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# Role of gender on acceptance of mobile payment

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220

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## Abstract

**Purpose** – The purpose of the research is to try to explain the intention of adopting a new mobile payment (m-payment) system in a country where this type of payment systems does not have a presence. More exactly, to propose and test an integrative theoretical model that allows to determine the relative influence of the determining factors (external influences, ease of use, attitude, usefulness, trust and risk) for the acceptance of a new m-payment system and to analyze the eventual moderating effect of the gender of the consumer in the use of these tools.

**Design/methodology/approach** – To carry out this research, a web experiment based on a general population sample was put in place, in order to analyze the proposed behavioral model towards a new m-payment system.

**Findings** – The empirical results show that the proposed behavioral model was appropriately adjusted, thus proving that the gender of the user introduces significant differences in the proposed relationships between ease of use and usefulness of the new system, between usefulness, attitude and intention to use, as well as between users' trust and a favorable attitude towards its use.

**Practical implications** – The conclusions and implications for management provide alternatives and segmentation strategies to consolidate this new business opportunity under the new technological developments.

**Originality/value** – This paper is a pioneer study about the acceptance of m-payment, analyzing at the same time the importance of the moderation effect of users' gender.

**Keywords** Trust, Risk, Ease of use, Mobile commerce, Mobile payment, Moderation effect of gender  
**Paper type** Research paper

## 1. Introduction: adoption of the internet and electronic commerce in business to consumer trade

In recent years, developments in the field of information and communications technologies (ICTs) and the important business applications derived from them, have created significant economic progress in terms of profitability, productivity, competitiveness and economic growth for both companies and countries (Dehning and Stratopoulos, 2003). Scientific literature includes mobile commerce (m-commerce) as a part of electronic commerce (e-commerce) as it differs only due to the business channel application.

In this context, m-commerce is an online trading model where mobile devices perform the classic functions of trade, for example, assisting in information searches, facilitating contact between the consumer and business and completing payments.

In today's society, the mobile phone has proven itself to be a vital tool in any personal or professional activity, with a very high level of acceptance by consumers (Masamila *et al.*, 2010). According to the Telecommunications Market Commission's



(CMT) (2012) Annual Report, the Spanish mobile telephony market has 51.6 million mobile lines compared with 20.2 million fixed telephone lines. In light of this data it seems clear that the mobile phone has become an indispensable tool in the daily lives of businesses and individuals.

The main similarities between e-commerce and m-commerce are (Liébana-Cabanillas, 2012):

- the maturity of the former and growth potential of the latter;
- the greater penetration of e-commerce;
- the increased accessibility of m-commerce;
- similar users;
- the similar levels of personalization available; and finally
- the diversity of buying motives.

The aim of this paper is to contribute to the research field of the acceptance of the new mobile payment (m-payment) tools. In order to achieve this goal, we propose to include the study of gender as a variable, together with the antecedents identified in scientific literature, on the basis of a review of the main classical models (e.g. TAM, TRA and UTAUT). More exactly, we propose and test an integrative theoretical model that allows us to determine the relative influence of different constructs (i.e. external influences, ease of use, attitude, usefulness, trust and risk) to explain the adoption of the new system and to analyze the eventual moderating effect of the consumers' gender. This paper is a pioneering study in the research field of the acceptance of the new m-payment tools, analyzing at the same time the importance of the moderation effect of users' gender.

Our study is structured in six sections. Following the introduction, in Section 2 we provide a theoretical framework aimed at examining the payment methods in the business to consumer (B2C) e-commerce. In Section 3, we establish the research hypotheses and the proposed behavioral model. In Section 4, we describe the methodology used in our research. In Section 5 we analyze and discuss the results. Finally, we draw the main conclusions and discuss some implications and limitations of the study in Section 6.

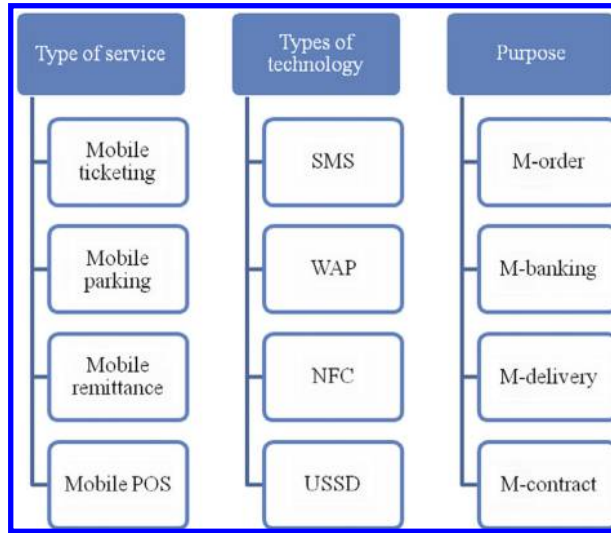
## 2. New payment methods in B2C e-commerce

ICTs develop new payment systems to improve management of business transactions between companies and their customers and to solve certain problems associated with managing physical money (Tamayo, 1999).

