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“Are Portuguese consumers prepared to adopt mobile commerce?”

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ABSTRACT

The purpose of this paper is to find out which factors affect young Portuguese consumers' intention of using m-commerce. Also it explores a conceptual model to analyze customers' perceptions of using mobile commerce services for online shopping. This paper contains prospects about consumer behavior, and the results have important implications for designers, managers, marketers, and operators related to mobile commerce (m-commerce).

An empirical investigation was carried out to test the hypotheses. The sample includes 183 anonymous participants. It was used a structural equation model (SEM) in order to test the relationships of the model.

The results reveal that anxiety, which is an affective obstacle against using new technology, is a key negative predictor of a customer's intentions to use mobile devices. Also, the consumer's self-awareness of mobile skillfulness affects positively anxiety, enjoyment, and usefulness. Additionally, enjoyment, usefulness, and compatibility have an impact on a customer's behavioral intentions.

The results of this study help to understand what prevents or encourages the use intention of m-commerce.

The results not only help develop a better understanding of mobile commerce theories for researchers, but they also offer viable knowledge to those involved in promoting m-commerce to potential purchasers.

Keywords: Mobile commerce systems, Internet shopping, Purchase behavior, Consumer behavior, Portugal

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1. INTRODUCTION

1.1. Motivation

According to a *Juniper Research Group* study (2015), more than 1.2 billion smartphones were sold worldwide during 2014, representing year-over-year growth of 29%. This was the first time that smartphone sales had exceeded 1 billion in a single year. In November 2014, the *Ericsson Mobility Report* revealed that there were over 7.1 billion mobile subscriptions worldwide, resulting in 5.6% year-over-year growth. Most of these subscriptions still involve regular phones. However, Ericsson's report (2014) indicates that this is rapidly changing, and by 2016 the number of smartphone subscriptions will exceed those for basic phones as they become increasingly affordable in developing markets. It is expected that by 2020 there will be approximately 9.5 billion mobile subscriptions, of which 6.1 billion will be smartphones and 650 million may be mobile PCs, tablets, and routers.

These impressive numbers, along with the systematic upgrading of the mobile devices' performance as well as internet access/bandwidth improvements, provides the perfect conditions for mobile commerce (m-commerce) emergence (Lu & Su, 2009). According to another *Juniper Research* report (December, 2014), mobile phone and tablet users made 72 billion mobile commerce transactions in 2014 alone. The same report anticipated that by the end of 2019, the number of transactions will reach 195 billion. On March 5, 2014, Goldman Sachs released a report estimating that global m-commerce sales reached US\$133 billion in 2013, and anticipating that this number will reach US\$626 billion in 2018. The 2013 m-commerce sales represent more than 9% of the global e-commerce sales (US\$1.233 trillion in 2013 according to *eMarketer*, 2014), while the 2018 m-commerce sales will represent about 3.7% of the anticipated global e-commerce sales for that year (US\$2.356 trillion in 2018 according to *eMarketer*, 2014). The m-commerce percentage seems to diminish over the next few years, although this has to do with the rapid growth of e-commerce in developing markets, such as the Asia-Pacific countries (*eMarketer*, 2014). It is expected that in the short-term mobile devices will exceed PCs as the most common way to access the internet worldwide. Gartner Inc. (2012) predicted that by the end of 2015 more than 80% of device sales in mature markets will be smartphones.

The situation in Portugal is not that different. According to a *Marktest* report (2012), there were about 8.54 million cell phone users on Portuguese soil by the end of 2011, representing 92.0% penetration. An *IDC* report (2013) revealed that there were 4,155 million mobile phones sold in 2013, and for the first time smartphone sales exceeded basic cell phone sales. According to the same report, during Q2 Portuguese users bought 473,742 basic call phones and 549,286 smartphones, and this trend remains constant until the present day. As for internet access through mobile devices, an *OberCom* study (2014) concluded that 38.5% of the Portuguese population used a cell phone, smartphone or tablet to navigate online during 2013. However, despite the evident progress in Portuguese telecommunications, it is obvious that m-commerce technology is still in its infancy compared to other mature markets. It is already possible to identify several mobile applications that allow users to buy through their mobile devices. However, these applications are just the tip of the iceberg compared to the anticipated full potential of m-commerce and what it could mean for Portuguese businesses.

Given m-commerce's growing influence on the 21st century economy, it is crucial that businesses take this new distribution channel into account, since otherwise they might lose their competitiveness (Siwici, 2012). Meanwhile, it is also important to follow a clear train of thought with regard to comprehending the factors that affect mobile commerce adoption. Portuguese companies that are interested in applying these strategies need to understand consumers' behavior with respect to this new mode of commerce. Perceptions of these behavioral aspects can help companies to predict consumers' reactions. Yet, there is currently very little knowledge concerning how individual's intrinsic motivations influence the use intention of m-commerce. Therefore, this research relies on the technology acceptance model (TAM) (Davis, 1989), which is an appropriate theory for measuring the use intention of a new technology, such as m-commerce. Furthermore, the TAM (Davis, 1989) has already been used in the mobile communications and wireless technologies context (Amberg et al., 2004; Fang et al., 2005-6; Han et al., 2006; Lu et al., 2003). Thus, it is assumed that the Technology Acceptance Model is appropriate for evaluating the consumer usage intention of m-commerce.

1.2. Objectives and Research Questions

Given the above reasoning, this research study's purpose is to understand and deepen the discussion concerning the use intention of m-commerce by Portuguese consumers. To achieve such a goal, it is proposed to evaluate the use intention of mobile devices, as a shopping alternative, on the part of young consumers. In order to do so, it is important to identify the factors that can be used to measure their behavior when faced with this new technology.

The consumer group selection is supported by the arguments of de Kulviwat et al. (2007) and Curry (2001). They identify young consumers as the early adopters of this kind of technology, based on the fact that such young consumers are the main users of mobile communication services, including m-commerce. This research considers young consumers to be individuals aged 18 to 29 (OCDE, 2001). The importance of studying them lies in the fact that they are early adopters (Rogers, 1995) and so they represent the future generation that will probably use these technologies.

Therefore, the following research question is proposed:

- Are young Portuguese consumers willing to adopt m-commerce?
- ↳ **What factors influence young Portuguese consumers' intention to use m-commerce?**

1.3. Structure

This document is divided into five chapters. Chapter One establishes the study's motivation, as well as the objectives and the research questions. In Chapter Two, the author reviews the relevant existing literature concerning mobile devices, the concept of m-commerce, the technology acceptance model (TAM), and m-commerce acceptance based on the TAM. Furthermore, it also presents the model and defines the hypotheses. Chapter Three details the methodology for the study, while Chapter Four presents the empirical study. Finally, Chapter Five discusses the findings of the study, offers the main conclusions, and makes some suggestions for future research.

