)

PS has been treated as the consumer's perception of an electronic system intended for making financial transactions (Shin, 2010). This perception also includes the reliability of payment methods as well as the security mechanisms for transmitting and storing sensitive personal data (Eid, 2011). More specifically, the idea of perceived security infers the user's perception of seller's skills to satisfy a customer's safety needs (Musleh et al., 2015) or customer's beliefs about the privacy of personal information and its appropriate handling and service when making electronic transactions (Flavián and Guinalfú, 2006). It also infers perceived privacy, which is associated with the seller's ability to protect customer confidential information when conducting an electronic transaction (Musleh et al., 2015), which is also related to legal requirements and good practices of personal information management (Flavián and Guinalfú, 2006).

Morosan and DeFranco (2016) found a direct relationship between customer's concerns about information privacy and the intention to use a payment system through smartphone apps: the higher the customer's concern, the lower the intention for using this payment system. Conversely, perceived security was the primary predictor of Jordanians' intention to adopt m-banking services (Al Mashagba and Othman Nassar, 2012), as it was found to have a direct and positive effect on the intention to use mobile payment (Shin, 2009). It was also found to have an indirect impact on the intention of Colombian users to use e-banking, through a direct and positive effect on perceived trust (Sánchez-Torres et al., 2018) and on the intention to use social networking through the direct impact it has on attitude (Shin, 2010). Nevertheless, Gupta et al. (2017) found that intention to adopt m-banking was positively associated with the user's perception of control and negatively associated with perceived risk, but the levels of security did not affect perceived risk or control.

It is clear that the limitation of income is a reality for BOP consumers. The fact that their priority consumption needs are concentrated on the basic needs does not indicate that their decision-making processes are simple (D'Andrea et al., 2004). The loss of money or a fraud situation in a digital transaction in this sector has a very high impact on the family's

finances. For this reason, it is essential to understand the effects of this variable and its contribution in relation to the other variables in the model. Therefore, it is proposed that:

H7. Perceived security will positively influence low-income consumer's behavioral intention to accept m-commerce in an emerging market.

4. Method

4.1. Data collection

The data for this study were collected using a survey. The instrument was developed following the multi-stage approach suggested by Morgan-Thomas and Veloutsou (2013). The first items were based on a thorough literature review and resulted in a preliminary questionnaire contained two sections: (i) demographic information, (ii) UTAUT2, Perceived Trust, and Perceived Security construct. The items and scales were taken and adapted from previous research in which its reliability and validity are established to measure the constructs above (See Table 1). Each item was measured with a 5-point Likert scale, ranging from "strongly disagree" (1) to "strongly agree" (5).

Table 1. Final questionnaire of the study.

Scale	Code	Item	Adapted from	N° of item
Performance Expectancy - PE	PE1	I find mobile commerce useful in my daily life	Venkatesh et al. (2012)	4
	PE2	Using mobile commerce increases my chances of achieving things that are important to me		
	PE3	Using mobile commerce helps me accomplish things more quickly.		
	PE4	Using mobile commerce increases my productivity		
Social Influence - SI	SI1	People who are important to me think that I should purchase by mobile commerce	Venkatesh et al. (2012); Davis (1989); Taylor and Todd (1995); Ajzen (1991).	4
	SI2	I think that people like myself also buy through mobile commerce		
	SI3	People whose opinions that I value prefer that I use mobile commerce		
	SI4	My friends, family and colleagues encourage me to buy through mobile commerce		
Facilitating Conditions - FC	FC1	I have the control over the whole mobile shopping process	Taylor and Todd (1995); Venkatesh et al. (2003)	7
	FC2	I have the resources necessary to purchase online through mobile device		
	FC3	I have skills necessary to shop through mobile device		
	FC4	I can purchase through mobile phone even if there was no one around to help me		
	FC5	I can purchase online with my mobile phone reasonably well on my own		
	FC6	When I shop on the mobile, there is someone who can help me if I experience trouble using the system		
	FC7	Mobile commerce are compatible with other systems I used		
Hedonic Motivation - HM	HM1	Using mobile commerce is fun	Venkatesh et al. (2012)	3
	HM2	Using mobile commerce is enjoyable		
	HM3	Using mobile commerce is very entertaining		
Habit - H	H1	The use of mobile commerce has become a habit for me		3
	H2	I am addicted to using mobile commerce		
	H3	I must use mobile commerce to purchase		
	BI3	I plan to continue to use mobile commerce frequently		
Perceived Security - PS	PS1	I am not worried that information I provide when buying by mobile commerce	Tavera & Londoño. (2014); Vatanasombut et al. (2008); Escobar-Rodríguez and Carvajal-Trujillo (2014); Morosan and DeFranco (2016); Eid (2011); Flavián and Guinalfú (2006)	5
	PS2	I feel secure buying in a mobile commerce		
	PS3	In general, provide personal and financial information on mobile commerce is more risky than a personal purchase		
	PS4	Buy on mobile commerce is more risky than a traditional purchase		
Perceived Trust - PT	PT1	In general mobile stores are trustworthy	Kim et al. (2011); Pavlou (2003); Tavera and Londoño (2014); Eid (2011); Flavián and Guinalfú (2006)	8
	PT2	In general mobile stores keep their promises and agreements		
	PT3	In general mobile stores aren't opportunistic		
	PT4	In general online stores can offer a good services		
	PT5	I trust mobile stores to do the right job		
	PT6	I think that the design and commercial offer of the online stores take into account the desires and needs of its users		
	PT7	I believe that the technology is suitable for purchasing online		
	PT8	I have confidence that the technology used by online stores providers will work properly		
Behavioral Intention - BI	BI1	I intend to continue using mobile commerce in the future	Venkatesh et al. (2012)	3
	BI2	I will always try to use mobile commerce in my daily life		
	BI3	I plan to continue to use mobile commerce frequently		