It therefore mainly consists of the completion of payments and transactions between two parties in a fast, convenient, safe, and simple way, anytime and anywhere, using a mobile device. M-payment can be defined as any type of individual or business activity involving an electronic device with connection to a mobile network enabling the successful completion of an economic transaction (Liébana-Cabanillas, 2012). M-payment can be classified according to three main criteria: type of service, technology used and purpose (Innopay, 2009) (Figure 1).

Although m-commerce is viewed as an activity in an expansion phase (San-Martín and López-Catalán, 2013), it is regarded as the payment system of the future due to the heavy penetration of mobile users (Liébana-Cabanillas, 2012). Our research focuses

Figure 1.  
M-payment typologies



specifically on a new payment system that is characterized by the use of SMS technology, specifically Zong of PayPal.

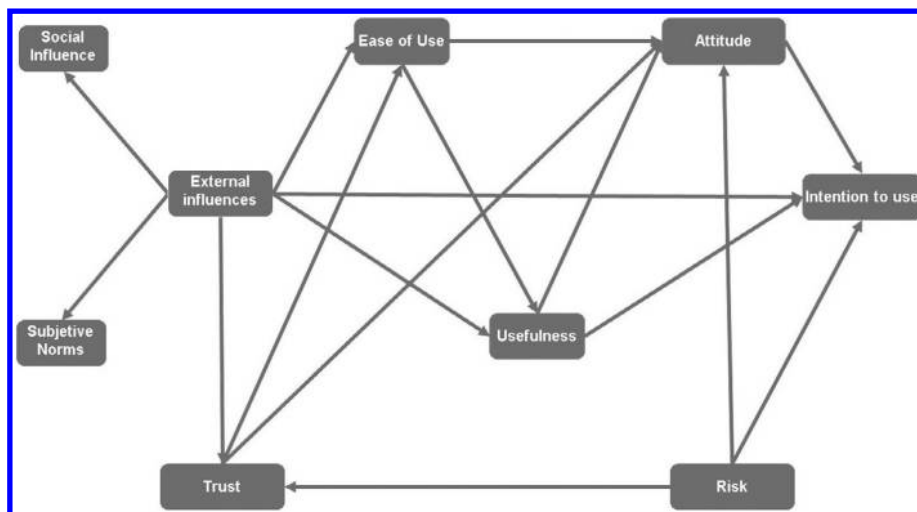
### 3. Research proposal: antecedents of intention of use with m-payment

The objective of this research is, from a holistic perspective, to develop a behavior model to define the intended use of a new payment tool used via mobile phones among population users. Our mobile payment technology acceptance model (MPTAM) integrates factors from different existing models and theories, to respond to the acceptance of these new payment tools.

In scientific literature, multiple models have been used to measure technology acceptance, but we will focus on the TAM, as it is the most widely used model in scientific literature (Benbasat and Barki, 2007), concerning commercial m-services (Wei *et al.*, 2011). Most models mentioned in the reviewed scientific literature are based on the TAM model for analyzing the acceptance of innovation, although with some limitations. Based on the classical TAM (Davis *et al.*, 1989), TAM 2 (Venkatesh and Davis, 2000) with the inclusion of social influence processes and instrumental cognitive processes, UTAUT (Venkatesh *et al.*, 2003), TAM 3 (Venkatesh and Bala, 2008), which expand the outdated model through a set of predictive and moderating factors, and the MOPTAM (Renaud and Biljon's (2008) mobile phone technology acceptance model), different adaptations have been made and new relationships have been proposed, which we will try to verify in this research. Besides, a second-order construct has been integrated in our research, on the basis of subjective norms and social influence: the effect of the "risk" and "trust" variables (Figure 2).

#### 3.1 Variables of the classic TAM

First, the ease of use refers to the individual's perception that using a certain system is effortless or simply easy to do (Davis, 1989). For this reason, it is considered to be one of the qualities of greatest impact on the acceptance of a new technology (Moore and Benbasat, 1991). Particularly in the e-commerce, Vijayasarathy (2004) defines it as



**Figure 2.**  
Proposed model:  
m-payment technology  
acceptance model  
(MPTAM)

“the extent to which a consumer believes that online purchasing would be free of effort”. Therefore, this concept is closely linked to the structure of the web site, its content, its ease of use, etc.

According to previous research, when users perceive that an information or a technological system is easy to use, their intention to use it will increase (Gefen *et al.*, 2003a). This effect of perceived ease of use on intention has also been demonstrated in numerous researches related to m-services (Zhou, 2011), Travel 2.0 tools (Muñoz-Leiva *et al.*, 2012), etc.

Second, perceived usefulness is defined as “the potential consumer’s subjective belief that using a particular system would enhance his or her job performance in an organizational context” (Davis *et al.*, 1989). In the online environment, perceived usefulness will show that the use of a given technology might be useful for someone to achieve a particular result (Vijayasathy, 2004). The relationship between usefulness and intention of acceptance has been tested in different fields of study, for example, in understanding blog continuance (Shiau and Chau, 2012) and m-services (Quan *et al.*, 2010).

