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Understanding consumer acceptance of mobile payment services: An empirical analysis

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ABSTRACT

Mobile technology has become increasingly common in today's everyday life. However, mobile payment is surprisingly not among the frequently used mobile services, although technologically advanced solutions exist. Apparently, there is still a lack of acceptance of mobile payment services among consumers. The conceptual model developed and tested in this research thus focuses on factors determining consumers' acceptance of mobile payment services. The empirical results show particularly strong support for the effects of compatibility, individual mobility, and subjective norm. Our study offers several implications for managers in regards to marketing mobile payment solutions to increase consumers' intention to use these services.

1. Introduction

Driven by the increasing mobility of today's modern society, the number of mobile phone accounts has sharply increased in recent years and the mobile telephony industry has grown significantly. In line with these developments, mobile services have increasingly become a part of everyday life (Hwang et al. 2007). In particular, some growth forecasts for *mobile payment services* have been very positive. The management consulting firm Arthur D. Little, for example, predicted a growth of mobile payment services from US$11.7 Billion in 2005 to US$37.1 Billion in 2008 (Arthur D. Little 2004). This number would have accounted for about 8% of the total mobile services market in 2006. Despite these encouraging forecasts, however, the reality looks quite different, and the situation is often disappointing for those firms offering mobile payment services. In 2008, only 1% of all cellular users had used mobile payment services (Gartner Group 2009). Thus, the actual market penetration of mobile payment services strongly deviates from previous predictions.

This observation leads to the question of why consumers have not adopted mobile payment services. Prior research has provided a rather limited understanding of the key drivers in consumer acceptance of mobile payment services. A comprehensive study about such factors offers the potential to derive important managerial implications regarding how mobile payment services could be marketed more effectively, thus leading to greater consumer acceptance. This is important because the number of firms already offering, or interested in, adopting mobile payment options has steadily increased, and guidance is needed on how managers can effectively boost the number of customers who choose this form of payment as an alternative to more traditional payment services. Given the high practical relevance and dearth of prior empirical work, the current research aims to develop and test an integrative model of factors determining consumers' acceptance of mobile payment services. For this purpose, we collected data from a representative sample of 1447 respondents and used the structural equation modeling software EQS to test a theory-based research model of mobile payment acceptance. Our results reveal major drivers of consumers' intention to use mobile payment services. Among the most important drivers are perceived compatibility

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(the degree to which mobile payment is reconcilable with existing values, behavioral patterns, and experiences), individual mobility (the degree to which an individual pursues a mobile lifestyle), and subjective norm (the degree to which the social environment perceives mobile payment as desirable).

This article has two main contributions. From a conceptual viewpoint, we develop a model that is based on various theoretical fields which are relevant to the consumer motives for using mobile payment solutions. This allows us to draw a broader and more holistic picture of the drivers of consumer acceptance of mobile payment services compared to previous research. From an empirical viewpoint, we make a contribution by testing this model with a large sample, which enables us to conduct several stability tests in order to increase confidence in the findings. Providing reliable, confirmatory evidence regarding the relevance of various acceptance factors is particularly important since prior research on mobile payment has primarily been qualitative in nature.

The outline of the current article is as follows: First, we define the key terms used in our research and elaborate on the theoretical basis—the technology acceptance model (TAM), which provides the general structure for our research model. Subsequently, we review previous work on mobile payment acceptance. Building on theory and extant knowledge about the phenomenon of consumer acceptance, we present our hypotheses, specifying a set of factors that are proposed to directly or indirectly determine consumers' intention to use mobile payment solutions. In the section on methods, we describe the survey and discuss the validity and reliability of the empirical data. We then present our substantive results and stability checks. The paper closes with a summary of the key findings and a discussion of the implications of the research.

