The mediating influence of trust in the adoption of the mobile wallet

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ABSTRACT

The technology of paying at the point-of-sale with a smartphone is available, but has not yet been accepted by consumers or retailers in North America. Retailers are reluctant to invest in the technology to upgrade their store equipment until there is a wider acceptance by the consumer. The research model in this study is based on the Technology Acceptance Model, which posits that consumers will accept the mobile wallet when they perceive usefulness. They discover features through informal learning and are concerned about trust. The model is extended with these constructs and empirically tested with a sample of Canadian consumers. The results, which show that perceived usefulness is a key influencing factor and that informal learning is mediated by trust, are of value to researchers and practitioners.

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1. Introduction

In 2012, Canadians charged over $300 billion of purchases to their credit cards (Canadian Bankers Association, 2014) with a fraud rate of just under 1%. In order to reduce the fraud rate further, the major credit card companies have formed EMVCo whose members are American Express, JCB, MasterCard and Visa (EMVCo, 2013). EMV specifications (EMV), also called 'chip and pin', are global and require secure, encrypted information to be stored in a chip embedded in the credit card. The chip is read at the point-of-sale (POS) when the customer enters their personal identification number (PIN) into an EMV enabled terminal (EMVCo, 2013; Lanc, 2007). As of the middle of 2012, there were over 1.55 billion EMV compliant chip-based payment cards in use worldwide with 21.6 million EMV terminals globally (EMVCo, 2013).

Less risky transactions of lower value can be processed more quickly without the entry of the PIN by simply allowing the consumer to wave their credit card near the processing terminal (MasterCard paypass, 2013; Visa payWave, 2013), when both card and terminal are enabled for Near Field Communications (NFC) (Cavoukian, 2012). This capability enables the waving of a physical card to be replaced by the waving of a smartphone, in which financial data is stored securely in a 'mobile wallet' that be can be used 'to initiate, authorize and confirm an exchange of financial value in return for goods and services' (Rajan, 2012, p. 2). The mobile wallet has been defined by Shin (2009) as a form of payment that enables users to conduct payment electronically via use of a mobile device, replacing the physical wallet so that payment transactions can be completed at a merchant's location. It not only stores payment data, but loyalty cards and coupons can also be

incorporated, allowing consumers to benefit, if they so choose, from POS discounts (Hoofnagle et al., 2012). Although Starbucks is one of the largest users of contactless payments, they do not use NFC, but instead use a scanner to read the screen of a smartphone, which displays the two dimensional bar code that uniquely identifies the pre-paid Starbucks card.

Mobile payments are growing in acceptance in various countries (Flood et al., 2013). In Canada, Latin America and the Caribbean, 31% of the cards and 76% of the terminals are NFC enabled (King, 2012). Each country offers its own versions of a mobile wallet due to the need to link the offerings from mobile service providers and financial institutions that operate within the regulations of that country. For illustration, Google Wallet is a partnership with Sprint and Citi MasterCard (Ross, 2012) and Isis Mobile Wallet is a partnership between the US wireless companies, Verizon, T-Mobile and AT&T (Ross, 2012). Neither of these mobile wallets is available in Canada, where, instead, major financial institutions have teamed up with mobile service providers to offer competing versions of an NFC enabled wallet. For example, CIBC (a major Canadian bank) has teamed up with Rogers and Telus (two of Canada's major voice and data telecommunications service providers); and Royal Bank of Canada (RBC) has joined with Bell Canada (the third major provider of network services in Canada) (cbcnews: Business, 2014; mobilesyrup, 2014).

There are 74 million Visa and MasterCard cards in circulation in Canada (Canadian Bankers Association, 2012) and, with a population of approximately 35 million, it can be concluded that, together with debit cards, consumers have more than one payment card in their wallet. The adoption of the mobile wallet would obviate the need to carry so many cards and would enable other valued offerings, such as location-based services to be delivered near the POS (Hoofnagle et al., 2012).

In the summer of 2013, there were 800,000 point-of-sale (POS) terminals in Canada of which 250,000 were NFC enabled (Mobile Payments Today, 2013), but consumer adoption of contactless payments using their physically enabled 'chip and pin' credit card has been slow, with the volume and value of such contactless credit card transactions being only 2.4% and 2.7% respectively (Arango et al., 2012). If consumers have been slow to accept the contactless plastic cards, will they be just as hesitant to accept the mobile wallet? To complete the transaction, the mobile payment has to flow through the 'ecosystem' of retailer, payment network, smartphone provider, software application ('app') and financial institution (Hoofnagle et al., 2012). Further investments are required by these organizations, but the investment decisions depend upon consumers' willingness to use their smartphones to make payments.

