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## **PREDICTORS OF MOBILE COMMERCE BEHAVIOUR**

### **ABSTRACT**

The increased mobile usage on recent years is a clear example of the system's growth, significance and the opportunities it offers as an independent sales channel and it therefore merits special attention from researchers. This paper analyses the background of M-commerce and key drivers of future M-commerce decision among Spanish mobile shoppers. Our objective is two-fold: (1) to determine the influence of relations with the Mobile (frequency of Mobile use and length of Mobile use), demographics, non-store shopping previous experience (mail, catalogue, Television and Internet) and attitude to M-commerce and its influence on the frequency of M-commerce and (2) to identify key drivers of willingness to M-commerce. We examined data from 270 personal interviews given to Spanish mobile shoppers over 14 years old. Data analysis shows that age, attitude towards M-commerce, Internet shopping previous experience and relations with the Mobile (frequency and length of Mobile use) are the main predictors of frequency of M-commerce while age, length of Mobile use, consumer attitude towards M-commerce and previous M-commerce experience are the most relevant factors influencing willingness to M-commerce.

**Key words:** M-commerce, Consumer behaviour, Distance shopping.

## 1 Introduction

The growth in non-store shopping promises new ways of influencing and serving consumers. Practically all products can be purchased quickly, conveniently and from home through non-store shopping (Hung, Ku, and Chang, 2003; Wu and Wang, 2004; Yang, 2005). Moreover, Information and Computer Technologies (ICTs) are currently experiencing spectacular growth and gradually entering our homes. The most innovative shopping channels such as mobile, Internet and digital television show significant growth rates (AIMC, 2007; Netsize, 2006) with a tendency for companies to use them alongside other sale systems (Wu and Wang, 2004; Yang, 2005).

In Spain, the field study “Surfers on the net” (AIMC, 2006) highlights the fact that the consumer has a positive attitude to new technologies, and reveals that 37.8% of Internet users have a laptop computer, almost all of them (95.0%) have a mobile phone, 45.6% have a Web Cam and 16.0% have PDAs.

Mobile telephony is growing fast, in combination with the development of wireless technology (Hung, Ku, and Chang, 2003). According to Wireless Week (2004) there were 94.9 million M-Commerce users worldwide in 2003 and the segment is expected to grow to 1.67 billion by 2008. Global income from M-Commerce was \$6.86 billion in 2003 and is expected to reach \$554.37 billion in 2008 (Wireless Week, 1994).

At present, the Spanish mobile market has a penetration rate of 91.63% with 39.4 million mobile subscribers (Netsize, 2006). Spain has three mobile operators. With more than 18 million subscribers and a 48% market share, Telefónica Movistar dominates the Spanish market. Around 60% of Spanish end-users are prepaid users (Telecommunications Market Commission, 2005), but the trend is downward as the result of improved contract conditions to gain user loyalty and the demand for personalised services (logos, images and ring tones).

Customization services represent 65% of the total services on offer (see Table 1). Vote services account for a significant part of data traffic (42%), thanks to the popularity of TV shows like *El Gran Hermano*, *Operación Triunfo* and *La Isla de los Famosos* (see Table 1).

**Table 1: Mobile services**

<b>Mobile services</b>	
Service	% of total
Logos and images Colour Ring tones Monophonic RT Polyphonic RT	65%
Games	29%
Entertainment	10%
Chat	6%
Vote	42%
Information service	22%
Adult content images	6%
Adult chat	26%

Source: Netsize (2006)

While published work on M-commerce applications and technologies and the different mobile operators and their services is becoming more abundant and representative (Barnes, 2002; Buellingen and Woerter, 2004; Coursaris and Hassanein, 2002; Dholakia and Dholakia, 2004; Figge, 2004; Gerstheimer and Lupp, 2004; Kumar and Zahn, 2003; Lehrer, 2004; Leung and Antypas, 2001), there is a lack of literature on the profile of users who buy products/services through the different mobile operators. Moreover, previous research into Mobile Commerce has mainly focused on its adoption in the context of high E-commerce adoption rates regions such as Norway or Finland (Nysveen et al., 2007; Skog, 2002) and to a lesser extent in developing regions such as Taiwan (Wu and Wang, 2004; Luarn and Lin, 2004). This study offers an insight into Mobile Commerce adoption in Spain, which has not previously been investigated.