For all of the above-mentioned reasons, ease of use and perceived usefulness are proposed as the two main factors that determine the acceptance and use of ICTs (Sánchez-Franco *et al.*, 2007), and in our case, also the use of a new payment tool.

Third, attitudes reflect people’s favorable or unfavorable feelings towards a given behavior (Premkumar *et al.*, 2008), which means that attitudes are developed in time, as people acquire experience. The different theoretical models (TAM, TRA and TPB) have proven that attitude is an essential pre-requisite of the intention to develop a particular behavior (Plewa *et al.*, 2012).

### 3.2 The importance of external influences, trust and risk

**3.2.1 External influences: social image and subjective norms.** Social image and subjective norms are the two classic variables used in the TAM model and its later adaptations (Venkatesh and Bala, 2008).

Specifically, Chong *et al.* (2011) defines social image as “the extent to which individual users perceive the importance of using innovation to others”. Besides, Fenollar and Cuestas (2010) state that social image is a decisive aspect of social influence and it is particularly important for the dissemination of new products, since it represents the driving force after the propagation of something new.

On the other hand, subjective norms are defined as the extent to which an individual perceives that people who are important to them think they should or should not use a certain system or perform a certain action, etc. (Venkatesh and Bala, 2008).

In our research about the acceptance of a new m-payment system, users may experience a feeling of uncertainty regarding the consequences of use and, therefore, may opt for the possibility of consulting opinions and experiences from other users through social networks, adding social image to subjective norms, and leading to a new second-order factor. Lu *et al.* (2008) discuss the relationship of TAM-related studies and incorporate this approach into their models, with certain empirical support (Venkatesh *et al.*, 2003), and therefore consider social influences as an equivalent to subjective norms in the TRA, formulating this factor based on other people’s opinions and environmental influences.

Therefore, in our electronic environment, there is a conceptual relationship between social image and subjective norms. On the one hand, it is seen as a desired social value, and on the other hand, as an influence of the social environment of those who use the new payment system. In our case, we have decided to implement a second-order factor, covering both variables, which we will call “external influences”.

*3.2.2 The importance of perceived trust and risk.* Singh and Sirdeshmukh (2000) define trust in the B2C e-commerce as “the psychological state leading to accept the vulnerability of a trustor, based on positive expectations of the trustee’s actions”. Gefen *et al.* (2003b) obtain a behavioral model that combines the antecedents based on trust, with those based on the characteristics of Davis *et al.*’s (1989) TAM model. This proposal points out the existence of a link between trust and usefulness, where trust is precisely influenced by the ease of use. However, in our research we suggest that trust is an antecedent of the ease of use, in the line of Pavlou’s (2002) proposals, based on the fact that trust in the payment system reduces the need to understand, control and survey the situation, making user’s task easier during the online transaction, performed with no effort (Muñoz-Leiva, 2008).

On the other hand, Bauer (1960) starts an analysis of perceived risk through two components: uncertainty (consumers’ lack of knowledge regarding what might happen when they make a purchase) and the eventual negative consequences of the purchase.

In the case of m-payment systems, the existing literature highlights the importance of analyzing both constructs (trust and risk), this is precisely what leads to the major concern that the risk of financial loss acts are an impediment to the adoption of m-payment. This might be due to the widespread knowledge of actual losses or reports of vulnerabilities, or just to uninformed concerns and natural risk-aversion (Shin, 2009). Besides, risk will have a decisive impact on the user’s trust towards the m-payment system (Chandra *et al.*, 2010), therefore reducing the intention to use it (Yang *et al.*, 2012).

On the other hand, reflecting the increasing importance of trust in m-commerce (Misra and Wickamasinghe, 2004), this construct is proposed in our study as an antecedent variable to attitude and to the intention to use a m-payment (Chandra *et al.*, 2010). Greater trust in the payment system concerned will

significantly improve user's attitude towards its use and therefore, the intention to use it (Lu *et al.*, 2011).

Furthermore, we can see that all the relationships proposed in the initial model (Figure 2) have been widely confirmed by scientific literature.

### 3.3 The moderating effects of gender

In order to achieve the goals of our research, we propose to include the study of gender as a variable, together with the antecedents identified in scientific literature, on the basis of a review of the main classical models (TAM, TRA and UTAUT).

The moderating effect of gender for the acceptance of e-commerce has been analyzed in previous studies (Wynn, 2009). These research studies show behavioral differences in online purchasing or purchase orientations among users, according to their gender. Traditionally, men have been more willing to engage in e-commerce than women; men have a greater tendency to make planned purchases (e-hardware), while women are more prone to buy other types of products or to make less planned purchases (food and drinks) (Van Slyke *et al.*, 2002).

