Effects of age and income moderation on adoption of mobile payments in Brazil

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Abstract

Purpose – This study aims to measure the effects of moderation by age and income in mobile payment systems' intended use as predictors of performance expectation, effort expectation, social influence, risk and perceived costs.

Design/methodology/approach – This study is based on a survey that generated a sample of 1,742 Brazilian users that responded to the measurement scale. The research data were analyzed using the partial least squares structural equation model.

Findings – All proposed latent variables were significant, with income positively moderating the performance expectation and negatively moderating the perceived cost and perceived risk. In addition, age positively moderates performance expectation and negatively moderates cost perception.

Originality/value – The findings evolved previous literature by understanding moderating effects that make it possible for companies operating in mobile payments to generate segmented communication and engagement plans for users of different income and age brackets.

Keywords Mobile payments, Consumer behavior, Technology adoption, UTAUT

Paper type Research paper

1. Introduction

Mobile payments differ from online payments made with smartphones using wireless or other mobile device-specific technologies (Dahlberg, Mallat, Ondrus, & Zmijewska, 2008). The conjunction in the growth of credit and debit cards, combined with the adoption of smartphones, enhances this payment method.

The use of mobile phones as a platform is prevalent. There were 242 million smartphones in Brazil as of June 2021, compared to 198 million personal computers, notebooks and tablets. Industries sold four smartphones for every television or personal computer sold in Brazil (Meirelles, 2021). A study by the Brazilian website Mobiletime and research institute Opinionbox (2021) found that 34% of adult Brazilians who own a smartphone made at least one mobile payment transaction, and 73% made at least one Pix (Brazilian Central Bank's instant payment platform) transaction.

This work aims to measure the effects of the moderation by age and income in the intended use of mobile payment systems using performance expectation, effort expectation,

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social influence, risk and perceived costs as predictors. The authors chose age and income as moderating variables and a proxy for customer segmentation.

This study uses a theoretical model based on the unified theory of acceptance and use of technology (UTAUT) theory, adapted for mobile payments in Brazil by Abrahão, Moriguchi and Andrade (2016). Their model comprises five constructs to measure behavioral intention to adopt mobile payments: performance expectation, effort expectation, social influence, perceived risk and perceived cost. This study expands the base model by submitting the five constructs' relation of behavioral intention to age and income moderation.

This study is relevant to literature in two ways. First, by discussing critical moderating effects on the model of Abrahão *et al.* (2016), it expands a model that brings together aspects of the UTAUT with the cost and risk perceptions, which is vital in the context of mobile payments. Second, by retesting their structural model, it is possible to find its suitability for replication, facilitating its use in further studies.

2. Literature review and hypotheses development

2.1 Mobile payments

The mobile payment ecosystem is a two-sided market, where customers and merchants on each side operate a system mediated by payment service providers backed by financial institutions, telecom operators, smartphone manufacturers and software vendors. Thus, market dynamics and the introduction of innovative technologies depend on the interaction of interests between these players (Dahlberg *et al.*, 2008).

Among the merchant segments, the ones most impacted by the mobile payments' transformational potential are retail, information services, entertainment and technology-related services according to Chen (2008).

Because mobile payments are an important new research field, some authors proposed categorizing current research streams. This study is part of the first category presented by Slade, Williams and Dwivedi (2013), which is to examine the readiness and determinants of m-payment acceptance. This category comprises the most significant proportion of studies on mobile payments.

2.2 Technology acceptance theory

The technology acceptance framework arises from the seminal study by Davis (1986) with the technology adoption model. The authors created this model aiming at two objectives:

(1) To provide new insights into how the subject matter experts design the technology systems and how their implementation affects the intention to use such systems.

(2) To provide a tool that would allow developers to test their proposed systems before the release by measuring user motivations in using a technology system where users would be experimenting with prototypes (Davis, 1986; Davis, Bagozzi, & Warshaw, 1989).

