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Influence factors of Individual Performance on M-Payments: Mixed methods approach

Sara Patrícia Batalha Motaco

Dissertation presented as partial requirement for obtaining the Master Degree in Information Management, with a specialization in Marketing intelligence

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by

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ABSTRACT

This paper investigates which factors influence individual performance. We integrated the task technology fit (TTF) model with the influence of three dimensions: gamification, social influence, and price value. To test individual performance in the Portuguese context, 317 m-payment users completed a survey, and their responses were analysed using the SEM-PLS model. During the study, the COVID-19 pandemic broke out, and because of that was necessary to adopt a mixed methods approach, conducting interviews to triangulate the results obtained previously and to analyse the impact of the pandemic on users' individual performance. The results show that individual performance is explained by TTF and usage, with a moderating influence from the constructs under study. The final conclusions of the project are intended to help in the creation of strategies for m-payment service providers, allowing them to optimize the user experience.

KEYWORDS

M-payments; task technology fit (TTF); mixed-methods; gamification.

INDEX

LIST OF FIGURES

LIST OF TABLES

LIST OF ABBREVIATIONS AND ACRONYMS

COVID-19	Coronavirus disease 2019
QR Code	Quick response code
TTF	Task technology fit
UTAUT	Unified theory of acceptance and use of technology
DOI	Diffusion of innovation theory
PTS	Perceived technology security
TAM	Technology acceptance model
SARS-CoV-2	Severe Acute Respiratory Syndrome Coronavirus-2

1. INTRODUCTION

New ways to commercialize products have led to the emergence of innovative payment methods striving to make purchases more convenient and accessible (Mallat, 2007). Mobile payments (m-payments) are an electronic method using mobile devices to permit, initiate, and confirm the exchange of money to make payments in physical stores or online. These methods are an omnipresent payment solution that can make wallets obsolete, replacing them with mobile phones (Slade et al., 2015). In 2018 the m-payments market was valued at US $881 billion (imarc group, 2019). Around 34.9% of smartphone users over the age of 14 have used their mobile phone at least once every six months to pay for a purchase at a physical point of sale (eMarketer, 2018a). Retailers are realizing that this new way of payment is a growing trend and, as such, they are creating their own apps. Examples of this are the big players in that market: Starbucks, Apple, Samsung, and Google (eMarketer, 2018b). In Portugal more than 80% of the population uses internet and about 46% shop online. 86% of online consumers use their cell phones to start researching their products and 80% end their purchase by paying on their mobile phone (Ferreira, 2020).

In the last year the growth in the use of m-payments has been greatly affected by changes in users' consumption habits and consequently by payment habits and business models that have changed, with the increased use of contactless payment methods (Zhao & Bacao, 2021). This is mainly due to the need for social distancing and several full lock downs of the population needed to increase the security of the population and thus mitigate the COVID-19 pandemic (which emerged in 2019) (Khanra et al., 2021).

There are several published works related to m-payments addressing the intention to use as well as the continuance use of m-payments (e.g. Mallat, 2007; Oliveira et al., 2016; Slade et al., 2015). However, no studies are known that seek to understand individual performance in the use of this technology. To fill this gap, this study will provide practical perceptions of individual performance by investigating the individual performance of m-payments, considering the consequence of the task technology fit (TTF) model, and combining social influence, gamification, and price value. Based on that, the following questions were formulated:

RQ1: What are the drivers of individual performance of m-payments?

RQ2: Did COVID-19 have an impact on individual performance of m-payments?

This work will contribute to a better understanding of post-adoption of m-payments technology and will provide greater understanding of the effect on well-being when using this technology. We will also help m-payment service providers understand trends in the use of these services during and after the pandemic. Our expected contributions are threefold. First, we show the importance of individual performance for the context of m-payments. Previous studies have observed the adoption and use of m-payments. This study helps to understand the effectiveness and efficiency that m-payments currently provide while performing tasks with technology. Second, previous studies have evaluated how gaming techniques influence the acceptance and adoption of m-payments (Baptista & Oliveira, 2017), but have not analysed the impact of this construct on individual performance. In addition, past studies have not attempted to explain how social influence and price value, combined with gamification, can affect individual performance in the use of m-payments. We expect that gamification, social influence, and price value can have a moderating effect on individual performance on m-payments use. Finally,

taking into account that the study was conducted in the context of the COVID-19 pandemic, individual interviews were conducted with m-payment users in order to triangulate our empirical results and support the conclusions taking into account the pandemic environment throughout the world. With the use of mixed methods in research, we combined two methodologies, qualitative and quantitative, in order to complement and corroborate the results, and expand the findings of the study (Venkatesh et al., 2013).

This paper is structured as follows. Overviews of the m-payments topic and the TTF model as discussed in the literature are presented in Section 2. We then present the model adapted to the m-payments and the hypotheses. Section 4 describes the research methodology. At the end we present the conclusions, the limitations of the study, and avenues for future research.

2. LITERATURE REVIEW AND HYPOTHESES

2.1. M-PAYMENTS

M-payments allow digital transactions with the possibility of paying for products or services in physical stores using a QRCode, bank transfers, and cardless bank withdrawals. All of this is possible using any mobile device, e.g. a mobile phone or tablet. These forms of payment allow the creation of value at the time of purchase for both consumers and merchants (Slade et al., 2015). These transactions can be realized through an intermediary or directly (Mallat, 2007). There are several applications for making m-payments, such as Apple Pay, Google Pay, PayPal, and Starbucks App. The Starbucks App is the largest player in this market, with 23.4 million people aged 14 or over using the application to make a purchase at the point of sale at least once every six months. Following Starbucks App is Apple Pay, which has 22 million users. Google Pay (11.1 million users) and Samsung Pay (9.9 million) are ranked third and fourth of the four most used mobile earnings apps (eMarketer, 2018b). In Portugal the most known m-payments platform its MB Way. These payment tools replace cards and even cash, and can function as virtual wallets. Since 2019 the effects of the COVID-19 pandemic have provoked a change in consumption patterns, which has caused a rapid transition from offline consumption to online consumption, leveraged by the growing use of m-payments (Liu et al., 2020)

Several studies, such as Oliveira et al. (2016) and Slade et al. (2015) have sought to understand the user's intention in adopting m-payments, as well as it's continuity of use (Mallat, 2007), but there is no current literature about the individual performance in m-payments; most reported studies are related to the adoption and continuity of the use of this technology. Herein we will also analyse how the use of game elements in the context of m-payments can increase the satisfaction, involvement, and improvement of individual performance when using this service (Baptista & Oliveira, 2017) in a pandemic environment. Below is a table illustrating that there is a gap in the study of individual performance related to m-payments.

