Technological Forecasting & Social Change 120 (2017) 32–40

Contents lists available at ScienceDirect

Technological Forecasting & Social Change

journal homepage: www.elsevier.com/locate/techfore

Predictive and explanatory modeling regarding adoption of mobile payment systems

F. Liébana-Cabanillas[a,*], J. Lara-Rubio[b]

[a] Marketing and Market Research Department, University of Granada, Spain
[b] Financial Economics and Accounting Department, University of Granada, Spain

ARTICLE INFO

Keywords:
Mobile payment
Adoption
Merchants
Intention to use

ABSTRACT

Commercial activities have evolved during the past decade from a single-channel focus and perspective on business opportunities to a multiple-channel approach, with mobile phones playing a major role in the most recent and latest business opportunities. Even if mobile payment systems are still under development and steadily becoming available worldwide, many experts have already pointed to them as the potential payment system of choice taking into account its high penetration level within our society, its accessibility and ease of use. This paper explores the adoption of mobile payment systems from the point of view and perspective of the merchants. In order to provide a comprehensive analysis, this research extensively reviewed existing literature and determined the main factors influencing the adoption of mobile payment systems approaching a methodology involving both a logistic regression modeling and a neural network analysis. Results of these different analyses show that the neural network analysis is the most precise tool in this research when predicting the use of mobile payment systems in certain business. According to these results, some suggestions are proposed to incentive and encourage the intention to use of these mobile payment systems regarding each participant in the adoption process. Finally, this paper discusses some factors regarding future research opportunities.

1. Introduction

Thanks to the implementation, development and also acceptance of the new technologies, business management has seen different major changes in recent years. Even though Internet trading is still seen as a critical asset with the highest potential for business companies in regard of new technologies (involving a drastic change in consumers' purchase habits and also mediating the established successful relationships between consumers and merchants, as reported by Sharma and Sheth, 2004), other commercial activities derived from this new type of commerce are still at an emerging, underdeveloped, or immature stage (such as mobile commerce or mobile payment systems, as reported by Liébana-Cabanillas, 2012).

Commercial activities have evolved over the last decade for many companies from a single-channel (monochannel) perspective to a multi-channel perspective, where new commercial formats allow easier interaction with their users and also between them, improving corporate results (National Retail Federation, 2011). In this regard, mobile phones have completely changed the already outdated traditional channels for offline and online relationships between customers and companies. The so-called Information Society keeps developing in a significant way and, according to a recent report published by Fundación Telefónica España (2015), mobile telephony has reached in 2014 a global penetration rate of 95.5 telephone lines per 100 inhabitants (2.4 percentage points over the previous year), meaning that nowadays there are more than 6.6 billion telephone lines in the world. Europe is the region with the highest penetration level, with over 120 telephone lines per 100 inhabitants. These results have directly improved statistics on mobile commerce. As the Online Business School's report on electronic commerce (2014) indicated, 27% of the online purchases in 2013 originated on mobile terminals (an increase over the previous year of 55% regarding the Spanish market). On the other hand, a recent report endorsed and originated by PayPal and carried by the independent consulting firm Ipsos (2015) concluded that mobile payment will grow by 48% in 2015 in Spain, well above growth projections for online commerce in this particular country during the same period of time. Ipsos' study also concluded that the factors and variables that users value the most when purchasing through smartphones or tabletsare the significant speed of the payment process (36%), eliminating the need of a physical wallet (24%),the

* Corresponding author at: Marketing and Market Research Department, Faculty of Economics and Business Administration, University of Granada, Campus Universitario La Cartuja, s/n, E-18071 Granada, Spain.
E-mail address: franlieb@ugr.es (F. Liébana-Cabanillas).

http://dx.doi.org/10.1016/j.techfore.2017.04.002
Received 21 July 2016; Received in revised form 8 March 2017; Accepted 2 April 2017
Available online 22 April 2017

simplification of the actual payment process (22%), the innovative character of the payment method (21%), the immediate confirmation and verification of a successful payment completion (20%), the ease of use (19%) and finally the fact that merchants cannot access personal financial data (16%).

Additionally, mobile payment systems are also seeing an increase in terms of their intention to use. According to Omlis, a provider of global mobile payments solutions, and to Capgemini's World Retail Banking Report (2015), there are only 1.3 billion active credit and debit accounts worldwide, but taking into account that there are more than 5 billion active mobile phone lines, there is and observed and clear potential for the widespread application of mobile payments. By the end of 2013, there were an estimated of about 245 million mobile payment users (with Juniper Research predicting that this figure will almost double within the next years up to 450 million mobile payment users by 2017). Regarding M-commerce value, Gartner predicts that the total amount of mobile payment transactions is expected to reach $507 billion in 2014. Worldwide adoption of mobile payments is on an upward trend, but its traction depends on consumers' access to new technologies, their changing and varying lifestyle choices and also on multiple, different economic factors.