Davis then worked with Venkatesh and others to continually test and advance the technology acceptance model (TAM) that later formed the basis for the TAM2 model (Venkatesh and Davis, 2000), with its additional dimensions going on to increase the rate of variance in user intentions.

Later, Venkatesh, Morris, Davis and Davis (2003) proposed another evolution based on the characteristics of eight technology adoption frameworks that combined resulted in the creation of the UTAUT. The main benefit of the UTAUT model is summarizing the frameworks into four determinants of usage and intention to be moderated by up to four variables.

2.3 Technology acceptance of mobile payments

Several studies have attempted to determine how technology adoption frameworks explain adopting mobile payments. Dahlberg, Guo and Ondrus (2015) critically reviewed the literature on mobile payments. They found that most models rely on general TAM and UTAUT models enriched by additional interest variables, where trust, security and cost strongly influence adoption.

Shafinah, Sahari, Sulaiman, Yusoff and Ikram (2013) reviewed the uses of several adoption models for mobile services. They found that TAM and UTAUT models are improved when adding perceived cost and risk. They also supported the framework adopted in Brazil by Abrahão *et al.* (2016).

The moderating effects of gender, age and income are also suggested in Shafinah *et al.* (2013), specifically mobile payments. The moderating effects of those three variables are part of the original UTAUT model, which the authors included in this current research supported by robust evidence.

A study in Brazil by Pavarini, Silva, da Rocha and Corso (2010) used moderating effects of age and income on the Innovation Diffusion Theory (IDT). This study found a significant moderating effect of age: younger consumers were more interested in adopting new technologies than more aged customers. The analysis of Liébana-Cabanillas, Muñoz-Leiva and Sánchez-Fernández (2015) in Spain, using the TAM, also found that younger customers were more willing to adopt mobile payments.

2.4 Constructs and hypotheses of this study

Abrahão *et al.* (2016) proposed the adapted UTAUT scale in this work. The authors chose this scale because of its straightforward structure, overall robustness, and original provision for the existence of moderating variables, allowing for a focus on potential findings for the mobile payments market in Brazil. The research of Bobsin, Visentini and Rech (2009) supports the adaptations to the original UTAUT model to better analyze specific technology adoption contexts.

In their model, Abrahão *et al.* (2016) used five predictors for behavioral intention. Performance expectation, effort expectation and social influence are directly derived from the UTAUT model. Additionally, the authors incorporated perceived risk and cost to measure mobile payment characteristics in the Brazilian context.

The variable performance expectation measures how the consumers perceive the technology as adequate to get gains in the efficiency of their activities. The UTAUT theory definition incorporates the perceived usefulness, extrinsic motivation, job fit, relative advantage and expected outcomes (Venkatesh *et al.*, 2003).

Effort expectation measures the ease of use consumers associate with technology. According to the definition by Venkatesh *et al.* (2003), it combines characteristics of three constructs from other models: perceived ease of use from TAM and TAM2, complexity from Model of Personal Computer Utilization and ease of use from IDT.

Social influence measures the degree to which other people's opinions influence user attitudes toward technology. Venkatesh *et al.* (2003) show that social influence incorporates subjective norms, social factors and images from TRA, TAM2, TPB/DTPB, C-TAM-TPB, MPCU and IDT. These constructs capture the effect of individuals changing behaviors in response to valued opinions, whether through personal response to social compliance, internalization or identification with social norms.

Abrahão *et al.* (2016) also added the variables perceived risk and perceived cost to complement the behavioral intention predictors of the UTAUT theory, incorporating aspects that are present in the context of a transactional service.

Perceived cost measures the perception of financial and time-related expenses of defining, evaluating, choosing and buying the hardware and software (in the form of a mobile phone,

data plans, and related applications) needed to perform mobile payment transactions (Abrahão *et al.*, 2016). It incorporates the findings of Shafinah *et al.* (2013) that compared different technology adoption models concerning mobile services. It stated that perceived cost, trust and perceived risk were the most used additional variables for the behavioral intention in mobile services.