This preliminary questionnaire was translated into Spanish and evaluated by five marketing research experts specialized in low-income consumers, consumer behavior, and mobile marketing. Based on experts' observations, changes were made to the wording, structure, and presentation of the questionnaire. Subsequently, a pre-test with a convenience sample of nine consumers with the same characteristic of the final sample was carried out to ensure clarity and explicit communication with respondents. Additional adjustments were made to the wording of some items according to the feedback obtained during this process.

The questionnaire was distributed to the Ecuadorian Chamber of Electronic Commerce members by e-mail through the QuestionPro platform. QuestionPro allows the sharing of questionnaires to their customer database through different media and the possibility of completion without an Internet connection. Each participant was encouraged to forward the link through their e-mail, Whatsapp, and social media (Facebook and/or Twitter) to their contacts. This snowball-sampling approach is often used where the target population may be difficult to access (Atkinson and Flint, 2001). Subsequently, those who met the following criteria were selected: Ecuadorians residing in Ecuador, who had made at least one purchase through their mobile device in the last month, and belonged to the low and medium-low socioeconomic segment. Membership at the socioeconomic segment was established based on a fixed income and current place of residence. In this sense, people with income lower than the legal minimum wage in Ecuador (U \$ 386) and that reported residency in low and medium-low areas according to the National Institute of Statistics' official population stratification system and Census of Ecuador.

The survey invitation contained information about the study's primary purpose, the voluntary nature of the participation, and the provided information's confidentiality treatment. This process resulted in questionnaires being distributed to 4758 individuals via the initial and secondary contact phases, later reduced to 344 after removing incomplete surveys.

4.2. Sample description

The final sample consisted of 344 participants, and its demographic profile is summarized in Table 2. The largest responding age groups were 26–35 and 18 to 25-year-olds, accounting for 79% of the total responses. The mean age was 29.7 (SD = 8.1). Regarding gender, there is a slightly higher proportion of females (60.5%) relative to males (39.5%). Most participants (57%) completed secondary education, 28% completed primary, and 15% completed technical degrees.

4.3. Data analysis and results

A partial least square structural equation modeling (PLS-SEM) using the SmartPLS 3.0 software was conducted to assess the proposed model. PLS-SEM is based on path and regression analyses and includes several

advantages over covariance-based SEM with stable parameter values from a small sample and for exploratory research purposes (Hair et al., 2014). A re-sampling by bootstrapping method was used to test the model. The number of re-samples was set at 500 to achieve a stable estimate of parameters.

4.4. Measurement model assessment

All constructs in this research model are first-order reflective. Measurement quality being verified by examining convergent validity, discriminant validity, and internal consistency. Convergent validity was assessed as follows: item reliability was inspected for each convergent item validity requiring indicator loadings to be 0.6 or greater (Bagozzi and Yi, 1988). All indicators presented loadings well above 0.6 except for five: two measuring facilitating conditions, one measuring perceived security, and two perceived trusts. As a consequence, these five items were removed from the model.

