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# Trust and privacy in the shift from e-commerce to m-commerce: A comparative approach

Panagiota Papadopoulou<sup>1</sup> and Jean-Eric Pelet<sup>2</sup>

<sup>1</sup>University of Athens, Athens, Greece

peggy@di.uoa.gr

<sup>2</sup>IDRAC International School of Management, LEMNA, IAE-IEMN – Nantes University,  
France

je.pelet@gmail.com

**Abstract.** Trust and privacy have been widely studied as key issues and success factors for e-commerce. The advent of m-commerce calls for revisiting these concepts and re-examining their antecedents in the mobile context. This paper attempts a comparative approach to the issues of trust and privacy in e-commerce and m-commerce. It investigates how trust and privacy are differentiated with the shift from the context of e-commerce to the context of m-commerce. Our analysis is supported by the results of an exploratory qualitative study in m-commerce.

## 1 Introduction

Even if year-over-year sales haven't increased dramatically since the fourth quarter of 2007 (ComScore, 2012), online commerce keeps on growing. Retail as an industry is experiencing important shifts in consumer behavior and the popularity of devices such as smartphones and tablets is having a significant impact on both online and in-store shopping. Some authors such as Serres (2012) or De Rosnay (2012) even talk of "symbiotical men" or "augmented men" or "little thumb" ("petite poucette"), when referring to the prosthesis such devices represent in our everyday life.

Trust and privacy, which have been recognized as issues of major importance in e-commerce, have been demised and retained in m-commerce. Activities such as purchasing online from a mobile site or leaving a comment on a social network, can involve more or less important risks linked to privacy and require trust. However, with the joint use of social networks with location-based applications, it seems that trust as well as privacy perceptions are differentiated. More and more people acquire smartphones, m-commerce is growing very rapidly, however, it remains difficult to explain why people may give away huge amounts of personal data from their mobile

device, without being as reluctant or afraid of any privacy problems, whereas it can sometimes be more difficult to purchase from a “normal” e-commerce website.

The aim of this paper is to offer a comparative analysis of the concepts of trust and privacy in e-commerce and m-commerce. Trust and privacy have been extensively examined in e-commerce and remain prominent in m-commerce. However, the mobile environment and the mobile devices, in terms of their specific characteristics and the nature of the interaction they offer, require a re-examination of these two concepts and the factors that contribute to their establishment or to their lack of.

This paper will try to illustrate the differences which exist between the two contexts, e-commerce and m-commerce. A literature review comparing trust and privacy in e-commerce and m-commerce is presented in the next section. The paper continues with an analysis of the shift from e-commerce to m-commerce, around the pillars of trust and privacy. The section focuses on two directions, the added value offered in the mobile commerce setting compared to the conventional e-commerce one and the privacy paradox that emerges in the mobile context. In support of our analysis, the findings of an exploratory qualitative study related to trust and privacy in m-commerce are presented next. The paper ends with concluding remarks.

## **2 Literature Review**

### **2.1 Trust and privacy in e-commerce**

The lack of consumer trust in online shopping has been recognized as one of the major impediments for the success of e-commerce. Trust and its establishment have been related to consumer perceptions of privacy and security. Perceived privacy and security, in terms of handling consumer’s private data, associated with a website has been found to influence trust (Flavian and Guinaliu, 2006). In a study of the adoption of social networking services, perceived privacy and perceived security were examined as the chief determinants of user trust (Shin, 2010). However, as the author notes, in the social networking services context, the effect of perceived privacy on trust is not as significant as showed by studies in the traditional e-commerce. The findings also include a strong effect of privacy on security.

Privacy is also the topic of a recent study (Schwaig *et al.*, 2012), which showed that consumers concern for information privacy is influenced by individual differences, namely self-esteem, consumer alienation and computer anxiety.

Privacy as a concept is closely intertwined with control. In e-commerce, there is a reported consumer demand for control over their personal data, in terms of disclosure or use. Disclosure of data would not aim at establishing intimacy but could be elicited by the potential of financial rewards, increased information and improved services as well as by the reputation of the vendor. Consumer demand for control also involves the ownership of the personal information collected and its use by vendors. The provision of control of personal data to consumers, together with the vendor’s reputation can both lead to reduced perceptions of risk and in turn to trust (Olivero and Lunt, 2004).