2. LITERATURE REVIEW

This chapter aims to synthesize the existing literature concerning mobile devices and their users, the current global and national market for m-commerce, actual m-commerce users, the definition and features of m-commerce, as well as consumer behavior in accepting mobile commerce and purchasing through it. Additionally, both the proposed model and the hypotheses for the study are defined.

2.1. Mobile Devices

Besides its personal aspect, a device must present three main characteristics in order to be considered a mobile device: portability, location specificity, and the absence of wires (Shankar & Balasubramanian, 2009). An ultra-small size and the relative ease of carrying such devices everywhere represent key qualities of portability as well as important benefits of mobile devices for consumers (Balasubramanian et al., 2002). These characteristics imply the continuous usage of the device, giving it a systematic presence in the user's daily life and allowing businesses to contact the consumer anywhere and at any time. The location specificity allows marketing professionals to target their offers according to the user's location. The wireless aspect represents a promotion and an increase of mobile device use and also creates opportunities for contextual marketing actions. Those actions can be harmonized with the consumer's profile and with his/her current location, thereby increasing the chances of a purchase decision by an individual (Shankar & Balasubramanian, 2009).

Due to its very nature, a mobile device is not just another technological gadget and it can be seen as a cultural object, that is, part of a person's everyday life. Mobile devices are in constant use in activities such as communicating, listening to music, searching for information, performing transactions, managing agendas, and facilitating the personal and social experiences of an individual; therefore, such devices have become agents of social change (Nurullah, 2009). Meanwhile, businesses' main challenges are to identify how to transform this cultural object, understand the mobile lifestyle, and adapt the small display (i.e. the mobile device's screen) into a commercial environment in order to explore the efficiency of this new channel of distribution.

2.2. M-Commerce

Before discussing and conceptualizing m-commerce, it is crucial to formerly identify the differences between e-commerce and m-commerce. Pay (2012) identifies two distinguished eras of m-commerce. At first, m-commerce is classified simply as an extension of e-commerce. In the second era, m-commerce develops as an independent business area and, consequently, as an alternative mechanism for e-commerce itself.

According to Hongjiang and Jiayun (2012), e-commerce is an alternative way of buying and selling goods and services using computer networks. Users can order the same products simultaneously in different places, while m-commerce brings the concept of mobility into the buying process, allowing the user to make a business transaction regardless of his geographic location (Zhang et al., 2004). So, the main difference between m-commerce and e-commerce resides in the transaction context and access method, in which it is possible to use cell phones or mobile devices to communicate anytime and anywhere. Therefore, the mobility concept, as used in the specific m-commerce contexts, represents the possibility of conducting transactions or business processes anytime and anywhere. The access occurs through wireless mobile communications networks, so that these services are viable regardless of the user's geographical location. Once a comparison and distinction have been made between the two concepts, it is possible to proceed to the conceptualization of m-commerce.

Being a relatively new phenomenon, m-commerce is still susceptible to various definitions. Kauffman and Angsana (2005) describe m-commerce as being like any other electronic transaction (e.g. the communication interaction, purchase, and payments) in that it uses a wireless connection to access the Internet or a supplier's private network. On the other hand, Hanebeck and Raisinghani (2002) describe m-commerce as the delivery capability of electronic commerce being directly available to consumers through wireless technology. According to them, the selling point of m-commerce is that it is basically in the consumer's hand.

This method of commerce allows businesses to reach consumers at anytime and anywhere. It is understood that m-commerce can operate through any wireless mobile device connected to the Internet, and so it can be perceived as a technological solution that uses wireless devices to conduct business or transactions via a network system. This way,

geographically independent consumers can buy, carry out banking services, transfer money, book a flight ticket or perform any other commercial transaction (Hanebeck & Raisinghani, 2002).

However, m-commerce should not be seen as simply a new distribution channel or a replacement for the computer. On the contrary, m-commerce should be seen as a new aspect of consumerism and a much more powerful way to reach the consumer (Nohria & Leestma, 2001; Zhang, Yuan & Archer, 2003). So, m-commerce should not be seen as a limited extension of e-commerce, but rather as an original model with its own unique benefits. Obviously, people will not go shopping with their mobile phones in the same way they shop with their computers. Exploring the true value of m-commerce requires an understanding of the role that mobility plays in contemporary lives; therefore, it is important to identify factors that can stimulate internal motivations towards buying processes involving this technology.

2.3. Technology Acceptance Model

Several theories have been used to understand the factors that determine the acceptance and use of technology. Among them, the technology acceptance model (TAM) proposed by Davis (1989) and Davis et al. (1989), which was adapted from the theory of rationalized action (TRA) (Ajzen & Fishbein, 1980), suggests that the belief of an individual determines his/her attitude towards the presented technology. This action, in turn, directly affects the use intention.

The TAM was designed as a parsimonious model to explain the adoption and use of a given technology by exploring only two cognitive constructs: the perceived usefulness and the perceived ease of use (Morris & Dillon, 1997). This model was specifically built to explain the use of computers and other related technologies (Davis et al., 1989).

In the original TAM model, the acceptance of a technology by an individual is determined by his voluntary intention to use it. This intention is characterized by perception and by the individual's attitude towards the technology, its usefulness, and its ease of use. Perceived usefulness refers to the extent to which an individual believes an item of technology will improve his performance when using a particular system. As for the perceived ease of use, this construct is defined by the extent to which an individual believes that using a given system will be effort free (Davis, 1989; Davis et al., 1989).

The TAM has been one of the most discussed and influential models intended to explain the final user's behavior while facing the use of computer technologies and information systems (King & He, 2006; Yousafzai et al., 2007). In this way, researchers have investigated and replicated the perceived usefulness and perceived ease of use constructs, associated with other external variables (Davis et al., 1989). There is also a general agreement that the constructs (ease of use and usefulness), in addition to several others introduced in the model, are valid for predicting the acceptance of a number of technologies by an individual.

2.4. M-Commerce Acceptance

Several studies have investigated m-commerce in different contexts, such as mobile banking (Luarn & Lin, 2005), ticket sales (Mallat et al., 2006), and auctions (Wang & Barnes, 2007). However, despite the fact that the literature evaluating the use intention and the effective use of mobile devices for commerce points to a number of factors that affect consumer behavior in the adoption of m-commerce, the results are not yet conclusive.

In an exploratory study, Mahatanankoon and Vila-Ruiz (2007) showed that (1) consumers' unfamiliarity with m-commerce, (2) the perception of a cell phone being an inefficient device on which to conduct transactions, (3) the lack of face-to-face communication in conventional transactions, (4) the interoperability limitation between different mobile technologies, and (5) the important need for customization in m-commerce activities are the main barriers to consumers adopting it.