2. Conceptual foundations

2.1. Terminology

Mobile payment services can be considered a special form of the electronic handling of payments. Looking at existing definitions, we find several distinct commonalities and differences. Most conceptualizations emphasize the mobile device as the key characteristic distinguishing mobile payments from other forms of payment. Some authors focus on cell phones (e.g., Henkel 2002), while others include all mobile communication devices (e.g., Zmijewska and Lawrence 2006). Regarding the function of mobile payments, all definitions refer to the transfer of monetary value. Differences can be found when it comes to the phases of the payment process that are considered to be part of the mobile payment. Henkel (2002), for example, refers to the authorization and initiation of the payment process in his definition, and Dahlberg et al. (2008) also include this realization, i.e. the execution of the payment, in their definition. In the current study, we adopt a broad view of mobile payment services and examine all payments for goods, services, and bills authorized, initiated, or realized with a mobile device. However, since acceptance drivers in a B2B context may differ from consumer acceptance, we focus on consumers as the users of mobile payment services.

The second key term used in this research is *consumer acceptance*, which we define as the relatively enduring cognitive and affective perceptual orientation of an individual. Similar to previous work, we use the construct of intention to use as a proxy for consumer acceptance (Mathieson 1991; Venkatesh and Davis 2000). This is a particularly suitable concept since empirical findings underscore the idea that intention to use is an appropriate predictor of later usage (Sheppard et al. 1988).

2.2. Theoretical background

In the IT/IS literature, a variety of models have been advanced to explain innovation usage (Venkatesh et al. 2003). Among them, the *technology acceptance model* (TAM), proposed by Davis (1989), has evolved as the most popular (Chau and Hu 2001). It can be considered the most influential extension of the theory of reasoned action (TRA) and the theory of planned behavior (TPB), replacing variables related to attitude and behavioral control with technology acceptance measures (Bagozzi 2007).

The benefits of TAM include reliable instruments with excellent measurement properties, conciseness, and empirical soundness (Pavlou 2003). Moreover, TAM compares favorably with alternative acceptance models in explaining a substantial proportion of the variance in usage intentions (Venkatesh 1999). TAM also applies to a wide range of research questions, including wireless LAN usage (Yoon and Kim 2007), adoption of internet banking (Lee 2009), and attitude toward self-service solutions (Dabholkar and Bagozzi 2002). Therefore, even if TAM was originally intended to predict IT system use in the workplace, the TAM variables can also be employed to predict consumer acceptance in a variety of settings.

Although very useful in explaining behavioral intention, we posit that certain extensions to the model are required to explain the intention to use mobile payment services. It has been suggested that the TAM is too parsimonious and should be expanded by factors particularly relevant to the specific technology under investigation (Venkatesh and Davis 2000). Also, integrating variables from related theoretical perspectives can provide a better understanding of consumer acceptance (Nysveen et al. 2005). Thus, we regard the TAM as a starting point of our research and extend it with additional constructs important to mobile payment acceptance. In doing so, we heed the call for additional research that broadens and deepens TAM by introducing new variables, as well as explaining and reconceptualizing existing variables in the model (Bagozzi 2007).

2.3. Literature review

Reviewing the relevant literature, we find that only a rudimentary understanding exists about the drivers of mobile payment acceptance. There appear to be three groups of researchers that have published empirical work on this topic. In a survey-based study, Linck et al. (2006) asked consumers which characteristics of mobile payment applications they perceive as particularly relevant. The authors present an analysis of frequencies, indicating that consumers prefer simple, secure, and inexpensive payment services.

The work by Zmijewska, Lawrence, and Steele aims to develop a user-orientated taxonomy of mobile payment systems (Zmijewska and Lawrence 2006; Zmijewska et al. 2004a,b). They classify existing mobile payment systems, evaluating those systems based on a set of consumer-oriented criteria. Relevant classification dimensions include factors such as simplicity, security, and costs. An examination of the relative importance of those dimensions, however, was not included.

The work by Dahlberg, Mallat, and Öörni also needs to be noted (Dahlberg et al. 2003; Mallat 2004). Based on group interviews, they analyzed factors contributing to the acceptance of mobile payment systems. Their empirical study included 61 consumers within various age groups and from different professional backgrounds. The participants' comments during open discussion rounds were subsequently coded by the researchers, yielding three relevant factors related to mobile payment acceptance: perceived ease of use, perceived usefulness, and trust. The results were interpreted as confirming the general applicability of the technology acceptance model in the context of mobile payment services. However, given the nature of the data, no confirmatory test of this prop-