Perceived risk measures the perception of exposure to financial, social, psychological, physical or time-consuming risks (Abrahão *et al.*, 2016). This additional construct was, along with perceived costs, found by Shafinah *et al.* (2013) as one of the major concerns for mobile services technology applications.

This study builds upon Abrahão *et al.* (2016), considering the moderating effects of age and income on the five original constructs. In addition, the authors have chosen the combination of age and income as a proxy for a potential consumer segmentation strategy.

Age was an original moderator for the four primary constructs on the original UTAUT model, as proposed by Venkatesh *et al.* (2003). However, later studies suggested that other moderating effects can amplify understanding when considering a specific technology, such as mobile payments. For example, as previously noted, Shafinah *et al.* (2013) suggested that age, income and gender tend to enrich technology adoption frameworks.

Age and income in the context of this study can be proxies for the technology readiness of consumers. Caldeira, Ferreira, Freitas and Falcão (2021) studied the effects of technology readiness on perceived ease of use, perceived usefulness, perceived quality and trust, and in all four constructs, the effect was positive. The hypothesis that age and income negatively affect costs and risk perceptions leads to the assumption that these audiences are more resistant to switching to emerging technology such as mobile payments.

The interaction of our proposed moderating variables with the five constructs from the base model resulted in the 15 hypotheses listed in Table 1.

3. Methodology

Two sections comprise the scale used in this study: a demographic description of the respondent from which the authors obtained the age and income information and a second section with twenty-three questions regarding the constructs for the adoption

H	Hypothesis description
H1	Performance expectation positively affects the intention to adopt mobile payments
H2	Effort expectation positively affects the intention to adopt mobile payments
H3	Social influence positively affects the intention to adopt mobile payments
H4	Perceived risk negatively affects the intention to adopt mobile payments
H5	Perceived cost negatively affects the intention to adopt mobile payments
H6a	Age positively moderates the performance expectation effect on the intention to adopt mobile payments
H6b	Age positively moderates the effort expectation effect on the intention to adopt mobile payments
H6c	Age positively moderates the social influence effect on the intention to adopt mobile payments
H6d	Age negatively moderates the perceived risk effect on the intention to adopt mobile payments
H6e	Age negatively moderates the perceived cost effect on the intention to adopt mobile payments
H7a	Income positively moderates the performance expectation effect on the intention to adopt mobile payments
H7b	Income positively moderates the effort expectation effect on the intention to adopt mobile payments
H7c	Income negatively moderates the social influence effect on the intention to adopt mobile payments
H7d	Income negatively moderates the perceived risk effect on the intention to adopt mobile payments
H7e	Income negatively moderates the perceived cost effect on the intention to adopt mobile payments

Source(s): Authors (2020)

Table 1. Summary of hypothesis

model proposed by Abrahão *et al.* (2016). Table 2 contains the questions used in the measurement scale.

The authors collected the answers to the questions on the adoption model using a six-point Likert scale. In addition, they collected data through an online questionnaire containing the research scale and through a sample of a payment methods company in Brazil. This company operates as a card issuer and pursues objectives in mobile payments. The company has five million cardholders in Brazil, most of whom are users of its mobile app solution, which allowed the authors to conduct a study on its user base. The authors sent an invitation to complete the questionnaire to 100,000 users of the mobile application of said Brazilian company, and the questionnaire was open to responses from July 6, 2020, to July 29, 2020. During this period, we collected 1,780 answers, which, after excluding invalid responses, resulted in 1,742 respondents.

3.1 Data analysis methods

The authors modeled the data collected from the survey using structural equation modeling (SEM). The analysis followed a two-step approach (Malhotra, Lopes, & Veiga, 2014). First, we validated the scale for accuracy, and then the analysis proceeded to structural modeling of the construct variables.

