

Mestrado em Estatística e Gestão de Informação

Master Program in Statistics and Information Management

DIGITAL BANKING

Understanding the continuous intention of use

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Dissertation presented as partial requirement for obtaining
the Master's degree in Statistics and Information
Management with specialization in Marketing Research &
Customer Relationship Management

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by

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DEDICATION

I am very grateful to all the people that made this work possible and always believed in me.

To my beloved parents and brother, for the endless support, encouragement, and contribution to my education whose good examples taught me to always work hard for the things I hope to achieve in life.

To my grandparents for the kindness words that have been an inspiration to write this work. A special feeling of gratitude to my paternal grandmother who I am sure is very proud of the effort I have e put into this work and how far I have come.

To my husband for the optimism and confidence that gave me the strength I needed to accomplish this goal.

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I also dedicate this dissertation to all my friends who always supported me through the process.

ABSTRACT

Digital banking is growing as the banking sector renews his strategies and knows the importance of technologies to respond to customers' expectations. Thus, financial services are facing a revolution with the introduction of fully digital banks. This study aims to identify the factors that lead to continuance intention of use of this service, using a combination of the expectation confirmation model (ECM) with service quality, trust, and perceived cost. A questionnaire considering people that already know and use the service was conducted to collect data to the analysis. The results support our hypotheses and suggest a strong and reliable model. In addition to theoretical and methodological contributions, the present study may also be helpful for banks to improve and adopt new strategies capable to enhance customers satisfaction and keep them engaged.

KEYWORDS

Digital banking; mobile app; smartphone users; expectation confirmation model; continuance intention

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1. INTRODUCTION

As technology advances, so does the switch-over from traditional to digital services. People are growing even more dependent on smartphones as they become an essential part of daily life making wallets dispensable – smartphones can perform equally well, even for money transactions and payments (Rathore, 2016). Nowadays, the digital technologies embrace new channels and are more focused on mobile devices and apps (Cuesta, Ruesta, Tuesta, & Urbiola, 2015). This is now occurring with banking, in which fewer customers are joining banking branches and more are accessing services via mobile apps (Oliveira, Thomas, Baptista, & Campos, 2016). To improve services provided in the present, institutions need to first understand what consumers expectations are when accessing finances remotely and what keeps them satisfied. The non-traditional competitors and FinTechs in this environment of digital banks are constantly pursuing and developing new and innovative functionalities at lower costs. The digital banks we know today are capable of offering interesting features, better savings rates, lower insurance fees, and no service costs, all of which generate interest and satisfaction amongst consumers (Deloitte, 2017). Khanboubi, Boulmakoul, and Tabaa (2019) said that people believe that technological innovations and digital trends that are constantly improving will someday replace traditional banks. Others believe that those constant innovations might be a complement to banks as we know them today.

While most earlier studies focus on digital banking intention to use and adoption drivers (Goel & Nath, 2020; Kaur, Ali, Hassan, & Al-Emran, 2021; Son, Kwon, Tayi, & Oh, 2020), our study diverges from the majority by examining the continuance intention. The first stage is adoption, corresponding to an initial stage of success of implementation of digital banking. After that comes the continuance use, corresponding to the successful long-term viability of the system. The aim of this study is to analyse the factors leading to the continuance intention of digital banking in Portugal and why its users continue to increase in number over time. Because it is such a recent service, the acceptance of the technology still brings concerns and doubts to users and potential users.

This study is expected to make e-contributions to the existing literature in several ways. First, there is a lack of investigation in digital banking and since the technology is growing, it has become important to recognize the long-term viability of the system, extending its knowledge. Secondly, the post acceptance theoretical model (Bhattacharjee, 2001b) will be extended to provide a better and complete explanation of post adoption behavior, introducing more variables relevant to the context of digital banking. They are trust, perceived cost, and service quality.

The model has already been applied to other topics including smartphone banking (Foroughi, Iranmanesh, & Hyun, 2019; Susanto, Chang, & Ha, 2016), smartwatches and wearables (Gupta, Dhiman, Yousaf, & Arora, 2020; Nascimento, Oliveira, & Tam, 2018), and fitness apps (Chiu, Cho, & Chi, 2020), among others, demonstrating that this is a model that can be widely explored and applied to different contexts. Also, to the best of our knowledge, no studies exist in the digital banking context that take these factors into consideration. Thirdly, digital banking is transforming the banking sector. Therefore, this study is a contribution to the financial industry, helping operators to better understand the key factors that influence this new service/technology and develop new strategies that bring value to customers. Fourth, we study the mediation and moderation effect. We investigated the trust dimension that moderates the effect between perceived usefulness and

continuance intention and between satisfaction and continuance intention. We also explore the mediation effects in the context of continuance intention.

The structure of this report is as follows. The next section presents the literature related with earlier studies on the topic of digital banking and ECM. The research model and hypotheses come next followed by the methods adopted. Results obtained are then discussed focusing on theoretical and managerial implications along with limitations and suggestions for future research.

2. THEORETICAL BACKGROUND

2.1. DIGITAL BANKING

Digital banking is similar to internet banking insofar that it provides financial transactions and payments quickly and conveniently (Ahangar, 2011). Relationships between banks and their clients are being disrupted by the digital technologies through the constant introduction of new features and technologies. Digital banking is a mobile-first solution that offers innovation and design across all smartphones by recognizing the importance of trends and updates to fit user needs. Each customer receives personalized service according to the individual's needs at any given time, increasing service level concerning customer satisfaction (Deloitte, 2017).