Privacy has also been linked to personalization. In e-commerce, personalization refers to tailoring and recommending products and services according to specific consumer characteristics, based on knowledge about their preferences and behavior (Adomavicius and Tuzhilin, 2005). Personalization and privacy are linked with a paradoxical relationship. According to Lee and Cranage (2011), personalization implies customer disclosure of personal information, since rich data are needed for delivering personalized offerings. In this sense, personalization can create privacy concerns, as customers feel that their privacy is invaded for the provision of personalized services. At the same time, personalization and positive perceptions of it, such as the perceived usefulness of personalized services, have a positive effect on customer willingness to share personal information.

The personalization – privacy paradox holds also in the mobile setting. Xu *et al.* (2011) examine the privacy personalization paradox in the context of location-aware marketing. The study is further analyzed in the next section.

## **2.2 Trust and privacy in m-commerce**

Lee (2005) studied trust in the m-commerce environment with an interactivity orientation. Five interactivity components, perceptions of user control, responsiveness, connectedness, ubiquitous connectivity and contextual offer were shown to be factors influencing trust.

Yeh and Li (2009) found that customer trust towards a vendor in m-commerce is affected by customization, as a dimension of the mobile vendor's website quality, customer satisfaction towards the vendor and brand image, as a dimension of the mobile vendor quality. Their model also included the interactivity of the mobile vendor's website quality as well as the responsiveness of the mobile vendor's quality, however their effect on trust was not found to be significant.

Zhou (2011a) has examined trust in the context of mobile banking. His empirically tested model shows that trust is affected by structural assurance, information quality, trust propensity and system quality. Trust in turn affects perceived usefulness and usage intention. In Zhou (2011b), the author examined the critical success factors of mobile website adoption. Trust was found to be influenced by system quality, service quality and information quality of mobile websites. Trust was also an antecedent of satisfaction together with perceived ease-of-use and perceived usefulness.

However, in Suki (2011), an opposite relationship between trust and satisfaction is presented. The findings of the study reveal that users' trust in the vendor or the service/application of m-commerce is affected by their satisfaction with the vendor or the service/application of m-commerce. Similarly, Hung *et al.*'s (2012) work on repurchase intention in m-commerce found that trust in mobile shopping is influenced by satisfaction with mobile shopping. The same study showed that confirmation of expectations with mobile shopping is also a determinant of trust.

Siau *et al.* (2003) suggested that trust in m-commerce encompasses privacy of customer information and security of mobile transactions. They proposed a framework in which trust antecedents, apart from the factors that have been identified in e-commerce, such as vendor and website characteristics, include technology related

factors. These involve technology of wireless services, technology of mobile devices and technology of mobile websites. Technology related factors are proposed to be the main barriers of trust in the conduct of m-commerce.

Xu *et al.* (2011) examine privacy in location-aware marketing, through the privacy calculus model. Personalization is positively associated with perceived benefits and perceived risks of information disclosure, which are both antecedents of perceived value of information disclosure. In a more recent study, Zhou (2012) focused on location-based services and their usage intention. His results showed that privacy concerns are negatively related to trust.

A summary of the literature on mobile commerce related to trust and privacy is presented in Table 1.

Study	Topic	Dependent variable	Antecedents	Consequences
Zhou (2011a)	Initial trust in mobile banking	Usage intention	Usage intention antecedents: initial trust, perceived usefulness. Trust antecedents: structural assurance, information quality, trust propensity and system quality	Perceived usefulness and usage intention.
Yeh and Li (2009)	Customer trust towards	Trust	Customization, satisfaction and brand image	
Siau <i>et al.</i> (2003)	Trust in mobile commerce	Trust	Vendor characteristics, website characteristics, technology of wireless services, technology of mobile devices, security framework	
Zhou (2012)	Usage intention of location-based services	Usage intention	Usage intention antecedents: performance expectancy, social influence, facilitating conditions, trust, perceived risk. Trust antecedents: privacy concerns	Perceived risk, usage intention
Zhou (2011b)	Mobile websites adoption	Satisfaction	Satisfaction antecedents: perceived ease-of-use, perceived usefulness, trust. Trust antecedents: system quality, service quality and information quality	Perceived usefulness, satisfaction