Table 1 - M-payments studies

Authors (year)	Dependent Variable	Model/Theory	Data/method	Results / Comments
(Yang et al., 2011)	Behavioural intention to adopt and behavioural intention to continue using	Adoption Drivers: Behavioural Beliefs + Social Influences + Personal Traits	639 individuals, China, PLS	The model explains 49.5% of variation in behavioural intention to adopt and 54.5% of variation in behavioural Intention to continue using m-payments. Both variations are explained by dimensions/constructs SN, PIT, REA, PRI, COM, and PEE.
(Slade et al., 2015)	Behavioural intention to use remote m-payments	UTAUT	268 individuals, UK, PLS	The model explains 67% of variance has behavioural intention to use m-payments adoption, this is explained by dimensions/constructs PE, SI, IV, and PR.
(Oliveira et al., 2016)	Behavioural intention to recommend and behavioural intention to adopt	UTAUT2 + DOI + PTS	301 individuals, Portugal, PLS	The model explains 61.3% of variation in behavioural intention to recommend m-payments and 71.8% of variation in behavioural intention to adopt. Both variations are explained by dimensions/constructs BI, PTS, SI, I, C, and PE.
(Wu & Lee, 2017)	Intention of use m-payments	TTF + UTAUT2	3132 individuals, China, PLS	This model explains 79.5% of variance has intention of use m-payments, this is explained by dimensions/constructs TTF, PE, EE, SI, FC, HM, PV, and PS.
(Bùi & Bùi, 2018)	Behavioural intention to use m-payments	UTAUT	331 individuals, Vietnam, PLS	This model explains 34.8% of variance has behaviour intention to use m-payments, this is explained by dimensions/constructs PE, EE, TR, and GA.
(Khanra et al., 2021)	Adoption postponement of m-payments use	TAM	633 individuals, China, PLS	The model explains 81% of variance has adopt postponement of m-payments, this is explained by dimension/construct ATT.

(Zhao & Bacao, 2021)	Adoption intentions of m-payments	UTAUT	739 individuals, China, PLS	The model explains 71% of variance has adoption intention of m-payments, this is explained by dimensions/constructs PE, TR, PB, SI, and PS.

Note: SN (social influences); PIT (personal innovativeness in information technology); REA (relative advantage); PRI (perceived risk); COM (compatibility); PEE (perceived fee); PE (performance expectancy); SI (social influence); IV (innovativeness); PR (perceived risk); BI (behavioural intention to adopt); PTS (Perceived technology security), I (innovativeness); C (compatibility); TTF (task technology fit); EE (effort expectancy); FC (facilitating conditions); HM (hedonic motivation); PV (price value); PS (perceived security); TR (trust); GA (Gamification); ATT (attitude); PB (perceived benefit).

2.2. TASK-TECHNOLOGY FIT (TTF) MODEL

Users may not adopt a particular technology if it is not compatible with the characteristics of their task. The TTF model argues that there should be a balance between the characteristics of the technology and the requirements of the task. This study seeks to explain how individual performance can influence the use of a technology (Goodhue & Thompson, 1995; Zhou et al., 2010). For this reason, if users find that a certain technology does not agree with their tasks or perceive that they cannot improve the performance of the task, the user does not adopt the technology, even though realizing that it is advanced (Zhou et al., 2010).

To perform a task it is necessary to have tools, which in the case of the TTF model are the technologies (Hardware, Software, and data) as well as users. These users have certain characteristics that can affect how a particular technology is used. Another factor that can affect the achievement of a task is the attributes of the technology, which can include accessibility and the response time. If these two attributes are optimized, there will be a significant increase in technology performance, which makes it possible to make tasks more productive and in turn more effective and efficient (Tam & Oliveira, 2016a). The TTF interconnects the job requirements, the individual characteristics, and the attributes of the technology. High performance in the accomplishment of the task implies a high level of TTF as well as greater satisfaction with the information system (Duarte & Martins, 2004). Using m-payments can save time and effort, allowing a greater individual performance. Individual performance was previously investigated using technologies such as m-banking in the study by Tam and Oliveira (2016). However, the authors have no knowledge of previous studies regarding the individual performance of m-payments technology. The current study can thus help the evolution of the technology. In addition, m-payments technology is a recent technology and for this reason it is essential to attract and retain users, as this is the only way to ensure the success of the technology. With this study we aim to determine if individual performance translates into efficiency and effectiveness at the moment when users perform m-payments tasks (Tam & Oliveira, 2016b).

The TTF model has often been used in studies on m-banking to examine the relationship between individualism and TTF (Tam & Oliveira, 2019), the relationship between utility and ease of use of a technology, as well as its interactivity (Zhou et al., 2010). TTF is often combined with other models to explain the acceptance of the use of a technology (UTAUT) and initial trust in the use of technology (ITM) (Oliveira et al., 2014). This model can also be used in several areas,

such as user acceptance and utilization of e-commerce and websites in the tourism industry (Usoro et al., 2010).

3. RESEARCH MODEL

We study the individual performance of m-payments with the gamification, social influence, and price value constructs (Figure 1). The TTF model (Goodhue & Thompson, 1995) will be the basis for evaluating whether the technology characteristics and task characteristics relate to m-payments. In this model the gamification construct is included because we believe it can play an important role in the individual performance of the users of the technology under study (Justin & Joy, 2019). The social influence construct will also be studied because it may have a direct influence on the behaviour intention of using the technology (Oliveira et al., 2014). Finally, the price value construct is included because we believe that it will have a significant impact on the use of technology, taking into account that there is a cognitive compensation of the consumer between the perceived benefits of the technology and the cost of use (Venkatesh et al., 2012).

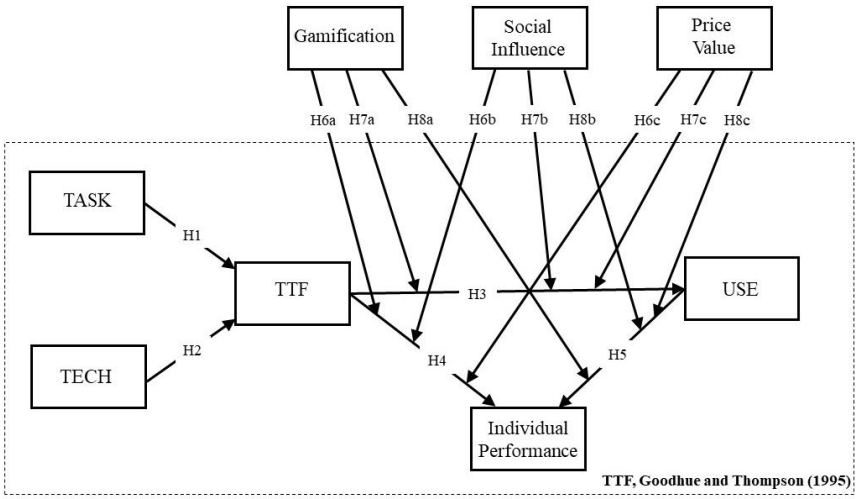

Figure 1 – Research model

3.1. TTF

In this study individual performance refers to the consequences or outcome of using m-payments. M-payments provide users with the possibility of ubiquitous payments in real time, access to financial assets, and an alternative to cash payments. Thus, the relative advantage of m-payments over traditional payment instruments is the possibility of time- and location-independent payments (Mallat, 2007). The TTF determines the relationship between the requirements of users' tasks, individual performance in use, and the functionality of the technology. This relationship is beneficial to individual performance when there is a response between the functionality of the technology and the task requirements (Goodhue & Thompson, 1995). M-payments have great technical advantages because they are accessible and convenient, features that attract users because they allow a better adjustment of the task technology (Zhou et al., 2010), influencing the expected effort of users (Wu & Lee, 2017), the behavior in use, and individual performance (Tam & Oliveira, 2016a). This advantageous situation does not happen in services where the task is complex, as complexity reduces the adjustment of the task technology. Thus, a high degree of TTF promotes the use of m-payments and a low degree of TTF decreases the user's intention to adopt the technology (Tam & Oliveira,

2016a). In this way, m-payments are attractive to the user and therefore improve individual performance, this is due to the beneficial relationship described above (Pousttchi & Wiedemann, 2007). Thus, the TTF is expected to be a precursor that significantly influences the use of m-payments. Therefore, the following hypotheses will be tested:

H1: Task characteristics of m-payments positively affect TTF.