Smartphones are essential when it comes to digital banking and are now considered the new banks. The increasing use of smartphones produces a huge transformation in the customers' habits and preferences. Innovation is now driven by mobile payments and financial transactions as consumer preferences and needs evolve. To go fully digital, a smartphone with the app of the bank is needed. Mobile apps and downloads are increasing and that is influenced by factors such as perceived security, familiarity, trust, and perceived benefits (Harris, Brookshire, & Chin, 2016). As the adoption of smartphones and its dependency increases, banks need to improve smartphone experience, and the digital communication should be natural, as expectations are constantly changing and rising with the development and introduction of new technologies.

In the past two years, digital banking has been gaining more popularity and because of that it is being considered even more as a case of study. As we know, digital trends are and will continue to change several banking processes (Khanboubi et al., 2019). A study about the influence of digital banking on customers' satisfaction conducted in Kenya, shows that this kind of technology increases customers satisfaction based on factors like fast transactions, ease of use, adaptability, the possibility to access finances anytime and anywhere and many others (Muluka, Kidombo, Munyolo, & Oteki, 2015). Nowadays, more companies have the tools and knowledge to improve payment systems and make them digital, having in consideration that trust is needed. A recent study using structural equation modelling (SEM) shows the impact of other factors that have an impact on trust and continuance intention of customers when using digital payment systems (Goel & Nath, 2020). Another study conducted in Vietnam focused on the intention to use digital banking, also using SEM, shows the importance of improving banking services and the need for a digital change of traditional banking activities, ensuring security and enhancing the sense of usefulness (Nguyen, 2020).

We conclude that there are several studies on the banking context in which diverse theories and approaches have already been applied. However, to the best of our knowledge, there are no earlier published studies addressing digital banking that combine ECM and the factors of trust, perceived cost, and service quality to understand continuance intention. Our purpose is to reveal the best knowledge on the theme by presenting the findings that will help to understand the popularity and need of digital banking apps and services as new technologies continue to emerge and the future is expected to be even more digital. We plan to contribute to the financial industry by presenting a new and unique model that considers a well-established theory. The next section describes the model applied in this research.

2.2. EXPECTATION CONFIRMATION MODEL (ECM)

ECM was born from expectation confirmation theory seeking to explain post-purchase satisfaction, combining expectations and perceived usefulness. ECM was introduced by Bhattacharjee (2001b) in order to study IS continuance usage. It addresses the dynamics and attitudes of individuals in technology use and re-use. The ECM model takes into consideration three variables to explain continuance intention: perceived usefulness, confirmation of expectations, and satisfaction. Perceived usefulness and confirmation directly affect satisfaction, and satisfaction and perceived usefulness predict the user's continuance intention of IS. Also, perceived usefulness is influenced by confirmation.

IS literature considers the ECM as the basis upon which to study sentiments and mindsets in technology use and continuance. There are several areas and studies in which the model has been applied successfully, including smartwatches use continuance (Nascimento et al., 2018), continuance of mobile and internet banking (Shih Chih Chen, 2012; Rahi, Othman Mansour, Alharafsheh, & Alghizzawi, 2021), purchase intention for paid mobile apps (Hsu & Lin, 2015), and economic contexts in which roles of trust and risks are shown to be important regarding ridesharing services (Jiang & Lau, 2021). This model is being used by many other investigators with several adaptations whereby explanatory variables are added in different contexts related to IS in order to study the post-acceptance behaviours, increasing explanatory power of the research. Also, several authors demonstrate that the ECM model can be combined with other models such as the technology acceptance model (TAM) in the study of the determinants of satisfaction and continuance intention toward self-service technologies (Shih Chih Chen, Chen, & Chen, 2009); or combined with the extended unified theory of acceptance and use of technology (UTAUT2), in a study about intention and factors influencing continuance intention to use mobile apps (Tam et al., 2018). Many studies relate internet and apps to explain an individual's behaviour after adopting the technology. As shown in Figure 1 there are two key variables that determine the IS continuance intention, and they also directly influence consumers' satisfaction: confirmation and perceived usefulness. Both satisfaction and perceived usefulness will predict user's continuance intention of IS.

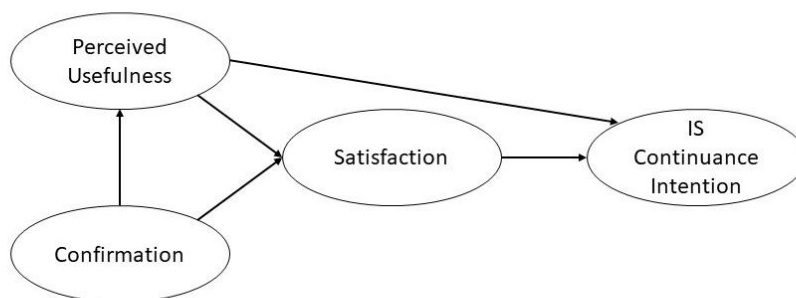


Figure 1 – Post-acceptance Model of IS Continuance (Bhattacharjee, 2001b)

3. RESEARCH MODEL AND HYPOTHESES

Figure 2 depicts the research model considering the ECM proposed by Bhattacharjee (2001b) related to IT continuance. Five main hypotheses are considered in the present study in combination with three additional factors: service quality, trust, and perceived cost. The constructs added to the original ECM model will provide a better explanation and understanding of the continuance intention to use digital banking and can be found in the theoretical model below.