Remaining item loadings (See Table 3) demonstrated acceptable convergent validity and were retained for subsequent analysis. Composite reliability (CR) indicators were higher than 0.7, and internal consistency was assessed via Cronbach Alpha Coefficient, and all values were above 0.8, indicating excellent (0.90–1.0) or high (0.70–0.80) reliability for all the constructs (Hair et al., 2014). The average variance extracted (AVE) was also examined for each construct, and values were substantially higher than Chin's (1998) suggested 0.5 thresholds.

Discriminant validity was assessed by comparing all items loaded in which we expected a higher value with the same construct than other variables (see Table 4). This comparison satisfied discriminant validity, as suggested by Chin's criteria (1998). Also, the square of root AVE for each construct was higher than the inter-scale correlation (see Table 5). These results indicate satisfactory reliability and convergent validity.

4.5. Structural model and hypothesis testing

Based on SEM-PLS, we used the following criteria to assess the hypothesis model: R² adjusted value, Beta Coefficient, and f^2 effect size. Before testing the structural model, fit adjustment with SRMR value was evaluated. The result was 0.0780, indicating a good fit adjustment.

In terms of the model's predictive power, the R² adjusted value indicates that it explains 55.6% of the variance in BI. Bootstrapping was performed to provide a significance level for each hypothesized relationship – parameter settings for bootstrapping included no significant changes, and 500 samples. According to the results, FC, HM, H, and PT significantly predict BI to use m-commerce (See Table 6). In particular, FC emerged as the best predictor, followed by perceived confidence. Consequently, the intention to make online purchases through the mobile device increased as people had the resources and support necessary to make a purchase and previous experience in this type of process. As the experience is perceived as fun, and they feel confident in the retailer.

Table 2. Demographic information of the sample.

Variable	Category	N	% Responded
Age	18–25	119	35%
	26–35	152	44%
	36–45	53	15%
	≥46	20	6%
Gender	Male	136	40%
	Female	208	60%
Educational level completed	Primary	96	28%
	High School	197	57%
	Technical career	51	15%
	TOTAL	344	100%

Bold represents the total sample.

Table 3. Summary results for outer model.

Construct	Indicator	Loading	Composite Reliability	Cronbach's Alpha	AVE
Performance Expectancy - PE	PE1	0.852	0.94	0.90	0.79
	PE2	0.877			
	PE3	0.892			
	PE4	0.921			
Social Influence - SI	SI1	0.847	0.89	0.84	0.68
	SI2	0.758			
	SI3	0.821			
	SI4	0.861			
Facilitating Conditions – FC	FC1	0.868	0.95	0.94	0.81
	FC2	0.853			
	FC3	0.925			
	FC4	0.936			
	FC6	0.905			
Hedonic Motivations - HM	HM1	0.934	0.95	0.93	0.87
	HM2	0.946			
	HM3	0.925			
Habit – H	H1	0.855	0.85	0.75	0.65
	H2	0.740			
	H3	0.823			
Perceived Security – PS	PS1	0.749	0.90	0.81	0.63
	PS2	0.822			
	PS3	0.796			
	PS4	0.806			
Perceived Trust - PT	PT1	0.893	0.94	0.92	0.71
	PT2	0.819			
	PT3	0.906			
	PT4	0.800			
	PT5	0.797			
	PT6	0.842			
Behavioral Intention - BI	BI1	0.909	0.94	0.90	0.84
	BI2	0.939			
	BI3	0.899			

According to [Cohen's \(1988\)](#) guidelines, f^2 values of 0.02, 0.15, and 0.35 represent small, medium, and large effect sizes, respectively. The f^2 effect size on BI was small for all the variables, which implies a small but significant contribution of the variables whose hypotheses were confirmed. All these results are summarized in [Table 6](#).

5. Discussion

This study's objective was to evaluate the intention to use m-commerce in low-income consumers in an EM (Ecuador) using an extended version of the UTAUT2 model that includes trust and perceived security. Specifically, the proposed theoretical model explained 55.6% of the variance in BI. However, the size of the effect of the four variables that significantly predicted the intention of Ecuador's low-income consumers to use m-commerce was small.

Even though the FC-BI relationship has been less researched than the PE-BI and SI-BI relationships ([Khechine et al., 2016](#); [Sanakulov and Karjaluo, 2015](#); [Williams et al., 2015](#)), in the case of Ecuadorian consumers from the BOP, it was evident that the perception of having the support, skills, and resources necessary to carry out transactions through mobile devices turned out to be the best predictor of the intention to use m-commerce.