Study	Topic	Dependent variable	Antecedents	Consequences
Lee (2005)	Interactivity and trust in m-commerce	Behavioral intention to use m-commerce	Behavioral intention to use m-commerce antecedents: trust, attitude towards using m-commerce and contextual offer. Trust antecedents: user control, responsiveness, connectedness, ubiquitous connectivity and contextual offer	attitude towards using m-commerce, behavioral intention to use m-commerce
Suki (2011)	Satisfaction and trust in	Trust in the vendor	Satisfaction with the vendor	
Hung <i>et al.</i> (2012)	Determinants of mobile shopping continuance	Continued intention toward mobile shopping	Continued intention toward mobile shopping antecedents: satisfaction, trust in m-shopping. Trust in m-shopping antecedents: satisfaction, confirmation	continued intention toward mobile shopping
Kao (2009)	Transaction trust on m-commerce	Intentions to adopt m-commerce	Transaction trust (business trust, experience-based trust, security)	Intentions to adopt m-commerce
Xu <i>et al.</i> (2011)	Personalization-privacy paradox in location-aware marketing	Purchase intention	Purchase intention antecedents: Willingness to have personal information used in location-aware marketing. Perceived benefits and perceived risks of information disclosure antecedents: personalization	perceived value of information disclosure

**Table 1.** Summary of literature on trust and privacy in m-commerce

### 3 The Shift from E-Commerce to M-Commerce

In e-commerce, trust formation has long been recognized as a demanding, continuous and complex process, which involves numerous elements from both a technical and business perspective. M-commerce inherits the issues that online vendors had to address to in traditional e-commerce environments. Trust and trust-related questions such as privacy and security remain important for m-commerce adoption (Siau and

Shen, 2003). Despite the similarities between e-commerce and m-commerce and the common approaches toward the difficulties they share, trust formation in m-commerce can be different from trust formation in the traditional e-commerce context. This can be largely attributed to several factors which can be largely grouped into two categories, the specificities of the mobile devices and the specificities of the wireless telecommunications.

The specificities of the mobile devices include differences in the interface and a limited screen size, which sometimes imply limited features and functionality compared to those available in desktop and laptop computers. These characteristics related to mobile devices can be mapped onto perceptions of the ease-of-use and usefulness of using mobile websites.

Wireless telecommunication may also affect perceptions of security, which were inherited from e-commerce but are even more salient in the m-commerce setting. In a recent study of Lu *et al.* (2012) in the context of consumer-to-consumer e-commerce trust toward a platform was revealed to be a much stronger determinant of user satisfaction than perceived platform functionality.

### **3.1 The mobile added value**

Forrester Research reports that approximately half of all tablet users are using their devices for shopping purposes (2012). A smartphone can be more convenient than a laptop or desktop to get a product or service. Firstly because we have it everywhere at any time, making of us ubiquitous citizen consumers. Secondly, and most importantly, smartphones own already stored information that enhances the speed of shopping, from the entrance in the online shop, to the payment.

The use of mobile devices for conducting online commercial transactions offers a number of possibilities that were not present in conventional e-commerce. Customers that need to have an actual look and feel of products before buying them now have the possibility to visit a store, see and experience the product of interest and then use their mobile device to buy it online. This is called “showrooming”, an activity which is becoming common in brick-and-mortar stores, as reports show that 53% of mobile consumers use their device to “showroom” products (ComScores, 2012). This is particularly useful when products have a cheaper price online than in store.

Another possibility is using mobile devices for comparison shopping while being in a brick-and-mortar store, to find the lowest price or the best deals online. The capability to use mobile phones to search and shop online while in brick-and-mortar stores creates one more advantage for Internet sellers with the right pricing and products. Customers now compete with retailers even when they are in their store.

Convenience is important too since people want to be able to shop anytime. Daily specials can be an important way of gaining consumers. Indeed, new online shopping models such as daily deals and flash sales are generating excitement and impulse purchases. They are made easier if they can be done anywhere at any time. More and more consumers are saving money by shopping only when sellers provide discounts or coupons (ComScore, 2012) and over 35 percent of shoppers regularly look for deals online. A “mobile benefit” would therefore exist, with the embedded capability



we now have to compare shops, looking for products, and purchasing from our smartphones and tablets. Consumers seek out and disseminate information about a product using social media and are not reserved about providing their views and opinions.