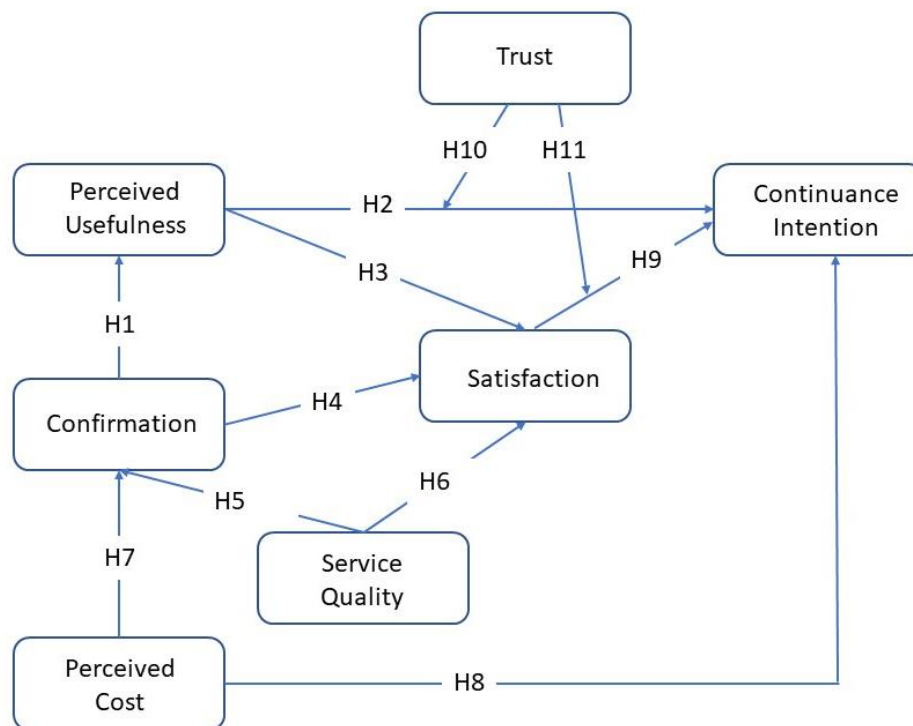


Figure 2 – Research model

Confirmation is considered to be the outcome that the users can extract from the IS, which means that users expect to obtain certain benefits with the technology. In the ECM, when that outcome meets users' expectations, they start to trust the system, leading to perceived usefulness of it. According to our study, digital banking users will continue using the system if they accept that the outcome of doing so will be positive. Satisfaction is first associated with an experience effect after consumption (Oliver, 1980) whereby pre-purchase is compared with post-purchase. This was confirmed by Bhattacharjee (2001b) who said that expectations influence confirmation when associated with performance, influencing customer satisfaction, followed by continuance intention. Susanto et al. (2016) concluded that confirmation has a significant impact on satisfaction regarding continuance intention of using smartphone banking services. The attitude toward the adoption of IS on both pre- and post-usage has trust as a significant construct (Venkatesh, Thong, Chan, Hu, & Brown, 2011). Therefore, we hypothesize:

H1. Confirmation influences perceived usefulness of digital banking use.

H4. Confirmation influences satisfaction of digital banking use.

A study conducted in Malaysia concluded that perceived usefulness affects the adoption of new banking technologies (Selamat & Jaffar, 2010), considering perceived usefulness as the point at which an individual agrees that the system used will provide better outcomes (Davis, 1989; Venkatesh et al., 2011). In the ECM, satisfaction is influenced by perceived usefulness (Bhattacharjee, 2001b) and also relates to IS continuance intention (Venkatesh et al., 2011). Trust is also affected by perceived usefulness concerning internet banking (Suh & Han, 2002). The consequences of certain behaviours are evaluated in terms of perceived usefulness, and that choice of behaviour is based on the desire for that usefulness (H. W. Kim, Chan, & Gupta, 2007a). Based on these findings, we expect that in the context of digital banking, if the service meets user's expectations, they may feel more satisfied and will continue using the service. We posit that:

H2. Perceived usefulness influences digital banking continuance intention.

H3. Perceived usefulness influences satisfaction of digital banking use.

Grönroos (1982) made the first effort to give a meaning to service quality. He believed that users compared the service they expected to obtain with perceptions of the service they received in assessing service quality. Therefore, we have in discussion the expectations that existed before the service and the expectations with the actual service and customers' experience (Krishna Naik, Gantasala, & Prabhakar, 2010). Considering the updated model (DeLone & McLean, 2003), service quality is a characteristic that also affects the use/intention to use and satisfaction, making these closely interrelated, and making it possible to achieve certain benefits and determinant of the success or failure of electronic commerce applications. Therefore, we also consider it important to study the moderator effect of service quality on continuance intention to use digital banking and its relationship with perceived usefulness. Unyathanakorn & Rampho (2014) suggest that improved service quality also adds more value to the banking service, while Zavareh et al. (2012) state that electronic service quality *"is becoming increasingly important in determining the success or failure of electronic commerce application"*. This is the reason why the service-quality dimension is considered herein and why it is suitable to explain and understand the factors that lead to success in the digital banking environment. Service quality, when considering electronic banking, will have a positive impact on customer satisfaction (Kumbhar, 2011) and therefore, once again, is considered an important construct. Another study about service quality showed that it produces satisfaction as an outcome (Cronin & Taylor, 1992). For that reason, we posit:

H5. Service quality positively influences confirmation.

H6. Service quality influences satisfaction with digital banking.

With banking and money, trust is also an important indicator. It does not yet have a precise definition and explanation due to constant and rapid changes in the environment (Sandy C Chen & Dhillon, 2003), but was once defined as the level of confidence that a customer has in the other party because of its honesty and trustworthiness (Morgan & Hunt, 1994). A study about the determinants of continuance intention and smartphone banking services (Susanto et al., 2016) extends the ECM and considers that trust is another crucial factor in continuance intention. When related to mobile banking, trust is defined by Koo and Wati (2010) as the vulnerability of a customer to the banking

technology after perceiving its characteristics, causing trust levels to have an impact on satisfaction depending on mobile banking quality. Trust, again, is able to cause an impact on both customer satisfaction and IS continuance intention (Venkatesh et al., 2011). In addressing mobile banking satisfaction, Masrek, Mohamed, Daud, and Omar (2014) also concluded that trust plays a key role. This means that if the levels of trust that the user has toward the service are high, satisfaction levels tend to rise. This relationship was also demonstrated by Kim, Ferrin, and Raghav Rao (2009).