As expected, the results confirmed that FC had a direct and positive influence on BI. Even though the size of the effect found in our study is smaller than results presented in other studies, the predictive power of the FC observed in this study was consistent with what has been confirmed by [Khechine et al. \(2016\)](#), [Sanakulov and Karjaluo \(2015\)](#),

and [Williams et al. \(2015\)](#). Likewise, this result is consistent with those of various authors in countries such as the United States, Portugal, India, and China, where the results yielded evidence that the FC has a direct effect on the intention of using different m-commerce services such as mobile shopping services and app, payment system via mobile phone, and m-banking ([Morosan and DeFranco, 2016](#); [Oliveira et al., 2014](#); [Savita Panwar, 2017](#); [Sivathanu, 2018](#); [Yang, 2010](#); [Yu, 2012](#)).

The second-best predictor of intent to use m-commerce was perceived trust. This confirmed that trust is a critical component of economic transactions in online environments ([Ashraf et al., 2014](#); [Flavián and Guinalfú, 2006](#); [Gefen et al., 2003](#); [Gefen and Straub, 2004](#); [Hansen et al., 2018](#); [Nguyen and Huynh, 2018](#); [Nor and Pearson, 2007](#); [Pavlou, 2003](#); [Sing and Matsui, 2017](#); [Tan and Sutherland, 2004](#)), and is positively related to the adoption of e-payment, m-payment and m-banking by consumers in Vietnam, Thailand, the Republic of Korea and the United Kingdom ([Nguyen and Huynh, 2018](#); [Pipitwanichakarn and Wongtada, 2018](#); [Shaikh and Karjaluo, 2015](#); [Shin, 2009](#); [Slade et al., 2013](#)). In fact, the first online purchase study of the Electronic Commerce Observatory of Ecuador suggested that more than 70% of Ecuadorians interviewed named trust as the main reasons for not making online purchases, and 44.9% declared that they did not buy in national portals for reasons related to lack security and support during the purchase process.

Regarding the weight of perceived trust in explaining behavioral intention, [Tan and Sutherland \(2004\)](#) admit that people differ culturally in how confident they feel in general. In fact, in the meta-analysis conducted by [Zhang et al. \(2018\)](#) to explore to what extent national culture moderates the relationship between intention to use e-banking and PE,

Table 4. Cross-factor loadings and reliability of constructs.

	PE	SI	FC	HM	H	BI	PS	PT
PE1	0,8520	0,4912	0,5739	0,4756	0,2608	0,5240	0,5390	0,5632
PE2	0,8775	0,5211	0,5970	0,4303	0,3770	0,5139	0,5203	0,5888
PE3	0,8922	0,5009	0,6536	0,5143	0,4283	0,5759	0,5517	0,6344
PE4	0,9211	0,5541	0,6652	0,5583	0,3962	0,6172	0,6330	0,6601
SI1	0,4247	0,8471	0,2201	0,4592	0,4314	0,3294	0,3962	0,4003
SI2	0,6505	0,7585	0,5650	0,5078	0,3322	0,4888	0,5075	0,5600
SI3	0,3415	0,8214	0,2127	0,3825	0,3721	0,3047	0,3686	0,3583
SI4	0,4072	0,8611	0,2671	0,4326	0,4919	0,3823	0,3932	0,4190
FC1	0,6195	0,4149	0,8686	0,4091	0,3842	0,6178	0,5519	0,7131
FC2	0,6365	0,3718	0,8532	0,4018	0,2527	0,5729	0,5780	0,6700
FC3	0,6191	0,3624	0,9256	0,4113	0,2659	0,5973	0,5319	0,6410
FC4	0,6494	0,3915	0,9365	0,3981	0,3044	0,6123	0,5245	0,6763
FC6	0,6394	0,3396	0,9056	0,3706	0,2561	0,5732	0,5438	0,6807
HM1	0,4914	0,5126	0,3685	0,9342	0,4973	0,4610	0,5141	0,4818
HM2	0,5419	0,5142	0,4637	0,9463	0,4676	0,5248	0,5257	0,5308
HM3	0,5391	0,5292	0,4067	0,9254	0,4788	0,4858	0,4401	0,4670
H1	0,4135	0,4614	0,3506	0,5262	0,8558	0,4499	0,4353	0,4219
H2	0,1577	0,2874	-0,0229	0,3404	0,7401	0,1723	0,2817	0,1888
H3	0,3407	0,3946	0,3054	0,3407	0,8238	0,3897	0,4800	0,4514
BI1	0,5673	0,4040	0,6021	0,4651	0,4334	0,9098	0,5142	0,6277
BI2	0,6314	0,4647	0,6287	0,5066	0,4218	0,9397	0,5755	0,6352
BI3	0,5360	0,4422	0,5905	0,4730	0,4115	0,8993	0,5326	0,5855
PS1	0,3774	0,4088	0,3247	0,3793	0,4571	0,3738	0,7495	0,5219
PS2	0,5196	0,4321	0,4703	0,5136	0,4928	0,5217	0,8226	0,6733
PS3	0,5189	0,4138	0,4877	0,4107	0,3321	0,4634	0,7966	0,5584
PS4	0,5786	0,4054	0,6157	0,3634	0,3695	0,4965	0,8060	0,6666
PT1	0,6588	0,4740	0,7143	0,4534	0,3921	0,5930	0,7006	0,8931
PT2	0,5481	0,5018	0,5386	0,4916	0,4172	0,5322	0,7003	0,8198
PT3	0,6544	0,5346	0,6782	0,4877	0,4375	0,6007	0,7198	0,9062
PT4	0,5492	0,4793	0,5829	0,3848	0,4508	0,4904	0,5853	0,8004
PT5	0,4789	0,3782	0,5555	0,3901	0,4116	0,5545	0,5449	0,7972
PT6	0,6036	0,4195	0,7219	0,4619	0,3274	0,6206	0,6335	0,8420