Construct	Questions
Performance expectation	PE1 – I believe mobile payment would be a helpful service in my day-to-day activities; PE2 – Using mobile payment would help me perform my financial transactions more quickly; PE3 – Using mobile payment would save time so I can do other activities in my daily life; PE4 – Mobile payment would bring me greater convenience
Effort expectation	EE1 – My interaction with the mobile payment service would be clear and easy to understand; EE2 – It would be easy for me to develop the skills to use the mobile payment service; EE3 – I believe that it is easy to use mobile payments; EE4 – Learning to use the mobile payment system would be easy for me
Social influence	SI1 – People who influence my behavior would think I should use mobile payments (when available); SI2 – People who are important to me would think that I should use mobile payments (when available); SI3 – People who are important to me could help me use mobile payments (when available); SI4 – In the future, organizations offering mobile payment services will ensure their smooth operation
Perceived risk	PR1 – I would not feel completely safe when providing personal information through the mobile payment system; PR2 – I am concerned about the future use of mobile payment services as other people might be able to access my data; PR3 – I do not feel protected when sending confidential information through the mobile payment system; PR4 – The likelihood that something goes wrong in mobile payment systems is high
Perceived cost	PC1 – I think mobile payment services would be too expensive; PC2 – I would have financial barriers (e.g. phone purchase and spending on communication time) to using the mobile payment services; PC3 – I believe I would have to make a lot of effort to obtain the information that would make me comfortable to adopt mobile payments; PC4 – It takes time to go through the process of switching to a new payment method
Behavioral intention	BI1 – If I had access to mobile payment services, I would intend to use them; BI2 – If I had access to mobile payment services, I would definitely use them; BI3 – I think it will be worth adopting mobile payment when it is available
Demographics	RD1 – How old are you? RD2 – What is your level of education? RD3 – What is your monthly income level? RD4 – In which State do you live? RD5 – Are you currently employed? RD6 – Which gender do you identify with?

Source(s): Abrahão *et al.* (2016) and Authors (2020)

Table 2. Components of measurement scale

The authors dichotomized the moderating variables of age and income following Vieira's guidelines (2009). The authors divided the two variables into two groups using the median as the midpoint. The median age variable was 34 years, and the income was up to R$2,090.00 per month.

To test the relationships among studied variables, the authors first tested and validated the structural model, then tested each moderating effect independently against the said structural model (Hair, Ringle, & Sarstedt, 2013). The authors performed all analyses using Smart PLS 3.3.2 software (Ringle, Wende, & Becker, 2015).

4. Data analysis and discussion of results

4.1 Respondent demographics

The authors removed answers with invalid data. The valid sample (1,742 answers) comprised 46% female, 39% male respondents and 15% other/prefer not to respond and no answers. Respondents are concentrated in the Southeastern region of Brazil, most prominently in São Paulo State, with 48% of respondents. The least represented regions are the Northern and West-Center regions.

The age distribution consists of respondents in Brazil's typical working age group, which falls from 16 to 60 years old in Brazil. The average age for the sample was 34.6 years. This distribution does not have a more significant presence of adolescents or the elderly, in line with the client's demography of the company that collaborated in the study.

The sample yielded respondents in all proposed income brackets, with 47% earning up to R$2.090,00 (US$904,37 converted by the average purchasing power at the average parity rate in 2020) monthly. Thus, even though a more significant concentration of respondents is in the lower-income segments, the sample has enough respondents in each class to allow for moderation analysis.

4.2 Results and discussion on the structural model

The authors analyzed the structural model using the bootstrapping technique with a 5,000 sample size (Hair, Ringle, & Sarstedt, 2011). The first run with the complete model showed that Question 4 of the perceived risk construct had lower than acceptable outer loading. However, all other questionnaire components yielded satisfactory outer loadings. Therefore, the authors removed only Question 4 from the analysis.

The authors performed the Cronbach's alpha test for reliability on this scale. The data adjustment resulted in all values above 0.84, which validates reliability. Next, the authors evaluated the average variance extracted (AVE) test for convergence validation, and all constructs have results above 0.71. Finally, the test for composite reliability resulted in all constructs being higher than 0.88. Table 3 shows the test values for each construct.