This research has the following objectives: (1) to determine the influence of frequency of Mobile use and length of Mobile use, demographics, non-store shopping previous experience and the attitude to M-commerce on the frequency of M-commerce and (2) to identify key drivers of willingness to M-commerce. The study is divided in two parts. The first part includes the literature review and development of the working hypotheses. The second part includes the methodology used in the empirical study of a sample of 270 Spanish mobile shoppers and the data analysis.

## **2 Literature Review**

### **Mobile relationships**

Several authors maintain that consumers with most exposure to new technologies are those who are more willing to adopt direct channels such as E-commerce (Bellman, Lohse and Johnson, 1999; Dholakia and Uusitalo, 2002; Lohse, Bellman and Johnson, 2000; Modahl, 2000; Sim and Koi, 2002).

Distance shoppers modify their behaviour and responses to marketing actions as their experience of the new environments increases (Dahlen, 2002). For example, expert Internet users surf more rapidly, their sessions are shorter, they visit a very small number of particular websites and enjoy their surfing experience more than novice users (Csikszentmihalyi, 1997), (Novak, Hoffman and Yung, 2000). If we focus on teleshopping, there is evidence that the closer an individual's relationship with a medium, the greater the probability of purchase based on the content observed (Ball-Rokeach, 1985; Defleur and Ball-Rokeach, 1989). It has been shown that teleshoppers watch significantly more television than non teleshoppers (Donthu and Gilliland, 1996; Eastlick and Lotz, 1999) and have greater teleshopping genre exposure (Grant, Guthrie, and Ball-Rokeach, 1991; Skumanich and Kintsfather, 1998).

Bearing in mind the results in the literature, we test a similar effect with the following hypotheses:

H.1a) Frequency of Mobile use has a direct positive relationship with frequency of M-commerce.

H.1b) Frequency of Mobile use has a direct positive relationship with willingness to M-commerce.

H.2a) Length of Mobile use has a direct positive relationship with frequency of M-commerce.

H.2b) Length of Mobile use has a direct positive relationship with willingness to M-commerce.

### **Demographics**

Previous research shows demographic differences among consumers using the different non-store shopping channels (Darian, 1987; Forsythe and Shi, 2003, Gehrt and Carter, 1992; James and Cunningham, 1987; Sim and Koi, 2000).

One of the most successful systems of direct sales is Internet. Studies focused on countries with low Internet adoption rates (such as Greece or Singapore) report that, the E-shopper profile is significantly different from that of the non-shopper and is mainly a young male, with a high level of education and income (Sim and Koi, 2002; Vrechopoulos, Siomkos and Doukidis, 2001); in countries with high Internet adoption rates (such as the United States) online shopping has increased among people with different educational and economic levels, assimilating both profiles (Forsythe and Shi, 2003; Siegel, 2003).

Finally, the Mobile shopper in several European countries has been described as much younger than the non M-shopper (Bigné, Ruiz and Sanz, 2005; Bigné, Ruiz and Sanz, 2007; Netsize, 2006).

The influence of demographics on M-commerce behaviour has not been sufficiently studied in the literature and so, in view of the above, we propose the following hypotheses:

H.3a) The individual's demographic profile has a direct positive relationship with frequency of M-commerce.

H.3b) The individual's demographic profile has a direct positive relationship with willingness to M-commerce.

### **Non-store shopping experience**

(Rogers, 2003) argues that “the adoption of one new idea may trigger the adoption of several others in a cluster which consists of one or more distinguishable elements of technology that are perceived as being interrelated”. The technology cluster concept has been used to examine the adoption of videotext (Larose and Atkin, 1992), E-Commerce (Eastin, 2002) and M-Commerce (Yang, 2005). This concept posits that consumers are likely to adopt a technology offering the same functions as those already adopted. M-Commerce offers features, such as time saving, convenience, enjoyment and lower prices, which are similar to those offered by other non-store shopping channels.