Islam et al. (2011) extended the TAM model and found that prices and usage costs (i.e. Internet access fees), rich and fast information, and security and privacy are significant indicators of m-commerce adoption. Their findings match the findings of previous studies, such as Haque (2004), which identified prices and costs as the most significant factors influencing the adoption of m-commerce. Regarding security and privacy, the results of Islam et al. (2011) were similar to those found in studies by Haque (2004), Huei (2004), and Mariga (2003). However, Islam et al. (2011) found a contradictory result concerning the perception of usefulness. Despite being previously identified as an important construct for predicting the use intention of both information systems and related technologies (King & He, 2006; Yousafzai et al., 2007), as well as m-commerce (Mariga, 2003; Huei, 2004), in Islam et al (2011), studies found that the perception of usefulness was not significant in

explaining the use intention. Suhong et al. (2008) investigated the gender moderation in the adoption and use of m-commerce. Their results indicate that gender does not influence the use decision, with the determining factors remaining price perception, the perception of usefulness, and the perceived ease of m-commerce service.

Other studies, including Amberg et al. (2004), identified the perception of usefulness, the perceived ease of use, the perception of mobility, and the perceived costs involved as key factors in the adoption of m-commerce. Finally, Wu and Wang (2005) reviewed the TAM and added the perceived risk, cost, and compatibility constructs.

2.5. Hypotheses and Proposed Model

Song et al. (2008) argue that any company considering implementing m-commerce strategies must first consider the behavioral aspects of consumers. Indeed, understanding these behavioral aspects can help them to predict consumer reactions. However, Song et al. (2008) argue that there is currently little knowledge concerning how the use of m-commerce is determined by the intrinsic motivations of users. In this sense, the TAM has been a useful model for assessing the intention and use of technologies by taking these factors into account. Therefore, based on Su and Lu's (2009) model, this study aims to evaluate the acceptance of m-commerce as a purchasing or shopping alternative on the part of Portuguese consumers. Following Davis et al.'s (1989) guidance, which suggests the introduction of external variables to the TAM in addition to the utility variable, some constructs that are considered to be important during the purchase process via m-commerce were added: anxiety, skill with mobile, easy access, fun, and compatibility. The relationships between each of them along with the appropriate justifications are described below.

- **Anxiety**

Anxiety reveals apprehensive feelings and even fear about experienced or imagined situations. Such emotions can be evoked in real or imaginary interactions with new technologies such as mobile commerce systems. As Igbaria and Iivari (1995, p. 593) noted, "individuals who experience high levels of anxiety are more likely to behave more rigidly than individuals whose level of anxiety is relatively low."

Normally, it is expected that people avoid behaviors that evoke feeling of anxiety (Compeau & Higgins, 1995). Mistrust on the part of an individual can reduce the probability of him using a mobile commerce service regardless of whether or not the individual is effectively using the service or just imagining that he is. For example, when the consumer is in the payment process, he fears pressing the wrong button, which leads to the possibility of financial loss, increasing his anxiety. In this context, previous studies have shown anxiety to be a factor with a significant negative influence on the adoption of information systems (Compeau et al., 1999; McFarland & Hamilton, 2006). Based on this, the following hypothesis is proposed:

H1: *Anxiety will have a direct and negative effect on a consumer's intention to use a mobile commerce service.*

- **Mobile Skillfulness**

A greater confidence in the ability to use a technology will lead to a greater intrinsic motivation to try it and embrace it (Compeau & Higgins, 1995). This way, skills related to computer use or the ability to use it are defined as a combination of experience, training, and knowledge that you have had with your computer. Igarria et al. (1996) found that users with computer skills are more likely to have a favorable perception and confidence about the performance of several tasks using computers.

Regarding mobile devices, ability or skill in handling them refers to the self-evaluation each individual makes of his ability to perform well a task on the device. The higher the usage skills, the bigger the probability of performing more complicated functions with greater dexterity, feeling less anxiety or frustration, and possibly having more fun (Lu & Su, 2009).

This way, during the purchase process, personal skill should be investigated as a key factor in reducing barriers to the adoption of m-commerce. Some consumers may avoid using these services due to a lack of skill in using mobile devices, even if they understand the results. They may doubt their ability to successfully complete the transaction and therefore not believe in the system's utility (Lu & Su, 2009).

On the other hand, Compeau et al. (1999) indicate that individuals feel anxiety when performing particular behaviors if they do not believe they have the ability to execute them.

That being said, ability/skill has a negative effect on the anxiety experienced by the individual.

Finally, it is necessary to understand the impact of skill level on the utility expectation of mobile commerce. The relationship between the self-efficacy of an individual and the use of a system has been studied previously (Huang & Liaw, 2005; Pajares, 1997; Schunk, 1996b; Schunk & Gunn, 1986; Staples et al., 1999). However, only a few researchers have investigated the relationship between ability and usefulness. Therefore, it is hypothesized:

H2: *Mobile skillfulness will have a direct and negative effect on anxiety when using a mobile commerce service.*

H3: *Mobile skillfulness will positively affect the enjoyment when using a mobile commerce service.*

H4: *Mobile skillfulness will have a direct and positive effect on the utility of using a mobile commerce service.*

- **Ease of Access**

Many studies have investigated ease of use by examining the influence that perceived ease of use has on the user's intrinsic motivation (Amoroso & Magnier-Watanab, 2012; Hsu & Lu, 2007; Liao, Tsou & Shu, 2008; Moon & Kim, 2001). While many researchers confirm that ease of use has a major effect on usefulness (Davis, 1989; Mallat, Rossi & Tuunainen, 2006; Venkatesh et al., 2003), relatively few studies have investigated the effect of ease of access to the mobile internet.

Sivunen and Valo (2006) suggest that the acceptance of different communication technologies depends on the availability of tools as well as the competence of those on the market. The basic tools for mobile commerce are a mobile device and a wireless communication system; therefore, without a reliable and affordable network, m-commerce is not viable. A good mobile Internet must be reliable. A reliable system should provide its consumers with a connection that does not need to be frequently restored and that is available in most locations frequented by consumers. Purchasing services via a mobile that are easier to access via mobile Internet results in less uncertainty and frustration experiences for the consumer (Lu & Su, 2009). Therefore, it is expected that the ease of

access has a positive impact on the consumer's perception and enjoyment of usefulness with respect to mobile commerce.

So, for this research, the ease of access refers to the individual's perception that Internet access via mobile phone will be accomplished without effort or problems, culminating in a resemblance to the perceived ease of use of the TAM. It is thus proposed:

H5: *The ease of access will have a direct and positive effect on the enjoyment of using a mobile commerce service.*

H6: *The ease of access will have a direct and positive effect on the consumer's intention to use a mobile commerce service.*

H7: *The ease of access will have a direct and positive effect on the perceived usefulness of a mobile commerce service.*

- **Perceived Usefulness**

The perceived usefulness portrays how an individual believes that a given technology can improve his productivity or performance in any work task (Davis, 1989). With regard to consumer matters, the perceived usefulness is linked to the functional outcome of using technology, and it can be translated as the probability perceived by the consumer that the technology in question will benefit him in some way when accomplishing a task. Regarding mobile commerce services, the utility associated with immediate access to information about products or services anywhere and anytime, plus the ability to transact at any time, can be attractive to customers (Lu & Su, 2009).