The objective of our research is to guide those organizations that are part of the ecosystem to determine their strategy with respect to investments that will expand the use of the mobile wallet. The research question addressed in this paper is 'what are the factors that influence consumers to adopt the mobile wallet'. We start with the Technology Acceptance Model (TAM) (Davis, 1989), which posits that Perceived Ease of Use (PEOU) and Perceived Usefulness (PU) are the primary factors that influence intention to use. We evaluate a number of past studies of TAM and develop a research model, which includes the constructs of trust, informal learning and mobile wallet self-efficacy. The model is empirically tested with a sample of students from a Canadian business school.

This paper is organized as follows. The next section is a literature review that leads to the research model. The third section is the research methods where the constructs are defined and the scales introduced. The fourth section is the analysis of the results. We discuss the results in the fifth section, where we include limitations and suggestions for future research. We present our conclusions in the final section.

2. Literature review

In order to use the smartphone for payment, the consumer must first learn that such a capability exists, and then be willing to accept the technology and trust the parties that the financial transaction will be completed securely and accurately. In this section, we show the derivation of our hypotheses based on constructs from the theories of technology acceptance, trust and informal learning.

2.1. Technology acceptance

Intentions to use the mobile wallet can be explained by the Technology Acceptance Model, TAM, (Davis, 1989). An advantage of TAM is that it is parsimonious with two independent variables that predict intention to use: perceived usefulness (PU) and perceived ease of use (PEOU). It has been the subject of many studies and has been extended to evaluate antecedents of PU and PEOU (Legris et al., 2003). TAM has been applied to online banking (Lai et al., 2010; Manochehri and Sundarraj, 2011; Sundarraj and Wu, 2006), Internet shopping (Gefen et al., 2003a) and mobile commerce (Lopez-Nicols et al., 2008; Wu and Wang, 2005).

Our study is on the external benefits that the mobile wallet will provide to the consumer. Meta-analyses of the TAM literature have confirmed the statistical significance of the influence of PU on intention to use (King and He, 2006; Legris et al., 2003; Turner et al., 2010) and we therefore propose the following hypothesis:

Hypothesis 1. Perceived usefulness positively influences intention to use a mobile wallet.

Given that the action of waving a smartphone at an NFC enabled terminal is a simple action and similar to that of waving a credit card, there should be no difficulty in the consumer learning this action and although we expect PU to have a greater effect than PEOU, we still expect that PEOU will influence intention to use. Therefore, our second hypothesis is

Hypothesis 2. Perceived ease of use positively influences intention to use a mobile wallet.

Further studies of TAM have extended the model in order to investigate antecedents of PU and PEOU (Benbasat and Barki, 2007; Legris et al., 2003). Igbaria and Iivari (1995) added the construct of computer self-efficacy and determined that individuals with high self-efficacy perceived that they gained greater benefits from use of the IT artefact. Similarly, users with high mobile self-efficacy reported more perceived usefulness from their smartphones and tablets (Duane et al., 2012; Keith et al., 2011). We have further refined the construct of self-efficacy by introducing mobile wallet self-efficacy, which is the individual's belief that they will have the skills and ability to use the mobile wallet. This results in our next hypotheses:

Hypothesis 3. Mobile wallet self-efficacy positively influences PU.

Hypothesis 4. Mobile wallet self-efficacy positively influences PEOU.

2.2. The role of trust

Even when the technological and support structure are in place for electronic transactions, consumers are still concerned about trust (Agarwal et al., 2009). When dealing with payments, consumers expect that money will be exchanged for a product or service in a dependable manner (Gefen et al., 2003b). They must trust that the transaction will be completed according to expectations and that any data shared will not be shared with inappropriate parties (Chellappa and Pavlou, 2002). Consumers are concerned about the safety of their data when conducting commerce via the Internet (Kim et al., 2009; Toufaily et al., 2013) and they have similar concerns when conducting mobile payments (Zhou, 2011).

When using a mobile wallet, the payment transaction is transferred from consumer to retailer via several parties that comprise the ecosystem: the retailer, the cell phone manufacturer, the mobile network provider, the software developer of the mobile wallet app and the financial institution (Amoroso and Magnier-Watanabe, 2012; Grabner-Kräuter and Kaluscha, 2003; Hoofnagle et al., 2012). In an online marketplace, transactions take place when there is belief in the reliability and honesty of the parties, some of whom may be unknown to the consumer (Ganguly et al., 2010; Pavlou and Gefen, 2004). Gefen et al. (2003b) showed that trust influenced consumers in their online shopping habits. In a qualitative study of attitudes towards mobile payments, Dahlberg et al. (2003) found that trust was a concern and they recommended that future researchers add the concept to TAM. We follow these recommendations and add trust to our model:

Hypothesis 5. Trust positively influences intention to use a mobile wallet.

2.3. Informal learning

When a new innovation becomes available, consumers need to be made aware. For online applications, word of mouth (WOM) is a major source of information (Ulmanen, 2011). This is a form of informal learning, where there is no structure, and learning takes place through interaction with others (Marsick and Watkins, 2001). Owners of smartphones are able to find out about new apps through informal learning, which can be decomposed into