Finally, it should be highlighted that some prior experience with non-store shopping channels has a positive influence on the adoption of new direct shopping channels, since the consumer acquires skill in purchasing products with no prior physical inspection (Dholakia and Uusitalo, 2002; Korgaonkar and Moschis, 1987; Shim and Drake, 1990).

In view of the above, it is to be expected that M-shoppers with non-store shopping experience (either through the mobile or other media) purchase more through Mobile and have a stronger willingness to M-commerce than those who have never used non-store shopping channels.

Therefore, we propose the following hypotheses:

H.4a) Non-store shopping experience has a direct positive relationship with frequency of M-commerce.

H.4b) Non-store shopping experience has a direct positive relationship with willingness to M-commerce.

H.5) M-commerce experience has a direct positive relationship with willingness to M-commerce.

### **Attitude towards M-commerce**

The TAM model (Davis, 1989: 1993), posits that intention to use a technology is determined by the individual's attitude towards the use of that technology. The model was developed by (Davis, 1989) to predict individual intention to use information technologies and has been used to predict future shopping intention towards non-store shopping channels such as Internet (O'Cass and Fenech, 2003) or mobile (Yang, 2005). Studies focused on other non-store shopping channels such as Internet also show that positive or negative attitudes to distance shopping influence non-store shopping adoption (Eastlick and Lotz, 1999; Goldsmith, 2000; O'Cass and Fenech, 2003).

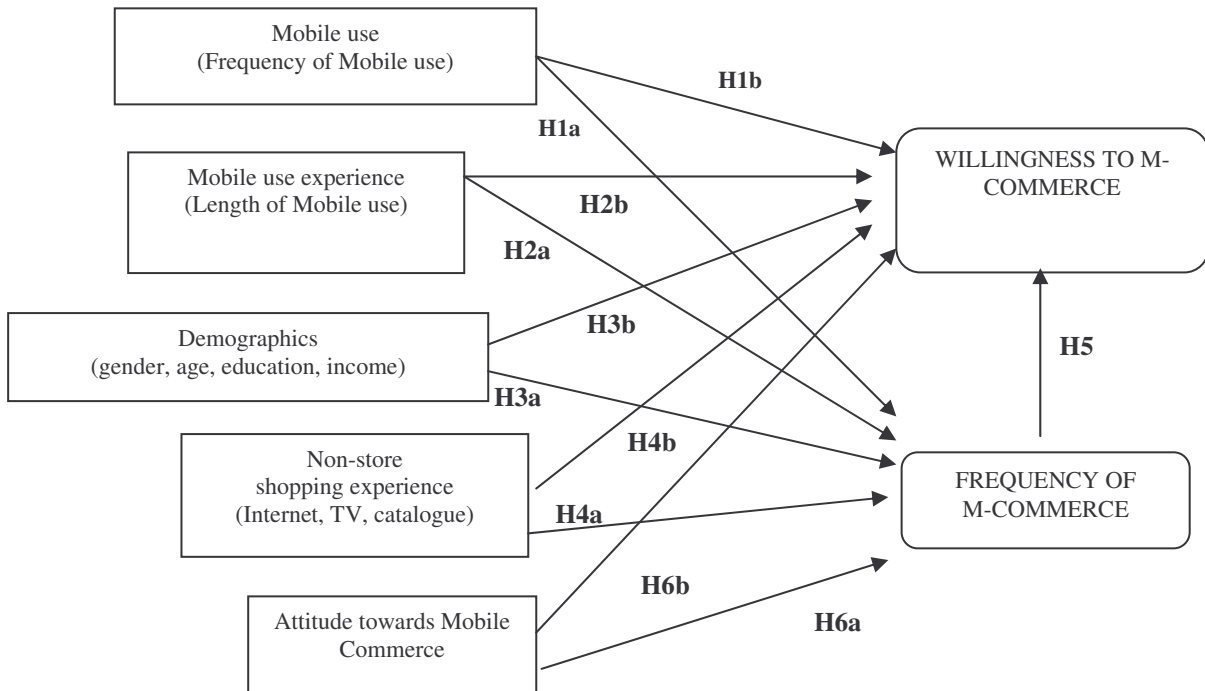
To complement the contributions of the above studies, we propose the following hypotheses:

H.6a) A positive attitude to M-commerce has a direct positive relationship with frequency of M-commerce.