Thus, based on previous research (Davis et al., 1989; Venkatesh & Davis, 1996; Amoroso & Magnier-Watanabe, 2012), we propose the following hypothesis:

H8: *Perceived usefulness will have a direct and positive effect on the consumer's intention to use a mobile commerce service.*

- **Enjoyment**

Advanced mobile devices provide a wide range of online media, such as product descriptions, photos, music, videos, commercials, and games. Customers can have fun looking for products and services while interacting with the media.

Davis et al. (1992) showed that both extrinsic and intrinsic factors affect consumer motivations for using information technology systems. Intrinsic motivations may be connected to the fun and the reward of action. Venkatesh (1999), for example, in a study about training based on games found that high intrinsic motivation indices lead to a sustained behavioral intention of using the software information. Chu and Lu (2007) suggest that perceived enjoyment serves as a motivation for music purchase intention in the online world. Finally, Hsu and Lu (2007) suggest that fun positively affects the loyalty of online games customers.

In this study, enjoyment refers to the consumer's immediate experience of pleasure and joy (Lu & Su, 2009) when using a mobile commerce service, and it can be considered to be an important dimension in the online shopping process. However, relatively few studies relate perceived fun with online purchasing behavior when using a mobile device. Therefore:

H9: *Enjoyment will have a direct and positive effect on the consumer's intention to use a mobile commerce service.*

- **Compatibility**

The compatibility construct refers to the degree to which an innovation is perceived as consistent with the values, prior experiences, and needs of potential adopters (Rogers, 1995). Mobile technology is already deeply integrated into people's lives. Communication via mobile devices has become universal and involves almost all activities of modern society, including work, education, social relations, and even entertainment (Nurullah, 2009). Some mobile device users feel severely isolated or even panic in cases of losing or forgetting their mobile phone. The existence of a high degree of consistency between the values and the individual's experience with using mobile technology may facilitate the adoption of other mobile services that are hardly used or less known, as in the m-commerce case.

Chen et al. (2002) suggest that greater compatibility positively affects the decision to use a virtual store. Similarly, Lin (2007) points out that compatibility has a positive effect on the spread of online games. Based on this, the following hypothesis is proposed:

H10: *Compatibility will have a direct and positive effect on the consumer's intention to use a mobile commerce service.*

The theoretical model proposed in this study is presented in Figure 1 below.

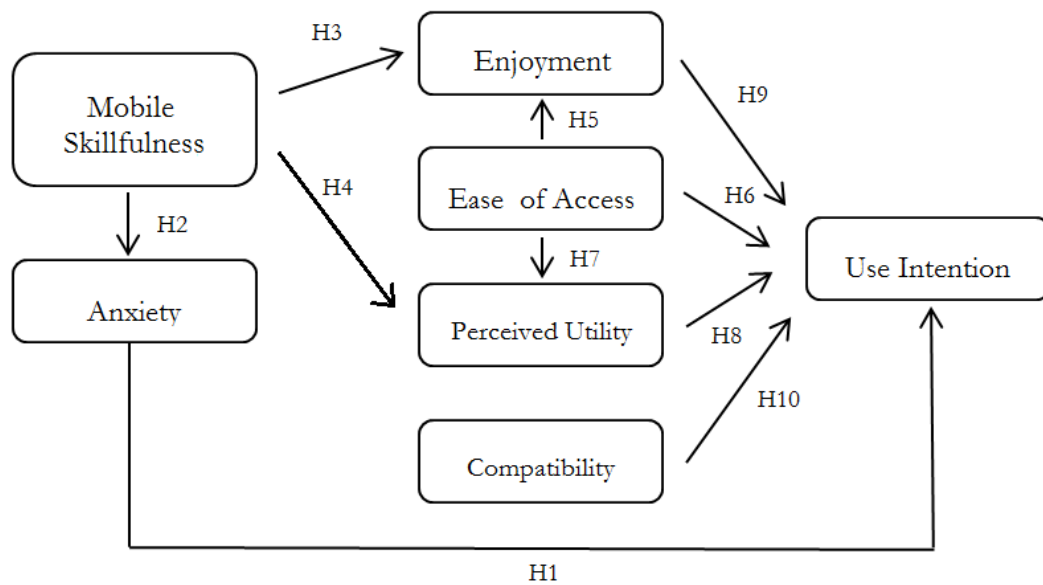


Figure 1: Conceptual Model
Source: Adapted from Su & Lu, 2009

3. METHODOLOGY

3.1. Overview

In order to analyze the relationships presented in the theoretical model introduced in the previous chapter, an online survey was designed that encompassed several constructs. The survey was written in Portuguese to enhance the response rate and facilitate the correct understanding of the questions. Writing the survey in Portuguese also helped to avoid misunderstandings that could occur when responding to a survey written in a foreign language.

The data obtained were then analyzed using statistical software SPSS Amos v22, mainly through the use of structural equations.

3.2. Questionnaire's Structure

At the beginning of the questionnaire, participants were informed about the academic nature of the study and the topic under analysis. A small paragraph was dedicated to explaining the concept of m-commerce. The survey was structured into six main sections, as summarized below.

First, participants were asked three important “yes” or “no” demographic questions: (“Do you have Portuguese nationality?”, “Do you live in Portugal?”, and “Are you between 18 and 29-years-old?”). The answers to these three questions had to be affirmative in order to validate the questionnaire. In the second section, participants were asked to indicate their degree of agreement/disagreement with statements regarding the “Mobile Skillfulness”, “Anxiety”, and “Use Intention” variables. The statements were based on Liaw and Huang’s (2005) 4-item “Mobile Skillfulness” scale; Mao, Thatcher, and Yaprak’s (2005) 6-item “Mobile Skillfulness” scale; Thatcher and Perrewé’s (2002) 4-items “Anxiety” scale; and Mao, Srite, Thatcher, and Yaprak’s (2005) 3-item “Use Intention” scale. To measure these three constructs, a 7-point Likert scale ranging from 1 “Strongly Disagree” to 7 “Strongly Agree” was used. Then, participants were asked to indicate their degree of agreement/disagreement with statements regarding the “Enjoyment” and “Perceived Usefulness” variables. The statements here were based on Davis, Bagozzi, and Warshaw’s (1992) 2-item “Enjoyment” scale and Davis, Bagozzi, and Warshaw’s (1989) 4-item

“Perceived Usefulness” scale. A 7-point Likert scale ranging from 1 “Very Unlikely” to 7 “Very Likely” was used. Next, participants were asked to indicate their degree of agreement/disagreement with a statement regarding the “Enjoyment” variable. The statement was based on Davis, Bagozzi, and Warshaw’s (1992) 1-item “Enjoyment” scale. However, despite using the same 7-point Likert scale, it had different anchors and so the participant were given a scale ranging from 1 “Very Unpleasant” to 7 “Very Pleasant”. The fifth section concerned the “Compatibility” variable and it asked participants to indicate their degree of agreement/disagreement with statements from Karahanna, Straub, and Chervany’s (1999) 3-item “Compatibility” scale. A 7-point Likert scale ranging from 1 “Little Importance” to 7 “Very Important” was used. Finally, in the last section, participants were asked two “yes” or “no” questions (Mao, Srite, Thatcher & Yaprak, 2005) regarding the “Ease of Access” variable.