Regarding the situation of mobile payment systems from the merchants' perspective, according to a survey for merchants conducted by the Spanish National Observatory of Telecommunications and Information Society (ONTSI, 2015), almost 100% of both small and medium sized enterprises have access to Internet-enabled computers with active email addresses (94.28% to be precise). However, only 15% of them offered online sales. On the other hand, Tecnocom's report (2014) on trends in mobile payments analyzed the demand of e-payments (electronic payments) and concluded that, in Spain, mobile payment systems have yet to consolidate as an alternative to other systems of electronic payment. In light of that information, several key differences can be identified between users/customers' needs in terms of purchases and payments and also the rate at which the sector is meeting those needs.

To this day, multiple studies have examined the adoption of mobile payment services and systems from the perspective of the users. These studies approach classic behavioral models (Liébana-Cabanillas et al., 2014a,b, 2015; Slade et al., 2015) but there is no actual empirical evidence assessing the adoption of mobile payment systems from the perspective of the merchants; this research specifically aims tom fill the existing gap in this regard. In this sense, the purpose of this research is to explore the determinants of mobile payment systems from the merchants' perspective through a comprehensive review of the literature and a quantitative research involving both a logistic regression modeling and a neural network analysis in order to find the driving factors and the deterrents influencing the use of mobile payment systems in the different commercial activities. Conclusions and implications for both drivers and deterrents are drawn from the obtained results and, also, from the data gathered in this research. Finally, possible future research opportunities are approached.

2. Determinants in mobile payment systems' adoption

Mobile payment is considered by many experts as one of the applications with the greatest potential in this sector, even referring to it as the future “star” or “killer” application in mobile communications (Ghezzi et al., 2010; Hu et al., 2008; Ondrus et al., 2009). Mobile payment can be defined as any type of individual or business activity involving an electronic device connected to a mobile network thus enabling the successful completion of an economic transaction (Liébana-Cabanillas, 2012). Dahlberg et al. (2008) suggested an analysis of the relevance of mobile payment systems taking into account both Porter's Extended Rivalry Model (1998) and the Generic Contingency Theory, which emerged from the work of Lawrence and Lorsch (1967), Perrow (1967) and Thompson (1967) as shown in Fig. 1; the

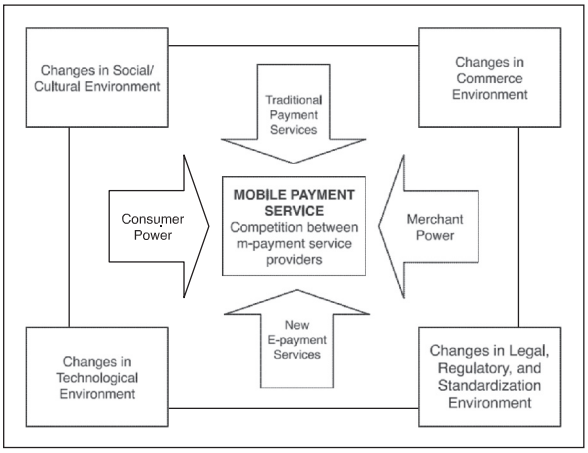

Fig. 1. Framework used to classify literature regarding mobile payment.
Source: Dahlberg et al. (2015a).

inner part represents both the actors and factors which mediatea particular mobile payment service market with the help of concepts taken from the Porter's Five-Forces model. The outer part describes contingent factors impacting the market with concepts derived from the contingency theory. As a result, the framework actually describes both the actors and factors of a market, as well as the competitive forces and the respective environment. Every actor involved in this framework has already been explored and analyzed in multiple instances as Dahlberg et al. (2015a) stated in a recent research approaching studies and researches of the past 8 years published as conference and journal articles.

As Dahlberg et al. (2015a) suggested, even if research on behavioral aspects concerning merchants is rather limited and constrained (Mallat and Tuunainen, 2008; Lai and Chuah, 2010, Silenzi, 2012; Hayashi and Bradford, 2014) this research suggests that a pioneering study is also necessary. Traditionally, the focus has mainly been on drivers and inhibitors to adoption. Research has approached the behavioral aspect of consumers, based on technology acceptance models and other adoption theories focus on traditional constructs such as the ease of use, utility, and also on behavioral intention. Also, other factors such as trust, security and privacy play a key role as well (Liébana-Cabanillas et al., 2014a; Slade et al., 2015; Dahlberg et al., 2015b). In light of these findings, this research suggests approaching the rate of adoption from the merchants' perspective.

The most significant drivers mediating the adoption of mobile payments have been found to be related to the ubiquity (Mallat and Tuunainen, 2008) and personal nature (Jarvenpaa and Lang, 2005) of the devices and services (Mallat and Tuunainen, 2008). In this sense, mobile payment systems positively influence both the mobility and ubiquity of payments providing easy access and instant transactions (Mallat and Tuunainen, 2008) thanks to the high level of penetration of mobile phones in our society, contributing to the added value of goods and services offered by business companies to their customers and users.

Considering these drivers influencing mobile payment systems, aparticularly increased presence and implementation of the new systems and protocols regarding usage of mobile terminals is observed due to the high level of penetration in our society and also thanks to the ever-growing services they offer (Heim and Sinha, 2005), improving both familiarity and comfort while using these new payment systems (Ramakrishna and Naik, 2014). In addition, security improvements being implemented in this sector, perceived by users, will also further drive the final use of the new mobile payment systems (Sahut, 2006).

In spite of the relevance of these payment systems in the present day, different studies have brought some inhibitors of said payment