In light of the above, we posit the following:

H10 Trust moderates the relationship between perceived usefulness and continuance intention.

H11. Trust moderates the relationship between satisfaction and continuance intention.

Customer satisfaction is an important measure that helps companies to manage and improve their business. It is related to the customers who paid for a product and that actually used the product. In general, satisfaction is considered to be the feeling of pleasure or disappointment and it is important to identify the quality of the service provided. Kumbhar (2011) studied e-banking and showed that factors like cost effectiveness, ease of use, responsiveness, security, and assurance play an important role in customer satisfaction. There are many other studies that relate various factors to the use of online banking. Concerning digital banking, customer satisfaction is being redefined (Muluka et al., 2015), attracting even younger customers. The emerging banks are able to provide high quality products and proximity with the customer, even by being fully digital, improving customer experience and therefore satisfaction and loyalty. User satisfaction can be related to continuance intention, which is closely linked to perceived usefulness and confirmation (Bhattacharjee, 2001b). For motivating customers to keep using such a channel, satisfaction is considered to be an important and critical factor (Yi & La, 2004). Also, being satisfied with a product or service motivates its continuance and the ECM reveals the direct relationship between satisfaction and continuance intention (Bhattacharjee, 2001b; Oliver, 1980). In the present context, when the overall level of satisfaction with digital banking increases, users will continue to use the system. So, a satisfied user will continue to use the service as long as it meets its needs (Bhattacharjee, 2001b). Therefore, we posit that:

H9. Satisfaction influences digital banking continuance intention.

Perceived cost describes the monetary effort about using digital banking. It reflects that using the system will somehow cost or save money and it affects the intention to use internet banking services (Tung, Yu, & Yu, 2014). Wu and Wang (2005) pointed that using mobile banking services has a reduced probability when costs associated with it are elevated, although having minimal significance when compared to other variables such as trust or perceived risk. In digital banking services the costs include transactions, cost of physical cards, and account maintenance., which have a considerable impact on the intention to use the service. Furthermore, for this study, perceived cost is included as having an effect on satisfaction, anticipating that perceived cost of using digital banking is likely to positively influence the continuance intention. Also, fraud, unpleasant situations, and poor service leads to a decrease in the intention to use the system (Wang, Zhou, & Zhang, 2017; Wu & Wang, 2005). Hence, we add the hypothesis:

H7. Perceived cost positively influences confirmation.

H8. Perceived cost influences digital banking continuance intention.

The intention to continue to use a product can be a link between other intentions. In this case, perceived usefulness, confirmation, and satisfaction can all be seen as mediators and be that link. The belief of a customer that the product's attributes perform functions and tasks shows the usefulness of the intention and add value to the product (H. W. Kim, Chan, & Gupta, 2007b). Also, perceived usefulness is one of the two main beliefs affecting the intention to use technologies (Davis, 1989) and the perception of usefulness of a digital-only bank will certainly increase over time as consumers seek to understand and take advantage of this type of app (Iacovou, 2018). We thus consider the following:

H12a. Perceived usefulness positively mediates the relationship between confirmation and satisfaction.

Confirmation is related to satisfaction in a way that meets the expected benefits associated with information systems usage (Bhattacharjee, 2001b) and a good service quality will most likely cause a good impact and meet users expectations, making the action of using digital banking services enjoyable, leading to satisfaction (Saha & Zhao, 2005). Under this premise, the present research proposes a hypothesis about the mediating effect of confirmation between service quality and satisfaction, stating the following:

H12b. Confirmation positively mediates the relationship between service quality and satisfaction.

If consumers find the service useful after consuming or experience it, they will most likely be satisfied with it and keep the intention to use it. This means that a consumer will evaluate the before and after perceptions and form a level of satisfaction (Bhattacharjee, 2001b; Oliver, 1980) evaluating the need and desire to continue to use the service. Also, higher rates of satisfaction may lead users to a pattern of repeat consumption in the future (Balasubramanian et al., 2003; Kim et al., 2004).

Considering the statements above and the in the intent of our research we state the following:

H12c. Satisfaction positively mediates the relationship between perceived usefulness and continuance intention.

4. METHODS

4.1. MEASUREMENT

The study was conducted in Portugal and had as target population the users of digital banking apps for mobile devices. Digital banking is a financial tool that allows access to finances and makes transactions anytime and anywhere through an app on a mobile device. Measurement items can be found in Appendix A. Trust was adapted from Suh and Han (2002) and Venkatesh et al. (2011) while service quality from Parasuraman, Zeithaml, and Malhotra (2005). Perceived cost adapted from Unyathanakorn and Rampho (2014) and Koloseni and Mandari (2017), satisfaction from Bhattacharjee (2001b), and Bhattacharjee and Premkumar (2004), perceived usefulness from Bhattacharjee and Premkumar (2004), and Venkatesh et al. (2011) and confirmation from Bhattacharjee (2001b). Lastly, continuance intention was adapted from Bhattacharjee (2001b) and Venkatesh et al. (2011).

4.2. DATA

A questionnaire was developed to collect data. Initially developed in English, then translated to Portuguese, because the study is conducted only in Portugal and, finally, translated back to English ensuring translation uniformity (Brislin, 1970). The survey was conducted online via a well-known website. Most items were measured on a 7-point Likert scale where (1) means totally disagree and (7) totally agree. A pilot test was previously conducted in order to detect further problems with measures and results. These observations were not included in the final survey. The pilot test was able to show that the scales were reliable but certain items could be meaningful like SQ1, SQ6 and SQ7. However, since it was a preliminary study, those items were kept to the final survey because of its importance in the context of digital banking.