The role of gender in the original TAM has been analyzed since the end of the 1990s. Gefen and Straub (1997) pointed out that gender has generally been avoided in behavioral research in the IT field. However, as explained previously, we believe that the influence of gender can be decisive.

Apart from the abovementioned fields, the moderating effect of gender has also been demonstrated in the loyalty of internet operators (Sánchez-Franco *et al.*, 2009), the adoption of the e-commerce (Hwang, 2010), etc. With regard to the theoretical proposal of the previous model, the present study explores the role of gender in consumer's behavior, including the constructs of perceived risk and trust.

First of all, we deal with the moderating effect of gender on the relationship between the ease of use and the usefulness of the proposed tool. We start from the premise that the greater the ease of use, the greater the usefulness perceived by men (Ha *et al.*, 2007). Therefore, we propose the following research hypothesis:

*H1.* The impact of the ease of use on the usefulness of the proposed payment system is significantly higher among men.

Second, Venkatesh and Morris (2000) claimed that men are more influenced by the perceived usefulness than women, who are more driven by the ease of use and subjective norms. Besides, the direct impact of usefulness on attitude is higher among men than among women, meaning that men will show a greater likelihood to use a given service if they perceive it is useful and it will help them achieve their goal (Shin, 2009). In the light of these statements, we propose the following hypothesis:

*H2.* The impact of usefulness on attitude is significantly higher among men than among women.

Furthermore, gender produces different levels of the intention to use. More exactly, the greater the usefulness of the new payment system, the higher men's likelihood to use it (Choi, 2010). Therefore, we propose the following research hypothesis:

*H3.* The impact of usefulness on intention is significantly higher among men than among women.

Finally, we suggest the moderating effect of gender in the relationship between trust and attitude. Several classic research studies have revealed the gender-related differences concerning the attitude towards the acceptance of new technologies (Hasan, 2010). More recently, it has been verified that women have a higher perception of trust in the adoption of e-services, which improves their attitude compared to men (Okazaki, 2007) and, therefore, increases their level of intention (Neil *et al.*, 2009). On the basis of this argument, we propose:

*H4.* The impact of the perceived trust in the proposed payment system on the attitude towards it is significantly stronger among women.

**4. Research methodology**

*4.1 Data collection*

Our research involved a national panel of internet users with profiles on social networks that navigate through an experimental scenario of a Facebook profile, where they watch a video that explains the proposed new payment system (Appendix 1). The payment system is called Zong, which permits the purchase of multiple physical and online content using a mobile device, through a very simple procedure that allows to process payment for purchases in different formats (internet, social networks, television and even POS), This payment can be diverted to the user’s telephone bill or a linked bank card at the time of service activation.

We chose Facebook network because according to the latest Annual Report on Digital Content in Spain, the National Observatory of the Telecommunications and Information Society (2011) estimates that 41.6 per cent of the population uses social networks regularly and reaching a penetration rate of almost 100 percent among users aged 18-55. On the other hand, Zong payment system is not implemented in Spain.

The study’s technical record is summarized in Table I.

The size of the final sample was 2012 valid questionnaires, using a quota sampling method based on users’ characteristics as reflected in the National Statistics Institute’s (2012), as described in Table II.

*4.2 Measurements’ development*

The survey used for data collection includes the adaptation of some of the most recognized scales, listed in Appendix 2. Regarding the construct of external influences,

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Based on the suppositions of a simple random sample

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Population	Internet users with a Facebook profile
Population size	14,372,260
Type of sample	By convenience and by quotas
Participation incentives	Through the company itself
Type of survey	Through a web site
Sample size (started questionnaires)	2,587 users
Valid sample	2,012 users
Sample error <sup>a</sup>	2.18 percent
Field work period	January and February 2012

**Table I.** Technical research record **Note:** <sup>a</sup>For an estimate proportion where  $P = Q = 0.5$  and a confidence level of 95 percent according to the principles of simple random sampling



	Frequency	Percentage
<i>Gender</i>		
Male	948	47.12
Female	1,064	52.88
<i>Age</i>		
< 35 years: young users	835	41.50
> 35 years: old users	1,177	58.50
<i>Prior experience</i>		
Expert	234	11.63
Novice	1,778	88.37

Role of gender  
on acceptance  
of m-payment

227

**Table II.**  
Descriptive statistics of  
respondent  
characteristics

from an analytical perspective we have observed a correlation between the latent first-order factors analyzed in this study. Although there is a correlation, we can also discuss isolated factors (Satorra, 2002); in other words, sub-dimensions of a more extensive factor (Del Barrio and Luque, 2012) formed by the dimension of social image and subjective norms.

Data analysis was carried out following a two-stage procedure. We analyzed the validity of the scales in the first place, and we performed a multi-group analysis in the second place, in order to check the links established theoretically, using SPSS 15 and AMOS 18 software, respectively.