H2: Technology characteristics of m-payments positively affect TTF.

H3: TTF positively affects the use of m-payments.

H4: TTF positively affects individual performance.

H5: Use of m-payments positively affects individual performance.

3.2. GAMIFICATION

Gamification is a concept created by Bret Terrill in 2008 (Terrill, 2008), and was defined by the use of game elements such as rules, objectives, and uncertain results on other technological systems, in order to increase engagement. These elements improve the user experience and, with the increase of engagement, lead the user to take the desired behaviour in services and applications outside of the gaming context (Bùi & Bùi, 2018). The games aim to involve and entertain users, and several consultants and providers of sites or apps realized that by adopting technologies similar to games, they would develop the reasoning of problem solving and involvement with users in order to enhance the use of applications, campaigns, or brand content (Deterding et al., 2011). Currently the principles of gamification are being used by different companies as a marketing tool to transform the daily interactions of customers and produce the desired effects and results. The elements of gamification allow reducing the adoption barriers of services and thereby provide positive results to business. These barriers can include difficulty of use, security breaches, low utilization rate, and/or unchallenging activities (Baptista & Oliveira, 2017).

With the use of points, rewards, leader board for competition, cash prizes, discounts, and other free advantages, consumer involvement is encouraged, loyalty increases, and positive feedback is promoted, thus leading to increased cooperation so that the consumer exercises specific behaviours. Gamification causes feelings of happiness leading to an increase in the value that the brand has for the consumer (Baptista & Oliveira, 2017). This occurs because through gamification the desired benefits for the user/consumer overlap the costs of services, which encourages positive interaction due to perceived value (Putri et al., 2019).

Actually, many banking services are designed only to serve consumers and work for transactional operations (Baptista & Oliveira, 2017). In addition, there is still great uncertainty in the use of online banking services. Gamification is intended to convert mere utility services into more enjoyable services, increasing interaction with new banking products, building customer loyalty, and facilitating complex operations (Justin & Joy, 2019) in order to increase financial involvement (Baptista & Oliveira, 2017).

We believe that gamification can have a positive impact and can increase the use of m-payments, because it brings a relevant experience and more value to the customer, involving

him and motivating him to use mobile banking more frequently and for more purposes (Pritzker, 2015). Thus, the following hypotheses are presented:

H6a: Gamification moderates the effects of the relationship between TTF and individual performance.

H7a: Gamification moderates the effects of the relationship between TTF and use.

H8a: Gamification moderates the effects of the relationship between use and individual performance.

3.3. SOCIAL INFLUENCE

Social influences are shown to be perceived pressures by individuals regarding the environment in which they are inserted. These may be related to the online or physical environment (Yang et al., 2011). Several authors have considered social influence in their studies because it is considered to be a critical element in the explanation of adoption behaviour and consequently in use. This influence may have a positive effect on organizations. In Zhou et al.'s (2010) study of mobile banking, according to the opinions of older users, social influence can have positive effects on adoption behaviour. At the personal level, this construct is also important because the social influence is a direct antecedent in the behavioural intention, that is, individuals perceive that the technology meets their expectations because someone from their environment has already used it (Oliveira et al., 2014). In this way, social influence can also reduce perceived risk in use, as it indicates the legitimacy of the technology (Yang et al., 2011). It is understood that the identification of social influence can lead to changes in the perception of risk at the time of adoption of m-payment services, and as such will be essential to understand the individual performance of users of these services. The following hypotheses are proposed:

H6b: Social influence moderates the effects of the relationship between TTF and individual performance.

H7b: Social influence moderates the effects of the relationship between TTF and use.

H8b: Social influence moderates the effects of the relationship between use and individual performance.

3.4. PRICE VALUE

The price value corresponds to the relationship between the benefits added to the use of m-payments and their monetary cost. This relationship has a positive impact when the benefits of use exceed the monetary cost (Venkatesh et al., 2012). The use of m-payments implies the need for inherent costs such as internet fees, the need for mobile equipment, and investment in time, effort, and knowledge in the technology (Wu & Lee, 2017). So, if users really consider it a useful and beneficial technology they will use it more often and integrate it in their routine (Baptista & Oliveira, 2017). Thus, this perception of benefit may lead to a perception of short and long-term cost reduction, taking into account the usefulness of the product, increasing loyalty, and satisfaction in use (Consuelo et al., 2017). Therefore, the following hypotheses are made:

H6c: Price value moderates the effects of the relationship between TTF and individual performance.

H7c: Price value moderates the effects of the relationship between TTF and use.

H8c: Price value moderates the effects of the relationship between use and individual performance.

4. METHODOLOGY

4.1 MEASUREMENT

The research model includes eight constructs, each of which was measured through three or four items. All measured items (Appendix A) were adapted from Oliveira et al. 2014; Urbach, Smolnik, and Riempp 2010; Zhou, Lu, and Wang 2010; Yang et al. 2012; Venkatesh, Thong, and Xu 2012; Bùi and Bùi 2018 with slight modifications. Task characteristics (TASK), technology characteristics (TECH), and TTF (TTF) come from Oliveira et al. (2014); social influence (SI) comes from Yang et al. (2012); individual performance (IP) comes from Urbach, Smolnik, and Riempp (2010); use (USE) comes from Zhou, Lu, and Wang (2010); price value (PV) comes from Venkatesh, Thong, and Xu (2012), and gamification (G) comes from Bùi and Bùi (2018).

According to the constructs under study, a questionnaire was administered in Portugal. Taking into account that the original questions were in English, a version had to be made which was adapted and translated into Portuguese and then another version back translated to English. Some items were adapted to the language in order to be clear and understandable. The items were measured using a Likert scale with seven points on which 1 corresponded to strongly disagree and 7 to strongly agree. All constructs and questions are included in Appendix A.

In addition, eight interviews were conducted with m-payment users in Portugal to corroborate the results of the study in the COVID-19 pandemic context. The questions used in the interviews were adapted from the questionnaire previously specified. Some of the items were adapted to the pandemic context. All interviews were conducted by video call and each interviewee gave his/her consent for voice recording. The interviewees expressed their free opinion about each topic; therefore each interview was analysed independently.

4.2 DATA COLLECTION

The objective of this study is to test all of the components of the model illustrated in Figure 1. As in earlier studies, we intend to test whether the TTF will strongly influence users' beliefs due the consequences of use, and in turn, if those beliefs have an effect on use (Goodhue & Thompson, 1995).

An online tool specialized in data collection was used for this research. The target population was Portuguese and comprised adults who use or do not use m-payments. The questionnaire had 23 questions, all of which had to be responded to in order to avoid a non-response bias. The questionnaire was presented through online platforms, always being sent by digital means.

In a first phase a pilot test was applied to 31 individuals in order to test each item. The pilot was important to obtain feedback about the content and structure of the questionnaire. The preliminary results of the pilot showed that the scales were reliable and valid, so no structural changes were made to the items. The data from the pilot survey were not included in the main survey. An announcement was then made inviting individuals to answer the questionnaire. According to the sample initially defined, 317 responses were collected based on the experience of using m-payments.