As mentioned above, data were collected only in Portugal between January 2020 and June 2020. In total, 336 responses were collected in that time. Due to incompleteness, 131 responses were excluded from the final sample, leaving 205 complete and valid responses. The results are based on digital banking apps users and a total of 135 are male while 70 are female, corresponding to 66 per cent and 34 per cent respectively. Concerning age, 70 per cent of the respondents are between the ages of 25-30. Regarding education, 112 respondents have an undergraduate degree (55 percent). Concerning the time since starting to use digital banking apps, 72 per cent of the respondents reported having used them for over a year against 12 per cent using them for only 1 to 6 months. The frequency usage in the last 3 months shows the highest percentage in the group of users that used digital banking apps more than 10 times, with 69 per cent. Table 1 shows the detailed descriptive analysis about demographics with respondent's characteristics.

Table 1 - Sample Characteristics.

Distribution (n=205)					
<i>Age</i>			<i>Education</i>		
<25	43	21%	High school or below	46	22%
25-30	70	34%	Undergraduate degree	112	55%
31-35	26	13%	Bachelor	1	0%
36-40	28	14%	Master's degree	45	22%
41-50	30	15%	No answer	1	0%
>50	8	4%			
<i>Gender</i>			<i>Digital banking usage frequency</i>		
Male	135	66%	>10 times	141	69%
Female	70	34%	1-4 times	21	10%
			5-10 times	37	18%
			0 times	6	3%
			<i>Time since started using digital banking</i>		
			Over a year	148	72%
			1-6 months	25	12%
			6-12 months	32	16%

5. RESULTS

The results of the analysis concerning the continuous intention of using digital banking are presented in this section. We used structural equation modelling (SEM) to validate the research model, analysing the quality of the measurement items as well as testing the hypotheses. This approach has the ability to produce more results (Iacobucci, 2010). The partial least squares (PLS) technique is known for good performance on conditions of non-normality and sample sizes from medium to small (Chin, 1998), which makes it an appropriate technique for the present study. Also, this model has not been tested yet and that is another reason to use PLS (Sarstedt, et al., 2017). SmartPLS was the software used and validity and reliability were checked first to evaluate the model. After that, relationships between constructs and measurement properties are the second step in hypothesis testing. With regard to discriminant validity, the square root of AVE for each construct was greater than other values in its row and column (see the bold diagonal scores in Table 3) suggesting that discriminant validity is achieved (Gefen, 2005).

5.1. MEASUREMENT MODEL

Three tests were used to assess the measurement model's strength, reliability, and validity: internal consistency, convergent validity, and discriminant validity. The results of the measurement model are presented in Tables 2, 3, and 4.

Regarding internal consistency, we assume that the model is both good and reliable because the results for composite reliability (CR) are greater than 0.85. Also, values of Cronbach's alpha are above 0.7 in all cases, indicating that the constructs are reliable (Straub, 1989). When testing for convergent validity, we used average variance extracted (AVE). AVE should be higher than 0.5 and as we can see in Table 3, each construct shows values of AVE higher than the threshold value. This ensures convergence and allows latent variables to explain more than half of the variance of their indicators (Hair, et al., 2011; Sarstedt, et al., 2017; Henseler, et al., 2009). For discriminant validity, three factors should be considered. First, loadings should be greater than cross loadings (Fornell & Larcker, 1981) and in this case, all loadings are greater than their corresponding cross loadings. Second, the Fornell and Larcker criterion should be applied to ensure that the square root of AVE is greater than all correlations between each pair of constructs (Chin, 1998). In Table 3, bold diagonal scores that are the square root of AVE are greater than the correlations between constructs (other values in its row and column). And third, the HTMT ratio should have values below 0.9. As shown in Table 4, all values are below the threshold value.

From the analyses, we concluded that the measurement model is strong, reliable, and valid.

Table 2 - PLS loadings and cross-loading.

Constructs		1	2	3	4	5	6
(1) Confirmation	CONF1	.893	.435	.472	.590	.616	.572
	CONF2	.859	.341	.399	.454	.450	.431
	CONF3	.890	.443	.466	.591	.626	.592
(2) Perceived performance	PP1	.393	.906	.223	.337	.469	.457
	PP2	.351	.892	.240	.336	.424	.407
	PP3	.426	.883	.300	.369	.493	.442
	PP4	.376	.657	.386	.451	.542	.480
(3) Perceived cost	PC1	.256	.200	.788	.325	.296	.258
	PC2	.581	.391	.881	.588	.591	.537
	PC3	.313	.208	.855	.387	.313	.284
	SQ2	.502	.358	.508	.826	.683	.452
(4) System quality	SQ3	.500	.381	.365	.827	.587	.432
	SQ4	.411	.320	.331	.786	.460	.334
	SQ5	.547	.359	.524	.703	.482	.446
(5) Satisfaction	SAT1	.532	.548	.446	.659	.918	.733
	SAT2	.595	.548	.482	.677	.929	.643
	SAT3	.628	.579	.490	.657	.952	.762
	SAT4	.660	.491	.535	.660	.915	.713
(6) Continuance intention	CI1	.590	.505	.463	.550	.763	.952
	CI2	.567	.562	.428	.490	.730	.952
	CI3	.561	.441	.442	.452	.658	.898

Table 3 - Means, standard deviations, correlations, and reliability and validity measures (CR, CA, and AVE) of latent variables.

Constructs	Mean	SD	CR	CA	1	2	3	4	5	6
(1) Confirmation	5.963	1.016	.912	.856	.880					
(2) Perc.Performance	5.950	1.114	.905	.855	.467	.841				
(3) Perc.Cost	6.038	1.068	.880	.819	.509	.349	.842			
(4) System Quality	5.936	.865	.866	.794	.627	.452	.556	.787		
(5) Satisfaction	6.440	.765	.962	.947	.651	.584	.526	.714	.928	
(6) Cont.Intention	6.549	.780	.954	.927	.612	.540	.475	.534	.769	.935

Table 4 - Heterotrait-Monotrait Ratio of correlations (HTMT)

Constructs	1	2	3	4	5	6
(1) Confirmation						
(2) Perc.Performance	.534					
(3) Perc.Cost	.529	.366				
(4) System Quality	.746	.541	.620			
(5) Satisfaction	.711	.642	.530	.812		
(6) Cont.Intention	.677	.599	.482	.615	.818	

5.2. STRUCTURAL MODEL

After making sure that the measurement model met all the necessary conditions, the structural model was analysed. Hypotheses and relationships between constructs are assessed in order to understand the significance of the standardized paths.