## 5. Results

### 5.1 Reliability and validity of measurement items

First, to measure the scales' reliability, we applied the Cronbach's  $\alpha$  indicator (Table III), with 0.6 as the reference value (Malhotra, 1997). To test the convergent and divergent validity of the scales, a confirmatory factor analysis was performed. In this analysis the items that contributed least to the explanatory power of the model was eliminated ( $R^2 > 0.5$ ). Convergent validity was evaluated by means of the factor loadings of the indicators. The coefficients were significantly different from zero, and the loadings between latent and observed variables were high in all cases ( $\beta > 0.7$ ). Consequently, we can deduce that the latent variables adequately explain the observed variables (Hair *et al.*, 1995).

With regard to discriminant validity, the variances were found to be significantly different from zero. Moreover, the correlation between each pair of scales did not exceed 0.8 (Campbell and Fiske, 1959).

The scales' reliability can be evaluated based on a series of indicators extracted from the confirmatory analysis. Specifically, the factor's compound reliability (CR) and extracted variance analysis (EVA) surpassed the reference threshold, 0.7 and 0.5, respectively, as well as other indicators of global adjustment for the corresponding models of individual measurements (Hair *et al.*, 1995).

After analysing the reliability and validity of the initial measurement scales, we tested the research hypotheses in the literature review using structural equation model (SEM). Considering the absence of normality of the variables, we opted for the maximum likelihood estimation method and bootstrapping technique for 500 consecutive steps or samples, and a significance level of 95 percent. The maximum likelihood is preferable in

Variable	Item	Stand. coef. ( <i>t</i> -value)	Cronbach's $\alpha$	CR	EVA
Social image	SI1	0.95	0.97	0.97	0.92
	SI2	0.96 (103.47)			
	SI3	0.95 (97.15)			
Subjective norms	SN1	0.87	0.93	0.93	0.77
	SN2	0.90 (57.73)			
	SN3	0.84 (49.49)			
	SN4	0.89 (56.88)			
Ease of use	EOU1	0.74	0.91	0.92	0.7
	EOU2	0.90 (43.38)			
	EOU3	0.71 (37.88)			
	EOU4	0.95 (45.63)			
	EOU5	0.92 (44.27)			
Usefulness	US1	0.89	0.95	0.93	0.81
	US2	0.93 (68.17)			
	US3	0.86 (56.63)			
	US4	0.92 (66.21)			
Attitude	AT1	0.88	0.95	0.95	0.84
	AT2	0.92 (64.31)			
	AT3	0.92 (64.37)			
	AT4	0.93 (65.87)			
Intention of use	IU1	0.94	0.97	0.97	0.92
	IU2	0.97 (103.70)			
	IU3	0.96 (101.13)			
Trust	TR1	0.88 (69.73)	0.97	0.97	0.89
	TR2	0.95 (91.84)			
	TR3	0.96 (96.47)			
	TR4	0.95 (93.42)			
	TR5	0.93			
Perceived risk	PR1	0.76	0.92	0.93	0.76
	PR2	0.86 (42.45)			
	PR3	0.95 (46.97)			
	PR4	0.89 (43.68)			

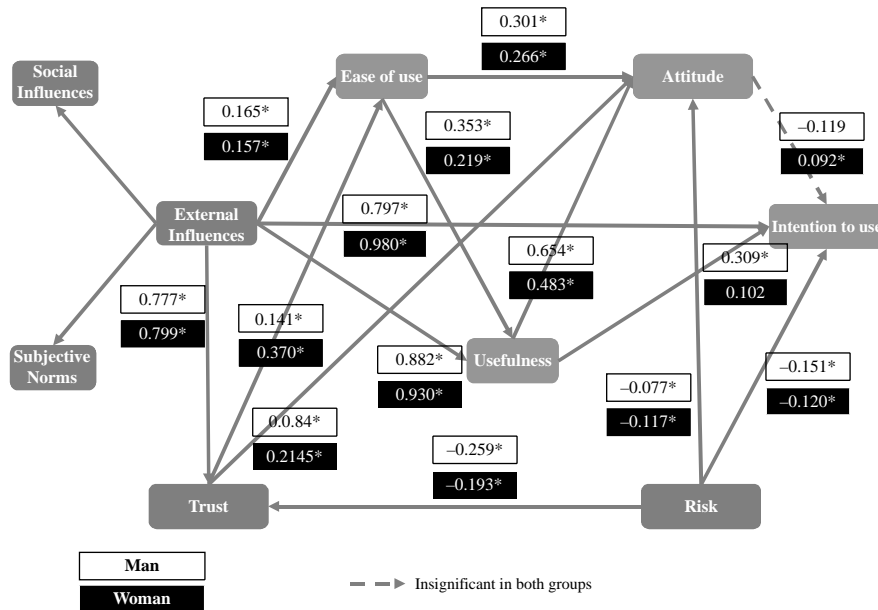
**Table III.**  
Convergent validity and reliability of the internal consistency

the case of small samples, as opposed to generalized or weighted least squares (West *et al.*, 1995). In the bootstrapping technique we used the Bollen-Stine's corrected *p*-value, testing the null hypothesis that the model is correct. Through re-sampling, this technique permits the standard error of the constructs to be corrected.