Of all respondents, 192 (61%) are women and 125 (39%) are men. Regarding age, 203 (64%) respondents were over 25 years old, 83 (26%) were under 25, and 31 (10%) were exactly 25 years old. Regarding the employment situation, 257 individuals were active professionals (on their own or on behalf of others). Finally, 166 (52%) individuals have a bachelor's degree or higher diploma. Detailed descriptive statistics on the demographic characteristics of the interviewees can be found in Appendix B.

5. ANALYSIS AND RESULTS

The analysis of the data was performed through with structural equation modelling (SEM). This is a statistical method to test mediation, functional, predictive, and causal hypotheses. SEM allows for more precision in addressing the hypotheses and operationalizing the constructs (Bagozzi & Yi, 2012), and allows for evaluating and validating empirical data collected from the questionnaire.

The method used in the research was the partial least square (PLS), taking into account that not all items in the study were distributed normally, as indicated by the KS test ($p<0.01$); the research model was not previously tested in the literature (Hair et al., 2011); the study is supported by a model with several constructs (Chin, 1998); the sample size is 10 times larger than the maximum number of paths directed to one construct (Gefen & Straub, 2005). The SmartPLS software was used for the estimation, data manipulation, and analysis of the theoretical model relationships.

5.1 MEASUREMENT MODEL

Statistical analysis was conducted using the SEM model to calculate the internal consistency, convergent validity, and discriminate validity of the model.

According to Table 2, all constructs have a composite reliability and Cronbach's alpha greater than 0.7, which means that the internal consistency of the constructs is confirmed (Straub, 1989). None of the constructs have values lower than 0.5, which means that none had to be eliminated (Henseler et al., 2009). To assess the discriminant validity of the constructs, PLS loadings and cross-loadings were analysed. The PLS loading requires that the square root of AVE must be greater than all correlations between each pair of constructs (Chin, 1998). As seen in Table 3, all diagonal values are greater than the others. We can thus verify that all of the loadings of each construct are greater than the corresponding loadings, which confirms the cross-loadings criterion (Mohammed et al., 2016). To ensure discriminant validity the HTMT approach was used. For discriminant validity to be established, the HTMT value must be less than 0.90. As seen in Table 4, the discriminant validity is confirmed (Henseler et al., 2015).

All criteria validate the scales used, from which we conclude that all constructs are statistically distinct and can be used in the model under study. Thus, the results of the model confirm that the indicators' internal consistency, convergence validation, and discriminant validation are satisfied.

Table 2 – 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	7	8
(1) Task characteristics	5.020	1.790	.919	.868	**.890**							
(2) Technology characteristics	5.741	1.259	.903	.857	.586	**.836**						
(3) Task technology fit	5.351	1.532	.946	.923	.662	.773	**.902**					
(4) Use	5.114	2.044	.939	.903	.754	.578	.721	**.915**				
(5) Gamification	4.222	1.721	.919	.883	.449	.397	.438	.464	**.860**			
(6) Social influence	3.066	1.568	.874	.848	.342	.233	.259	.291	.438	**.798**		
(7) Price value	4.507	1.516	.876	.798	.489	.543	.620	.565	.420	.321	**.838**	
(8) Individual performance	5.452	1.357	.876	.811	.675	.713	.695	.657	.449	.351	.567	**.799**

Table 3 - PLS loadings and cross-loading

Constructs		TaskC	TechC	TTF	Use	Gamif	SInf	PricV	IPerf
Task charateristics	TASK1	**.926**	.551	.626	.692	.379	.267	.430	.608
	TASK2	**.934**	.559	.648	.767	.421	.322	.502	.658
	TASK3	**.803**	.444	.473	.529	.406	.336	.362	.526
Technology characteristics	TECH1	.446	**.787**	.525	.404	.291	.169	.391	.586
	TECH2	.480	**.880**	.636	.468	.320	.182	.442	.626
	TECH3	.532	**.790**	.743	.583	.419	.244	.507	.552
	TECH4	.485	**.884**	.642	.445	.276	.170	.454	.623
Task technology fit	TTF1	.593	.741	**.929**	.657	.407	.270	.572	.671
	TTF2	.604	.664	**.908**	.635	.388	.276	.543	.584
	TTF3	.602	.730	**.934**	.656	.410	.205	.602	.643
	TTF4	.590	.652	**.835**	.653	.375	.183	.518	.606
Use	USE1	.714	.564	.718	**.941**	.439	.273	.569	.640
	USE2	.641	.535	.649	**.908**	.386	.250	.495	.560
	USE3	.714	.485	.607	**.896**	.446	.275	.482	.599
Gamification	G1	.347	.332	.366	.348	**.881**	.413	.362	.377
	G2	.436	.440	.456	.463	**.821**	.286	.396	.464
	G3	.334	.272	.329	.346	**.913**	.407	.344	.340
	G4	.401	.285	.325	.409	**.823**	.422	.326	.332
Social influence	SI1	.351	.336	.304	.360	.400	**.865**	.338	.415
	SI2	.211	.056	.135	.137	.331	**.807**	.216	.173
	SI3	.255	.082	.157	.146	.354	**.825**	.209	.216
	SI4	.148	.003	.056	.074	.260	**.681**	.130	.078
Price value	PV1	.297	.313	.367	.358	.297	.288	**.800**	.336
	PV2	.535	.609	.658	.585	.431	.278	**.851**	.609
	PV3	.328	.355	.453	.413	.287	.242	**.860**	.402
Individual performance	IP1	.486	.732	.597	.479	.330	.173	.454	**.810**
	IP2	.521	.753	.646	.495	.336	.218	.479	**.841**
	IP3	.580	.369	.462	.562	.373	.332	.393	**.751**
	IP4	.572	.414	.510	.567	.398	.402	.482	**.792**

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

Constructs	TaskC	TechC	TTF	Use	Gamif	SInf	PricV	IPerf
Task charateristics								
Technology characteristics	.669							
Task technology fit	.732	.855						
Use	.841	.645	.788					
Gamification	.508	.436	.475	.509				
Social influence	.347	.179	.226	.247	.477			
Price value	.545	.603	.680	.630	.472	.334		
Individual performance	.802	.852	.800	.768	.521	.342	.661	

5.2 STRUCTURAL MODEL AND HYPOTHESES TESTING

In this model the significance levels were estimated using a bootstrap with 5,000 sampling interactions (Chin, 1998). In order to test the model's multicollinearity, we calculated the variance inflation factor with VIF<5, and found no multicollinearity problems (Hair et al., 2011). The results of the study are summarized in Figure 2.