3.3. Participants

A sample of 200 potential respondents took part in the study, although only 183 participants replied affirmatively to the first three demographic questions.

The 183 valid participants all had Portuguese nationality and lived in Portugal, and the sample was composed of people between 18- and 29-years-old.

3.4. Data Collection

The research took place in Portugal and it was based on an online survey conducted using Google Consumer Surveys. The survey was distributed with the help of selected universities, companies, and individuals that shared the survey with their contacts.

The survey was formulated using existing scales from the literature that were originally written in English. The survey was translated from English to Portuguese by the author of the thesis (a native Portuguese speaker). This process corresponds with the approach of Harzing and Maznevski (2002), as it contends that an instrument developed in one culture and language has to be translated into the language of the second culture, while at the same time preserving and maintaining the meaning of the original. The authors are against single-language surveys as they believe that such surveys most probably give deceptive results, claiming that “there is proof that the language of the questionnaire affects the way respondents answer the same questions” (Harzing & Maznevski, 2002, p.1).

The survey was pre-tested in order to identify possible errors and problems, analyze if the scales' items were well understood by the respondents and to guarantee the quality of the translation. The pre-test didn't reveal any major concern.

3.5. Procedure

Only those surveys in which the first three questions were answered affirmatively were considered in the sample. No uncompleted surveys were rejected and no values were missing from the analysis since all the questions were marked as mandatory, meaning that the respondents could not move on to the next question without answering the previous one. Otherwise, the respondents received an alert message asking them to complete the unanswered question. For the same reason, there was no space for univariate or multivariate outliers (Silva et al., 2012). The sample obtained was considered acceptable given the number of constructs in the analysis. Sampling, coverage, and measurement errors were also evaluated.

3.6. Scales

The following constructs were measured: (1) Mobile Skillfulness, (2) Anxiety, (3) Enjoyment, (4) Perceived Usefulness, (5) Ease of Access, (6) Compatibility, and (7) Use Intention. All constructs were measured using scales constructed by the authors of similar studies. The constructs were measured using several 7-point Likert scales and one nominal scale. Different anchors were also used, ranging from 1 "Strongly Disagree" to 7 "Strongly Agree"; 1 "Unlikely" to 7 "Likely"; 1 "Unpleasant" to 7 "Pleasant"; 1 "Low Value" to 7 "High Value"; and 1 "Yes" or 2 "No". The questions presented in the online survey are related to the six constructs used within the current study, as detailed in Table 2. Some of the items were adapted from the original scales.

Mobile Skillfulness		
Reference	Items	Scale
<p>Liaw & Huang (2005) Cronbach $\alpha = 0,92$</p>	<p>For the following statements, please indicate your degree of agreement/disagreement with each one. We propose a 7-point scale ranging from "strongly disagree" (1) to "strongly agree" (7).</p> <p>I feel confident using a mobile device.</p> <p>I feel confident using a mobile device in order to purchase via m-commerce.</p>	<p>7-point Likert scale (1) Strongly Disagree to (7) Strongly Agree</p>

	<p>I feel confident using a mobile device correctly.</p> <p>I feel confident using a mobile device easily.</p>	
<p>Mao, Thatcher & Yaprak (2005) Cronbach $\alpha = 0,90$</p>	<p>I had never used mobile devices before.</p> <p>I had only the manual for reference.</p> <p>I had seen someone else using a mobile device before trying by myself.</p> <p>I had used similar mobile devices like these before.</p> <p>I could call someone for help if I got stuck.</p> <p>Someone else helped me to get started.</p>	<p>7-point Likert scale (1) Strongly Disagree to (7) Strongly Agree</p>
Anxiety		
Authors	Items	Scale
<p>Thatcher & Perrewé (2002) Cronbach $\alpha = 0,94$</p>	<p>For the following statements, please indicate your degree of agreement/disagreement with each one. We propose a 7-point scale ranging from “strongly disagree” (1) to “strongly agree” (7).</p> <p>I feel apprehensive about using mobile devices.</p> <p>It scares me to think that I could cause the mobile device to destroy a large amount of information by hitting the wrong key.</p> <p>I hesitate to use a mobile device for fear of making mistakes that I cannot correct.</p> <p>Mobile devices are somewhat intimidating to me.</p>	<p>7-point Likert scale (1) Strongly Disagree to (5) Strongly Agree</p>
Enjoyment		
References	Items	Scale
<p>Davis, Bagozzi & Warshaw (1992) Cronbach $\alpha = 0,94$</p>	<p>For the following statements, please indicate your degree of agreement/disagreement with each one. We propose a 7-point scale ranging from “Unlikely” (1) to “Likely” (7).</p> <p>I find using m-commerce enjoyable.</p> <p>I have fun using m-commerce.</p> <p>For the following statement, please indicate your degree of agreement/disagreement with each one. We propose a 7-point scale ranging from “Unpleasant” (1) to “Pleasant” (7)</p> <p>The actual process of using m-commerce is unpleasant/pleasant.</p>	<p>7-point Likert scale (7) Likely to (1) Unlikely (1) Unpleasant to (7) Pleasant</p>
Perceived Usefulness		
References	Items	Scale
<p>Davis, Bagozzi & Warshaw (1989) Cronbach $\alpha = 0,97$</p>	<p>For the following statements, please indicate your degree of agreement/disagreement with each one. We propose a 7-point scale ranging from “Unlikely” (1) to “Likely” (7).</p> <p>Using m-commerce would help me to do my shopping.</p> <p>Using m-commerce would increase my probability of purchasing online.</p> <p>Using m-commerce would enhance my shopping effectiveness.</p>	<p>7-point Likert scale (7) Likely to (1) Unlikely</p>

	I would find m-commerce useful for the shopping process.	
Ease of Access		
References	Items	Scale
Mao, Srite, Thatcher & Yaprak (2005) Cronbach $\alpha = 0,94$	For the following statements, indicate whether they reflect your situation or not using the following “Yes” (1) or “No” (2) nominal scale. I have a mobile device that lets me use m-commerce. My service provider lets me to use m-commerce.	Nominal Scale 1 - Yes 2 - No
Compatibility		
References	Items	Scale
Karahanna, Straub & Chervany (1999) 0.93	For the following statements, please indicate your degree of agreement/disagreement with each one. We propose a 7-point scale ranging from “Low Value” (1) to “High Value” (7). If I were to adopt m-commerce, it would be compatible with most aspects of my shopping needs. If I were to adopt m-commerce, it would fit well the way I like to do my shopping. If I were to adopt m-commerce, it would fit well my purchase process.	7-point Likert scale (7) High Value to (1) Low Value
Use Intention		
References	Items	Scale
Mao, Srite, Thatcher & Yaprak (2005) Cronbach $\alpha = 0,80$	For the following statements, please indicate your degree of agreement/disagreement with each one. We propose a 7-point scale ranging from “strongly disagree” (1) to “strongly agree” (7). I intend to use m-commerce to purchase online. I intend to use m-commerce to make online payments. I intend to use m-commerce to make reservations.	7-point Likert scale (1) Strongly Disagree to (7) Strongly Agree

Table 1: Items of the constructs used in the online survey.