H.6b) A positive attitude to M-commerce has a direct positive relationship with willingness to M-commerce.

The model below (see Figure 1) shows the influence of Mobile relationships (frequency of mobile use and length of mobile use), demographics (age, gender, education and income), non-store shopping experience and attitude towards M-commerce in the present and future M-commerce decision.

**Figure 1: M-commerce model**



### 3 Methodology

The data for analysis come from a study done in Spain from April to June 2006 on a sample of 270 mobile shoppers over the age of 14. As in previous studies (Harris, Rettie and Kwan, 2005; Lee, Kim, Lee and Kim, 2002) the sample was chosen using a convenient selection of respondents, with a greater proportion of young people (74.1% were between 14-24 years old). Young adults were selected because consumers under 30 have been found to be faster adopters of mobile services in general (Lee, Kim, Lee and Kim, 2002; Netsize, 2006).

A research instrument with close-ended questions was used for this study. Questionnaires were delivered to and collected from volunteer participants over the age of 14. A total of 315 Spanish Mobile shoppers, were contacted during the survey; 290 agreed to participate in this study. Among the questionnaires received, 270 were completed and analyzed.

**Table 2: Profile of respondents**

	M-shoppers (n=270)
<b>GENDER</b>	
Man	47%
Woman	53%
<b>AGE</b>	
From 14 to 24 years old	74.1%
From 25 to 34 years old	15.6%
From 35 to 49 years old	8.1%
From 50 to 64 years old	2.2%



65 or older	0%
EDUCATION	
No formal education	2.2%
Primary	31.9%
Secondary	43%
University	23%
INCOMES	
I have no salary	56.7%
Well below average	4.5%
Below average	9%
Average	9%
Above average	17.2%
Well above average	3.7%

The demographic variables were measured as follows: age was measured continuously, the level of income and education were measured as ordinal variables with six and four response intervals (for income, from 1 “I have no salary” to 6 “well above average” and for education, from 1 “no formal education” to 4 “university level”). Analysis of the sample’s demographic profile is shown in Table 2. It shows that M-shoppers are both men and women (47% and 53% respectively), young people (89.7% are aged between 14 and 34), with secondary education (43%) and no monthly income (over 50%), as most of the interviewees are students in full-time education.

Mobile use behaviour was measured by the frequency of mobile use and length of time as mobile user. Consumers’ non-store shopping experience was measured by asking if they had used other direct shopping systems (mail, catalogue, television and Internet). Attitude to M-commerce was measured by asking consumers their general opinion of the M-commerce system, on a 5 point Likert scale (“Very bad”, “Bad”, “Average”, “Good”, “Very good”).

Frequency of M-commerce was determined by asking interviewees about the purchase frequency of products/services offered through the mobile and willingness to M-commerce by the response to the question “Would you buy again through the Mobile over the next year?” on a 5 point Likert scale where 1: “No definitely not”, 2: “Probably not”, 3: “Indifferent”, 4: “Probably yes” and 5: “Yes definitely”.

#### **4 Data Analysis**

Hypotheses were tested using a path analysis. (Luque, 2000; Steenkamp and Baumgartner, 2000), highlight two main advantages of this technique. Firstly, structural equation models mean that measurement error can be explicitly incorporated into marketing models and its influence on the degree of fit can be analysed. Secondly, with this technique relations between model variables can be studied simultaneously. The robust maximum likelihood estimation method was used due to this estimation method guarantees estimation consistency even

though some of the variables are ordinal (Babakus and Ferguson, 1987; Jöreskog and Sorbom, 1994).