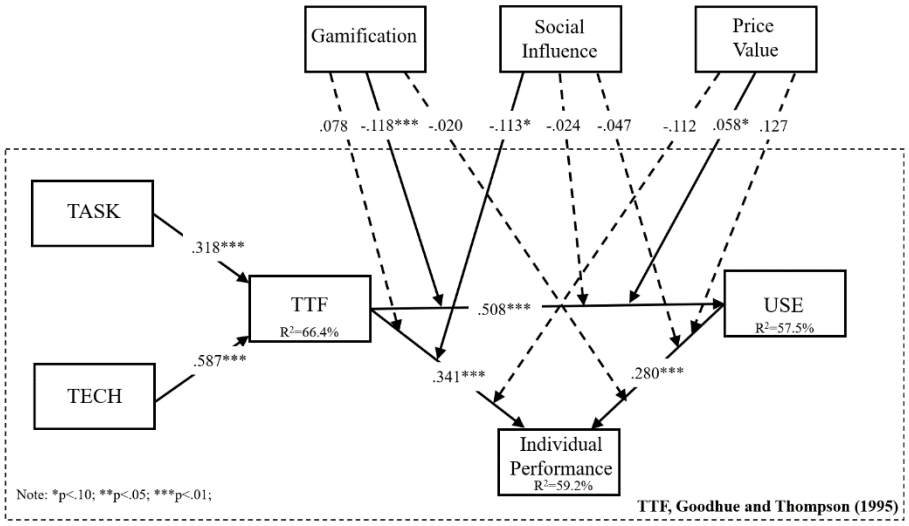

Figure 2 - Research model with results

The model explains 66.4% of the variation in TTF. Task characteristics ($\hat{\beta}$=.318; p<.01), and technology characteristics ($\hat{\beta}$=.587; p<.01) were considered statistically significant to explain TTF, and consequently H1 and H2 are confirmed.

The model explains 57.5% of the variation in use. TTF ($\hat{\beta}$=.508; p<.01) is statistically significant to explain use, and consequently H3 is confirmed. The gamification and price value were assessed as moderating variables in the relationship between TTF and use. The moderating effect from the gamification ($\hat{\beta}$=-.118; p<.01), which showed a negative sign, and price value ($\hat{\beta}$=.058; p<.10) are both statistically significant, and consequently H7a and H7c are confirmed.

The model explains 59.2% of the variation in individual performance. TTF ($\hat{\beta}$=.341; p<.01) and use ($\hat{\beta}$=.280; p<.01) were both statistically significant, and thus H4 and H5 are confirmed. The

relationship between TTF and individual performance had a moderating effect from social influence ($\hat{\beta}$=.113; p<.10), which had a negative sign, contrary to what was expected, and thus H7b is confirmed. Moderating influences that were not statistically significant were: moderating effect of gamification and price value in the relationship between TTF and individual performance (H6a and H6c are not confirmed); moderating influence of gamification, social influence, and price value in the relationship between use and individual performance (H8a, H8b, and H8c are not confirmed); moderating influence of social influence in the relationship between TTF and use (H7b is not confirmed).

6. DISCUSSION

The m-payments had a rapid development for both users and merchants, according to the expectation of previous studies (Wu & Lee, 2017). Service has a significant influence on consumption methods, and that effect was more pronounced at the time of pandemic lockdowns, as forcing the population, as confinement changed their consumption methods more quickly than expected. This study is the only one that combines the adjustment of m-payments task technology with gamification, social influence, and price value constructs to explain and understand the impact of the constructs on individual performance when using m-payments. To build the research model, 14 hypotheses were formulated, 8 of which were confirmed as significant (H1, H2, H3, H4, H5, H7a, H6b, and H7c) and 6 were not significant.

The results of this study show that price value is the construct that most positively affects m-payments use (H7c) (Wu & Lee, 2017), social influence negatively affects individual performance (H6b) and has no significant influence on use (H7b), contrary to previous literature (Oliveira et al., 2016; Slade et al., 2015; Wu & Lee, 2017). Gamification negatively affects the use of m-payments (H7a) and does not exert significant influence on individual performance (H6a), contradicting the results reported in the literature (Baptista & Oliveira, 2017; Bùi & Bùi, 2018; Khanra et al., 2021). In the present study the game mechanics and techniques do not promote the intention to use m-payments and do not create a positive attitude amongst users. Our model is consistent with results from previous studies (e.g. Wu & Lee, 2017), explaining 66.4% of the variation in TTF, 57.5% of the variation in use, and 59.2% of the variation in individual performance.

This study brings an important contribution to the scientific community on individual performance in the use of m-payments by analysing how the constructs of gamification, social influence, and price value can influence the TTF model. In addition, by triangulating PLS results, this is a mixed-methods study, which allows us to directly analyse the opinions of users in an atypical environment, the SARS-CoV-2 pandemic, providing new insights that help to understand how personal characteristics can influence individual performance in the use of m-payments, thus confirming the PLS results (Tam et al., 2020).

6.1 THEORETICAL IMPLICATIONS

According to what we can see in the model results, gamification has a negative effect on the use of m-payments (H7a), contrary to reports in the literature (Baptista & Oliveira, 2017; Bùi & Bùi, 2018; Khanra et al., 2021). Gamification also has no significant influence on individual performance (H6a and H8a). Regarding use, the study suggests that the features of sharing points, rewards, and game goals may be important to users and may increase performance when using this technology, but this is not an aspect that encourages them to use the service more; the key is that the m-payments technology meets their needs effectively. The study also suggests that users devalue the use of this gamified technology because m-payments manage their payments, which involves a very sensitive asset (money), so users value more the fact that this service meets the expectations of the tasks in accordance with the technology (Khanra et al., 2021; Oliveira et al., 2016). Contrary to previous literature, the present study shows that game elements increase neither the sense of enjoyment nor the perceived effectiveness amongst m-

payments users, and consequently users do not believe that game elements directly increase their task performance, and therefore there is no significant influence on individual performance (Baptista & Oliveira, 2017). Gamification also does not significantly influence the relationship of use with individual performance (H8a). Finally, according to the interviews conducted, it was found that for users, gamification techniques can have a beneficial impact only if they provide as rewards better interest rates and reductions in fees or credits. This finding is compatible with previous research on the acceptance of mobile banking (Baptista & Oliveira, 2017). Furthermore, it is understood that the hedonic motivation of gamification should not outweigh the utility of the service. Thus, the service will have to be secure and transparent in order to increase financial security as well as customer trust (Bùi & Bùi, 2018; Khanra et al., 2021).

In the present study, social influence is not considered relevant to the context of m-payments use (H7b), contrary to literature (Wu & Lee, 2017). This suggests that the opinions and suggestions of individuals from the social environment of m-payment users have no influence on the intention to use the service (Wu & Lee, 2017). According to previous studies, social influence is an important factor for the adoption of m-payments, but the present study shows that the social environment does not positively influence the use of the service. This is in accordance with previous studies reporting that social influence becomes less significant over time, that is, with increasing experience of use this influence is lower, because in this case individuals already use and know the system, which diminishes the importance of the opinions of others (Oliveira et al., 2016; Yang et al., 2011).

Regarding individual performance, social influence has a significant influence on the construct, affecting it in a negative way (H6b), which suggests that users use the m-payments service because it effectively satisfies their tasks and not because they are influenced by the social environment (Baptista & Oliveira, 2017). It is important to bear in mind that the study was conducted in an atypical moment, the COVID-19 Pandemic, which forced the total confinement of the population, thereby negatively affecting social relationships, and users started using the m-payments service only for online payments or in essential goods stores, and no longer used the service in social settings (e.g., transfers to friends). However, in agreement with the interview data from the gamification construct, it is understood that sharing game elements among the network of contacts to obtain financial benefits (better interest rates and fee or credit reductions) may have a more positive impact on moderating social influence and individual performance (Baptista & Oliveira, 2017). Social influence has no significant influence on the relationship between use and individual performance (H8b).