4. EMPIRICAL STUDY

In this chapter, the computation model's main results are presented, the hypotheses are tested, and the research questions are discussed. The measures' reliability and the model's specification were assessed through preliminary analysis. The properties of the measures were assessed through exploratory and confirmatory factor analysis. To test the hypotheses suggested in the model, multivariate analysis of variance and structural equation modelling were employed. In order to simplify the analysis of the results, a list of abbreviations for the constructs used in this study was elaborated, as presented in Table 2.

Variable	Abbreviations
Mobile Skillfulness	MS
Anxiety	A
Enioyment	E
Perceived Usefulness	PU
Ease of Access	EOA
Compatibility	C
Use Intention	UI

Table 2: Abbreviations of the constructs.

4.1. Data Analysis

The author tested and validated the model for the study sample. The author opted to present in this master's thesis the results of the Portuguese consumers' sample for mobile commerce.

4.1.1. Confirmatory Factor Analysis

The model's specification was subject to a confirmatory factor analysis (CFA), conducted with the support of AMOS 22.0, with a maximum likelihood discrepancy estimation method in order to assess the construct and convergent validity. CFA is useful in the scale validation for the analysis and measurement of specific constructs (Hair et al., 1998) as well as the multidimensionality of a theoretical construct (Byrne, 2001). In the current analysis, the specified relationships between the seven constructs were tested. Some of the scale items were removed due to low factor loadings in the standardized regression, low squared multiple correlations values, and respondents' perceived similarity between items. Comrey (1973) states that values for loadings higher than 0.63 are very good. Some of the retained

items present lower values than this benchmarking value; however, the author considered that these items should be kept in the model and analysis. The respondents answered similarly to different items in the same scale and, therefore, five items were removed. The scale purification changed the number of items in the scales used in the current model, as presented in Table 3.

The internal scales' consistency was measured using the Cronbach's α value. According to Hair et al. (2006, p.137), "the generally agreed upon lower limit for Cronbach's α is 0.7, although it may decrease to 0.60 in exploratory research." Also, if a construct has a limited number of items, researchers may be less strict with the Cronbach's α value (Hair et al., 2006, p.137). As can be observed in Table 3, all of the values obtained are higher than 0.7, with the exception of the Ease of Access construct (EOA), whose indicators have a dichotomous scale. However, several testes were made with and without EOA construct showing that if this construct was removed it would jeopardize the other constructs Cronbach's α and fit indices as well. Therefore, the author opted to maintain it.

Variables	Initial Items	Removed Items	Maintained Items	Cronbach's α
MS	10	5	5	0.88
A	4	1	3	0.70
E	3	0	3	0.91
PU	4	0	4	0.96
EOA	2	0	2	0.59
C	3	0	3	0.96
UI	3	0	3	0.94

Table 3. Items removed and maintained after scale purification.

After the scale purification, the model was again analyzed and tested for the different samples under analysis. Several model-fit indices were used to assess the measurement model: χ^2/df , GFI, AGFI, NFI, NNFI, CFI, RMR, and SRMR. As shown in Table 4, all the model-fit indices are very close to the recommended values from previous studies, thereby revealing a satisfactory fit to the collected data.

Fit Indices	Measurement Model	Recommended Values
CMIN / DF	2.75	< 3.00
Goodness of Fit Index (GFI)	0.79	> 0.90
Adjusted Goodness of Fit Index (AGFI)	0.73	> 0.80
Normed fit index (NFI)	0.88	> 0.90
Incremental Fit Index (IFI)	0.92	> 0.90
Non-normed fit index (NNFI) or (TLI)	0.91	> 0.90
Comparative fit index (CFI)	0.92	> 0.90
Root mean square residual (RMR)	0.16	< 0.10
Root mean square residual of Approximation (RMRA)	0.09	< 0.10

Table 4. Fit indices for measurement model.

In Table 5, it is possible to observe the main results of the CFA model estimation, including Cronbach's α , the average variance extracted (AVE), and each item's factor loadings. The AVE was not obtained directly from SPSS since it does not directly compute the value (Hair et al., 1998). Instead, the AVE was computed in Excel by the author. These values are calculated using the following formula (Hair et al., 1998, p.612):

$$Variance\ Extracted = \frac{\Sigma\ standardized\ loading^2}{\Sigma\ standardized\ loading^2 + \Sigma\ \epsilon_j}$$

$$\Sigma\ \epsilon_j = \Sigma (1 - \Sigma\ standardized\ loading^2)$$

The reliability and convergent validity of the factors were estimated using Cronbach's α and average variance extracted (AVE) (see Table 5). According to Hair et al. (1998, p.612), "the indicator reliabilities should exceed 0.50 which roughly corresponds to a standardized loading of 0.70." All of the Cronbach's α coefficients were above 0.70, with the exception of the Ease of Access construct due to its nominal scale nature. According to Hair et al. (1998), the variance extracted value (AVE) should exceed 0.50 for a construct. As can be seen in Table 5, all values of the average variance extracted exceeded the minimum value. Therefore, the extracted variance reveals the basis of convergent validity. Furthermore, as shown in Table 5, convergent validity was also demonstrated through the factor loadings of the measurement items. According to Field (2005), factor loadings should be above 0.5 in order to be acceptable. Almost all of the factor loadings were above 0.80. This suggested

the adequate reliability and convergent validity of the measurements. For satisfactory discriminant validity, the AVE from the construct should be greater than the variance shared between the construct and other constructs in the model. The factor loadings reveal the correlation between the original variables and the factors (Hair et al., 2006). According to Hair et al. (2006, p.129), based on a significance level of 0.05, “factor loadings of ± 0.40 are minimally acceptable, the values greater than ± 0.50 are generally considered necessary for practical significance.”

Items	Cronbach's Alpha	AVE	Factor Loadings
<i>Mobile Skillfulness</i>	0.88	0.71	
MS1			0.97
MS2			0.67
MS3			0.97
MS4			0.96
MS8			0.56
<i>Anxiety</i>	0.70	0.50	
A1			0.50
A2			0.83
	A3	0.72	
<i>Enjoyment</i>	0.91	0.78	
E1			0.93
E2			0.91
	E3	0.81	
<i>Perceived Usefulness</i>	0.96	0.86	
PU1			0.95
PU2			0.91
PU3			0.92
	PU4	0.93	
<i>Ease of Access</i>	0.59	0.53	
EOA1			0.50
	EOA2	0.91	
<i>Compatibility</i>	0.96	0.89	
C1			0.92
C2			0.96
	C3	0.95	
<i>Use Intention</i>	0.94	0.84	
UI1			0.90
UI2			0.93
	UI3	0.92	

Table 5. Reliability, average variance extracted, and factor loading of items.