Adjusting the model with absolute, incremental and parsimonious measurements verified that the model's adjustment was reasonably effective ( $\chi^2 = 4,197.14$ ,  $p = 0.00$ ; RMSEA = 0.04; TLI = 0.95; CFI = 0.96; GFI = 0.88; AGFI = 0.85) (Bollen, 1989).

Once approved the validity of the model adjustment, the final result was reflected in a graphic based on the coefficients standardized for the behavioral model that measures the intention to use the new m-payment system, according to the gender of the user (Figure 3).

In the male users model all the relationships turned out to be significant, except from the one between attitude and intention to use. The percentage corresponding to the variable "intention to use" reached 79.5 percent. On the contrary, in the female



Note: Significant at: \*0.01 level

Figure 3. Structure results of the multigroup model analysis

users model all the relationships proposed are significant, except from the relationship between usefulness and intention. The intention to use reaches a percentage of 76.8 percent.

### 5.2 Hypothesis testing results

In order to evaluate the moderating effect of gender, the sample was divided in two groups according to the gender declared by users from the options given in the survey. To this end, we carried out the invariance test through a  $\chi^2$ -value comparison (and the degrees of freedom) for the overall model and the constrained model, resulting in significant differences (Table IV).

After checking the existence of significant differences and with the aim of testing the moderating effect of the proposed variables, we applied a test comparing the regression coefficients or weights between structural models considered in pairs, using a modified Student's *t*-test for independent samples (Goodman and Blum, 1996). The results achieved are listed in Table V.

The SEM analysis results and the hypotheses results are listed in Table V. As observed, the contrast proved the existence of significant differences in all of the hypotheses considered.

Overall model	$\chi^2$	df	$\Delta \chi^2$	$\Delta gl$	<i>p</i> -value	Invariant
Unconstrained	4,197.14	896	73.958	39	0.000	No
Fully constrained	4,256.240	935				

Table IV. Invariance analysis

Hypothesis	Moderating effect Effect	Gender				PRUEBAT	Differences	Remark
		Man	<i>p</i>	Woman	<i>p</i>			
1	EOU → US	0.353	0.00	0.219	0.00	2.915*	Yes	O
2	US → ATT	0.559	0.00	0.798	0.00	2.437*	Yes	X
3	US → INT	0.309	0.00	0.102	0.07	2.589*	Yes	O
4	TRUS → ATT	0.084	0.00	0.214	0.00	3.062*	Yes	O

**Notes:** Significant at: \*0.01 level; the evaluation was performed using the procedure suggested by Chin (2000) to develop a multi-group analysis based on student's *t*-test according to the following formulation:

$$H_0 : B_1 = B_2$$

$$t = \frac{B_1 - B_2}{\sqrt{SE_1^2 + SE_2^2}}$$

**Table V.**  
The results of  
hypotheses test

where  $B_i$  denotes path weights and  $SE_i$  is the standard error of the path in the structural model

Concerning *H1*, which showed that the impact of ease of use on usefulness is significantly higher among men, it was found that the standardized regression coefficient is higher among men ( $\beta = 0.353, p < 0.05$ ) than among women ( $\beta = 0.219, p < 0.05$ ). Our results support the idea that the greater the ease of use of the payment system, the greater the usefulness perceived by men (Ha *et al.*, 2007). This means it requires less mental effort and the user holds control of its use at any time. We can therefore conclude that there is empirical evidence to accept or confirm the relationship proposed in *H1*.

Concerning the relationship proposed in *H2*, stating that the impact of usefulness on attitude is significantly higher among men than among women, it was found that the coefficient which links these two variables is higher among women ( $\beta = 0.798, p < 0.05$ ) than among men ( $\beta = 0.559, p < 0.05$ ). Therefore, it was not possible to confirm the results obtained in previous research, according to which men are more likely to use a given service if they perceive it is useful (Shin, 2009). What explains this situation is the significance of the network where our research was conducted, which places greater importance on the relationships derived from external influences than on the rest of variables of the model with regard to the intention to use.

*H3* establishes that the impact of usefulness on intention is significantly higher among men than among women. Here, we observe that the relationship between perceived usefulness and the intention to use the new tool was higher among men ( $\beta = 0.309, p < 0.05$ ) than among women ( $\beta = 0.102, p < 0.05$ ), backing the expected results and those obtained in previous studies (Choi, 2010). Therefore, we can conclude that *H3* has been confirmed.

The last hypothesis (*H4*) establishes that the impact of the perceived trust in the proposed payment system on the attitude towards it is significantly stronger among women. Our research reveals that the importance of this relationship is significantly

lower for men ( $\beta = 0.084$ ,  $p < 0.05$ ) than for women ( $\beta = 0.214$ ,  $p < 0.05$ ). These results strengthen those obtained in previous research studies, which stated that the effect of perceived trust on attitude is stronger in the case of women (Hasan, 2010), thus increasing their intention to use (Neil *et al.*, 2009). Therefore, we can conclude that *H4* has been confirmed.