Bold represents the factorial load of each item with the total variable.

Table 5. Construct correlation matrix.

	BI	FC	H	HM	PS	PT	PE	SI
BI	0,9164							
FC	0,6627	0,8985						
H	0,4607	0,3273	0,8080					
HM	0,5258	0,4436	0,5137	0,9354				
PS	0,5905	0,6076	0,5175	0,5278	0,7942			
PT	0,6727	0,7532	0,4778	0,5284	0,7683	0,8442		
PE	0,6321	0,7044	0,4150	0,5613	0,6356	0,6923	0,8860	
SI	0,4770	0,4194	0,4929	0,5543	0,5216	0,5491	0,5838	0,8230

Bold represents intra - correlation of each variable.

Table 6. Summary of hypothesis testing.

Path	Beta Coefficient	T - Value	P- Value	Result
H1: Performance Expectancy → Behavioral Intention	0.133	1.847	0.066	Not confirm
H2: Social Influence → Behavioral Intention	0.020	0.394	0.694	Not confirm
H3: Facilitating Conditions → Behavioral Intention	0.298	4.298	0.000	Confirm
H4: Hedonic Motivation → Behavioral Intention	0.123	2.436	0.015	Confirm
H5: Habit → Behavioral Intention	0.123	2.832	0.005	Confirm
H6: Perceived Trust → Behavioral Intention	0.192	2.048	0.041	Confirm
H7: Perceived Security → Behavioral Intention	0.038	0.608	0.541	Not confirm

EE, SI, risk, and perceived trust, the overall conclusion was that the relationship between trust and behavioral intention was more robust in the case of cultures with high power distance and uncertainty avoidance cultural dimensions of Hofstede (2011), and expected the trust-BI relationship to be stronger in those societies with low individualism. Power distance is defined as the “degree to which the less powerful members of a society accept and expect that power is distributed unequally.” At the same time, the uncertainty avoidance dimension “expresses the degree to which the members of a society feel uncomfortable with uncertainty and ambiguity,” and individualism is defined as “a preference for a loosely-knit social framework in which individuals are expected to take care of themselves and their immediate families” (Hofstede Insights, 2019).

According to the reported results by Hofstede (2011), Ecuador is one of the countries with the highest scores in power distance and uncertainty avoidance. It has one of the lowest scores in individualism, making it one of the most collectivist cultures of all studied. Ecuador is characterized as a society in which people tend to accept the hierarchical order established for each individual. This order occupies a place that does not need to be justified and serves to maintain rigid beliefs and behavioral codes, to tolerate unorthodox ideas and behaviors, and to attach great importance to belonging to a group, showing a strong identity based on race or in class distinctions and much solidarity towards members of their in-groups (Hofstede Insights, 2019). For Zhang et al. (2018), in societies with high power distance, opportunistic behaviors are presented with higher incidence; thus, the confidence that others will behave responsibly and not take advantage of their position of power can be of great importance in the decision making of consumers, especially in electronic markets. On the other hand, these authors suggest that people from countries with high uncertainty avoidance tend to be resistant to changes, causing them not to adopt new technologies unless they have high confidence in them. Finally, because of the critical role power distance plays in the processes of building and maintaining relationships, it can significantly impact people's decision-making in collectivistic cultures (Zhang et al., 2018).