Table 3.
Results for Cronbach's alpha, AVE and composite reliability tests

	Cronbach's alpha	AVE	Composite reliability
BI	0.926	0.871	0.953
EE	0.894	0.760	0.927
PC	0.895	0.752	0.924
PE	0.941	0.850	0.958
PR	0.844	0.712	0.880
SI	0.920	0.807	0.944

Source(s): Authors (2020)

All outer loadings on the final model are above 0.7 (Hair *et al.*, 2011) and significant at a 5% level. The R^2 for the proposed model is 0.688. The authors also calculated the F^2 test, and it resulted in 2.23. The authors conducted a blindfolding test to assess the predictive relevance of the structural model. The resulting Q^2 of 0.595 denotes an acceptable value according to Hair *et al.*'s (2011) guidance. The authors validated the path coefficients and the final constructs at a 5% confidence interval.

The results show that performance expectation has a significant and positive influence on behavioral intention (+0.285; significant at 0.001) as predicted by the UTAUT theory and further demonstrated by Chen (2008), Liébana-Cabanillas, Sánchez-Fernández and Muñoz-Leiva (2014), Oliveira, Thomas, Baptista and Campos (2016), Morosan and DeFranco (2016) and Abrahão *et al.* (2016). This finding confirms that users believe the adoption of mobile payments increases their overall efficiency when paying for their purchases.

The authors found that effort expectation significantly influences behavioral intention significantly (+0.236; significant at 0.001), following the previous findings by Abrahão *et al.* (2016). A higher perceived effort score means the user values a more straightforward application in terms of ease of use, indicating that the simpler the mobile payment solution is, the greater the likelihood that the user will adopt it. Furthermore, Venkatesh *et al.* (2003), Chen (2008) and Barbosa and Zilber (2013) validate this finding.

The perceived risk significantly and negatively influences the behavioral intention in mobile payment adoption (−0.050; significant at 0.005), and Abrahão *et al.* (2016) study confirmed this influence. Users are usually concerned about information safety and potential fraud risk. Similar findings from Chen (2008), Yang, Lu, Gupta, Cao and Zhang (2012), and Liébana-Cabanillas *et al.* (2014) corroborate the significance of perceived risk in our sample.

Social influence significantly and positively impacts the behavioral intention (+0.379; significant at 0.001) in line with the UTAUT model of Venkatesh *et al.* (2003), besides confirming the base model. From a long-term standpoint, personal connections, opinions and adoption have influenced technology adoption. This effect was also confirmed in Yu (2012), Silveira (2012), Morosan and DeFranco (2016), Oliveira *et al.* (2016) and De Luna, Montoro-Ríos, Liébana-Cabanillas and de Luna (2017), considering that social influence is increasingly significant, given the proliferation of social networks.

The construct perceived cost positively correlates with behavioral intention (+0.065; significant at 0.05). While the hypothesis considered that perceived cost negatively influenced the behavioral intention to adopt mobile payments, our sample showed a slightly positive result. Although contrary to previous studies that adapted UTAUT for mobile applications, this finding follows the direction of the effect found by Abrahão *et al.* (2016) and Baptista and Oliveira (2015). The perceived cost was not statistically significant at a 5% level for Abrahão *et al.* (2016).

Given these findings, managers must emphasize their applications' performance and ease of use. As these two factors positively relate to intention, focusing on the user experience and performance and effectively communicating these attributes will leverage the potential users' perception of the value. The way users value the usefulness of the mobile payment method over traditional payment alternatives helps to assess the expected performance. Hence, companies should emphasize facets such as transaction speed and convenience. Likewise, one can translate effort expectations depending on how the user values the ease of use. In this case, pursuing a simple, practical user experience is essential.

Another essential point is that social influence has the most significant effect on adoption. Given the importance of subjective norms, this finding is vital, considering the increase in the reach of individual opinions due to the growth of social networks. Companies must make wise use of social media to generate word of mouth. Gamification strategies, such as rewards for new user referrals, can maximize social influence impact.