Finally, male users' intention to use was higher than women's (79.5 percent among men, compared to 76.8 percent among women), reaffirming previous research findings (Lee, 2011).

## 6. Discussion and conclusions

### 6.1 Main conclusions

The aim of our research was to analyze the effect of gender on consumer's acceptance of m-payment systems, based on a behavioral model and the factors that determine this model.

First of all, the variable with highest influence on intention was the external influence, based on social image and subjective norms. This strong link is due to the online environment where the user conducted his/her activity, since the network itself is the place where communication between people is established. And it is precisely on that network that the user will shape his/her acceptance of the payment tool. As observed, external influences have the greatest impact on the intention to use, which leads us to state that it is the determining element for establishing the intention to use a payment system in a virtual environment.

In the second place, the intention to use is influenced by the usefulness of the m-payment system, only among men. This second element supports the TAM approach, but is very different from the external influence values.

Third, attitude establishes a significant relationship with women's intention to use and an insignificant one among men.

Finally, perceived risk establishes a negative relationship with the intention to use, due to the uncertainty perceived by the new user and/or to the eventual negative consequences of the purchase. The impact of this effect has been widely checked in several fields and our results confirm and strengthen the abovementioned approach.

Concerning the moderating effect of gender, it has been proved – first of all – that the impact of the ease of use on usefulness of the payment system was higher among men than among women, which confirms the results obtained in previous studies (Ha *et al.*, 2007). This approach suggests that the higher the ease of use of the tool, the greater the usefulness perceived by men. Second, men have not shown an increased likelihood of using the tool if they consider it useful, unlike the results obtained by Shin (2009), which verified the approach of the initial hypothesis. This does not allow us to state, in the present case, that men are more likely to use a given m-payment service if they perceive it as useful.

In spite of this conclusion and in relation to the previous statement, perceived usefulness by men will definitely increase their intention to use, more than in the case of women. This corroborates similar results achieved by other authors (Shin, 2009) in similar environments. Lastly, we can confirm that the impact of perceived trust in the payment system on the attitude towards it is greater among women than among men, in line with previous research (Hasan, 2010).

For all of the above, we can confirm the relevance of gender, given its moderating effect on the intention to use the m-payment tool.

### *6.2 Contributions and implications*

Among the most recent payment systems we can highlight the payment by mobile phone thanks to the importance of wireless devices in the current society.

Thanks to the context in which the research was carried out, it was found that internet users are highly influenced by the opinions in their social environment when developing their behavior of purchase on the internet, and are even more influenced by social networks.

The managerial implications of the present research are crucial and comprehensive. First of all, managers, CEOs of mobile credit card companies, mobile phone manufacturers, bankers, merchants and private practitioners may take into their considerations the impact of external influences, perceived usefulness and risk. Therefore, they will need to ensure that the m-payment service dynamizes the relationship with the environment improves usefulness and reduces perceived risk.

More exactly, based on the segments resulting from the application of the moderating effect of gender, companies will be able to define strategies adapted to the influence patterns, producing differentiated value propositions (market segmentation), so that these propositions properly satisfy customers, improving their loyalty, and thus contributing to achieve the goals of the companies themselves. Therefore, the organizations that decide to penetrate this new market sector should differentiate the sales arguments or proposals on which they base their advertising and promotional messages. Particularly, if an action targets male users, the business case of the new payment system should be utilitarian and simplistic to ensure higher probability of use.

If the campaign targets women, it should be focused on concerns about security and/or privacy as a way of improving trust and, therefore, the attitude towards the service. In particular, these strategies may be accompanied by the presence of security links and/or policies, as well as by a money-back guarantee and, where appropriate, comments from the customer. Moreover, it is essential to pay careful attention to the functional quality (no technical errors, content organization and different options of interaction with the web site) and to the web site esthetic (visually attractive, uniformity of format, etc.), as a measure to improve perceived trust, main determinant of the intention to use.

On the other hand, and given the importance of external influences for the groups of internet users, mouth marketing (including rumor management on the web, EWOM) should rather be an interesting tool of control in the case of male users, who have a higher tendency to be influenced by third parties than women. Since men will see their decisions influenced by their closest environment, it is advisable to create forums in order to strengthen the influence male users might receive and to increase their intention to use.

### *6.3 Limitations and further research issues*

This document presents a series of limitations that must be debated, and which may lead to future lines of research. In regards to the sample chosen, sample users participating in the web site visits were limited to watching a video and reading a text

describing the functions of this tool. Based on this viewing, our research has focused on measuring the intention of use, but does not reveal the true behavior of individuals with the system. Achieving a real interaction with the system requires the use of a mobile device and web sites for purchases as part of the system, which would significantly increase the complexity of this study.