The present research also confirmed that the perception of using m-commerce as an entertaining and fun experience has a direct and positive impact on the intention to use the m-commerce by low-income Ecuadorian consumers. This coincides with the findings by Baptista and Oliveira (2015), Savita Panwar (2017), and Sivathanu (2018), who found that HM has a significant impact on the intention to use m-banking, mobile shopping app, and digital payment systems, and reinforces the claim of authors such as Alalwan et al. (2016), Morosan and DeFranco (2016), Poong et al. (2016) and Venkatesh et al. (2012) that hedonic benefits are essential drivers of intention to use or adopt information technologies.

Our results also suggest that habit has a direct positive effect on the intention to use m-commerce, coinciding with what was reported by Baptista and Oliveira (2015) and Sivathanu (2018) regarding the intention to use mobile banking and digital payment systems. However, results do not support the hypothesis that there is a direct and positive effect of PE on the BI to use m-commerce. This is a contradiction of what has been found in several systematic reviews of research in which the UTAUT was used (Khechine et al., 2016; Sanakulov and Karjaluo, 2015; Williams et al., 2015; Zhang et al., 2018) and of the results obtained by authors who have studied the adoption and use of various m-commerce services (Oliveira et al., 2014; Venkatesh et al., 2012; Yang, 2010), even when working with samples from other emerging economies such as India (Savita Panwar, 2017; Sivathanu, 2018), Mozambique (Baptista and Oliveira, 2015), China (Yu, 2012), and Jordan (Al Mashagba and Othman Nassar, 2012). The absence of a significant relationship between PE and BI could also be related to the characteristics of the culture of Ecuador in the dimensions of Hofstede (2011): (a) individualism; (b) power distance; and (c) masculinity, which represents a societal preference for achievement, heroism, assertiveness, and material rewards for success. In this sense, according to the results reported by him, Ecuador has one of

the lowest scores in individualism and has high scores both in masculinity and in power distance. The latter implies that Ecuadorians “are competitive and status-oriented though collectivistic” and that competition is directed towards members of other groups (or social classes) rather than their in-group members. In concordance with these cultural characteristics, Zhang et al. (2018) found that the PE-BI ratio's strength was lower as the individualism score decreased, and the power distance and masculinity scores increased.

In addition to the cultural argument, another reason for the absence of a significant relationship between PE - BI could be attributed to the overall evaluation carried out in this mobile commerce study. PE is related to the “degree to which technology will provide benefits to consumers in performing certain activities” (Venkatesh et al., 2012, p.159). There may be variations in this relationship's significance, depending on the type of purchasing activities or the brand through which the purchases are made. This assumption is consistent with findings from Mahfuz et al. (2017), who, when studying the adoption of banking services using the UTAUT2 in Bangladesh, also did not find a significant relationship between PE - BI when evaluating this relationship in general terms. In contrast to the model, when this relationship was explored by incorporating the brand name, a significant relationship between both variables was evidenced.

The results presented in this research were also consistent with findings from Kwateng et al. (2019), who also failed to confirm the PE - BI hypothesis when studying the acceptance of mobile banking in Ghana using UTAUT2, unlike habit and perceived trust, whose hypotheses were confirmed. Similarly, our results invalidate the hypothesis that the consumer's SI has a direct positive effect on the BI to use m-commerce, therefore contradicting what can be found in several systematic reviews (Khechine et al., 2016; Sanakulov and Karjaluo, 2015; Williams et al., 2015; Zhang et al., 2018).

Regarding the absence of a direct relationship between SI and BI, these results coincide with those reported by Baptista and Oliveira (2015), Martins et al. (2014), Oliveira et al. (2014), and Shin (2009) who, working with samples from Portugal and the Republic of Korea, also did not find evidence that the SI significantly predicted the intention to adopt Internet banking, use m-banking, or use m-payment. However, they disagree with the observations made by Al Mashagba and Othman Nassar (2012), Morosan and DeFranco (2016), Savita Panwar (2017), Shaikh and Karjaluo (2015), Sivathanu (2018), Venkatesh et al. (2012), Yang (2010), and Yu (2012), who did confirm the positive and significant impact of SI on the intention to use the mobile shopping app, payment system via mobile phone, mobile technology, mobile shopping services, and m-banking when working with samples from Jordan, the United States, India, and China. Zhang et al. (2018) found that the SI-BI relationship was less intense in cultures with high scores in uncertainty avoidance, as is Ecuador's case; however, this relationship was more robust in countries with high scores in power distance and masculinity.