4.3 Results of the analysis of moderating effects

After acceptance of all tests for the structural model, the authors tested each moderating relation. Then they assessed each sub-model with the same analysis methods as the original model. Figure 1 shows the results.

The results accept the moderating hypotheses H6a, H6e, H7a, H7d and H7e. On the other hand, they do not accept H6b, H6c, H6d, H7b and H7c.

4.4 Discussion on the moderating effects of age

This study hypothesized that age would positively moderate performance expectation, effort expectation and social influence, and negatively moderate perceived risk and perceived cost.

The results demonstrate that our sample confirms the effect of age moderation on performance expectation and perceived cost. On the other hand, no evidence supports the moderating effects on the other constructs.

This finding is in line with Pavarini *et al.* (2010) and Gouveia and Coelho (2007). Although their studies did not study specific relationships, they negatively affected the age moderation on behavior. Nevertheless, their findings are consistent with our analysis as higher performance expectations and perceived cost impacts increase the challenge for companies to adopt mobile payment among more aged customers.

Regarding the positive moderating effect of age on performance expectation, our study found that more elderly customers needed to perceive greater usefulness when switching to mobile payments than younger users. This moderation can be related to the older group's more extensive cumulative history of working with different payment methods and is more

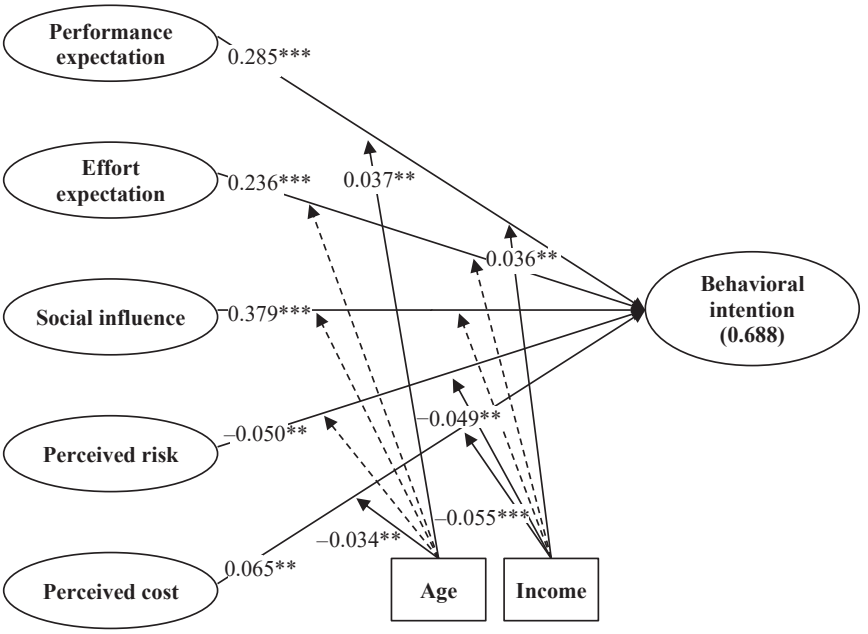

Figure 1.
Adjusted model path diagram

Note(s): ----► Not Significant , *Significant at 0.1, **Significant at 0.05, ***Significant at 0.001

Source(s): Authors (2020)

inclined to continue with their current method. Therefore, they will only migrate to mobile payments if the perceived use case is strong enough to encourage them. Again, this is consistent with Porter and Donthu (2006) and Liébana-Cabanillas *et al.* (2015).

Age negatively moderates the cost perception construct. Eze and Poong (2013) investigated how more aged consumers have already experienced and accessed multiple payment methods. Nevertheless, the age moderation effect is still unfavorable even after accounting for this more extensive experience. A potential technology readiness effect is on these more aged customers when they realize, through the cost dimension, the direct financial burden and the investment in time and effort to learn to use a mobile payment solution. According to Caldeira *et al.* (2021), technology readiness strongly affects the perception of trust. In this case, more aged customers seem not to trust that a new solution will require less individual effort or be financially more advantageous, even though most mobile payment solutions are devoid of charges to users.