Among the elements that contribute to the massive use of mobile devices, is the growth in social media usage in shopping activities, also called “social shopping”. Social networking is one of the most important factors in mobile shopping. Today consumers are not passive shoppers, but they are active contributors to the shopping activity. They will abandon any company that does not serve their needs or is perceived as not giving value to them. If companies do not allow its customers to share items, or any other information, they may miss some customers that are used to communicate and get information from social network contacts before making any shopping decision. The instantaneous views on consumer profiles, m-commerce and the development of mobile tools (e.g. smartphones, tablets) reinforce the appetite consumers have for this “communication swiss-knife” style.

### **3.2 Privacy concerns of social networks and location-based applications: a paradox**

People live with their mobile devices, and mobile phones, in particular, have become a personal tool in the sense that people use them anywhere, anytime, for a range of tasks, for example to check their email or even set their alarm. Although, in general, people may use different computers at different places (e.g. at work, at home, etc), they usually have one mobile phone, which belongs to them and they are not willing to lend it. As such, using a mobile gives the impression that privacy is protected as it is a personal tool. Thus, people will probably take more risks with their mobile than with their computer.

Users are sometimes not aware that when they sign up for a social network service, they are giving away information to third parties, affiliates, partners, agencies, companies, etc. The latter can learn information that people would rather keep private and use it to target customized advertisements to them. By knowing prospect or customer location, at a specific time with the help of GPS, users could suffer from bombardments of advertising specifically targeted to them, not only via email or SMS/calls on their mobiles but also on public visual advertising i.e. assuming that public billboards will target ads specifically to customers through push GPS and social network applications.

All users’ data is available on mobiles, in the applications to which users subscribe. Thus, companies have access to an incredible amount of data. This raises a question of ethics, regarding the use of the collected data. The data lifecycle problem must be seriously taken into consideration for m-commerce. Several issues may arise in this direction. Which data exist? How are they collected? How are they protected? Where are they stored? How are they used? Who are they shared with? How are they destroyed?

The relative novelty of mobile devices could possibly explain why people are not really aware of their threats yet. The screen is smaller and it looks more intuitive and

visual, thanks to the lack of keyboards for some of them, which can drive more spontaneous behaviors sometimes. There is no anti-virus on mobiles giving users the impression that it is safer than a usual computer. There is less prevention from risks in comparison to computers, probably because less important information is stored into a mobile device. This can develop trust towards m-commerce and m-philosophy in general, since a link between a fun aspect and social aspect is established while doing business, particularly with the use of social networks.

By downloading an application, the user will use a tool that fits perfectly to the screen and may think that it is simplified in comparison to usual computers. The simplicity of mobile applications allows users to share information much faster. It makes users not think about the consequences of sharing the information as they normally would, but rather wanting to get it out as fast as possible – “on the spot”. It seems that self-disclosure of personal data is easier in mobile settings as convenience outweighs the risk of privacy. At the same time, there is a lack of applications on computers such as those that have been created for mobile devices, which facilitate the process of sharing information. Time pressure can entice users to prefer mobiles for such applications which are ready and faster to use than on computers. Transactions costs, in terms of time and money, are lower when using mobiles rather than computers because there are fewer stages. Customers thus prefer to use their mobiles for certain tasks.

Users being less risk-averse towards m-commerce could also be due to other features of the mobile context. It is easier to connect everywhere with an internet-enabled mobile device. Finally, participating in social networks via mobile devices and using location-based application in particular, is also a way to stay connected all the time with contacts.

#### **4 Exploratory study**

An exploratory qualitative study has been conducted seeking to understand consumer perceptions and behavior related to mobile devices and social networks. According to our knowledge, research combining social networking services, m-commerce and trust is scarce, thus an exploratory approach of the topic, with a survey-based method using short interviews seemed appropriate. The main objective of this study is to investigate if the use of social networking applications on mobile devices is common, and if so, if users were influenced in shopping on m-commerce websites after using these social applications. In this direction and in an attempt to elicit data from consumers, the study has been conducted asking questions related to the following topics: use of social network systems on mobiles, use of mobiles for shopping, emotions and feelings felt following the visit of a mobile commerce website, factors affecting behavior with mobiles and social networking services and perception an “ideal” m-commerce website. Questions were structured and open, allowing for low duration interviews. Every interview, the duration of which ranged from 20 to 25 minutes, was re-transcribed offering a verbatim of around 80 pages corresponding approximately to 6 hours of recording.