The analysis of the price value construct in the present study shows that price value has significant influence on the use of m-payments (H7c), in line with the literature (Baptista & Oliveira, 2017; Wu & Lee, 2017). In this study the price value is the construct that most influences the use of this service, which suggests that users value the fact that the fee for using the service is fair and appropriate to the tasks required and this is therefore a significant factor when using the m-payments service. Usually m-payments users do not have costs or pay relatively low amounts compared to the transfer services provided by the bank itself, which makes users opt more often for m-payments (Bùi & Bùi, 2018; Wu & Lee, 2017). Regarding individual performance, price value has no significant influence on this construct (H6c and H8c), suggesting that users like the m-payments service because it meets their needs effectively, and that it is irrelevant in the context of individual performance. These findings are in agreement with previous studies about the adoption of m-payments (Oliveira et al., 2016). Price value has no significant influence on the relationship between use and individual performance (H8c).

Contextualizing m-payments with the TTF model, we realize that the effect of task characteristics (Task) (H1) is less than the effect of technology characteristics (Tech) (H2). This suggests that this technology is very new and therefore users are not yet aware of all the tasks possible to perform with the service (Goodhue & Thompson, 1995). The model explains the variation of TTF by 66.4%, which means that the characteristics of the technology and the characteristics of the task affect the alignment of the task technology, which determines that consumers understand that m-payments are important for their routine (Goodhue & Thompson, 1995; Wu & Lee, 2017). The model explains 57.5% of use, which could mean that despite this being a recent system, users are affected by the features of the system and therefore recognize its usefulness (Zhou et al., 2010). This model explains 59.2% of the individual performance, which shows that there is an adequate joint function between the tasks of the technology (TTF) and the use of m-payments (Goodhue & Thompson, 1995), meaning that this service meets the needs of users and they see its usefulness, allowing comfort and satisfaction with m-payments (Zhou et al., 2010).

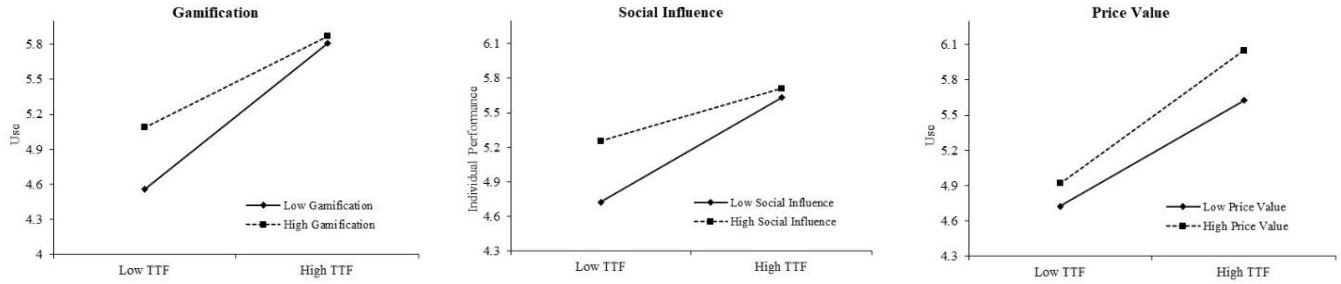

Figure 3 - Moderator effects

Figure 3 shows the impact of the three statistically significant moderators, which are: moderator of gamification over TTF to use of m-payments, social influence over TTF to individual performance, and price value over TTF to use of m-payments. In the first graph, in which we depict the moderating effect of gamification, we find that TTF has a more significant impact on use when gamification is low. Furthermore, when TTF is moderated by gamification (H7a), there is a significant impact on use. The effect of gamification can be explained by the fact that users value the relationship between the technology and the task more than the game elements when using m-payments. This is because the service is taken very seriously by users since it is their own money. Regarding the second graph, we analyse the moderating effect of social influence and conclude that TTF has a more significant impact on individual performance among people with low social influence. Thus, when the TTF is moderated by social influence (H6b), there is a significant effect over individual performance. The effect of social influence can be explained by the fact that users value the relationship between the technology and the task more than the opinions of the people around them. This is important because m-payments are a service that involves a sensitive asset for the user (money) and therefore use should be undertaken consciously and not dependent on the influence of others. In the third graph, we study the moderating effect of price value and confirm that TTF has a more significant impact over the use of m-payments among users with high price value. Thus, when TTF is moderated by price value (H7c), there is a significant effect over the use. The effect of price value can be explained by the fact that users assign more value to the alignment between the technology and the task and are therefore willing to pay a fair amount, provided that the service meets their expectations and

transactions can be made securely. When the moderating effects of gamification, social influence, and price value are included in the model to analyse individual performance in the use of m-payments, the variance of individual performance is 59.2% and the variance of use is 57.5%. Disregarding the moderating effects, the variance of individual performance falls to 53.3%, which is an improvement from the variance of 6.6 percentage point with the inclusion of the moderating effects. Regarding use, when disregarding the moderating effects, the variance of use falls to 52%, which represents an improvement of the variance of 5.5 percentage point with the inclusion of the moderating effects.

This study was conducted during a pandemic caused by the SARS-CoV-2 virus, which has greatly changed consumption habits, given that there have been several total or partial confinements (obligation to remain in the dwelling in order to prevent the spread of the virus) since March 2020. The study country has been in a state of emergency for a lengthy period of time, the entire population is required to wear masks, and hand disinfection is advised several times a day. Therefore, it was necessary to complement this research with a qualitative study in order to answer the question, "How has the COVID-19 pandemic impacted the behaviour and performance of m-payments users?"

Eight interviews were therefore conducted with m-payments users in order to develop an in-depth understanding about the impact of the pandemic context on individual users' performance of this service. This approach aims to provide greater breadth and depth in order to make the study more accurate (Venkatesh et al., 2013).

For anonymity purposes, respondents are identified with “U” identifier. The participants are men and women between the ages of 25 and 45 and most have a Bachelor's degree (U1, U2, U3, U4, U6, U7, U8). Users U2, U6, and U8 use m-payments between 1 and 5 times per month; users U3 and U5 use between 6 and 10 times; users U1, U4, and U7 use more than 11 times per month. Regarding occupations, respondent U4 is a nurse, U5 is a firefighter, U7 is a banker, U6 is a student, U2, U3, and U8 are managers, and U1 is a businessman.

The discussion started with the analysis of the task characteristics construct through the question “Is it important for you to make transfers, payments, and manage your account through m-payments anytime and anywhere?” All participants replied “yes”, and the following characteristics were mentioned: it is important because the service is practical (U1, U2, U3); functional (U1, U4); secure (U2, U4, U5); intuitive (U3); convenient (U4, U7); fast (U4, U6, U7, U8); and affordable (U6). The following question was then asked, "Do you usually carry out your financial instructions immediately or do you prefer to wait until traditional means of payment are available?". All interviewees mentioned that they prefer to carry out their financial instructions. Regarding the question "Do you believe that at the time of the COVID-19 pandemic the fact that you could make payments without physical contact was relevant? Why?". All interviewees stated that it was relevant to make payments without physical contact, and the following characteristics were mentioned: there is no need to touch public payment terminals, which may be infected (U1, U2, U3, U5, U6, U7); it is important to reduce the risks of transmission (U3, U5, U6, U8); maximize time (U4); I avoid touching cash because it can transmit viruses (U5, U8).