According to Bagozzi and Phillips (1991, p.425), discriminant validity refers to “the degree to which measures of different concepts are distinct.” Consequently, in order to be unique and capture some phenomena that other constructs did not, there should be high values for the discriminant validity (Hair et al., 2006). In fact, a high value guarantees that the construct is significantly distinct from related concepts.

According to Fornell and Larcker (1981), discriminant validity is ensured if “the construct inter-correlations are significantly different from one another, and the shared variance between any two constructs is less than the average variance explained in the items by the construct.”

The discriminant validity is visible in the current model, as shown in the correlation matrix (Table 6), wherein the main matrix diagonal values are calculated based on the squared average variance extracted obtained (Fornell & Larcker, 1981) from Table 4.

Variables	MS	A	E	PU	EOA	C	UI
MS	0.84						
A	-0.34	0.70					
E	0.62	-0.43	0.88				
PU	0.62	-0.40	0.94	0.93			
EOA	-0.21	0.38	-0.31	-0.31	0.72		
C	0.68	-0.58	0.68	0.70	-0.32	0.94	
UI	0.62	-0.5	0.90	0.87	-0.40	0.73	0.92

Table 6. Discriminant validity and correlations of constructs.

According to Hair et al. (2006, p.778), “nomological validity is tested by examining whether the correlations among the constructs in a measurement theory make sense. Face validity must be established prior to any theoretical testing when using CFA.” In fact, it is vital to understand each item’s content and correct meaning in order to define the measurement theory in a correct way.

To test the nomological validity of the model, it was necessary to conduct research and then analyze the scales’ fundamental and founding principles. It was proved that the scales used in the current study passed the nomological validity test. Despite the fact that some of

the constructs have been used in dissimilar contexts, they were revealed to be good alternatives since they still measure the same constructs as before. The scales used were already calibrated and validated by other researchers.

4.1.2. Structural equation model

The conceptual model proposed in this master's thesis (Figure 1) involves various relationships between constructs, which should be tested simultaneously. Consequently, structural equations modelling (SEM) was used in order to validate the model by measuring all the suggested construct relationships simultaneously. As previously stated, the model was computed with AMOS v22.0, with a maximum likelihood discrepancy estimation method. The model has seven constructs, 23 observed variables out of a total of 57, considering measurement and latent variable errors and inter-correlations between the latent constructs. The null model ($\chi^2 = 667.543$, $df = 217$), defined as a single-factor model without measurement errors (Hair et al., 1998), has a statistical significance level of 0.000. The normed chi-square (χ^2 / df) has a recommended level range between 1.0 and 2.0. The current model chi-square equals 3.07 ($667.543/217$), near to the recommended values. The incremental fit index (IFI), Tucker-Lewis index (TLI), and comparative fit index (CFI) all reveal acceptable results. These indices should present values above 0.900 (Hair et al., 1998). In the current model, IFI = 0.91, TLI = 0.89, and CFI = 0.90.

Regarding the root mean square error of approximation (RMSEA), acceptable models typically have values below 0.10, while values that are greater than 0.10 indicate an unacceptable fit (Browne & Cudeck, 1992). According to Thompson (2004), values below 0.08 are desirable and those below 0.05 are considered outstanding. The current model has an RMSEA of 0.10, which represents an insignificant result.

The path coefficients from the SEM analysis are shown in Figure 2, with the standardized parameter estimate in *bold* and the t-value on the other side of the arrow. Only H2, H9, and H10 were supported. Despite not being a supported result, Anxiety tends to have a negative effect on Use Intention (H1). That being said, the more anxious or insecure an individual feels when using a mobile device, the lower the chance of using m-commerce is. Mobile Skillfulness also exhibited a significant negative influence on Anxiety (H2) and an insignificant positive influence on both Enjoyment (H3) and Perceived Utility (H4). If an

individual has more ability to use a mobile device, he will feel less anxious, resulting in a higher probability of enjoying and understanding its purpose. Ease of Access also exhibited an insignificant negative influence on Enjoyment (H5), Use Intention (H6), and Perceived Utility (H7). The more facilitated or granted access to m-commerce is, the less enjoyment, understanding and desire of using it an individual has. Despite positive, there was no significant relationship between Perceived Utility and Use Intention in m-commerce (H8). If an individual understands the purpose and utility of m-commerce, there's a better chance of he trying it. Finally, Enjoyment (H9) and Compatibility (10) had a significant positive impact on Use Intention. There's a higher probability of an individual ending up using m-commerce if this technology fulfils some of his needs and amuses him as well.

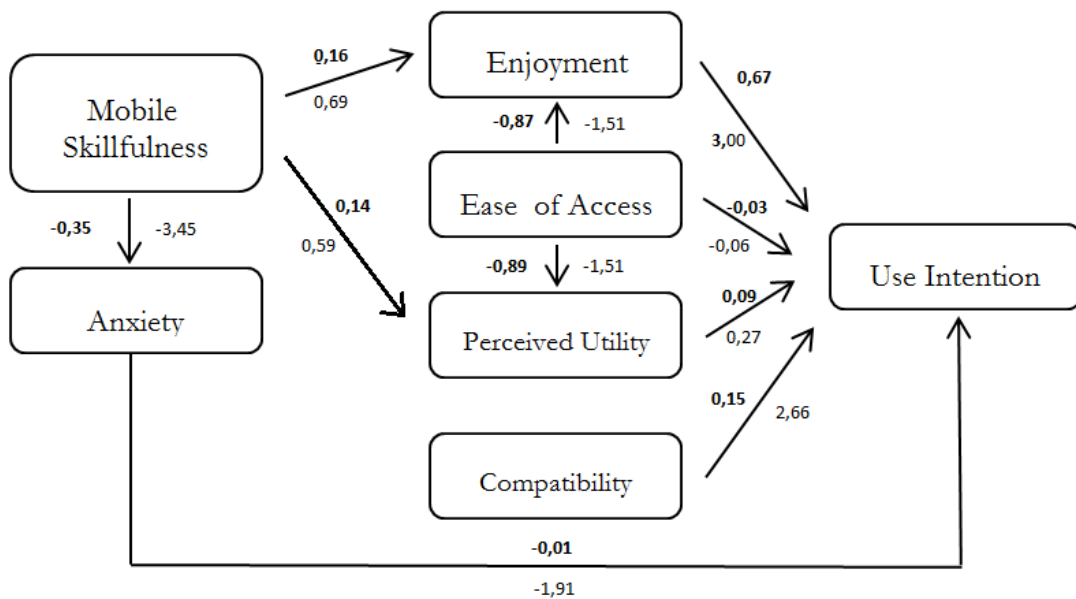


Figure 2: Model Results

4.1.3. Discussion and Conclusion

“What factors influence young Portuguese consumers’ intention to use m-commerce?”