Figure 2 shows the PLS estimation and the path coefficients that were calculated from t-statistics derived from bootstrapping with 5,000 iterations. As shown, we are able to confirm that the model explains 65.4% of the variations in continuance intention to use digital banking, having as statistically significant variables: perceived usefulness ($\hat{\beta}=.127$; $p<.05$), and satisfaction ($\hat{\beta}=.429$; $p<.001$). Therefore, the hypotheses H2 and H9 are confirmed. On the other hand, the perceived cost is not statistically significant in explaining the continuance intention, and consequently the hypothesis H8 is not confirmed.

The model explains 21.8% of the variation in perceived usefulness. The confirmation ($\hat{\beta}=.467$, $p<.001$) is statistically significant in explaining perceived usefulness, thus confirming H1.

The model explains 63.1% of variation in satisfaction, validating hypotheses H3, H4, and H6, where perceived usefulness ($\hat{\beta}=0.273$, $p<.001$), confirmation ($\hat{\beta}=0.253$, $p<.001$) and service quality ($\hat{\beta}=.433$, $p<.001$) are all statistically significant.

The model explains 43% of variation in confirmation where service quality ($\hat{\beta}=.497$, $p<.001$) is revealed to be statistically significant, confirming H5. Also, H7 is confirmed since perceived cost ($\hat{\beta}=.233$, $p<.001$) is also statistically significant.

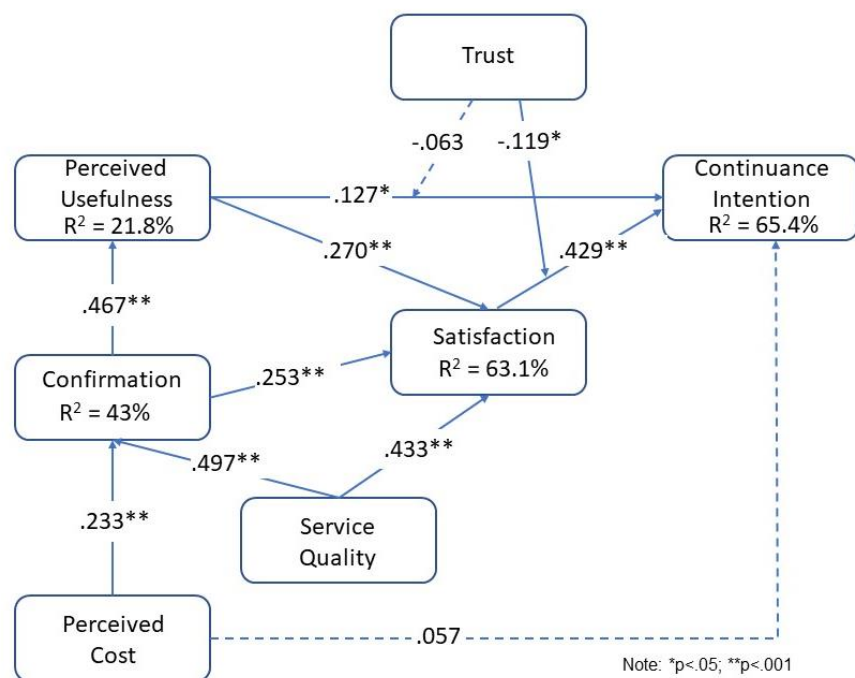


Figure 2 – Research model with results

5.3. RESULTS OF THE MEDIATING ROLE OF PERCEIVED USEFULNESS, CONFIRMATION, AND SATISFACTION

Mediation hypotheses are shown to be supported. This results in a third mediator construct capable of playing an intermediary role in a relationship between two other constructs (Carrión, Nitzl, & Roldán, 2017). In this study we examined the mediating effect of perceived usefulness between confirmation and satisfaction, the mediating effect of confirmation between service quality and satisfaction, and also the mediating effect of satisfaction between perceived usefulness and continuance intention. The results of the effects are shown in Table 5, in which all the effects show a partial mediation, leading to indirect effects of confirmation on satisfaction, ($\hat{\beta}=.126$, $p<.001$), service quality on satisfaction ($\hat{\beta}=.126$, $p<.001$), and perceived usefulness on continuance intention ($\hat{\beta}=.116$, $p<.001$). Thus, hypotheses H12a, H12b, and H12c are confirmed.

Table 5 - Mediation Analysis.

	Beta	SD	t-Test	p-value
H12a - Complementary (partial mediation)				
(P1*P2) Confirmation -> Perceived performance -> Satisfaction	.126	.030	4.221	<.001
(P3) Confirmation -> Satisfaction	.253	.064	3.930	<.001
H12b - Complementary (partial mediation)				
(P1*P2) System quality -> Confirmation -> Satisfaction	.126	.037	3.383	<.001
(P3) System quality -> Satisfaction	.433	.053	8.185	<.001
H12c - Complementary (partial mediation)				
(P1*P2) Perceived performance -> Satisfaction -> Continuance intention	.116	.034	3.442	<.001
(P3) Perceived performance -> Continuance intention	.127	.064	1.988	<.05