Finally, our results do not constitute evidence in favor of the hypothesis that perceived security has a direct positive influence on the intention to use m-commerce. This is inconsistent with Al Mashagba and Othman Nassar (2012), Morosan and DeFranco (2016), and Shin (2009), who found that the intention to adopt m-banking services, use a payment system through smartphone apps, and use mobile payment decreased as the customer's concerns about information increased. However, our results are consistent with what was reported by Gupta et al. (2017) in that the security levels did not affect the perceived risk or the perceived control, variables that had a direct influence on the Indian customers' intention to adopt m-banking. Our results may be related to what was reported by Zhang et al. (2018), who found that the relationship between perceived risk and intention to use e-banking was less potent in societies with low individualism, as is the case in Ecuador. It is also important to highlight that perceived security is related to personal and financial information delivery. So the means of payment determines in a certain way

how much information is delivered. In particular, credit card payments require more information, but access to this means of payment in these sectors is limited or non-existent.

6. Implications for academics

The results suggest that even though UTAUT is one of the most frequently used models to account for the adoption of technologies in general (Williams et al., 2015) and mobile technologies in particular (Sanakulov and Karjaluoto, 2015; Shaikh and Karjaluoto, 2015; Slade et al., 2013), the behavior of BOP consumers in emerging markets such as Ecuador does not correspond fully with what was expected according to the assumptions associated with this theory and the baseline model of the multi-level framework of technology acceptance and use of Venkatesh et al. (2016) based on the UTAUT2. Consequently, our results constitute additional evidence to results previously reported by Mohd-Isa and Wong (2015), Sánchez-Torres and Arroyo-Cañada (2016), Venkatesh and Zhang (2010), and Zhang et al. (2018) suggesting that the relationships between the core constructs of UTAUT2 may vary depending on the countries where it is applied. This is consistent with what was proposed by the authors of the model (Venkatesh et al., 2016) and other authors who have implemented it (Baptista and Oliveira, 2015) and argued that national culture and economic development are contextual factors that can moderate the impact of the explanatory constructs of the technological adoption on the part of the users. Thus, our results add to what has already been reported by Khechine et al. (2016), who argued that the evidence obtained in the studies in which the UTAUT has been used are inconclusive, and by Venkatesh et al. (2012) regarding the need to carry out more research by applying the UTAUT2 in different countries and with different technologies, as well as identifying other relevant variables such as perceived trust in order to extend this version of the theory (Oh and Yoon, 2014), and help increase its applicability to a broader range of contexts, cultures, and users (Chang, 2012; Venkatesh et al., 2012).

7. Implications for practitioners

Whereas the growth of upper-middle-income countries has been significantly impacted by fixed telephony, mobile telephony, and Internet usage, both upper-low-income and low-income countries are only significantly impacted by mobile telephony (Chavula, 2013). Despite these less developed markets' clear business potential, organizations and marketing managers continue to show an inexplicable disinterest in BOP consumers (Hamilton and Catterall, 2005).

Even though there are successful examples of firms that serve BOP markets globally such as Grameen Bank in Bangladesh (Jain, 1996), General Electric in Bangalore (Kapur and Ramamurti, 2001), Big Cola in Peru (Vassolo et al., 2011), Banesco Banca Comunitaria in Venezuela (Vainrub and Rodriguez, 2012) only a few other companies have developed specific strategies and business models that fit the characteristics of BOP consumers and can explore the significant potential of this segment (Pels and Sheth, 2017). Conversely, there have been many examples of the failure of multinational firms that tried to expand operations to emerging economies, highlighting that merely taking a product, services, and business systems from developed economies to emerging markets will not work in the BOP segments. Therefore, the findings presented in this paper are essential for firms targeting BOP segments. An understanding of these results could help these firms understand how to balance global standards with local receptiveness as the development of BOP markets should evolve past the idea of merely implementing concepts to an existing market but rather treat it as a new market.

