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NFC mobile credit card: The next frontier of mobile payment?

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ABSTRACT

With the advancement of mobile devices and the emergence of Near Field Communication (NFC) technology, payment today is a mere wave-of-the-phone. However, the adoption of mobile credit card (MCC) is still not widespread despite its potential as documented. Premised on this, the study extends the Technology Acceptance Model (TAM) with four additional constructs. The moderating effect of gender was also examined. Data collected from 156 respondents were analyzed using Structural Equation Modeling (SEM) and multi group analysis. Cohen's *f*-square statistic for effect size is 0.815. The results revealed that only finance-related risks and the moderating effect of gender are the non-significant factors in this study. The research provides useful theoretical and managerial implications for mobile phone manufacturers, merchants, bank decision makers, software developers, governments and private practitioners when devising their marketing campaigns and business strategies. The study also extends the applicability of TAM in the area of MCC from the perspective of an emerging market.

1. Introduction

In the past, shopping has often been associated with either cash or credit card payment. As mobile phone technology becomes more sophisticated, new forms of payment have since emerged within the mobile payment theme. Generally, mobile payment (MP) refers to the "payments for goods, services, and bills with a mobile device such as mobile phone, smart-phone, or personal digital assistant by taking advantage of wireless and other communication technologies" (Dahlberg et al., 2008, p. 165). Regardless of the definition, MP is viewed as an alternative to the old-fashioned credit card. As mobile commerce continues to gain popularity, MP will eventually play an important role to facilitate transactions between consumers and merchants (Ondrus and Pigneur, 2007). The innovation within MP has grown rapidly over the last decade with the introduction of various payment methods such as Wireless Application Protocol, Unstructured Supplementary Service Data, short messaging services, and General Packet Radio Service. While each individual MP method provides flexibility and convenience, they are still not ideal when viewed from the traditional payment context (Chen et al., 2010). This is because the traditional MP solutions are not easy to use (Ondrus and Pigneur, 2007). Leavitt (2010), for example describes the tedious process in keying in credit card numbers on the limited physical keyboards. Lee (2004) opines that for an innovation to be regarded as truly mobile, the transactions should not only take place in the virtual world but with any mobile device in a physical world. Taking into consideration of the current limitations within the traditional MP solutions, this paper

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focuses specifically on mobile credit card (MCC) as another form of MP. MCC in this context is referred to as a contactless credit card payment using a mobile phone with the aid of the Near Field Communication (NFC) technology. In this case, physical connection between consumer payment and the terminal reader is not required since transactions can be conducted with a simple touch or wave.

Although the adoption of MCC brings convenience and benefits to consumers, the adoption rate is still far from massive utilization (Bank Negara Malaysia, 2010; The Star, 2012). Both the articles reported that MCC is not widely adopted among consumers and merchants in Malaysia although the technology has been in the market since 2010. It is interesting to note that with such a low adoption rate, very little study has been conducted in relation to MP solutions from the NFC's perspective. Most of the MP findings to date were constrained to the use of mobile telecommunications network and short range wireless technologies as a choice to transfer data. In addition, most of the studies were also confined to established markets (Ondrus and Pigneur, 2007; Teo et al., 2005) with limited perspectives from emerging markets such as Malaysia. Attentions given to MP, likewise were mainly focusing on specific themes. The viewpoints of consumers' attitudes have been sparsely explored although they have major implications on the adoption rate. Since consumers have unpredictable behaviors yet they play important roles in MP's success, there is an urgency to explore MCC's acceptance from the perspective of consumers' attitude.

This study adopts the Technology Acceptance Model (TAM) since it has the ability to predict different Information Technology (IT) utilization (Tan et al., 2012). As the model only takes into consideration two constructs, the overall prediction is not considered to be complete. Taking the cue, this study incorporates two additional psychological variables, namely personal innovativeness in information technology (PIIT) and social influence (SI). The variables were included since consumers' paying habits are grounded from the person's characteristics as well as environmental influences. In addition, two other constructs on finance-related risks – perceived risk (PR) and perceived financial cost (PFC) were added to the model as well. This is in view of the fact that PR is among the major obstacles mentioned in most of the technology adoption studies, while the decision to adopt a particular technology is often linked to the perception of financial cost in acquiring and utilizing it. The arguments found support from Mallat's (2007) study which concludes that PR and PFC are the two major barriers in adopting financial-related MP services. Further, since most of the research papers related to IT adoption focused solely on the technology itself and do not consider other social factors, the moderating effect of gender is also added to the model. Taken together, it is believed that the integrated model can help to explain MCC's acceptance from the theoretical perspective, in which practical contributions can be derived at based on the study's results.

The next section reviews the literature relevant to the variables of interest. As a result, a research framework and a series of testable hypotheses are developed. The methodology is then described, followed by an analysis and interpretation of the data collected. The implications are discussed and recommendations are provided before the paper is concluded with possible future research directions.

2. Theoretical background and research model

2.1. Overview of NFC-aided mobile credit card

NFC has been regarded as the future of MP services (Ondrus and Pigneur, 2007). Initially, the payment method was carried out for VISA and MasterCard Paypass program (Pasquet et al., 2008). Ruijun and Yao (2010) remarked that NFC can transfer data either in active or passive modes via a short range high frequency wireless communication technology. The operational distance under passive mode is 10 cm, while the inactive mode is 20 cm (Chen et al., 2010). Hence, the NFC technology enables transactions to be conducted merely by holding a mobile phone within the range of the NFC reader. The technology has since been adopted in USA, Canada, Hong Kong, Korea, Japan and Taiwan (Chen and Chang, 2011; Pope et al., 2011). In Malaysia, Malayan Banking Berhad (Maybank) is the only participating bank at the moment that provides such a payment convenience in collaboration with Maxis (the country's largest telecommunication services provider), VISA, and Nokia.

Table 1
Merchant list in Malaysia.

S/N	Category	Name
1	Hypermarket	Carrefour
2	Retailer	Parkson, AEON
3	Specialty store	Watson, Hush Puppies, Toy City, The Body Shop
4	Convenience store	7 Eleven
5	Petrol station	Caltex
6	Food and beverage	Nandos, O'Briens, A&W, Burger King, Dunkin Donuts, Steven's Tea Garden Café, Kaya Kopitiam, Golden Oven, Station 1 Café, Daily Fresh, Mercu UEM Café, Bank Negara Café, Baskin Robbins
7	Cinema	Cathay Cineplex
8	Others	Tolls nationwide, Rapid KL LRT stations, Rapid KL buses, KTM Komuter, Monorail, selected parking lots (32 in Kuala Lumpur)

Source: Maybank2u.com (Maybank Malaysia, 2012).