Sample selection was primarily based on qualitative criteria. To follow the criteria of data saturation (Mucchielli, 1991, p.114), we interviewed 21 students. Students are deemed suitable as a sample even if their use has often been questioned in terms of their appropriateness. They share many characteristics with the profile of mobile and Internet users' population, such as age. As shown by several studies, Internet users tend to be young adults, while the Internet usage penetration within the age groups of 18–29 years raises up to 95% (Zickuhr, 2010; Pew Research Center, 2010). Hence, although our sample presents a bias towards younger subjects, it can arguably be acceptable as representative of Internet and mobile users. In addition, our study benefits from the use of students since they are considered as an important group of online consumers (Delafrooz et al, 2010) and are useful as a sample for empirical studies in m-commerce, in line with previous research (e.g. Kim et al, 2008). We adopted a neutral attitude when interacting with them so as not to influence their answers. Participants were questioned without being allowed to look at their mobile phone. This was to ensure that they answered only using their memory to access the information reinforcing their use of the combination of social networking services and m-commerce websites of their choice. The sample was selected using a mix of age, gender and socio-professional background, in order to obtain a homogeneous sample.

On the topic of trust, when respondents are questioned about what encourages them to trust a particular social network/application and not another, we observe that peer recommendations represent an important reason why trusting an m-commerce website. Thereby, when “it is popular” (6/21) especially into the network of the respondent, when the “social network/m-commerce” application “has been heard from friends”, 7/ 21 respondents seem more interested in the m-commerce website. On top of that, privacy concerns arise. “If it respects our privacy when sharing info” (4/21) and “when many other people trust it and have it” (5/21), respondents are inclined to install a social network application or visit an m-commerce website. Like for e-commerce, “when there is a special safe paying system like paypal” (3/21) respondents accept to pursue this initiative to reach a new m-commerce website. Finally, the application itself “*must be well-known*” by 2/21 respondents in order to trust it.

## 5 Discussion

The rapid growth of mobile commerce is associated with an increasing level of consumer experience with mobile devices. As mobile commerce grows to be an alternative shopping channel to traditional e-commerce, the effects of factors influencing online shopping may change accordingly (Zhou *et al.*, 2007). Trust and privacy remain high in the agenda of m-commerce success factors, both with a somewhat contradictory contribution, as enablers and at the same time as inhibitors of m-commerce. This dual role is especially evident when m-commerce is bundled with social networks and location-based applications.

As Xu *et al.* (2011) suggest, the conceptual structure of the personalization privacy paradox is context dependent. This can be deemed as the outcome of the contextualized value of the content delivered to customers in mobile environments, especially

with location-based services. Personalization in location-based services involves tailoring content to individual customers' interests, location, identity, activity and time (Junglas and Watson, 2006). With the advent and widespread adoption of social networking and location-based services and applications, the need for personalization transforms to a need for a feeling of participation. The joint use of social networks and location-based services through mobile devices allows for ubiquitous presence and participation. This possibility can boost their self-esteem and create a feeling of belonging to a community, where they can be constantly in touch with others. Consumers in order to leverage this new value inherent in these applications available anywhere, anytime seem to be willing to release personal data, probably with even less reluctance than for just having personalized content. In this sense, the shift from e-commerce to m-commerce also seems to signal a shift from the personalization-privacy paradox to a participation-privacy paradox.

Identifying mobile users with these characteristics is important for online vendors with a mobile presence. M-commerce websites and applications can achieve collection of data in exchange for consumers' feelings of active participation and social presence. In addition, Ranganathan *et al.*'s (2006) study on mobile users and their switching behavior showed that mobile users should be distinguished and treated differently according to their usage pattern of mobile services. Mobile users who use their mobile services for social, non-work related purposes are more inclined to switch providers than users who use the services more for functional and work-related needs. Therefore this user category should also be taken into account from mobile providers to ensure customer loyalty.

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