Regarding the technology characteristics construct, the following questions were asked "Do you think m-payments are a secure means of payment? Why?". Interviewees U1, U2, U3, U4, U5, U7, and U8 answered “yes”, and interviewee U6 mentioned that he believes it is safe but does not trust it 100 percent. In this question the following features were mentioned: The service

always asks for authentication to validate transactions (U1, U2, U3, U5, U7, U8); I do not know of any case that has had problems with the service (U1, U8), there may be a risk of fraud, but this situation may occur with other payment methods (U3, U5). Next we asked: "Do you believe that being able to make payments and transfers immediately with your mobile phone has a significant advantage in your daily life? All users answered affirmatively, and the following explanations were mentioned: It is immediate and easy to use (U1, U2, U7, U8); I have no need to go to an ATM (U3; U4, U5, U6, U7); I maximize time (U1, U5, U6, U8). The last question regarding the technology characteristics construct is the following: "During the pandemic which feature of m-payments did you find most important: fast service, secure service, service without the need to travel? Why?". Respondents U1, U3, U7, and U8 consider the characteristic "fast service" most important because they can make transactions immediately and have immediate confirmation of the transaction; respondents U2, U3, U4, U5, and U6 consider the characteristic "no-travel service" most important because during the quarantine period travel had to be reduced to what is strictly necessary. Interviewee U5 mentioned the characteristic "secure service".

Regarding the TTF construct the following questions were asked "Do you think the services provided by m-payments are appropriate in your daily life?" all participants answered "yes". Regarding the question "During the pandemic were the m-payments services sufficient to meet your needs?" all participants answered "yes".

The first question regarding the individual performance construct asked: "In your opinion, do m-payments make accomplishing tasks faster? Why?". All participants answered "yes" with the following considerations being mentioned: It is very practical (U6, U5, U7); No errors occur (U1); it is accessible and easy to understand (U2, U4, U6); it is immediate and no need to move around (U3, U5, U6, U7, U8). Regarding the same construct we asked: "Do you believe that m-payments increase your daily productivity?". One respondent (U5) said that he does not feel that the service increases productivity, the others (U1, U2, U3, U4, U6, U7, U8) answered that m-payments increase productivity, and the following characteristics were mentioned: I do more tasks both personally, and professionally, because I don't have to travel, and I save resources (U1); I don't waste time traveling to payment terminals (U4, U7), time optimization (U6, U7). The last question of this construct asks "In what way, in the current pandemic context, have m-payments facilitated your daily tasks?", in this question the following statements stand out: No need to leave the house at a time of mandatory confinement (U5, U6, U8); due to the need to work from home, it was possible to manage professional and personal payments immediately (U1); no need to touch public payment terminals that may be contaminated (U2, U4, U5, U7); facilitated the payment of services that previously did not use (e.g., food delivery at home) (U3, U7).

The use construct consists of four questions. The first is: "Were m-payments useful during the quarantine period? Why?". Participants U4 and U5 stated that there were no significant changes in the use of the service compared to the period before the pandemic. This is because due to their professions (nursing and firefighting) during the quarantine period there was an increase in work. All other participants (U1, U2, U3, U7, U8) mentioned that the service was useful, and the following statements were highlighted Telework forced me to make most of the payments through m-payments (U1); consumption habits have changed, before I used more m-payments at a social level, now I use more for online purchases (U2, U3, U7, U8); I avoid unnecessary travel (U6); there are more points of sale adhering to this technology (U7). The next question was "Do you feel that the current pandemic context and the security measures imposed due to the

COVID-19 virus have influenced your use of m-payments? Have you started to use m-payments more?". Participants U4 and U5 did not feel any changes compared to the period before the COVID-19 pandemic. All other users (U1, U2, U3, U6, U7, U8) considered that the pandemic had influenced their use of m-payments and that they used the service more. The next question was, "Do you usually use m-payments for transfers or payments? During the pandemic did this condition change?", respondents U1, U3, U5, U7, and U8 used the service more for payments and U2, U4, and U6 used it for transfers. Most of the interviewees mentioned that the changes in use after the onset of the pandemic were due to being confined and not having an active social life, preventing them from using the service for transfers to friends and family. User U7 also mentioned that the main cause for the change was the fact that there were more points of sale adhering to the service following the beginning of the pandemic. The last question of the use construct mentions, "Do you usually use m-payments more for online payments or in-store payments? During the pandemic did this condition change?". User U5 stated that the use was the same for both formats. The remaining users (U1, U2, U3, U4, U6, U7, U8) used the service more often for online payments. In this question the main reason for the change in the use of the service was to avoid touching public payment terminals, which may be contaminated (U4, U6).

Regarding the social influence construct, the question was: "Considering the current pandemic context, do you feel more social influence concerning the use of m-payments? In what way?". Three of the interviewees did not feel any influence (U1, U3, U5), the remaining interviewees felt influence, and the following considerations were mentioned: due to the pandemic, m-payments are favoured in physical stores (U2, U3, U7, U8); people close to me use the service (U3, U6, U7). Next, we asked, "Have changes in the social context caused by the COVID-19 pandemic influenced the way you use m-payments?" Participants U5, U7, and U8 did not feel that social changes affected the way they used m-payments during the pandemic. The remaining participants felt the influence of the social context, and the following statements were mentioned: There are more points of sale adhering to the service (U1); Consumption habits have changed due to confinement, I used to use it more in social contexts, now I use it in payments (U2, U3, U4, U6).

Regarding the price value construct, the question was: "Considering the current economic context, do you believe that m-payments are reasonably priced?" Users U5 and U8 have costs when using the service so they do not consider m-payments to be reasonably priced. The remaining users considered that the service was reasonably priced and the following considerations were made: if the service was paid at my bank I would continue to use it, but less frequently (U1, U3, U4); the fact that I do not have costs with the m-payments service makes me more satisfied with my bank (U6); if the service was paid I would opt for traditional means of payment (U7).

The last construct is gamification, which asks: "Do you think you might use m-payments more if you get rewards and prizes (better interest rate, lower transaction fees, discounts on products and services, etc.)?" In this question the following statements were mentioned: I do not know the gamification aspect of the m-payment service I use (U5, U3); I do not use the gamification aspect of the m-payment service (U1, U2, U4, U6, U7, U8); I will only use the gamification aspect of m-payments that gets rewards according to my needs, such as lower bank fees (U1, U2, U5, U6, U8); I use m-payments because I like the service, the gamification elements will not increase my use (U3, U4, U7). Finally, we sought users' opinions on the question, "In your opinion, in the current pandemic context, does the fact that m-payments are fun and challenging lead you to

use the service more often? Why?". The respondents replied with the following statements: I would only use the service more often if I got advantages according to my needs (U1, U2, U4, U6); I find the gamification aspect interesting, but I will not use the service more for those elements (U3, U4); I will research more about this aspect and if it is advantageous, I will use it (U5, U8); I will not use the service more for the gamification elements, I like the technology and I use it because it matches my needs (U1, U3, U7).

6.2 PRACTICAL IMPLICATIONS

This study was the first to integrate gamification, price value, and social influence in order to understand the influence of these constructs on individual performance and use of m-payments. Taking into account the consumption changes of the last year, caused largely by the COVID-19 pandemic, the use of m-payments is believed to grow 28% worldwide by 2022 (Santos, 2020). Thus, the study provides information for m-payments service providers to create strategies to improve their services by increasing customer satisfaction, boosting individual performance, and influencing them to use the service. In the present study, individual performance is justified by 59.2% and use is justified by 57.2%, allowing us to state that this study makes a valuable contribution to the existing body of research about the individual performance of m-payments.