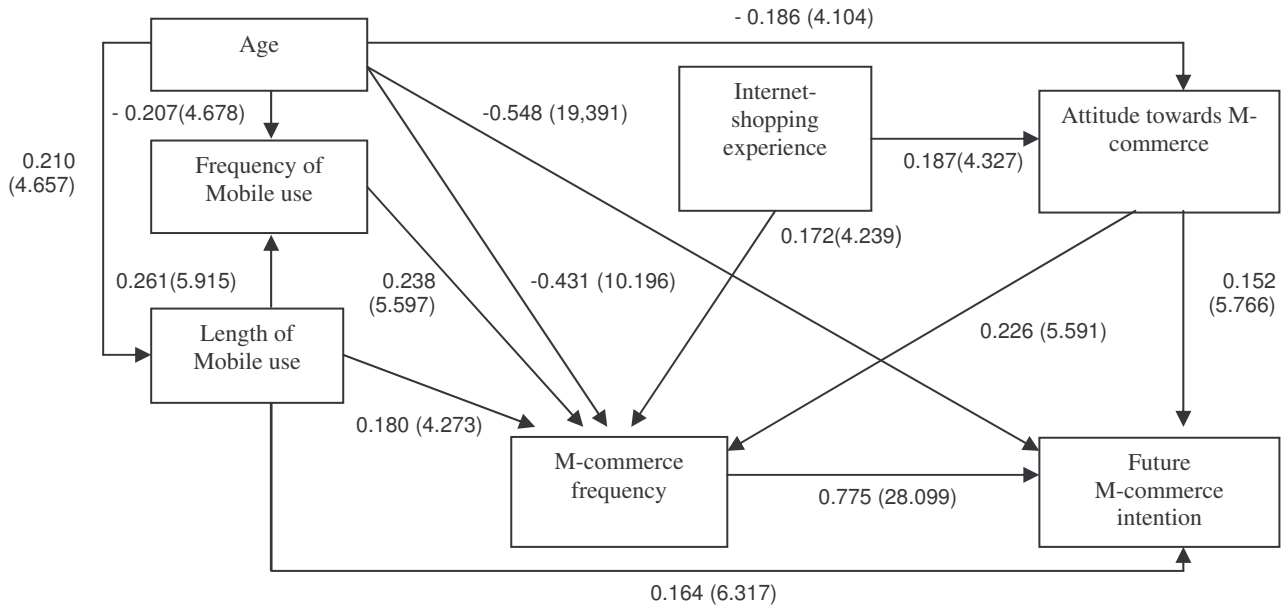
The first step in model testing was to estimate the goodness-of-fit of the hypothesized research model (see figure 1). As for the initial model, various goodness-of-fit statistics indicate that the model shows a poor fit with the data (see Table 3).

**Table 3: Goodness of fit for the proposed model**

Fit measurements	Optimum recommended level	Initial model	Final model
X <sup>2</sup> (gl): p-value	p>0.05	356.434 (55) <0.001	21.789 (7) 0.0024
Absolute fit measurements			
GFI	Around 1	0.894	0.987
RMR	Close to 0	0.102	0.049
RMSEA	<0,08	0.108	0.069
Incremental fit measurements			
NFI	>0,9	0.695	0.974
NNFI	>0,9	0.608	0.946
AGFI	Close to 1	0.824	0.949
IFI	Close to 1	0.729	0.982
CFI	Close to 1	0.982	0.982
Parsimonious fit measurements			
Normed X <sup>2</sup>	Between 1,2 and 3	6.4	3.1
AIC	Low value	37.082	7.789

The initial model estimation indicates the need to re-specify the hypothetical model eliminating the following non significant relations: (1) gender, education, income-frequency of M-commerce, (2) gender, education, income-willingness to M-commerce (3) frequency of mobile use-willingness to M-commerce (4) non-store shopping experience (mail, TV, catalogue)-frequency of M-commerce, (5) non-store shopping experience (mail, TV, catalogue and Internet- willingness to M-commerce. Finally, we added the relations (1) age-frequency of mobile use, (2) age-length of mobile use, (3) age-attitude towards M-commerce; (4) non-store (Internet) shopping experience-attitude towards M-commerce which, as Figure 2 shows, it provides a model with excellent fit.