In regards to the data collection method, this research has been conducted with using a cross-section, which does not allow for the analysis of the evolution of users' behavior over time. A long-term focus would allow us to verify the robustness of the established relationships and factors and, from a temporary perspective, the evolution of the effects of other analyzed moderating variables (gender and experience of users).

Regarding future lines of research, first, assuming the real measurement of use, the relationship between intention and use or acceptance can be compared by extracting the most relevant conclusions. To obtain greater consistency in the results, the study should be repeated in the future in order to verify the effect of experience and review how it affects the other variables and relationships.

Second, another future line of research could explore the perception and influence of external elements (security seals, providers' brands, etc.) on the trust and security of this type of tool and whether they influence intention and use (remember that Zong belongs to Paypal and eBay).

Third, we believe the use of the video is appropriate in this case, for being the first contact with SMS m-payment systems for the population under study, since this type of tools is practically unknown in Spain. We are currently designing a comparative study between SMS, NFC and QR payments, for which we are conducting an experiment with mobile terminals. Through this study, we want to analyze, among other aspects, the eventual impact on the intention to use when users watch a video and test the terminal.

Lastly, to give our results greater external validity, we have considered conducting a comparative study of different payment systems, establishing user categories and profiles for each one, including other technologies that are being considered as substitutes for credit card payments also using mobile technology (NFC or QR).

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### Appendix 1



**Figure A1.**  
Experimental scenario

	Type of scale	Source
<i>Scale of social image</i>		
The people in my environment who use this type of tool are more prestigious than those who do not use it	Seven-point Likert, 1 – totally disagree, 7 – totally agree	Venkatesh and Bala (2008), Venkatesh and Davis (2000), Moore and Benbasat (1991)
The people in my environment who use this type of tool have a superior profile		
Using this type of tool is a status symbol in my environment		
<i>Scale of subjective norms</i>		
The people whose opinions I value would approve of me using ZONG to purchase products	Seven-point Likert, 1 – totally disagree, 7 – totally agree	Herrero <i>et al.</i> (2005), Taylor and Todd (1995), Agarwal <i>et al.</i> (1998)
Most of the people I have in mind think that I should use ZONG to purchase products		
They hope that I use ZONG to purchase products		
The people who are close to me would agree with me using ZONG to purchase products		
<i>Scale of ease of using online payment systems</i>		
Interaction with the tool is clear and understandable	Seven-point Likert, 1 – totally disagree, 7 – totally agree	Venkatesh and Bala (2008)
Interaction with the tool does not require mental effort		
I think it is easy to get the tool to do what I want to do		
I think this is a useful tool for making small purchases on the internet/social networks		
In general, the tool is easy to use		
<i>Scale of perceived usefulness online payment systems</i>		
Using ZONG could help me make purchases I usually make on the internet/social networks	Seven-point Likert, 1 – totally disagree, 7 – totally agree	Bhattacharjee and Premkumar (2004), Karahanna <i>et al.</i> (1999), Koufaris (2002), Pikkarainen <i>et al.</i> (2004), Muñoz-Leiva (2008)
Using ZONG could increase the efficiency of making my purchases on the internet/social networks		
Using ZONG for my purchases on the internet/social networks could increase my productivity		

**Table AI.**  
Measurement scales used

(continued)

	Type of scale	Source	Role of gender on acceptance of m-payment
In general, ZONG could be useful for me to make purchases on the internet/social networks			
<i>Scale of attitude towards using online payment systems</i>			
I dislike it – I like it	Semantic differential of seven points	Shih and Fang (2004), Herrero <i>et al.</i> (2005), Muñoz-Leiva (2008)	
Absurd – intelligent			
Boring – interesting			
Unpleasant – pleasant			
<i>Scale of intention of using online payment systems</i>			
Assuming that I had access to the ZONG payment system, I intend to use it to make purchases on the internet/social networks	Seven-point Likert, 1 – totally disagree, 7 – totally agree	Venkatesh and Bala (2008)	
If I had access to ZONG over the next few months, I think I would use it instead of an alternative system			
Assuming that I had access to ZONG, I would use it in the next few months			
<i>Scale of perceived trust in online payment systems</i>			
I think that ZONG will keep the promises and commitments that it makes	Seven-point Likert, 1 – totally disagree, 7 – totally agree	Pavlou (2002 (study 1)), Muñoz-Leiva (2008)	
ZONG is trustworthy			
I would qualify ZONG as honest			
I think that ZONG is responsible			
In general, I trust ZONG			
<i>Scale of perceived risk in online payment systems</i>			
Other people can know information about my online transactions if I use this tool	Seven-point Likert, 1 – totally disagree, 7 – totally agree	Jarvenpaa <i>et al.</i> (2000), McKnight <i>et al.</i> (2004), Wikefield and Whitten (2006), Muñoz-Leiva (2008)	
There is a high potential for money wasted if I make purchases on the internet/social networks using this tool			
There is significant risk important in making purchases on the internet/social networks using this tool			

Table AI.

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