The analysis of the results confirms that the most important constructs for the use of m-payments are gamification and price value. However, gamification has a negative influence on the use of this technology, which suggests that the game elements should be put into practice cautiously. That is, it should be tailored to your target and technology system. If the use is maladjusted it may lead to criticism and users may no longer value the gaming features (Smith, 2012). Thus, gamification elements should build trust and promote desired outcomes in the use of gamification-provided systems (Robson et al., 2015). For this, it is necessary for m-payments service providers to use the gamification dimensions in a balanced way in order to avoid distrust and keep the financial transaction system effective, making the most of user engagement (Baptista & Oliveira, 2017). The gamified application should promote financial rewards such as better interest rates, rate reductions or more beneficial credits, and thus the game elements would serve a purpose that meets the users' needs, greatly increasing individual performance and use of the technology.

Price value has a significant positive influence on the use of m-payments, so we understand that this is a very important factor for users. In order to capture and retain users in the short term it is important that the costs at the users' expense provide a greater advantage in use. Therefore, m-payment providers should carefully analyse pricing models and consider reducing service fees or adapting benefits to the costs of the technology (Mallat, 2007; Wu & Lee, 2017).

Social influence has a negative influence on individual performance and for this reason we believe that m-payments service providers should cautiously analyse their social influence strategies. Social marketing should play an important role in increasing satisfaction when using the technology through the users' social environment such as encouraging use for transfers when socializing. For users it will be beneficial because the wider the use of the technology in the network of contacts, the more easily transactions can be made with close contacts, feeling more satisfied with the service. The m-payments service providers can expand their user base

and consequently their revenue (Yang et al., 2011). Thus, marketers can focus their campaigns on network channels such as social networks or public social venues (Wu & Lee, 2017).

7. LIMITATIONS AND FUTURE RESEARCH

This study has some limitations that encourage further research. A limiting factor in this research is that m-payments is a relatively recent technology in Portugal. Most users of online payments are familiar with the service but lack sufficient experience about these payments (Zahedi & Song, 2008).

The COVID-19 pandemic caused major changes in consumption worldwide, which may have repercussions in the future. During the study it was found that after the start of the pandemic the use of m-payments changed, and some users use the service more or differently. Given these changes, in future studies it would be interesting to investigate how the pandemic affected the continuity of the service's use during and after the pandemic situation (Liu et al., 2020).

The fact that 84% of participants in this study are 45 years of age or younger is also a limitation of this research, so it is important that in future research individuals with a more disparate age are included.

Asia, Europe, and the United States of America are currently the regions where the use of m-payments is most developed, and this use can vary considerably from culture to culture (Mallat, 2007). For this reason, another limitation of this research is the fact that all participants are resident of Portugal, so it would be interesting to undertake studies in countries and cultures with different perspectives of use. The research can also be extended to Africa, where although this service has lower levels of use, the way of using it also differs, because here the mobile banking and m-payment services are often integrated into a single system, which modifies the experience of use (Oliveira et al., 2016).

Finally, it is important to note that online games are often associated with maladjusted psychic behaviour and even addictions. Thus, in future research it may be interesting to analyse the psychological impacts caused by using gamification m-payments services (Baptista & Oliveira, 2017).

8. CONCLUSION

M-payments have received increasing attention worldwide, but previous studies have not yet identified which factors influence the individual performance of this service. Thus, this research seeks to understand how gamification, social influence, and price value influence individual performance through the TTF model. The results show that individual performance is explained by TTF and use, with a negative moderating influence by social influence. Regarding use, this construct is explained by the TTF, and reveals a negative moderating influence from gamification and a positive moderating influence from price value, the latter being the moderator with the most significant influence.

This research offers a mixed-methods approach that provides positive and robust inferences and allows the single method data to be confirmed. The combination of qualitative and quantitative research allowed us to deepen the analysis, find new insights, and analyse the impact of the COVID-19 pandemic on m-payments individual performance through the opinion of the respondents. This qualitative analysis found that consumers' habits were changed, which influenced individual performance when using m-payments.

For researchers, this study provides important information for further refinement of the individual performance model, allowing it to be a solid foundation for future studies. For practitioners, the study provides an understanding of which key constructs are important to effectively design, plan, and implement m-payment service features to achieve high rates of use.

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APPENDIX A – CONSTRUCTS

CONSTRUCTS	ITEMS		SUPPORT
TASK CHARACTERISTICS	TASK1	I need to manage my accounts anytime anywhere.	(Oliveira et al., 2014)
	TASK2	I need to do transfers anytime anywhere.	
	TASK3	The financial instructions I give can't wait.	
TECHNOLOGY CHARACTERISTICS	TECH1	M-payments provides ubiquitous services.	(Oliveira et al., 2014)
	TECH2	M-payments provides a real time service.	
	TECH3	M-payments provides secure services.	
	TECH4	M-payments provides a quick service.	
TTF	TTF1	M-payments services are appropriate.	(Oliveira et al., 2014)
	TTF2	M-payments account management services are appropriate.	
	TTF3	Real time m-payments services are appropriate.	
	TTF4	In general, m-payments services are enough.	
INDIVIDUAL PERFORMANCE	IP1	The m-payments enables me to accomplish tasks more quickly.	(Urbach et al., 2010)
	IP2	The m-payments makes it easier to accomplish tasks.	
	IP3	The m-payments is useful for my job.	
	IP4	The m-payments increases my daily productivity.	
USE	USE1	I use m-payments.	(Zhou et al., 2010)
	USE2	I often use m-payments to transfer and remit money.	
	USE3	I often use m-payments to make payments.	
SOCIAL INFLUENCE	SI1	Those people who are important to me think that I should use m-payments.	(Yang et al., 2011)
	SI2	People around me who use m-payment have more prestige than those who do not.	
	SI3	People who use m-payment have a high profile.	
	SI4	Using m-payment is considered a status symbol among my friends.	
PRICE VALUE	PV1	M-payments is reasonably priced.	(Venkatesh et al., 2012)
	PV2	M-payments is a good value for the money.	
	PV3	At the current price m-payments provides a good value.	
GAMIFICATION	G1	If m-payments were more fun/enjoyable, I would probably use it more often.	(Bùi & Bùi, 2018)
	G2	If using m-payment would give me points, rewards, and prizes (better interest rate, lower transaction rates, discounts on products and services…) I would probably use it more often.	
	G3	If m-payment were more fun, I would probably advise others to use it.	
	G4	I enjoy being challenged by achievements and leader boards.	

APPENDIX B – DEMOGRAPHIC INFORMATION

DEMOGRAPHIC INFORMATION	FREQUENCY	PERCENT
GENDER		
MALE	125	39%
FEMALE	192	61%
AGE		
UNTIL 20	14	4%
21-25	100	32%
26-35	80	25%
36-45	74	23%
OVER 45	49	15%
EDUACATION		
LESS THAN HIGH SCHOOL	29	9%
12TH GRADE	115	36%
BACHELOR'S DEGREE	103	32%
MASTER DEGREE	43	14%
DOCTORATE DEGREE	3	1%
POST GRADUATION	17	5%
OTHER	7	2%