**Figure 2: M-commerce final model**



GFI=0.987; RMR=0.049; RMSEA=0.069; NFI=0.974; AGFI=0.824; IFI=0.729; CFI=0.982; Chi-square (7) = 21.789 (p=0.0024)

As can be seen the initial model has been modified and substantially simplified by eliminating some of the initial relations which are, therefore, rejected hypotheses in our study. The theoretical rationale of these results is discussed in the following section. The results suggest that frequency of Mobile use has a significant effect on M-commerce frequency (H1a. 0.238; p=5.597) but it does not affect willingness to M-commerce. These results provide support for H1a but do not support H1b. Length of Mobile use has positive effects on M-commerce frequency (H2a. 0.180; p=4.273) and willingness to M-commerce (H2b. 0.164; 6.317), which provides support for H2a and H2b. In addition to these relations, we found that length of mobile use influences frequency of mobile use (0.261; p=5,915).

Contrary to our hypotheses, gender, education and income have no significant effect on M-commerce frequency or willingness to M-commerce. These results only provide partial support for H3a and H3b. Age has significant and strong negative effects on M-commerce frequency (H3a.-0.431; p= 10.196) and willingness to M-commerce (H3b. -0.548; p=19.391). In addition to these relations, we found that age influences frequency of mobile use (-0,207; p=4,678), length of mobile use (0,210; p=4,657) and attitude towards M-commerce (-0,186; p=4,104).

Previous experience of Internet shopping has significant positive effects on M-commerce frequency (H4a. 0.172; p=4.239). Non-store shopping experience, however, does not

influence the willingness to M-commerce. This result does not support H4b and provides only partial support for H4a. In addition to these relations, we had found that Internet shopping experience does influence the attitude towards M-commerce (0.187;  $p=4,327$ ).

The effect of M-commerce on willingness to M-commerce was statistically significant, as shown by the path coefficient of 0.099 (H5. 0.775;  $p=28.099$ ). Attitude towards M-commerce has positive effects on M-commerce frequency (H6a. 0.226;  $p=5.591$ ) and willingness to M-commerce (H6b. 0.152;  $p=5.766$ ), which provides support for H6a and H6b.

## **5 Discussion and managerial implications**

In this research, we have analysed the influence of relations with the mobile, consumer demographic profile, non-store shopping previous experience and the influence of the attitude to M-commerce on frequency of M-commerce and we have identified the key drivers of willingness to M-commerce. Given the generalised use of mobiles and the scarcity of studies which analyse the profile of the users of this system, this work has contributed to the research by providing an understanding of the factors influencing M-commerce behaviour.

Data analysis shows that age, relations with the mobile (frequency and length of mobile use), Internet shopping previous experience and attitude towards M-commerce are the main predictors of frequency of M-commerce while age, length of mobile use, consumer attitude towards M-commerce and previous M-commerce experience are the most relevant factors influencing willingness to M-commerce.

Data analysis has highlighted the fact that age is the only demographic variable which can predict frequency of M-commerce and willingness to M-commerce. A possible explanation for this is that the new technological progress in mobile telephony makes it necessary to bear in mind the individual's capacity to understand the changes and complexities of the new technologies and to develop a positive attitude towards them (Mulhern, 1997; Wotruba and Privoba, 1995). Young people use the mobile telephone from a very early age (AIMC,2006) and for them it is a source of communication and entertainment as well as an alternative shopping channel. Young consumers show the most positive attitude towards innovation and change and thus are more willing to accept new services and contents offered by the different mobile phone operators. They are definitely the group with the most favourable attitudes towards the direct shopping channels.

It is also worth noting the positive influence of age on length of mobile use. A possible explanation for this is the fact that less than ten years ago the mobile in Spain was a very expensive item with limited performance, mainly used in a professional capacity by a specific segment of the population and was therefore something which young people could not afford.

Gender, education and incomes have not turned out to be determinant factors in the M-purchase behaviour. The possible differences due to gender in M-shoppers (and all virtual environments in general) tend to disappear as a consequence of changes in social habits and in the greater level of introduction and development of the new technologies (Modahl, 2000; Siegel, 2003). Thus, the findings of this study confirm the results of other research (Modahl, 2000; Rosenberg, 1980) which highlights the fact that women are becoming increasingly familiar with virtual environments and that mobile use is becoming more and more widespread (AIMC, 2006; Siegel, 2003).