The concept of marketing management is grounded on the use of managerial tools that enable organizations to base their decisions on relevant market information. Nevertheless, none of this is possible if a firm does not develop a solid understanding of how a BOP market operates. Therefore, managers can use the framework proposed in this

study to help them make better decisions in areas associated with the existing gap that separates organizational activities and resources from BOP consumers. Multinationals operating in BOP markets need to be structured differently in order to be able to service these markets (Pels and Sheth, 2017), while managers responsible for operations in BOP markets require new tools to support their decisions when operating in these markets (Abendroth and Pels, 2017; Pels and Sheth, 2017; Sridharan et al., 2017). Consequently, the framework proposed for the present study can provide a valuable and impactful contribution. Managers should take advantage of it to develop ecosystems designed to acquire new customers in the BOP segment. BOP markets are strongly associated with the need for new services and applications, consequently imprinting in them a unique developmental capacity fuelled by the innovation process that characterizes emerging markets.

Managers should also become aware of other global firms that use BOP markets as laboratories to develop breakthrough innovations that not only allow them to participate in BOP markets but ultimately have the potential also to be adopted in developed country markets. Careful consideration and management of the factors that could contribute to the adoption of technology in low-income sectors would expand the portfolio of opportunities for organizations considering bringing their offers to this population sector. In contrast, on the side of consumers, this would provide more opportunities that are significant for this group of consumers to access new products and services offerings.

In terms of the specific results reported in this study, the positive and significant influence of the facilitating conditions suggests, in practice, the need for the availability of support resources for BOP clients that carry out transactions via mobile phones. These resources could be made available in the form of confirmation messages sent to clients during the different stages of the purchase process, by taking advantage of the opportunity to provide support either through call centers or automated tools during the purchase, as well as providing illustrative and straightforward video tutorials that offer detailed instructions on how to make purchases and validate its successful execution. Likewise, the confirmation of the impact of hedonic motivation on purchase intention suggests the need to design environments for purchases through mobile phones that are attractive, entertaining, and pleasant for users. Considering that this segment has a lower educational level, it is crucial to optimize experience using visual and dynamic resources that facilitate the familiarity and success of purchases through mobile devices. On the other hand, given that perceived trust positively affects the intention to buy online, it is essential to create and communicate the existence of quality seals, as well as the accreditation and certification of online purchases that can help build trust in purchases through the platform. The e-Trust seals seek to foster a relationship of trust between companies and their consumers. It represents a certification program recognized worldwide by the World Trustmark Alliance, which endorses companies' commitment to their consumers, establishing that these brands have the highest security and responsibility levels during all their online interactions. There are no quality seals in Latin America equivalent to the Europe Trustmark in Europe to accredit online sales platforms. Specifically, in Ecuador, there is no local e-trust accreditation for its marketplaces.

8. Limitations and future research

This study has some theoretical and methodological limitations. As for the theoretical limitations, one aspect that needs to be highlighted is that the theoretical model used was fundamentally designed to be applied with users with some experience of the technology being studied, so that this represents a limitation for socially and economically disadvantaged group analysis, where the analysis of non-users represents a critical area to explore for the development of applications aligned with these sectors.

Regarding the methodological limitations, in addition to those observed in studies using surveys and structural equation models, it is essential to note that the sample used was selected in the framework of a broader investigation, which was selected for convenience. Thus,

according to the official census figures from Ecuador, the study sample's demographic composition does not correspond to the structure of the low-income sectors. Given these limitations, it is recommended that future studies to advance the development of theoretical models include non-users, as well as the selection of samples whose demographic characteristics that correspond to the population structure of the low-income sectors in emerging economies.

Based on the lack of significance for Perceived Security to Behavioral Intention, it would be necessary to include information related to the means of payment to expand the explanation of these relationships.

Additionally, we recommend further research to explore and compare mobile services' adoption in other technological contexts and more specific categories of goods and services. This can help determine how these relationships occur according to the digital environment and the type of purchase decision.

Finally, making comparisons between developed versus emerging economies, as well as between different emerging economies, should produce more robust conclusions about the adoption and use of technology of this broad sector of the population globally.

Declarations

Author contribution statement

S. Dakduk: Conceived and designed the experiments; Performed the experiments; Analyzed and interpreted the data; Contributed reagents, materials, analysis tools or data; Wrote the paper.

Z. Santalla-Banderalli: Conceived and designed the experiments; Analyzed and interpreted the data; Contributed reagents, materials, analysis tools or data; Wrote the paper.

J.R. Siqueira: Analyzed and interpreted the data; Contributed reagents, materials, analysis tools or data; Wrote the paper.

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The authors declare no conflict of interest.

Additional information

No additional information is available for this paper.

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