The purpose of this thesis was to investigate the factors that influence young Portuguese consumers’ intention to use m-commerce services and, in fact, whether they are willing to use m-commerce at all. Therefore, in order to answer this question, an evaluation of m-

commerce services was performed from the perspective of emotional states. Previous studies that used the technology acceptance model (TAM) have somehow ignored negative emotions, beliefs in level of capability, and intrinsic motivations. However, this study has successfully included factors such as mobile skillfulness, anxiety about mobile devices, enjoyment in using and purchasing through mobile commerce, and revised TAM factors (perceived utility and ease of access) and applied them in the context of m-commerce.

Besides being satisfactory, the results prove the role of psychological and functional beliefs in human behavior. The results also provide insights into the opportunities and risks that are part of the rapidly changing environment of mobile services.

This study provides six important insights into consumers' behavior, and the outputs represent important information for all m-commerce providers.

To begin with, the study indicates that enjoyment has an evident impact on the intention to use m-commerce. It is interesting to see, through the study's results, that a customer's interaction with m-commerce occurs because the individual gets involved in an activity due to intrinsic motivation (i.e. enjoyment, β 0.67) rather than extrinsic motivation (e.g. perceived utility, β 0.09). Ryan and Edward (2000) claimed that if individuals are in a playful state, they will find the interaction intrinsically interesting and, therefore, they are involved in the activity for pleasure and enjoyment rather than for extrinsic rewards. The results of this study support this opinion. Mobile devices play a systematic role in their owner's life, since they are more at hand and ready for use than traditional personal computers. Also, users normally enjoy a deep connection with their mobile phones. M-commerce applications or systems can be seen as interactive intermediates that may become one of the customer's favorite pastimes/hobbies. So, these findings suggest that operators should aim for their efforts to stimulate customers' intrinsic motivations, especially their enjoyment experiences. In addition, entertainment elements should be integrated into the m-commerce movement.

Secondly, as previous studies had already stated, anxiety was proven to be a negative predecessor of behavioral intention to the purchase act. Individuals who are less anxious when interacting with a system also feel more comfortable using it, so they are more likely to accept the system. Operators should seek to control the complexity of m-commerce systems in order to reduce the negative effect barrier created by customers' worries about

operation errors. Also, design departments should pay attention to any system features that may cause anxiety and work to minimize them.

Regarding mobile skillfulness, this factor plays an important role. It is a precedent of three constructs: enjoyment, usefulness, and anxiety, which have a direct influence on behavioral intentions to use mobile services that can be observed in many ways. Mobile skillfulness indirectly encourages m-commerce purchases and it also has an effect on the use intention, more so than the individuals' perceptions of utility and enjoyment. Additionally, mobile skillfulness plays a vital role in reducing anxiety about mobile technology and enhancing the motivation to use mobile commerce systems. One suggestion regarding this finding is that retailers should offer potential users training or tutorial programs in using mobile devices. Such an initiative would also improve users' performance skills by demonstrating how to purchase products or services. These educational and training programs, designed as they are to help individuals perform advanced mobile phone skills effectively, will both enhance their ability to handle a mobile device and reduce affective barriers to using m-commerce.

This investigation successfully expands the capacity to generalize all of its constructs to the mobile commerce context. This area of research is different from that of prior studies focused on analyzing traditional information systems. Overall, the predictive power of this revised TAM is rigorous. Furthermore, similar to previous investigations, this study confirmed that usefulness exerted a tendentially positive influence on behavioral intention to use m-commerce.

The study's outcome is consistent with the results of recent studies on internet technology-related systems. It is possible to observe that ease of access was an important and direct determinant of an individual's perception of enjoyment and utility. This discovery suggests that operators should pay attention to reducing the user's constraints in connecting with the mobile internet. Operators should not only develop large network systems, since they should also eliminate the inherent effort involved in switching between networks and the struggle with variations in communication quality while in subways, suburbs or remote areas. Despite the non-significant direct effect of ease of access on the intention to use m-commerce, the new construct of ease of access may be valuable in future studies into the

adoption of wireless services. In agreement with previous investigations, usefulness tends to exert a positive influence on the use intention of m-commerce.

Finally, the compatibility factor applied a significant effect on the use intention of m-commerce. This result indicates that a customer's engagement can be achieved by developing compatibility with the customer's values, lifestyle, and needs. A lifestyle that embraces the use of mobile devices, receiving or processing information anytime and anywhere, will influence a person's intention to engage in m-commerce. Operators can capture the attention of potential customers who may have previous experience with e-commerce services. It is not surprising that the early adopters of advanced mobile devices are likely to be well educated and to have a higher socioeconomic status. It is also evident that these individuals are attracted by innovative commercial media and applications. Operators should hence introduce m-commerce in the context of e-commerce services that customers already have experience of.

5. IMPLICATIONS AND FUTURE RESEARCH

5.1. Managerial Implications

This study suggests customers' use of mobile devices as a shopping intermediate with several managerial implications. Communication operators should be aware that the ease of access (EOA), the perceived usefulness (PU), and the enjoyment (E) are the three most essential elements that lead customers to engage with mobile commerce. If operators try to eradicate the difficulty associated with accessing the mobile internet and make it as easy as accessing the computer internet, it could improve customers' perceptions of the helpfulness of accomplishing a transaction through an m-commerce connection. Operators should also pay more attention to not only the useful outcomes of using m-commerce services, but also to the fact that there is an evident fun factor involved in the whole shopping process and, therefore, customers can develop a habit of using m-commerce step-by-step. For example, instead of using old fashioned forums or website instructions and tutorials, using a massive multimedia or animation user interface would better motivate customers to purchase through m-commerce.

5.2. Limitations and Future Research

One of the two major limitations of this study is that there is a significant lack of prior research concerning m-commerce in the Portuguese market. It is hence very difficult to gather information or statistics about m-commerce consumers and m-commerce is often confused with e-commerce, which is the second major limitation.

This thesis suggests three possible directions for further research. First, additional social factors can be added to this model in order to explain the adoption of human communication tools. Second, these results were obtained in only one time period, so longitudinal research would help to develop a better sample of the interrelationships among the variables over time. Third and finally, taking into account the payment system over a mobile connection would be interesting. It is obvious that a great deal of mobile phone subscribers may become mobile commerce customers who should feel safe in the mobile transaction environment. Therefore, the payment security issue needs further investigation in order to enhance customers' engagement and satisfaction with mobile

commerce. Future work in these three areas would not only help to develop a better understanding of m-commerce concepts for researchers, but would also provide valuable data for those involved in endorsing online purchasing to potential mobile customers.

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