6. DISCUSSION

There are not many studies concerning digital banking. Since it is considered a new and emerging technology and service that is growing, it is a good starting point to investigate and provide an explanation of what the determinants are that influence the intention to continue using the service, as most of the academic literature until now has focused on digital banking adoption. To the best of our knowledge, this is the first study that combines ECM and other relevant constructs in order to investigate continuance intention to use digital banking. There are a few studies about internet banking that show the importance of perceived usefulness in predicting the continuance intention to use the service (Rahi et al., 2021). Another study about the drivers for continuing to use mobile banking services shows that factors such as perceived usefulness, satisfaction, and performance influence continuance intention and that these are drivers to the success of a mobile banking service (Foroughi et al., 2019). Regarding digital banking, access to the service is made by apps, and a study combining ECM and UTAUT2 (Tam et al., 2018) about the factors that influence the continuance intention to use mobile apps reports that satisfaction and performance expectancy have a direct effect on that intention. Our results show that except for H8 and H10 our proposed hypotheses are accepted, making a total of nine significant hypotheses. As indicated in Figure 2, our model accounts for 65.4% of the variation of continuance intention in using digital banking, supporting both H2 and H9. The continuance intention in the model is explained by satisfaction and perceived usefulness. The link created between satisfaction and continuance intention has been previously confirmed in an extensive variety of studies concerning products and services contexts (Bhattacharjee, 2001b, 2001a; Shih Chih Chen et al., 2009) and the present study also reconfirms its association in the context of digital banking. This supports the belief that improving satisfaction is a key factor to keep customers linked to the service.

The findings also confirm the influence of service quality (H5) and perceived cost (H7) on confirmation that has a variation of 43%. This enhances the significance of costs at the initial stage and confirms that service quality adds value to the banking application (Unyathanakorn & Rampho, 2014). Confirmation will positively affect perceived usefulness (H1) and satisfaction (H4), along with perceived usefulness affecting satisfaction (H3), as previously confirmed (Bhattacharjee, 2001b; Susanto et al., 2016).

6.1. THEORETICAL IMPLICATIONS

To explain the continuous growth of digital banking applications and the increase of its popularity, we felt the need to understand what motivates and engages users to continue using these bank services. Our research model is innovative in the way that it approaches this new banking service – digital banking – while also exploring a well-known model – ECM – by extending it and integrating factors that are important: trust, perceived cost, and service quality. The basis of the post-acceptance model is formed by the ECM, which approaches the attitudes and beliefs of users in the use and re-use of technology (Bhattacharjee, 2001b). Its theoretical background reflects the intention to repurchase, level of satisfaction, perceived performance, and future expectations (Oliver, 1980) and ECM has been employed in order to explain users' continuance intention toward a specific IT product and/or service (Bhattacharjee, 2001b). Trust, perceived cost, and service quality

add more value to the existing ECM model and contribute to the prior knowledge about online and smartphone banking. Most banking and mobile apps studies are more focused on understanding what actions could attract and retain potential users, while the present study is motivated by the post-adoption stage. Theoretically speaking, our results reveal that the proposed model has a good explanatory power (65%) in the prediction of consumers' intentions to continue using digital banking apps. This study addresses a new field and presents a good starting point for future research in the area.

Service quality is shown to be important in maintaining overall satisfaction with the service, but is also the trigger that leads to a positive outcome by using the service (confirmation). Service quality along with system quality and information quality are expected to lead to higher rates of satisfaction (DeLone & McLean, 2003) and similar studies concerning mobile banking show that mobile banking users will continue to use the service if they are satisfied using it (Baptista & Oliveira, 2015). Overall, service quality plays an important role in satisfaction regarding post-adoption behaviour. Service providers can focus on improving overall quality, as that will influence the general satisfaction of users.

Also, perceived cost shows to be important in short-term relationships with the banks in a way that is more important during the initial approach to engage new customers. Once customers already have long-term contact with digital banking, they are willing to pay for more and better services that digital banks can offer – meaning more security, more transactions, more withdrawals, lower fees, and so on. When this occurs, continuance intention loses most or all of its importance, and users tend to adopt and use products or services that are free or inexpensive (Hsu & Lin, 2015).

Regarding security and privacy, companies need to keep in mind that for sensitive financial matters, consumers need to trust new banking services prior to using them (Susanto et al., 2016). Consumers are very serious about their money and private information, especially when digital banks are exclusively online, since non-mobile banking services are less risky and more trustworthy (G. Kim et al., 2009). Taking this into consideration, for digital banks, these findings are important to optimize and maintain the relationship with customers after the initial experience with the service. The factors presented are determinant to increase continuance usage of digital banking applications. Trust plays a significant role when in banking, finances, money, and personal data. Lack of trust can be the reason not to use banking services like mobile banking (Chu, Lee, & Chao, 2012). The mediation effects of trust have also been studied regarding perceived usefulness and satisfaction (Koo & Wati, 2010). Our model supported one of the two hypotheses of moderation effects – H11 – showing significant results in the relationship between satisfaction and continuance intention. Trust was not found to have a moderating effect on the relationship between perceived usefulness and continuance intention, and thus H10 is not confirmed. The impact of trust as a moderator effect of satisfaction to continuance intention is shown in Figure 3. The trust moderator suggests a major impact of satisfaction over continuance intention when the user has low trust in the service. This highlights the importance of trust when users are less satisfied with digital banking. Amongst users with high trust tendency, satisfaction is not as important in explaining the digital banking continuance intention.