Making Internet purchases does have a significant influence on the M-commerce behaviour. These findings are consistent with previous studies using the technology cluster concept that concludes “the adoption of new communication technologies is best predicted by the adoption of functionally similar technologies and user perception toward them” (Rogers, 2003; Yang, 2005). Consumers who have purchased a product or service through Internet have broken the barriers to non-store shopping and therefore are more predisposed to M-commerce.

Internet shopping experience has also been found to be a positive influence on M-commerce attitude, perhaps due to important complementarity between the two shopping methods, as the mobile is one of the main formats for Internet access. This attitude leads to greater levels of M-purchase and more favourable future behaviour intentions.

Attitude towards M-commerce predict actual and future M-commerce behaviour. It has been shown that consumers with the best opinion of the system have the strongest current and willingness to M-commerce thus confirming that intention to use a given technology is determined by the individual's attitude towards using that technology (Davis, 1989: 1993).

M-commerce previous experience has a positive influence on willingness to M-commerce, suggesting that a consumer who has previously purchased through the Mobile is likely to make a purchase in the future.

Frequency of Mobile use and length of mobile use influence M-commerce frequency. This result is in agreement with that of previous studies which show that the closer an individual's relationship with a medium, the greater the probability of purchase (Ball-Rokeach, 1985; Defleur and Ball-Rokeach, 1989) and that consumers with most exposure to new technologies are those who are more willing to use distance shopping channels (Bellman, Lohse and Johnson, 1999; Dholakia and Uusitalo, 2002; Lohse, Bellman and Johnson, 2000; Modahl, 2000; Sim and Koi, 2002).

A possible explanation for the influence of length of time as user on M-commerce and mobile use may be the increased performance and services offered by mobiles nowadays: full colour screens, MP3 players and integrated videos, loudspeakers, polyphonic ring tones, high speed Internet connectivity, etc., making these devices a perfect medium for reproducing all types of contents offering the consumer a wide range of possibilities and consequently increasing mobile use.

This research enables companies to know the key drivers influencing M-commerce behaviour and, therefore, what aspects to highlight in their marketing strategies. The priority segment for companies to consider when launching their marketing campaigns should be that of young people, heavy Mobile-users, both men and women, preferably with previous experience of Internet shopping. Companies which use Mobile as a shopping channel should be able to offer new, innovative services and contents with added value to improve consumers' opinion of the M-commerce system as it would allow consumers to maintain a relation with the Mobile and to increase the probability of purchase.

The complementary use of Internet is recommended since the similarities between both methods and their important advantages may favour the adoption of non-store shopping systems, enabling companies which sell through the mobile to obtain marketing synergies.

In terms of the limitations of this study, maybe the most important one is the sampling technique used. Lack of randomness in the sample limits the generalizability of our findings beyond our specific sample. However, the convenience sampling technique is being increasingly used in M-commerce research (Lee, Kim, Lee, and Kim, 2002; Harris, Rettie, and Kwan, 2005).

There are complementary aspects not included in the questionnaire which we think would be interesting to analyse. In this paper we have noted that attitude has positive and direct influence both on the frequency of M-shopping decision and willingness to M-shopping. Therefore, a future line of research would be to analyse the life studies of individuals who declare themselves most compatible with M-Commerce. Moreover, we have not analysed the impact of motivations and barriers on M-commerce behaviour. For this reason, we think it would be very useful to complement this study with the development and validation of a scale to measure M-commerce motivations and perceived risk. Finally, another limitation is that most of the sample consists of young people. While students are likely to be enthusiastic adopters of M-commerce, their relatively low income may influence the nature of the services which they adopt. Currently the products and services acquired by mobile are low cost and related to entertainment and leisure which contributes to their being more widely accepted by young people. For this reason, and despite that fact that this research analyses the profile of the consumer willing to acquire products and services which are currently marketed through the mobile, it would be interesting to repeat the study when the range of products and services has been increased to find out whether the results obtained are still valid.

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