For older demographics, there are two main takeaways for companies and managers. First, since more aged customers emphasize usefulness, managers should employ products development efforts to make them as simple as possible. Second, marketing should communicate the solution usage and the time and financial cost benefits of switching to mobile payments.

4.5 Discussion on the moderating effects of income

This study hypothesized that income would positively moderate performance and effort expectations and negatively moderate social influence, perceived risk and perceived cost. In line with Hernández, Jiménez and Martín (2011) and Lopez, Gonzalez-Barrera and Patten (2013) findings, the underlying assumption was that the higher the income, the higher the overall likelihood of adopting mobile technologies.

Income positively moderates the performance expectation construct, which means that higher-income individuals assess high-performance standards when adopting mobile payments compared to lower-income individuals. This finding is in line with previous studies by Porter and Donthu (2006), Shin (2009), Al-Qeisi (2009) and Chawla and Joshi (2018).

The study found a negative moderating effect of income on perceived risk. As perceived risk already presents a negative value, higher-income individuals have a more critical perception of risk in their behavioral intention to adopt mobile payments.

This finding can be counterintuitive as there are findings that higher-income individuals experience less technology anxiety than lower-income individuals (Lee, Cho, Xu, & Fairhurst, 2010). In our case, the measured specific risks refer to potential data leaking and financial risks due to fraud. In this case, higher-income individuals tend to spend more on purchases and are more aware of risks. In addition, Eze and Poong's (2013) study of e-commerce and mobile commerce applications found that higher-income individuals place more importance on trust, a complementary dimension to our perceived risk.

Income negatively moderates the perceived cost variable in our sample. In Eze and Poong (2013), income moderated cost perception and made cost perception the second most crucial factor in their model. For Chawla and Joshi (2018), higher-income individuals have less time to spare and consider this time cost more important, as it denotes a greater need for efficiency in their shopping habits.

When considering segmented approaches by income, the product and marketing plans should consider that higher-income individuals place more importance on performance proportionately. When enhancing the security area of the system, it is vital to realize that the risk controls can be important messages for higher-income consumers. Finally, managers must emphasize cost and time effectiveness when targeting a mobile payments marketing strategy by income.

5. Conclusions

This work aimed to measure the effects of the moderation by age and income in the intended use of mobile payment systems using as predictors the performance expectation, effort expectation, social influence, risk and perceived costs, with age and income acting as a proxy for customer segmentation. Confirming the moderating effects of age on performance expectations and perceived costs and of income on performance expectations, perceived risks and perceived costs allows for the creation of specific, customer-targeted approaches by practitioners in the mobile payments field.

It allows companies operating in this market to segment products and marketing strategies. For example, companies targeting more aged or higher-income customers should maximize their customer experience development efforts, emphasizing the practicality of products and the ability to improve customer productivity. In addition, they can adapt their marketing strategies, allowing managers to better communicate the most valued attributes for their targeted income or age brackets.

Social influence was an essential dimension, surpassing performance and effort expectations, and age or income does not moderate it, which may lead to further research on whether other moderating variables are relevant to this dimension. The research found that Brazilian customers are less influenced by the perception of cost and risk when handling their own money in mobile transactions with higher-income more risk-averse than those with lower-incomes. Such a scenario means new potential studies for Brazilian customers in mobile payments investigating components such as perception of trust and brand image.

Another contribution to the literature is confirming the structural model and its scale, with the re-tested significance of the perceived cost construct, allowing other researchers to reuse this reference model.

This study used a non-probabilistic sample. One of the limitations of this non-probabilistic approach is that the authors obtained the sample from users of a single Brazilian company. While the sample size is satisfactory for the statistical analysis, the fact that users were mostly from the southeastern region of Brazil suggests a possible further study with users from different Brazilian regions and a better generalization of the Brazilian customers.

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