Figure 3. Moderators effects

6.2. MANAGERIAL IMPLICATIONS

The practical perspective focuses on understanding what drives consumers to continue to use digital banking services after previous contacts and experiences with the service. This research thus has a considerable and important practical impact on how digital banks should approach and drive their relationships with customers who are already engaged and use the service on a regular basis. All the constructs of the ECM model plus service quality, perceived cost, and trust are shown to be important in explaining continuance intention. In this case, banks can take advantage of the findings in this study that are shown to be important determinants capable of influencing users' continuance intentions to use digital banking. Strategies can be adopted to improve performance, satisfaction, costs, and overall quality of the service. Our results suggest that improving the quality of the service concerning ease of use, response time, friendly app, among others, is important because it will lead to greater user satisfaction and will also affect confirmation. Banks that provide internet services should adopt key strategies to improve their service and be more efficient, reliable, trustworthy, and consider privacy issues that will allow them to achieve greater levels of satisfaction (Saha & Zhao, 2005). A good service can be seen as a powerful forecaster of satisfaction (Reji Kumar & Sudharani Ravindran, 2012), keeping users engaged and leading to continuance intention.

The financial industry is a business area that requires trust in both ways. By going digital, high levels of trust can sometimes be more difficult to achieve, since there is no person to person contact between the customer and the institution. The digital era brings along risks and uncertainty, and in this kind of environment trust is essential and can be achieved by communication, by providing and explaining the banking policies, and by assuring security (Muneesh, et al., 2012). The *Harvard Business Review* says that the overall experience that a customer has with the service needs to be well managed, mainly to improve digital privacy and security (Chakravorti, et al., 2018) because a

customer who trusts the service is more likely to be a satisfied customer capable of recommending the service (Casaló, Flavián, & Guinalíu, 2008). Regarding satisfaction, a study conducted in the United States concluded that customers who use digital-only banking services are the least satisfied, mainly because of communication, or the lack of it (Power, 2018). A customer needs to feel valuable and the service should meet its needs and expectations in order to generate satisfaction and loyalty (Unyathanakorn & Rampho, 2014). Also, banks should be concerned about performance since it is shown to be a key factor in the ECM, additionally affecting continuance intention. Accordingly, trust and satisfaction can build successful business relationships (D. J. Kim et al., 2009). Costs will not directly affect continuance intention, but at the initial stage of the relationship between a customer and the service provider can be important in engaging the customer, especially if the costs are low or non-existent (Son, et al., 2020), thus having an impact on confirmation. Users may also be willing to pay for better services and additional features, as they are satisfied and maintain a long-term relationship with the service.

6.3. LIMITATIONS AND FUTURE RESEARCH

The study suffered from some limitations that will allow for future research in this field of investigation. The generalization of the study is limited by having data of only one region (Portugal) and, therefore, caution should be adopted when interpreting the results, allowing for deep investigation, addressing cultural costumes and differences. Also, most of the population represented is highly educated and familiar with digital banking apps. Future research may test our proposed model in different regions, with users less familiar with the service and with different levels of education. Difference between genders can also be studied in the future. Another possible methodology for future studies goes by adding new constructs and test for different results. Another limiting factor is the fact that risk is not included as a construct that could cause impact on continuance intention in using digital banking. Since we are talking about a service that deals with people's finances and money, risk could be a determinant factor and can be used in future research (Slade et al., 2015). Also, our research only accounts for a limited period and future research could take into consideration that opinions and perceptions may change over time. Having that said, it could be interesting to apply this research in a longitudinal study gathering information and obtaining results for a long period of time.

7. CONCLUSIONS

Nowadays, with the digital era, in which everything can be done online to save time and money, people are open to try new services; and digital banks fit perfectly in this niche. Users do not need to take a trip to the bank to manage their money, and banks do not need to open physical facilities to have customers or be trustable. We can therefore say that common users are willing to try digital banking apps, since most of those provide free basic banking services and require little effort to register or deposit money. Companies should know that satisfaction plays the major role in continuance intention and is directly affected by perceived usefulness, confirmation, and service quality. As trust in the service increases over time, users will pay for additional and better services that the banks provide. This will emphasize the customer-company relationship and users will continue to use the service.

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9. APPENDIX

Appendix A - Items		
Constructs	Items	Adapted from
Confirmation	CONF1. My experience using digital banking was better than I was expecting CONF2. The service level provided by digital banking services was better than I was expecting CONF3. Overall, most of my expectations about digital banking were confirmed	Bhattacharjee, A. (2001b)
Perceived Usefulness	PP1. Using digital banking services enables me to complete banking tasks more quickly PP2. Using digital banking services makes it easier to access banking services PP3. Using digital banking services enhances the effectiveness of my banking activities PP4. Using digital banking gives me total control of my finances PP5. Overall, I find digital banking useful	Bhattacharjee & Premkumar (2004), Venkatesh et al. (2011)
Satisfaction	SAT1. Using digital banking was a smart choice SAT2. I am satisfied with the experience of using digital banking SAT3. I think I did the right thing on deciding to use digital banking SAT4. Overall, I am satisfied with using digital banking	Bhattacharjee, A. (2001b), Bhattacharjee & Premkumar (2004)
Trust	TR1. I trust digital banking services TR2. Digital banking apps are genuine and sincere TR3. Digital banking apps provide good banking services	Suh and Han (2002), Venkatesh et al. (2011)
Continuance Intention	CI1. I intend to continue using digital banking services in the future rather than not use CI2. I will always try to use digital banking in my daily life CI3. I will continue to use digital banking as regularly as I do	Bhattacharjee, A. (2001b), Venkatesh et al. (2011)
Service Quality	SQ1. Digital banking enables me to complete a transaction quickly SQ2. Digital banking services are well organized SQ3. Digital banking services launch and run quickly SQ4. Digital banking apps don't crash SQ5. Digital banking services are committed to its offers SQ6. Digital banking services show support whenever needed SQ7. Digital banking services protect my private information	Parasuraman A., Zeithaml V., Malhotra A. (2005)
Perceived Cost	PC1. When compared with the traditional banks, the costs of digital banking are appropriate PC2. When compared with traditional banks, quality of the service is adequate PC3. I think transaction fees of using digital banking are adequate	Unyathanakorn & Rampho (2014), Koloseni & Mandari (2017)

